NATIONAL HEALTH MISSION
राष्ट्रीय स्वास्थ्य मिशन

Ministry of Health & Family Welfare
Government of India

COMPREHENSIVE EMERGENCY OBSTETRIC AND NEWBORN CARE CURRICULUM 2024

Part - I

Comprehensive Emergency Obstetric and Newborn Care (CEmONC)

Revised Curriculum 2024

आराधना पटनायक, भा.प्र.से.
अपर सचिव एवं मिशन निदेशक (रा.स्वा.मि.)
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आज़ादी का अमृत महोत्सव

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Government of India
Ministry of Health and Family Welfare
Nirman Bhawan, New Delhi-110011

Message

The National Health Mission (NHM) is dedicated to reducing maternal and infant mortality and morbidity, aligning with national and international targets. The decline in Maternal Mortality Ratio (MMR) is a result of the quality of services and the availability of Basic and Comprehensive Emergency Obstetric Care (EmOC) at healthcare facilities, particularly at First Referral Units (FRUs) and secondary-level care facilities. To achieve these crucial goals, NHM has fortified all Community Health Centers (CHCs) and FRUs to handle emergency obstetric care services, including referrals.

Enhancing service delivery necessitates the re-orientation of medical officers to manage emergency obstetric and newborn services efficiently. The Comprehensive Emergency Obstetric & Newborn Care (CEmONC) and Life-Saving Anesthetic Skills (LSAS) programs play a pivotal role in equipping medical officers with the necessary skills to handle obstetric emergencies and bolstering FRUs' capacity. Many states have leveraged this provision to establish FRUs and significantly improve maternal health outcomes through comprehensive obstetric care. Initiatives like Surakshit Matritava Aashwasan (SUMAN), Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA), Laqshya, and the Midwifery Initiative also contribute to providing quality maternal and newborn services, necessitating a skilled workforce and adequate infrastructure.

The CEmONC curriculum, a powerful tool in our mission, has been revised based on extensive consultations with field experts. The updated curriculum, rooted in the latest evidence-based protocols, is expected to enhance training quality, ensuring more trained doctors are available to operationalise FRUs and expand SUMAN CEmONC facilities across states. As mission directors, state and district program officers, and training institutes, I would urge you to effectively use the updated curriculum to improve obstetric and newborn services.

I have complete confidence in the ability of Mission Directors, state and district program officers, and training institutes to utilise the updated curriculum effectively, which will not only operationalise FRUs but also significantly enhance the quality of obstetric and newborn services, thereby contributing to the overall improvement of maternal and newborn healthcare services.

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Message

Over the past decade, significant advancements have been made in expanding access to essential maternal and newborn healthcare services nationwide. Initiatives such as the Janani Suraksha Yojana (JSY), Janani Shishu Suraksha Karyakram, Pradhan Mantri Surakshit Matritva Abhiyan, LaQshya Program, and the Midwifery Initiative have played a pivotal role in increasing institutional deliveries and improving outcomes for mothers and newborns.

However, disparities persist, particularly in rural and remote areas, where healthcare infrastructure and trained workforce remain inadequate. To address this, short-term training for MBBS doctors began in 2009 to create a pool of health professionals equipped to provide quality maternal and newborn health services. The Emergency Obstetric Care Services Training (EmOC) have focused on operationalising FRUs, providing timely emergency obstetric management, and performing C-sections to ensure timely medical intervention.

Evaluations highlighted the crucial need to revise the curriculum, incorporating the latest evidence-based practices and aligning it with current medical practices for managing obstetric services. The training's name was changed to CEmONC, underscoring the importance of the newborn component. The curriculum's duration was extended from 16 to 24 weeks to ensure comprehensive learnings. The revised curriculum, focusing on skill and practice through video mannequins and case studies, aims to enhance doctors' practical experience at FRUs. These innovative methods, embedded in the CEmONC curriculum, are a significant step towards reducing specialist shortages in rural areas.

I sincerely hope that the states and the training institutes, in collaboration with medical professionals will find the revised curriculum instrumental in ensuring deliverance of quality, comprehensive emergency obstetric and newborn care services.

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ACKNOWLEDGEMENT

The Comprehensive Emergency Obstetric and Newborn Care (CEmONC) marks a significant milestone in our ongoing efforts to strengthen maternal and newborn healthcare in India. This framework reflects the Government of India's unwavering commitment to ensuring the well-being of mothers and infants across the nation with especial focus on hard-to-reach areas.

Ensuring accessible emergency obstetric care within the community is vital for reducing maternal and neonatal morbidity and mortality. States/UTs have been supported under National Health Mission (NHM) to create First Referral Units (FRUs) equipped with the necessary infrastructure, equipment, and blood bank/storage units. However, due to the shortage of specialists in peripheral public healthcare facilities, placing skilled doctors at FRUs to conduct C-sections and manage complications has been challenging. It has become imperative to enhance the capacity of MBBS doctors to manage emergency obstetric cases and maintain quality in service delivery.

The Government of India has initiated EmOC training program in 2009 with the aim to operationalize emergency obstetric care services at FRUs. The curriculum has now been revised to include a newborn component, making it the Comprehensive Emergency Obstetric and Newborn Care (CEmONC) curriculum. I extend our sincere gratitude to all those who contributed their expertise, guidance, and unwavering support throughout this transformative process.

I also extend my heartfelt gratitude to Shri Apurva Chandra, Secretary (H&FW), Ms. Aradhana Patnaik, AS&MD (NHM), and Ms. Meera Srivastava, JS (RCH), for their steadfast guidance and administrative support in developing the CEmONC curriculum.

Special thanks to the technical resource group members from esteemed medical colleges across India: Dr. Vinita Das (Ex-HoD Obs & Gynae, KGMU Lucknow), Dr. Amita Pandey, Dr. Anjoo Aggarwal (KGMU), Dr. Poonam Shiv Kumar (MGIMS Wardha), Dr. Vidushi (AIIMS New Delhi), and Dr. Manju Puri (LHMC) for their meticulous work in

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incorporating the latest technical updates and framing the curriculum with a proper blend of knowledge and skills.

The contributions of NHSRC, particularly Major General (Prof) Dr. Atul Kotwal, Executive Director, Dr. K. Madan Gopal, Advisor Public Health Administration (PHA) Division, Dr. Himanshu Bhushan (former Advisor PHA), and the PHA team, especially Dr. Kalpana, Dr. Palak, Ms. Diksha, Ms. Aashu, and Ms. Neelam, were pivotal in drafting the CEmONC Curriculum. I would also acknowledge the support provided by the various partners like IHAT, IPE Global, Jhpiego, UNFPA, UNICEF, and WHO for their insightful consultations which have significantly enriched the content of the Curriculum.

The unwavering contributions of my esteemed colleagues, Dr. Anupama Prasad (Deputy Commissioner MH), Dr. Santosh Ojha, Dr. Bhumika Talwar, Mr. Vivek Singhal, Dr. Tushar Purohit, Dr. Priyanka Sharma, Dr. Himangini Wadhawan, Dr. Jagdish Chhimpa, and Mr. Brahm Kumar Sharma, have been instrumental in drafting and finalizing the curriculum.

I am confident that the revised CEmONC curriculum will serve as a valuable resource for States/UTs, improving the quality of CEmONC training and facilitating the operationalization of First Referral Units (FRUs). Through these collective efforts, we are poised to enhance the delivery of Obstetric and Newborn Care services across the nation.

(Dr Pawan Kumar)

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MESSAGE

India has not only reached but surpassed the National Health Policy (NHP) goal, achieving a maternal mortality ratio (MMR) of less than 100 per lakh live births. This significant milestone is a testament to our collective efforts towards preventing the preventable maternal deaths, and provides continued motivation for further progress. As we persevere ahead on our journey towards the Sustainable Development Goal (SDG) target of an MMR of less than 70 per lakh live births by 2030, we are optimistic about the future of maternal health in India. However, we acknowledge that maternal mortality and morbidity levels still vary widely between states and within regions, primarily due to differences in access to high-quality Comprehensive Emergency Obstetric and Newborn Care (CEmONC) and a shortage of trained medical professionals at referral facilities.

The 10th Five-Year Plan's expert group, in response to the scarcity of trained doctors, recommended a task-shifting strategy. This innovative approach involved developing training modules in emergency obstetric care (16-week program) and lifesaving anaesthetic skills (18-week program) for MBBS doctors in 2003. The strategy was piloted in two states from 2004-2006, and its implications were undeniable- It operationalised FRUs and saved lives, particularly in remote areas. This paved the way for nationwide implementation in 2009, bringing FRUs to life across many states and further reinforcing our belief in the effectiveness of this strategy.

The curriculum underwent significant revisions following expert consultations to incorporate the latest technical evidence and strategies to enhance CEmONC services. These revisions included extending the training duration to 24 weeks, strengthening FRUs, rationalising CEmONC/ LSAS-trained doctors' postings, improving workforce management, introducing financial and non-financial incentives, and robust indemnity and medico-legal cover. The Ministry's release of operational guidelines in 2020 further enhanced the capabilities of MBBS doctors with the latest practices and protocols, reflecting a commitment to continuous improvement and ensuring that the training remains up-to-date.

Effective coordination, planning, and decision-making involving all stakeholders are crucial to achieving these goals. I am confident that the new curriculum will significantly improve emergency obstetric care services and help reach the SDG target ahead of time.

I thank everyone who contributed to framing the training curriculum for lending their expertise and dedication.

Maj Gen (Prof) Atul Kotwal

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3TC	Lamivudine commonly called 3TC
ABC	Airway, Breathing and Circulation.
ABCDE	Airway, Breathing, Circulation, Disability, and Exposure.
ABO	Blood Grouping System
ACLS	Advanced Cardiovascular Life Support
ACS	Acute Coronary Syndrome
ACT	Artemisinin Combination Therapy
ACT	Activated Clotting Time
ACT-SP	Artemisinin Combination Therapy- Sulfadoxine + Pyrimethamine
AIDS	Acquired Immuno-Deficiency Syndrome
ALL	Acute Lymphocytic Leukaemia
ALS	Amyotrophic Lateral Sclerosis
AMTSL	Active Management of Third Stage Labour
ANC	Anti Natal Check-Up/Care
ANM	Auxiliary Nurse Midwife
AP	Anteroposterior
APH	Antepartum Hemorrhage
APTT	Activated Partial Thromboplastin Time
ARDS	Acute Respiratory Distress Syndrome
ARM	Artificial Rupture of Membrane
ARSH	Adolescent Reproductive and Sexual Health
ART	Anti-Retroviral Therapy
ARV	Anti-Retroviral
ASHA	Accredited Social Health Activist
AST	Aspartate Aminotransferase OR After Sensitivity Testing
AVPU	Alert, Verbal, Pain, Unresponsive
AWW	Aanganwadi Worker
AYUSH	Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy
BCC	Behaviour change Communication
BCG	Bacilli Calmette-Guerin
BCLS	Basic Cardiac Life Support

BEAU-	CHOPS mnemonic developed by the AHA specific to causes of cardiac arrest in pregnant women. B = Bleeding/DIC, E = Emboli: coronary, pulmonary, amniotic fluid A=Anesthetic Complications (aspiration, local anesthetic toxicity), U=Uterine Atony, C=Cardiac Disease i.e., cardiomyopathy. aortic dissection, H=Hypertensive disease i.e., preeclampsia-eclampsia, O=Other-think about the Hs and Ts, P=Placental abruption, previa, S=Sepsis
BEmONC	Basic Emergency Obstetric and Neonatal Care
BLS	Basic Life Support,
BMI	Body Mass Index
BMV	Bag and Mask Ventilation
BMW	Biomedical Waste
BMWM	Biomedical Waste Management
BP	Blood Pressure
BP	Blood Pressure
BPL	Below Poverty Line
BT	Bleeding Time OR Blood Transfusion
BT-CT	Bleeding Time Coagulation Time
BUN	Blood Urea Nitrogen
CAB	Compressions-Airway-Breathing
CAC	Comprehensive Abortion Care
CBC	Complete Blood Count
CBMWTF	Common Bio-Medical Waste Treatment Facility
CCT	Controlled Cord Traction
CDC	Centre of Disease control
CEmONC	Comprehensive Emergency Obstetric and Newborn Care
CHC	Community Health Centre
CHF	Congestive Heart Failure
CME	Continuing Medical Education
CNS	Central nervous system
COVID	Corona Virus Disease
CPD	Cephalo-Pelvic Disproportion
CPR	Cardiopulmonary Resuscitation
CPT	Co-Trimoxazole Prophylactic Therapy
CRL	Crown-Rump Length

CRT	Capillary Refill Time
	C-Section Cesarean section
CSSD	Central Sterile Supply Department
CT	Computed Tomography / Coagulation Time
CTIs	Central Training Institutes
CU-T	Copper T
DBT	Direct Bank Transfer
DCGI	Drugs Controller General of India
DFMC	Daily Fetal Movement Count
DH	District Hospital
DIC	Disseminated Intravascular Coagulation
DIPSI	Diabetes in Pregnancy Study Group of India
DNA	Deoxyribonucleic Acid
DNB	Diplomat of National Board
DoB	Date of Birth
DP	Diastolic (Blood) Pressure
DWH	District Women Hospitals
EBF	Exclusive Breastfeeding
ECG	Electrocardiogram / Electrocardiography
ECV	External Cephalic Version
EDD	Expected Date of Delivery
EDTA	Ethylenediamine Tetraacetic Acid
EFV	Efavirenz
EID	Early Infant Diagnosis
ELISA	Enzyme-Linked Immuno-Assay
EmOC	Emergency Obstetric Care
EMT	Emergency Medical Trained
ENBC	Essential Newborn Care
EtO	Ethylene Oxide
ETP	Effluent Treatment Plant
EVA	Electric Vacuum Abortion
FBMDR	Facility Based Maternal Death Review
FBMNM-R	Facility based Maternal Near Miss Review
FDP	Fibrin Degradation Products

FFP	Fresh Frozen Plasma
FGR	Fetal Growth Restriction
FHR	Fetal Heart Rate
FHS	Fetal Heart Sound
F-IMNCI	Facility based Integrated Management of Neonatal and Childhood Illness
FOGSI	Federation of Obstetric & Gynaecological Societies of India
FP	Family planning
FRU	First Referral Unit
GA	General Anesthesia
GCS	Glasgow Coma Scale
GDM	Gestational Diabetes Mellitus
GI	Gastrointestinal
gm	Grams
GOI	Government of India
H/o	History Of
H2O2	Hydrogen Per Oxide
HB	Haemoglobin
HBNC	Home Based New-born Care
HBV	Hepatitis B Virus
HBYC	Home Based Care for Young Child
HC	Head Circumference
HCAI	Healthcare Associated Infection
HCG	Human Chorionic Gonadotropin
HCL	Hydrogen Chloride
HDU	High Dependency Unit
HEI	HIV-Exposed Infants
HELLP H =	Hemolysis, EL = Elevated Liver Enzymes, and LP = Low Platelet Count
HOD	Head of Department
HIV	Human Immunodeficiency Virus
HLD	High Level Disinfectant
HPS	High Performing States
HPV	Human Papilloma Virus
HR	Human Resource
hrs	Hours

HS	Hora Somni i.e., at bedtime
ICMR	Indian Councill of Medical Research
ICTC	Integrated Counselling Testing Centre
ICU	Intensive Care Unit
IDA	Iron Deficiency Anemia
IFA	Iron Folic Acid
IGT	Impaired Glucose Tolerance
IM	Intra Muscular
IMEP	Infection Management and Environment Plan
IMR	Infant Mortality Rate
Inj.	Injection
INR	International Normalized Ratio
IP	Indian Pharmacopeia OR Infection Prevention
IU	International Unit
IUCD	Intra Uterine Contraceptive Device
IUD	Intrauterine Device / Intrauterine Death
IUGR	Intrauterine Growth Restriction
IV	Intravenous
IVF	In vitro Fertilization
JIPMER	Jawaharlal Institute of Postgraduate Medical Education & Research
JSSK	Janani Shishu Suraksha Karyakram
JSY	Janani Suraksha Yojana
JVP	Jugular Venous Pressure
KFT	Kidney Function Tests
kg/cm	Kilogram/Centimeter
KGMU	King George's Medical University
KMC	Kangaroo Mother Care
LAM	Lactational Amenorrhea Method
LaQshya	Labour Room Quality Improvement Initiative
LARC	Long-Acting Reversible Contraceptive
LB	Live Births
LBW	Low Birth Weight
LDH	Lactate Dehydrogenase
LDR	Labour Delivery and Recovery Room

LFT	Liver Function Test
LHV	Lady Health Visitor
LLIN	Long Lasting Insecticide Nets
LMP	Last Menstrual Period
LOA	Left Occipito-Anterior
LOT	Left Occipito-Transferse
LPS	Low Performing States
LR	Labour Room
LSAS	Life Saving Anaesthesia Skills
LSCS	Lower Segment Caesarean Section
MAP	Mean Arterial Pressure
MBBS	Bachelor of Medicine and Bachelor of Surgery
MC	Medical College
MC	Menstrual Cycle
MCI	Medical Council of India
MCP	Mother and Child Protection
MCTS	Mother and Child Tracking System
MCV	Mean corpuscular volume
MCV-RBC	Mean Corpuscular Volume-Red Blood Cell
MD	Doctor of Medicine.
MD	Maternal Death
MDG	Millennium Development Goal
MDSR	Maternal Death Surveillance and Response
MEC	Medical Eligibility Criteria
MGIMS	Mahatma Gandhi Institute of Medical Sciences
ml	Millliliter
MMA	Medical Methods of Abortion
MMR	Maternal Mortality Ratio
MNM	Maternal Near Miss
MNM-R	Maternal Near Miss review
MNT	Medical Nutrition Therapy
MO	Medical Officer
MoHFW	Ministry of Health and Family Welfare
MoU	Memorandum of Understanding\

MP	Madhya Pradesh
MPA	Medroxy Progesterone Acetate
MRI	Magnetic Resonance Imaging
MRP	Manual Removal of Placenta
MSAF	Meconium-Stained Amniotic Fluid
MTP	Medical Termination of Pregnancy OR Massive Transfusion Protocol
MVA	Manual Vacuum Aspiration
NACO	National AIDS Control Organisation
NCD	Non-Communicable Disease
NFHS	National Family Health Survey
NHM	National Health Mission
NHSRC	National Health System Resource Centre
NICU	Neonatal Intensive Care Unit
NNM	Neonatal Mortality
NNMB	National Nutrition Monitoring Bureau
NNRTI	Non-Nucleoside Reverse Transcriptase Inhibitors
NRHM	National Rural Health Mission
NS	Normal Saline
NST	Nonstress Test
NTG	Nitroglycerin
NVBDCP	National Vector Borne Disease Control Programme
NVP	National Vaccine Program or N-vinyl pyrrolidone
O2	Oxygen
OBD	Outbound Dialing
OBGY	Obstetrics & Gynaecology
OD	Once a Day
OGTT	Oral Glucose Tolerance Test
OH	Overt Hypothyroidism
OIs	Opportunistic Infections
OPA	Orthophthaldehyde
OPD	Outpatient Department.
OPV	Oral Polio Vaccine
ORS	Online Registration System
OSCE	Objective Structured Clinical Examination
OT	Operation Theatre

OTP	One Time Password
PAIUCD	Post Abortion Intra Uterine Contraceptive Device
PAS	Post abortion sterilization
PC&PNDT	Pre-Conception and Pre-Natal Diagnostic Techniques
PCR	Polymerase Chain Reaction
PCV	Packed Cell Volume
PET	Pre-Eclampsia Toxemia
PGE1	Prostaglandin E
PGF2	Prostaglandin F
PGF2	Prostaglandin F2-alpha
PHC	Primary Health Centre
PID	Pelvic Inflammatory Disease
PIP	Program Implementation Plans
PMMVY	Pradhan Mantri Matru Vandana Yojana
PMSMA	Pradhan Mantri Surakshit Matritva Abhiyan
PNC	Post-Natal Care
PNM	Perinatal Mortality
PO	Post-Operative
POC	Post-Operative Care OR Products of Conception
PPE	Personal Protective Equipment
PPH	Postpartum Haemorrhage
PPIUCD	Postpartum Intra Uterine Contraceptive Device
PPPG	Postprandial Plasma Glucose
PPROM	Preterm Premature Rupture of The Membranes
PPS	Post-partum Sterilization
PPTCT	Prevention of Parent to Child Transmission
PPV	Positive Pressure Ventilation
PR	Pulse Rate
PRBC	Packed Red Blood Cell
PROM	Premature Rupture of Membranes
PT	Prothrombin Time
PUQE	Pregnancy-Unique Quantification of Emesis and Nausea
PV	Per-Vaginal/ Per-Vaginam
PW	Pregnant Women
QID	"quater in die" i.e., four times a day

RA	Rheumatoid Arthritis
RBCs	Red blood cells
RCH	Reproductive and Child Health
RDA	Recommended Dietary Allowances
RDK	Rapid Diagnostic Kit.
RDT	Rapid Diagnostic Test
RGI	Registrar General of India
Rh	Rhesus (Rh) Factor
RHD	Rheumatic Heart Disease
RIA	Rapid Initial Assessment
RL	Ringer Lactate
RMC	Respectful Maternity Care
RMNCH	Reproductive, Maternal, New-Born and Child Health
RPOC	Retained Products of Conception
RPR	Rapid Plasma Reagin
RR	Respiratory Rate
RTI	Reproductive Tract Infection
SBA	Skilled Birth Attendant
SCH	Sub-Clinical Hypothyroidism
SDG	Sustainable Development Goals
SDH	Sub District Hospitals
SFH	Symphysis Fundal Height
SGOT	Serum Glutamic Oxaloacetic Transaminase
SGPT	Serum Glutamic-Pyruvic Transaminase
SIHFW	State Institute of Health and Family Welfare
SLE	Systemic Lupus Erythematosus
SMOR	Severe Maternal Outcome Ratio
SMS	Short Message Service
SN	Staff Nurse
SNCU	Sick Newborn Care Unit
SOP	Standard Operating Procedure
SP	Systolic (Blood) Pressure
SPO2	Partial Pressure of Oxygen
SRS	Sample Registration Survey
SSI	Surgical Site Infection

STH	Soil Transmitted Helminths
STI	Sexually Transmitted Infection
SUMAN	Surakshit Matritva Aashwasan
TB	Tuberculosis
TBA	Traditional Birth Attendants
TDF	Tenofovir Disoproxil Fumarate
TFT	Thyroid Function Test
TOT	Training of Trainers
TRALI	Transfusion-Related Acute Lung Injury
TSH	Thyroid Stimulating Hormone.
TSSU	Theatre Sterile Supply Unit
TT	Tetanus Toxoid
TVS	Transvaginal Sonography
U	Unit
UBT	Uterine Balloon Tamponade
UHID	Unique Health Identification
UIP	Universal Immunization Programme
UK	United Kingdom
UNFPA	United Nations Population Fund
UNICEF	United Nations International Children's Emergency Fund
UP	Uttar Pradesh
UPT	Urine Pregnancy Test
USA	United States of America
USG	Ultrasonography
UT	Union Territory
UTI	Urinary Tract Infection
UWP	Universal Work Precautions
VDRL	Venereal Disease Research Laboratory Test
VHND	Village Health and Nutrition Day
VPD	Vaccine Preventable Diseases
w/v	Weight/Volume
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization

CHAPTER 1

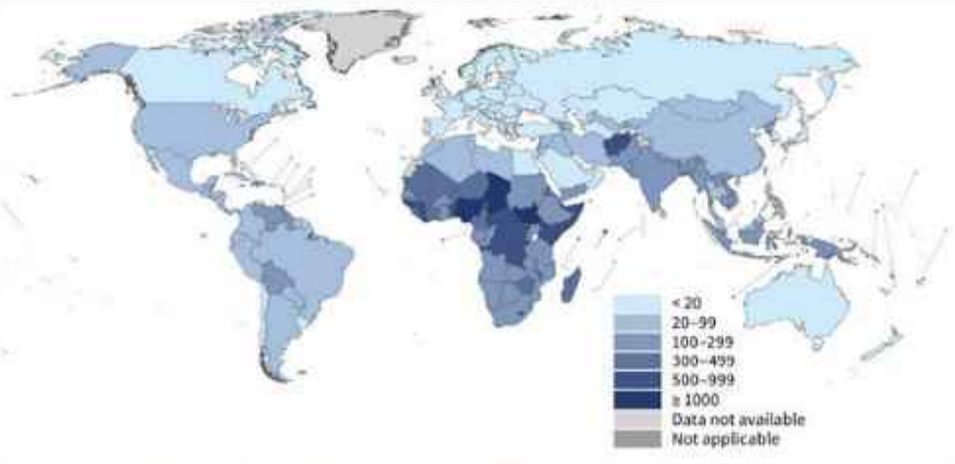
MATERNAL MORTALITY - AN OVERVIEW

Pregnancy related morbidity and mortality continues to have huge impact on the lives of women and their newborns. Maternal Mortality Ratio (MMR) is one of the key indicators for assessing maternal health situation in the country.

The target 3.1 of Sustainable Development Goals (SDG) set by the United Nations aims to reduce the global maternal mortality ratio to less than 70 per 1,00,000 live births. GOI has made significant progress in reducing the maternal mortality ratio (MMR) from 556 per lakh in 1990 to 97 per lakh live births in 2018-20 (a decline of 83% compared to the global decline of 45%). India is currently on track to achieve the Sustainable Development Goal 3 (SDG 3) target of an MMR below 70 by 2030. Similarly, Infant Mortality Rate (IMR) has declined from 89/1000 live births in 1990 to 28/1000 live births in 2018-20 (a decline of 69% compared to the global decline of 55%).

IMPORTANT FACTS

- India has 136 crores population (Projected population 2021 as per RGI Report), 292 lakh pregnancies and 268 lakh deliveries per annum.
- Annually estimated 30 lakh abortions, 30,000 maternal deaths, 6 lakhs newborn deaths and 6 lakhs still births.
- 15-20% low-birth weight babies are born annually.
- Average out-of-pocket expenditure on childbirth is more than Rs 2916.
- Care around birth (first 24 hours) has potential to reduce risks of maternal mortality and severe morbidity due to labour related complications by 95% and asphyxia related New-born deaths by 40%.
- The global commitment to achieve SDG 3 is to reduce MMR to <70 per 100,000 live births by 2030.
- Timely access to basic and comprehensive emergency obstetric care is a key strategy for early identification & management of complication during pregnancy and childbirth.
- In service training for capacity building of MBBS Doctors for providing CEmONC services has proven to be a good initiative in saving life.



Maternal mortality ratio (MMR) estimates, by country, 2020

(Source: Trends in maternal mortality 2000 to 2020: estimates by WHO, UNICEF, UNFPA, World Bank Group and UNDESA/Population, February 2023).

To understand the burden of MMR in India, it is pertinent to mention that MMR in developed countries like Australia, Germany and Sweden is less than 5. Even in neighboring countries like Thailand and Sri Lanka, MMR is 29 respectively.

Developed Countries	Neighboring countries	India & variations in states (SRS 2018-20)
Denmark - 5	China - 23	India - 97
Germany - 4	Malaysia - 21	Kerala - 19
Australia- 3	Maldives - 57	Maharashtra - 33
Sweden - 5	Sri Lanka - 29	Telangana - 43
Italy- 5	Thailand - 29	UP - 167
UK- 10	Indonesia - 173	Assam - 195

Quantum of maternal mortality and morbidity varies greatly from one state to another and even within the state, from one region to another. This is largely due to variations in access to Comprehensive emergency obstetric and newborn care (CEmONC). After achieving MDGs, the country has a global commitment to achieve SDGs, which is to reduce its MMR to less than 70 per 100000 live births by 2030. Very recently, India has achieved the NHP 2017 target (To achieve MMR of 100 by 2020) however there is a huge variation in the MMR across states.

Kerala (19), Maharashtra (33), Telangana (43), Andhra Pradesh (45), Tamil Nadu (54), Jharkhand (56), Gujarat (57) and Karnataka (69) have already achieved SDG targets however, states like Bihar, MP, Rajasthan, UP and Assam are far behind and account for nearly 65-75% of total estimated maternal deaths in the country. These are the states where accessing and operationalizing CEmONC services still remains a challenge largely because of non-availability of critical human resources and lack of skill and practice amongst the existing doctors present at PHC/CHCs. So despite availability of adequate infrastructure, availability of essential drugs and diagnostics, and network of ambulances etc. these high focus states have not yet been able to operationalize the designated First referral units.

Maternal Death is defined as death of a woman while pregnant or within 42 days of termination of pregnancy. It is irrespective of the duration and the site of the pregnancy. from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Maternal Death is measured as Maternal Mortality Ratio (MMR) i.e. ratio of maternal deaths during a given time period per 1, 00,000 live births in the same time period. The MMR is used as a measure of quality of a functional health care system.

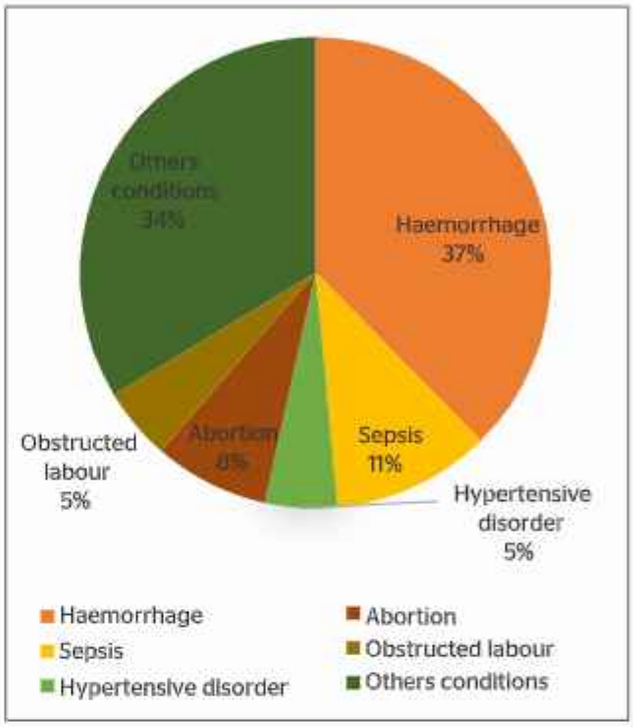
Causes:

1. Direct Causes - Maternal deaths resulting from obstetric complications of the pregnancy state (pregnancy, labor and the puerperium), interventions, omissions, incorrect treatment or a chain of events resulting from any of the above. These causes include hemorrhage, unsafe abortion, infection, obstructed labor, eclampsia etc.

2. Indirect Causes - Maternal deaths resulting from previous existing diseases or diseases that developed during pregnancy, which got aggravated by physiologic effects of pregnancy but were not due to direct obstetric causes. Examples of indirect causes are: medical conditions such as Anemia, Heart disease, Asthma, Infectious diseases such as HIV/Malaria etc.

3. Social Determinants- Besides the medical (direct and indirect) causes of maternal mortality, there are a number of social contributing factors or causes. The examination of these factors provides insights into the preventability of each maternal death and potential solutions to avoid the same. These include:

   - Low socio-economic status of women.
   - Gender Inequality- Lack of say in the family.
   - Illiteracy- poor health seeking behavior, poor knowledge, prejudices.
   - Early age of marriage, teenage pregnancy.
   - Poor access to family planning and safe abortion services.
   - Poor access to quality antenatal services.
   - Inadequacy of skilled attendants at delivery.
   - Difficulties in obtaining transport/lack of assured referral.
   - Failure to receive appropriate emergency care on time.



Cause of Maternal death (Source: RGI-SRS 2001-03)

Other factors affecting Maternal death or MMR

Delay in decision making by individual/ family (delay 1), delay in reaching the designated health facility (delay 2), delay in receiving appropriate treatment even after reaching the health facility (delay 3) are the factors which further worsen the condition of a woman who is suffering from complications during pregnancy and child birth.

Delay 1

- Failure to recognize danger signs
- Reluctance of the family to seek care because of cultural constraints
- Lack of empowerment
- Lack of encouragement from relatives and community to seek care.
- No one to take care of children and home.
- No one to accompany to hospital.

- Lack of awareness about entitlement/ govt. schemes.

Delay 2

- Long distances to hospitals.
- Difficult terrain/roads.
- Unavailable or expensive transport.
- Lack of knowledge about appropriate health facilities.
- Lack of assured referral services.

Delay 3

- Lack of Comprehensive EmOC.
- Lack of Competency of health care providers.
- Lack of Availability of skilled HR particularly specialists.
- Lack of adequate Supplies (medicines, equipment, blood, investigation etc.).
- Lack of availability of beds (booked/un-booked cases).
- Lack of qualtiy care & adherence to SOPs (triaging, assessment, partograph).

As shown in the pie chart, hemorrhage, sepsis, hypertensive disorders and indirect cause remain the major contributors to maternal mortality. Timely identification of high-risk factors and access to Emergency Obstetric Care is a globally proven strategy for reducing maternal mortality and morbidity.

The Ministry of Health & Family Welfare (MoHFW) has therefore committed to establishing Obstetric HDUs & ICUs at high volume delivery facilities to tackle serious obstetric conditions. Maternity OTs have been strengthened for assured surgical services requiring emergency and elective C-sections.

In order to operationalize the Obstetric emergency services at health care facilities, availability of HR particularly Obstetrician is pertinent. Along with the availability of trained HR there is a need to operationalize LDR, HDU/ICU,OT, along with requisite emergency drugs and diagnostics. MBBS doctors particularity those posted at CHC-FRU and DH can be oriented on the various skills and knowledge for providing CEmONC services including provision of emergency C sections, assisted vaginal deliveries, managing complicated cases etc. which will lead to saving more lives, eventually reducing maternal deaths.

CHAPTER 2

ROUTINE ANTENATAL CARE

KEY LEARNING OBJECTIVES

At the end of this session the learners will be able to:

- Describe the importance of routine **quality antenatal care** for all women.
- Describe the importance and timing of four **antenatal care visits.**
- Describe the **physiological care during pregnancy-common signs and symptoms**
- Clinical assessment and management during each antenatal care visit. (including all recommended diagnostic tests and USG)
- **Supplementation and vaccination**
- Identification of danger signs during pregnancy

IMPORTANCE OF ROUTINE QUALITY ANTENATAL CARE

Effective antenatal care (ANC) can improve the health of the mother and give her a chance to deliver healthy baby. Regular monitoring during pregnancy can help detect complications at an early stage before they become life-threatening emergencies. However, one must realize that even with the most effective screening tools currently available, one cannot predict which woman will develop pregnancy-related complications. Hence, every pregnant woman needs special care. As the medical officer (MO) in charge, you must remember the following:

- Ensure that ANC is used as an opportunity to detect and treat existing problems, e.g. Essential hypertension, Diabetes, Hypothyroidism, Heart and/or respiratory disease or allergies and addictions.
- Prepare the woman and her family for the eventuality of an emergency.
- Make sure that services needed to manage obstetric emergencies are available in time at the point of use.

IMPORTANCE AND TIMING OF FOUR ANTENATAL CARE VISITS

The important components of ANC are discussed below.

➢ Early registration

✓ Timing of the First visit/Registration

The first visit or registration of a pregnant woman for ANC should take place as soon as the pregnancy is suspected. Every married woman in the reproductive age group should be encouraged to visit her health provider if she believes herself to be pregnant. To confirm pregnancy, a urine pregnancy detection kit may be used.

Ideally, the first visit should take place in the first trimester within12th week of pregnancy. However, even if the woman comes late in her pregnancy for registration, she should be registered, and care should be given to her according to the gestational

age with complete screening.

Table 1: Recommended ANC visits and contacts

VISIT	RECOMMENDED WEEKS
First visit	Within 12 weeks, preferably as soon as the pregnancy is suspected-for registration of pregnancy and first antenatal check-up.
Second visit	Between 14 and 26 weeks.
Third visit	Between 28 and 34 weeks (preferably by MO)
Fourth visit	Between 36 weeks and term

✓ Importance of early registration

Early registration is required to:

- Confirm pregnancy by Urine Pregnancy Kit Test in early pregnancy and to ensure whether the woman wants to continue the pregnancy or not
- Help the woman recall the date of her last menstrual period (LMP)and calculate expected date of delivery (EDD).
- If she does not want to continue with the pregnancy, help her access facilities for an early and safe abortion, followed by reliable method of contraception of her choice. Be alert to the possibility that the abortion might be an attempt at female feticide (incase the gestational age is more than 12 weeks).
- If she wants to continue the pregnancy, assess the health status of the woman and obtain baseline information on blood pressure (BP), weight, hemoglobin, blood sugar level etc.
- Identify pre-existing medical problems from her history or previous medical or delivery record for early identification and management of complications and linking the women with appropriate facility for further care.
- If a pregnant woman has not previously been vaccinated or if her immunization status is unknown, she should receive 2 doses of tetanus toxoid injection at least 28 days apart the first contact or as early as possible in pregnancy. If subsequent pregnancy occurs within 3 years, only 1 booster dose to be given. The second dose should be given at least 2 weeks before delivery.
- Tetanus, Diphtheria and Acellular Pertussis(T-dap) vaccination or Td. Vaccine can be considered instead of second dose of tetanus toxoid (preferably between 27 to 36 weeks) to offer protection against diphtheria and pertussis in addition to tetanus. The main objective is to facilitate transplacental passage of antibodies against pertussis antigens to fetus in order to offer protection.
- Give the woman folic acid for first three months/ first trimester to prevent neural tube defects in the growing fetus.
- Build a good rapport with the pregnant woman. Allow plenty of time to counsel the woman and her family.

➢ Record-Keeping

Complete the **Maternal and Child Protection Card** for every woman registered/examined by you and the facility record card (if admitted i.e. bedhead ticket). Hand over the card to the woman and instructs her to bring the card with her for all subsequent check-ups/visits, and carry it along with her at the time of delivery. Give the **Safe Motherhood booklet** to every woman.

Record this information in the antenatal/RCH register.

PHYSIOLOGICAL CARE DURING PREGNANCY-COMMON SIGNS AND SYMPTOMS

Summary of common symptoms and signs and complications/problems that may be encountered in a pregnant woman, probable diagnosis and action required to be taken:

Symptoms	Signs/investigations	Most probable diagnosis	Action(s) to be taken
Vomiting during the first trimester		May be physiological (morning sickness)	• Advise the woman to eat small frequent meals; avoid greasy food, eat lots of green vegetables and drink plenty of fluids. • If vomiting is excessive in the morning, ask her to eat dry food such as biscuits or toast after waking up in the morning. • Tab Doxylamine 1-tab HS or twice daily can be added. • If excessive and associated with fever or/and yellowing of urine, advice liver function tests
Excessive vomiting, especially after the first trimester; inability to retain anything taken orally	The woman may be dehydrated	Hyperemesis gravidarum (May be physiological)	• Admit her for a few days and manage as given under the management of "Hyperemesis gravidarum."
Palpitations, easy fatiguability, breathlessness at rest	• Conjunctival and/or palmar pallor present • Hb level < 7 g/dl – severe anemia	• Severe anemia (May be pathological)	• Start the woman on a double dose of IFA tablets. • Monitor the Hb level after one month. • Take special precautions for delivery • If severe anemia seen after 36 weeks, admit and transfuse packed red blood cells at higher facility

Symptoms	Signs/investigations	Most probable diagnosis	Action(s) to be taken
Puffiness of the face, generalized body oedema	• BP >140/90 mmHg • Proteinuria absent	Gestational hypertension (May be pathological)	If the BP is <150/100 mmHg, advise home management with rest and regular biweekly BP monitoring follow up.
	BP >140/90 mmHg but less than 160/110 Proteinuria present + or ++	Pre eclampsia (May be pathological)	Start antihypertensive if BP > 150/100 mm hg If Systolic BP is >160 mmHg &/or Diastolic >110 mmHg or features of severe disease, manage as severe PET (Pre-eclampsia Toxemia) on admission, give antihypertensives and magnesium sulphate and consider termination of pregnancy if period of gestation is more than equal to 34 weeks Advise her on the danger signs of eclampsia and manage accordingly as in the section on Hypertensive disorders of pregnancy
Heartburn and nausea	Reflux	Reflux disorder of pregnancy (May be pathological)	• Advise the woman to avoid spicy and rich foods. • Ask her to take cold milk during attacks. • If severe, antacids may be prescribed.
Increased frequency of urination up to 10-12 weeks of pregnancy Increased frequency of urination after 12 weeks, or persistent	Tenderness may be present at the sides of the abdomen and back. The body temperature may be raised	• May be physiological due to pressure of the gravid uterus on the urinary bladder • Urinary tract infection	• Reassure her that it will be relieved on its own • Counsel on hygiene of private parts after urination and defecation • Manage as given under the management of "UTI"

Symptoms	Signs/investigations	Most probable diagnosis	Action(s) to be taken
Constipation		Physiological	• Advise the woman to take more fluids, leafy vegetables and a fiber rich diet. • If not relieved, prescribe Psyllium husk, 2 tablespoons to be taken at bedtime with water or with milk. • Do NOT prescribe strong laxatives as they may initiate uterine contractions.
Bleeding P/V, before 20 weeks of gestation-	• Check the pulse and BP to assess for shock • Ask for history of violence • Ask for expulsion of products of conception • Ask for severe pain in abdomen	• Threatened abortion/ spontaneous abortion/ hydatidiform mole/ectopic pregnancy • Spontaneous abortion due to violence (May be pathological)	• Carry out an MVA/suction evacuation to evacuate the retained products of conception in case of incomplete abortion. • Ask the ANM to put the woman in touch with local support groups. • Do NOT carry out a vaginal examination
Bleeding P/V, after 20 weeks of gestation	• Check the pulse and BP to assess for shock	• Ante-partum hemorrhage (May be pathological)	• Manage as per guidelines mentioned in the topic of APH.
Fever	• The body temperature is raised • Blood peripheral smear is positive for malaria parasite • Fever with chills & rigor	• Site of infection somewhere, including possible sepsis • Malaria • UTI • Other causes of fever	• Advise rest, antipyretic & plenty of oral fluids • If temperature ³ 100° F give tepid sponging. • Try to ascertain the cause of fever. Start the woman on antibiotics only after ascertaining the cause of fever • If malaria diagnosed, manage

Symptoms	Signs/investigations	Most probable diagnosis	Action(s) to be taken
	• H/o burning on micturition		according to the NVBDCP (National Vector Borne Disease Control Programme) guidelines for malaria in pregnancy. • For treatment of UTI see related chapter
Decreased or absent foetal movements (NOTE: Foetal movements are felt only after about 4 months of gestation)	• FHS heard, and within the normal range of 110-160 beats/minute • FHS heard, but the rate is <110 beats/minute, or >160 beats/ minute • FHS not heard	• Baby is normal • Foetal distress • Intrauterine foetal death • (May be pathological)	• Reassure the woman. • Re-check the FHS after 15 minutes. • If the FHS is still out of the normal range, manage as given under the management of "Foetal distress." Consider Non stress test/induction depending on gestational age • Inform the woman and her family that the baby might not be well & manage accordingly. • If labour pains are present, conduct the delivery in the usual manner. • If there are no labour pains, do induction of labour to terminate the pregnancy.
Vaginal discharge, with or without abdominal pain		• RTI/STI (May be physiological)	• Start treatment as per the GOI Guidelines for RTI/STI.
Leaking of watery fluids P/V	• Wet pads/cloths	• Preterm or pre-labour rupture of membranes (May be pathological)	• Manage as given under the management of "PROM".

CLINICAL ASSESSMENT AND MANAGEMENT DURING EACH ANTENATAL CARE VISIT

➢ Preparing for the ANC clinic

Before beginning each ANC clinic, ensure that all the required instruments/equipment, e.g. Stethoscope, BP apparatus, weighing scales, thermometer, stadiometer, inch tape are available and are in working condition. Ensure fficient time management so that the pregnant women do not have to wait for long time for their consultations. Provide adequate and comfortable sitting arrangement.

Conduct the antenatal examination in a room/enclosure that allows privacy for taking history and conducting an abdominal palpation. Record all findings accurately on the Maternal Child Protection Card and in the antenatal/RCH register.

➢ History

During the antenatal visits, take a detailed history of the woman

(I) To confirm the last date of menstrual period and confirm EDD

(ii) To identify any complications during previous pregnancies which may have a bearing on the present one; and

(iii) To identify any medical or obstetric conditions that may complicate the present pregnancy (first and subsequent visits).

(iv) Any H/o addiction/ abuse domestic.

While taking the history, ask the following questions:

✓ Date of the last menstrual period

Remember that the LMP refers to the FIRST day of the woman's last menstrual period. Ensure that the woman, while telling you her LMP, is NOT referring to the date of the first MISSED PERIOD. This mistake will lead to miscalculation of the gestational age and expected date of delivery (EDD) by 4 weeks. The LMP is used to calculate the gestational age at the time of check-up and the EDD.

If the woman has undergone a test to confirm the pregnancy, ask her the approximate date when it was done, and after how many days of amenorrhea. This will assist you in estimating her LMP.

Calculation of EDD:

The following formula for calculation of the EDD assumes that the menstrual cycle of the woman was regular before conception and it was a 28-30 days' cycle. If the period of the menstrual cycle is more than 30 days, add the additional number of days in the cycle (beyond 28 days) to the EDD calculated below

EDD = LMP + 9 months + 7 days (+ additional days, if cycle length > 30 days)

EDD = LMP + 9 months + 7 days (- additional days, if cycle length <30 days)

✓ Urine Pregnancy Test

Ask the women if she did have a urine pregnancy test to confirm the pregnancy once she was overdue, if yes then when did she check. If she has not checked herself and she has missed her periods by few days, get a urine pregnancy test done.

✓ Urine Pregnancy Testing

- Keep the necessary items ready: pregnancy test kit, disposable dropper, clean container to collect urine.
- Check expiry date and read instructions on the kit.
- Take sample of urine of the pregnant woman (if early pregnancy than a morning sample is preferred).

- Remove the pregnancy test card and place it on a flat surface.
- Use the dropper to extract urine from the container.
- Put 2-3 drops in the well-marked 'Circle' and wait for 5 mins.
- If one red band appears, the pregnancy test is negative.
- If 2 parallel red bands appear, the pregnancy detection test is positive.
- Inform the woman of the results: if positive, give her a MCP card and write pregnancy test result: Positive.

✓ Dating USG

If woman is having menstrual irregularity, a Trans-Vaginal Sonography (TVS) to calculate crown-rump length (CRL) of the fetus in early pregnancy gives a good idea of the fetal age.

✓ Age of the woman

This is required as women below 20 years of age or above 35years have greater chances of having pregnancy-related complications.

✓ Order of Pregnancy

Primigravida & those who have had 4 or more pregnancies are at a higher risk of developing complications during pregnancy &labor.

✓ Birth interval

Research shows that women who have spaced their children less than 36 months apart have greater chances of having preterm labour, delivering a premature and low birth-weight (LBW) baby, with consequently increased risk of maternal and infant mortality and morbidity. An interval of less than 2 years from the previous pregnancy or 6 months from the previous abortion increases the chances of the mother developing anemia.

Counseling to choose the postpartum family planning option should begin in antenatal period.

✓ Symptoms during the present pregnancy

You must ask for symptoms that might be causing the woman some discomfort, and for symptoms which indicate that a complication may arise:

Symptoms that indicate discomfort-

- Nausea and vomiting
- Heartburn
- Constipation
- Increased frequency of micturition

Table 2: Symptoms which indicate that a complication may arise

- Fever
- Persistent vomiting.
- Abnormal vaginal discharge/itching.
- Palpitations, easy fatigability and breathlessness at rest or on mild exertion.
- Generalized swelling of the body; puffiness of the face
- Vaginal bleeding
- Decreased or absent fetal movements
- Preterm pain abdomen, pre-labour leakingof watery fluid per vaginum (P/V)
- Severe headache and blurring of vision
- Passing smaller amounts of urine and burning sensation during micturition or decreased urinary output
- Itching over body

✓ Previous pregnancies

It is essential to ask a woman about her previous obstetric history, especially if she had suffered from any complications. This is important as some complications may recur during the present pregnancy.

Ask the woman about:

- The total number of previous pregnancies (including the present one, "gravida" and deliveries "parity").
- Ascertain the date/year and outcome of each event, along with the birth weight of the respective child, if known. It is especially important to know about the last pregnancy. Find out if there was any abortion, premature birth, stillbirth, adverse perinatal (period between 7 days before birth and 28 days after birth) outcome or neonatal loss.
- Ask women about any of the following complications during previous pregnancy/ies.
  - hypertensive disorders of pregnancy (if not known, ask for a history of convulsions in previous pregnancies).
  - prolonged labor, obstructed labor.
  - Malpresentation, breech delivery.
  - Antepartum hemorrhage (APH), postpartum hemorrhage (PPH).
  - assisted delivery (forceps or vacuum extraction), delivery by caesarean section.
- Any surgery on the reproductive tract (e.g. myomectomy, removal of the septum, cone biopsy, cervical cerclage, uterine perforation following an MTP, etc.).
- Isoimmunization (Rh -ve) in the previous pregnancy (history of any costly injection given within 72 hours of the previous delivery).

Ask especially for notes on the previous pregnancy, if available.

✓ History of any systemic illness

Rule out any personal history of systemic illnesses such as hypertension, diabetes, thyroid disease, heart disease, tuberculosis, renal disease, epilepsy, asthma, rashes, jaundice, Malaria, RTI/STIs.

✓ Family history

As pregnancy is a physiologically stressful period in a woman's life, it can unmask the underlying tendency to develop many chronic medical disorders prevalent in family. So, ask for a family history of:

- Hypertension
- Diabetes and
- Tuberculosis.
- Family history of Thalassemia, or whether anybody in her family has received blood transfusions.
- Family history of Twinning.
- Delivery of an infant with congenital malformation as the presence of such a history in the family increases the chances of the woman giving birth to a child with the same defect.

✓ History of drug intake or allergies

It is important to find out whether the woman is allergic to any drug, or if she is taking any drug that might be harmful to the fetus. Find out whether she had undergone any treatment or taken drugs for infertility. If yes, then the woman has a higher chance of having twins or multiple pregnancies.

✓ History of intake of habit-forming or harmful substances

Ask the woman if she takes tobacco (chewing or smoking) and/or alcohol. If yes, she needs to be counseled to discontinue them during pregnancy, as they harm her and the developing foetus.

Even after the delivery, the woman should be advised to continue to abstain from taking alcohol and tobacco as their use may lead to other complications such as addiction and/or cancer. Counsel her that passive smoking is equally harmful to the foetus.

✓ Dietary History

Healthy diet includes adequate energy, protein, Vitamin (green & orange vegetable, meat, fish, beans, nut, whole grains and fruit). The diet advised should be balanced & not only rich in carbohydrates or proteins. For e.g. even in under nourished population, only high protein diet supplementation is not recommended for pregnant women to improve maternal & perinatal outcomes. Ask the woman what food she eats, how many times in a day and in what quantity. She will need counseling on nutritious diet during her antenatal visits. At the same time, vigilance is needed to avoid development of Obesity among expectant ladies. Ask her to:

- **Eat:** balanced diet including variety of foods each day.
- **Diet:** seasonal fruits, green leafy vegetables, milk and milk products, protein (pulses, egg, meat).
- Have at least one extra serving per day.
- Try smaller, more frequent meals
- Take micronutrient supplements as directed.

➢ Examination

This activity will be nearly the same during all the visits. Initial readings may be taken as a baseline and compared with the later readings.

Use an antiseptic handrub or wash hands thoroughly with soap and water and dry with clean, dry cloth or allow to air dry.

✓ General examination

Weight: A pregnant woman's weight should be taken AT EACH VISIT. The weight taken during the first visit/registration should be treated as the baseline weight.

Keep the following points in mind while taking the weight:

- The weighing machine should be checked for "zero error" before taking the weight.
- The woman should be wearing light clothing.
- She should stand erect on the weighing machine, in such a way that her weight is evenly distributed on the platform.
- The weight must be measured to the nearest 100 g.

Method to measure weight:

- Keep the weighing scale on a hard, flat surface and check for zero error before taking the weight
- Ask the woman to stand straight on the weighing scale, looking ahead and holding her head upright
- Read the scale from the top
- Record the weight to the nearest 100 g
- Record the findings on the MCP card and the counterfoil, ANC/RCH register

Weight gain: Normal weight is subject to pre-pregnancy body mass index. If the woman is in health weight range before becoming pregnant (BMI 18.5-24.9) she should ideally gain 11-16 kgs during herpregnancy: 1-1.5 kgs in 1st trimester, then 1.5-2 kg/month in IInd and IIIird trimester. If her BMI is <18.5, she should gain more and if her BMI is or > 24.9, she should gain less.

Weight gain per week in 2 and 3rd trimester is about 0.4 to 0.5 kg, hence a weight gain of more than 2 kg/month should increase vigilance for pre-eclampsia, thyroid disorder or diabetes.

To calculate the expected weight gain since her previous visit, multiply the number of weeks elapsed since the previous visit by 0.5 kg. This should be compared with the actual weight gained.

If the diet is inadequate, with less than the required number of calories, the woman might gain only 5-6 kg during her pregnancy. Suspect an inadequate dietary intake if the woman gains less than 2 kg per month in second half of pregnancy. Put her on food supplementation. Take the help of the ANM or refer the woman to the Aanganwadi worker (AWW) of her village for food supplementation, especially for those categories of women who need it the most. A low weight gain usually points towards Intrauterine Fetal Growth Restriction (FGR) and results in a LBW baby.

Excessive weight gain (more than 3 kg in a month) should arouse the suspicion of pre-eclampsia, twins (multiple pregnancies), abnormal thyroid profile or diabetes. Check the woman's BP, and test her urine to check if she has proteinuria & sugar. Check her blood sugar 2 hours after a 75gm glucose drink (DIPSI).

Blood pressure: Measure the BP of pregnant women AT EVERY VISIT to rule out hypertensive disorders of pregnancy. It should be- Systolic < 140 mm Hg & Diastolic < 90 mm Hg.

Checking blood pressure:

- Select the type of blood pressure instrument, preferably non-mercury.
- Ensure the patient has rested for at least 5 minutes before taking the measurement. Ask the patient to empty her bladder if needed.
- Position the patient comfortably in a seated position with her back supported and feet flat on the floor. Ensure the patient's arm is bare, removing any tight clothing.
- Support the patient's arm at heart level, usually by resting it on a table or armrest. Palm should be facing upward. Elbow should be slightly flexed.
- Choose an appropriately sized cuff (cuff bladder length should be 80% and width should be 40% of arm circumference). Place the cuff on the upper arm, with the lower edge about 1 inch above the antecubital fossa (elbow crease). Ensure the cuff is snug but not too tight. You should be able to slip two fingers underneath.
- Turn on the digital sphygmomanometer. Ensure the device is properly calibrated and functioning correctly.
- Press the start button on the device to begin inflation. The cuff will automatically inflate to the appropriate level.Remain quiet and still during the measurement. The device will slowly deflate the cuff and detect the systolic and diastolic pressures.
- Once the measurement is complete, the device will display the systolic and diastolic blood pressure readings, along with the pulse rate. Record these values accurately in the patient's chart.
- Wait 1-2 minutes. Repeat the measurement following steps 5-6. If the readings differ by more than 5 mmHg, take a third measurement, and use the average of the closest two readings.
- Record the reading on the MCP card, its counterfoil. ANC/RCH register

Pallor: Pull down the lower eyelid and look at the lower palpebral conjunctiva, and also the nails.

palms, tongue and oral mucosa of the woman for the presence of pallor. If present, it is an indication that the woman is anemic. Investigate her hemoglobin (Hb) level with hemoglobin meter and correlate with pallor. Manage her as per guidelines.

Icterus: Look for yellowish discoloration of the skin and sclera. The color of the skin and sclera may vary depending on the level of bilirubin. Approximately 3%-5% of pregnant women will have abnormal liver function tests and though, jaundice in pregnancy is relatively rare but has potentially serious consequences for maternal and fetal health. Chronic history of jaundice and high levels of liver enzymes can give rise to repeated abortions and may also lead to serious consequences. Liver enzymes including SGPT and SGOT tend to fall in pregnancy while alkalinephosphatase tends to rise in pregnancy.

Respiratory rate (RR): It is important to check the RR, especially if the woman complains of breathlessness. If the RR is above 30 breaths/ minute and pallor is present, it indicates that she has severe anemia. Manage her as per the guidelines. If the RR of the woman is >30 breaths/ minute along with other associated medical problems, consult a physician or refer to a specialist at District Hospital/Medical college.

Generalized oedema: Pedal edema alone may be present normally during pregnancy & is called physiological oedema of pregnancy. The presence of generalized oedema or puffiness of the face, hands, abdominal wall and vulva should arouse the suspicion of severe pre-eclampsia. Non-pitting oedema might indicate Hypothyroidism or Filariasis and requires immediate referral for investigation and management.

✓ Breast examination

Ensure privacy and presence of a female attendant/nursing staff in case of male MOs. Observe the size and shape of the nipples for the presence of inverted or flat nipples. Try and pull out the nipples to see if they are protractile (i.e. can be pulled out easily). Flat nipples that are protractile do not interfere with breastfeeding. However, truly inverted nipples might create a problem in carrying out successful breast feeding.

- Crusting & soreness of the nipples must be looked for. If present, the woman must be advised regarding breast hygiene. If the nipples do not heal, look for an infection or any other cause and treat accordingly.
- The breasts must be palpated for any lumps or tenderness. If present, refer the woman to the surgical specialist at the District Hospital/ Medical College.
- There might be secretion of milk in some women during pregnancy which is normal.

✓ Abdominal examination

Examine the abdomen to monitor the progress of the pregnancy and foetal growth, and to check the fundal height, foetal lie and presentation, FHS & scars etc.

Preparation before P/A examination:

- Maintain privacy throughout examination.
- Ask the woman to empty the bladder completely immediately before proceeding with the abdominal examination. This is important as even a half full bladder might result in an increase in fundal height.
- Ask woman to lie on her back with upper part of body supported with pillow or rolled bed sheet. Make her semi flex hip and knee joints & abduct the hips &partially flex the knees.
- Never make a pregnant women lie flat on her back, as the heavy uterus may compress the main blood vessels and cause fainting (supine

hypotension).

- Stand on right side of woman & examine in a systematic manner.
- Attention of woman may be diverted by conversation.
- Your hand must be warm & should be placed on the abdomen till the uterus is relaxed before you begin palpation. Poking with finger tips should be avoided.

Fundal height from IInd trimester onwards-

- Before actually measuring fundal height, ask the woman to empty her bladder, help her lie on the examination table/couch with legs extended. Stand on the right side of the woman and dextrorotation of uterus if present should be corrected by placing back of right hand on lateral aspect of uterus on abdomen and pushing it towards left to make the tilt of the uterus straight.
- To measure fundal height, use the ulnar border of the left hand. Start from the xiphisternum & gradually proceed downwards towards symphysispubis till you feel a resistance which is the uterine fundus.
- The fundal height indicates the progress of the pregnancy and the foetal growth. The uterus becomes an abdominal organ only after 12 weeks of gestation. The gestational age (in weeks) can be estimated from the Symphysio fundal height (SFH)(in cm)after 24 weeks of gestation measured by measuring tape.

Figure 1: Symphysio fundal height (SFH) (in cm)

At 12th week	Just palpable above the symphysis pubis
At 16th week	At lower one-third of the distance between the symphysis pubis and umbilicus
At 20th week	At two-thirds of the distance between the symphysis pubis and umbilicus
At 24th week	At the level of the umbilicus
At 28th week	At lower one-third of the distance between the umbilicus and xiphisternum
At 32nd week	At two-thirds of the distance between the umbilicus and xiphisternum
At 36th week	At the level of the xiphisternum
At 40th week	Sinks back to the level of the 32nd week, but the flanks are full, unlike that in the 32nd week

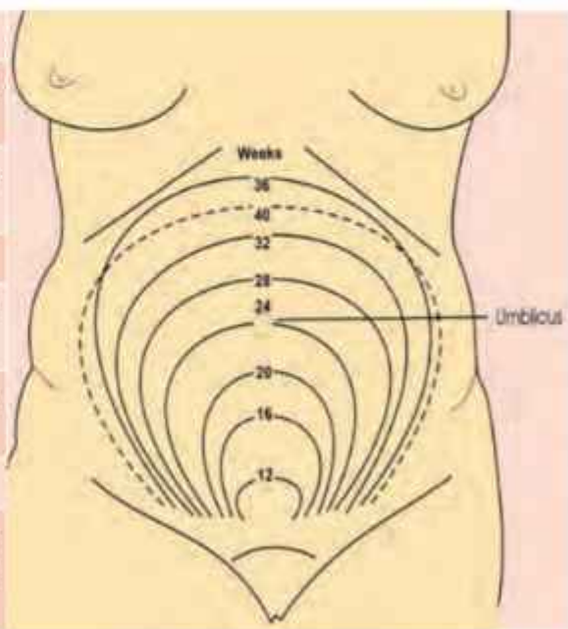


Table 3: Reasons for height of the uterus more or less than that indicated by the period of amenorrhoea

If the height of the uterus is more than that indicated by the period of amenorrhoea, the possible reasons could be:	If the height of the uterus is less than that indicated by the period of amenorrhoea, the possible reasons could be:
• Wrong calculation of date of LMP. • Full bladder. • Multiple pregnancy. • Polyhydramnios. • Hydatidiform mole. • Pregnancy with a pelvic tumour. • Large sized foetus.	• Wrong calculation of date of LMP. • Fetal growth restriction. • Missed abortion. • Intrauterine death (IUD). • Hydatidiform mole (sometimes). • Transverse lie. • Oligohydramnious.

✓ Fetal lie and presentation

- The pelvic grips (4 in number) are relevant late in pregnancy (after 32 weeks). They are performed to determine the lie and the presenting part of the foetus.
- Ask the woman to lie down on her back after evacuating bladder.
- Ask her to semi flex her hip and knee joints and abduct the hips and partially flex the knees.

✓ Leopold's Maneuver

i) Fundal palpation/Fundal grip

- Fundal palpation helps to determine the lie and presentation of the foetus.
- Palpate the uterine fundus gently by laying both hands on the sides of the fundus to determine which pole of the foetus (the breech or the head) is occupying the uterine fundus. The head feels like a hard globular mass which is ballotable (moves between the fingertips of the two hands), whereas the breech is of a softer consistency and has an indefinite outline.
- In the case of a transverse lie, the fundal grip will be empty.
- If the fundal height is less than period of gestation – Suspect fetal growth restriction and refer the patient to higher centre since there is need for Doppler sonography.

  Remember, if a malpresentation is diagnosed before 36 weeks, no active management or intervention is recommended at that point of time. Counsel the woman to go for an institutional delivery.

You must be able to recognize a transverse lie. Missing it can be disastrous because there is no mechanism by which a woman with a transverse lie can deliver vaginally. This woman would need a caesarean section. Failure to do a timely caesarean section in such a woman can lead to obstructed labour, rupture of the uterus, and death of the woman and foetus/baby.

ii) Lateral palpation/Lateral grip

- This palpation is used to locate the back of the foetus to determine itsposition.
- Place the hands on either side of the uterus at the level of the umbilicus and apply gentle pressure. The back of the foetus is felt like a continuous hard, flat surface on one side of the midline and the limbs are felt as irregular small knobs on the other side in a longitudinal lie.
- In the case of a transverse lie, the back is felt transversely, i.e. stretching across both sides of the midline.

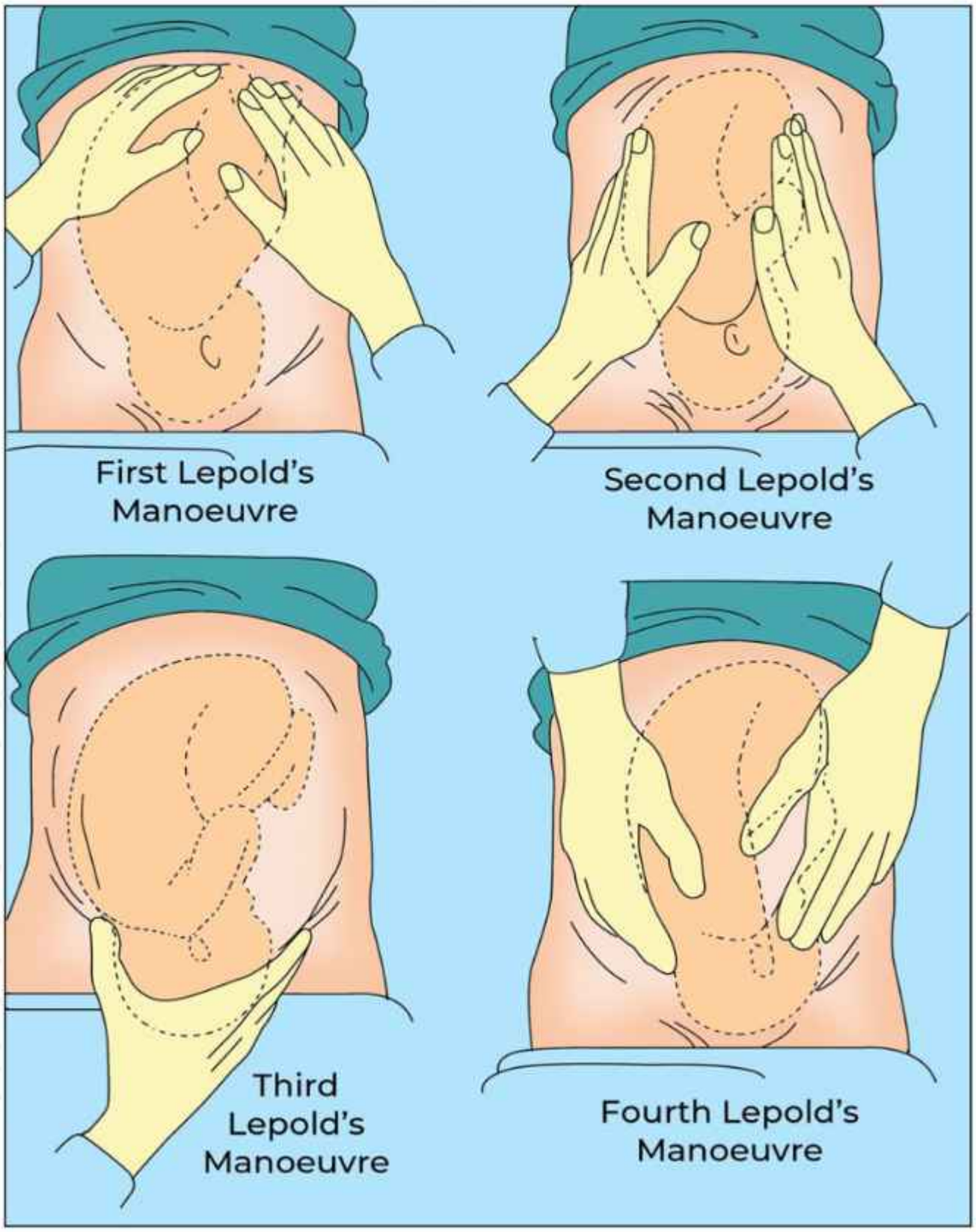
iii) The first pelvic grip/Superficial pelvic grip

- The third manoeuvre must be performed gently, or it will cause pain to the woman. Spread your right hand widely over the symphysis pubis, with the ulnar border of the hand touching the symphysis pubis. Try to approximate the finger and the thumb, putting gentle but deep pressure over the lower part of the uterus. The presenting part can be felt between the fingers and the thumb. Determine whether it is the head or the breech (in the case of a longitudinal lie).
- The mobility of the presenting part can also be determined by gripping the presenting part and trying to move it. If it can be moved, it indicates that the presenting part is free and not "engaged". The foetal head is said to be engaged if the widest diameter of the foetal head has passed through the brim of the pelvis, and only one pole of the head or only two finger-breadths are felt above the pelvic brim.
- In the case of a transverse lie, this grip will be empty.

iv) The second pelvic grip/Deep pelvic grip

- To perform this grip, you must face the foot end of the mother. Keep both the palms of your hand on the sides of the uterus, with the fingers held close together, pointing downwards and inwards, and palpate to recognize the presenting part.
- If the presenting part is the head (felt like a firm, round mass, which is ballotable, unless engaged), this maneuver, in experienced hands, will also be able to tell you whether it is in a state of flexion. It is important to see whether the presenting part is the vertex (normal), or any other part of the cephalic end (face, brow), or the breech.
- If the woman cannot relax her muscles, tell her to flex her legs slightly and to breathe deeply. Palpate in between the deep breaths.

Figure 2: Leopold's Maneuver



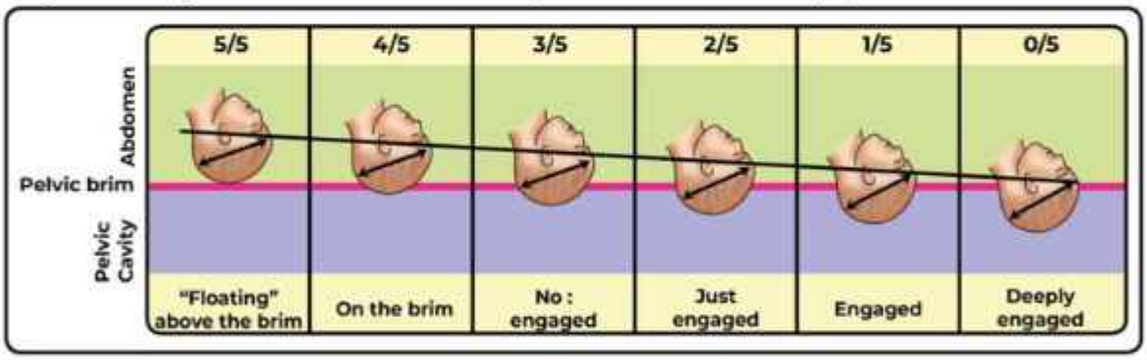
Estimating station of head

It is done by abdominal examination, using the rule of fifth to assess engagement and descent of head. The objective of this step is to determine the amount of head palpable above the woman's pelvic brim in fifths, if there is a cephalic presentation. The examiner faces the patient's feet, and with the tips of the middle 3 fingers palpates deeply in the pelvic inlet. In this way the head can usually be readily palpated, unless it is already deeply in the pelvis. The amount of the head palpable above the pelvic brim can also be determined.

Table 4: Estimating station of head.

5/5	Both occiput and sinciput readily palpable.
4/5	Sinciput readily palpable, occiput palpable.
3/5	Sinciput readily palpable, occiput palpable with difficulty.
2/5	Sinciput palpable, occiput just felt.
1/5	Only Sinciput partly palpable.
0/5	Neither sinciput nor occiput palpable.

Figure 3: Progressive descent of the head, assessed in "in fifths" palpable above the brim



✓ **Fetal heart Sounds and Fetal heart rate- By 12 weeks, rate (FHR):** If the FHR is between 110 and 160 beats per minute, it is normal. Both fetal bradycardia (FHR <110 beats/minute) and fetal tachycardia (FHR more than 160 beats per minute) indicate foetal distress.

Remember that the FHS is not heard through the abdomen with the help of an ordinary stethoscope before the 26th week and with the help of a fetoscope before 20th week of pregnancy & hence the FHS needs to be checked from the second visit only. Before this one can rely on appreciation of fetal movement by the mother.

FHS can however be heard with a Doppler stethoscope or an electronic fetal stethoscope by 12 weeks of gestational age.

✓ **Position of fetal heart:** The position of the fetal heart changes with lie, presentation & position of the fetus. In cephalic presentation the fetal heart sound is heard below the umbilicus through the back of the fetus. In Occipito-anterior position it is heard on the spinoumbilical line, in Occipito-transverse position it is heard more laterally & in Occipito-posterior position it is heard well out in the flanks.

In breech presentation the fetal heart sound is

heard above the umbilicus. In transverse lie, it is felt above or below the umbilicus.

✓ **Fetal Movement:** The first perception of fetal movement is called **QUICKENING** & is perceived from 18-20 weeks of gestation. Maternal assessment of fetal activity is a simple & yet valuable method for monitoring fetal condition. Pregnant women should be asked to watch for fetal movements on each antenatal visit.

✓ **Vaginal examination-**

- Assessment of the pelvis is required to assess if it is adequate for delivering the baby vaginally. This should be done during the last ANC visit (at about 36 weeks of gestation) to rule out any Cephalopelvic disproportion (CPD).

➢ **Investigation**

List of mandatory investigation in antenatal patient

1. Hemoglobin
2. Blood group
3. Urine routine microscopic
4. Thyroid Profile
5. HIV
6. RPR
7. HbsAg
8. Blood Glucose (2hours after 75gm load) for Screening for Gestational Diabetes Mellitus
9. Ultrasound

1. Hemoglobin estimation

Estimation of the level of Hb is essential for the following:

Estimate the level of Hb in pregnant women at every antenatal visit. The initial Hb level will serve as a baseline to compare with the results at 28-30 weeks.

✓ **Estimating haemoglobin**

Hb estimation by Digital Haemoglobinometer

- Wherever available the Hemoglobin needs to be measured through auto/semi-auto analyzers.
- For outreach and field set ups/ANC contact points like Sub-centre, Health and Wellness centre, digital invasive hemoglobinometer is recommended for testing.
- If hemoglobinometer is not available then Sahli's method may be used.

Test Procedure

1. Move the switch at the back of the Hemo instrument to the "Power On" position.
2. Pull out the cuvette holder to insertion position. This is noted by a distinct stop which should not be exceeded.
3. Calibrate the hemoglobinometer using the standard cuvette provided.
4. Clean the fingertip with cotton wool soaked with 70% alcohol. Allow alcohol to dry. Obtain a drop of blood by puncturing either the ear lobe or fingertip with a sterile lance. Wipe away the first drop of blood.
5. Fill the disposable cuvette with the blood drop by placing the capillary tip of the cuvette on the blood drop.
6. Be sure that the cuvette is entirely filled with blood, but do not overfill it. If air bubbles are present, discard the cuvette and fill a new disposable cuvette.

7. Place the filled cuvette in the cuvette holder and push it into the device until it stops.
8. After 45 seconds, the hemoglobin value is shown on the display

The disposable cuvettes cannot be reused and must be disposed of properly, as described in the waste disposal section.

Table 5: Diagnosis of anemia and its severity (ICMR)

Hb Level	Diagnosis
• Hemoglobin >11 g/dl	No clinical anemia
• Hemoglobin 10 to 10.9 g/dl	Mild anemia
• Hemoglobin 7 to 9.9 g/dl	Moderate anemia
• Hemoglobin <7 g/dl	Severe anemia

If found anemic, refer to anemia chapter for management.

2. Blood Group estimation

Knowing the blood group (ABO and Rh) can be of great help in cases of hemorrhage, when precious time could be saved and blood transfusion can be started as soon as possible, when required. Also, administration of Anti D can also be done at appropriate times in case of Rh-negative pregnancies

3. Urine routine microscopic

Testing the urine for the presence of protein: This test should be done at every antenatal visit using multi-reagent dipsticks. It is used in the diagnosis of pre-eclampsia, which (along with eclampsia) is an important cause of maternal mortality.

Testing the urine for the presence of asymptomatic bacteriuria: This test should also be done at every antenatal visit using multi-reagindipsticks to detect nitrates and leukocyte esterase.

4. Thyroid Profile

Testing for hypothyroidism

To be done in high-risk women.

High risk factors:

- Residing in an area of known moderate to severe iodine insufficiency (according to area mapping).
- Obesity (pre-pregnancy/first trimester Body Mass Index (BMI) >30 kg/m2) [BMI= weight in kg/height in m2].
- History of prior thyroid dysfunction or prior thyroid surgery.
- Symptoms of thyroid dysfunction or the presence of goiter.
- History of thyroid dysfunction in first degree relative (parents/siblings/children).
- History of diagnosed mental retardation in family/previous births.
- Known case of autoimmune diseases like Type I diabetes/Systemic Lupus Erythematosus (SLE)/Rheumatoid Arthritis (RA)/Addison's disease/Coeliac disease, etc.
- History of recurrent miscarriages, pre-term delivery, intrauterine demise, pre-eclampsia/ eclampsia, abruption placentae.
- History of infertility (inability to conceive after one year of unprotected intercourse).
- Use of amiodarone or lithium, or recent administration of iodinated radiologic contrast

5. **HIV:** Testing for HIV (Voluntary testing and follow up)

6. **RPR:** Done after pretest counseling.

7. **HbsAg:** Done after pretest counseling.

8. **Screening for Gestational Diabetes Mellitus:** It's done at first visit, if found normal then repeated between 24-28 weeks of pregnancy. In presence of high risk (spontaneous abortions, still births, previous baby with birth weight of >4 kg, history of shoulder dystocia, hypothyroidism, family history of type 2 diabetes in parents and siblings) repeat the test at 32 – 34 weeks if prior tests are normal. (Refer to GDM chapter for details)

Tests: Blood Glucose (2hours after 75gm load)

9. **Ultrasound**

One ultrasound between 18-20 weeks is needed to estimate gestational age, detect gross anomaly, multiple pregnancies etc.

A later ultrasound scan can be considered to identify the number of fetuses, fetal presentation, placental location etc. if an early ultrasound scan has not been performed or if indicated like:

- Previous USG showing low lying placenta.
- Clinical evidence of fundal height less or more than period of gestation.
- Antepartum hemorrhage.

Refer to national guideline for ultrasound in pregnancy at the end of the chapter.

✓ **Guidelines on Use of Ultrasonography during Pregnancy: GOI**

- Any doctor conducting obstetric USG has to work within defined parameters of PC&PNDT Act and Rules.
- All Medical Colleges, District Hospitals /District Women Hospitals (DH/DWH), Sub District Hospitals (SDH) and functional First Referral Units should have an in-house facility for conducting USG.

a) Number of Ultrasound in Pregnancy:

Considering available resources and feasibility, it has been decided that **one obstetric ultrasound** should be done during pregnancy between 18 and 19 weeks of pregnancy as part of routine Ante Natal Care (ANC) package. Additional ultrasound examinations can be done if clinically indicated.

b) Timing of obstetric ultrasound:

- If a **single scan** is to be performed in pregnancy, ideally it should be done between 18 to 22 weeks of gestation but the law in our country permits MTP up to 20 weeks only; hence a single routine obstetric ultrasound should be performed between **18 and 19 weeks.**
- Routine USG in first trimester has not been able to provide any benefit in low-risk pregnancies, except for the diagnosis of ectopic pregnancy.
- However, it may be **desirable for an ultrasound to be done earlier if there is some high-risk factor.** If the woman comes for the first time after 20 weeks, the USG should be done for clinical indications only.
- The woman should be counseled before conducting ultrasound about the purpose of USG and after the ultrasound about the prognosis of fetal anomaly, if any anomaly is detected and the options available.
- As far as possible, the day of ultrasound should coincide with ANC examination day and fixed days for USG should be avoided, as this may lead to multiple visits by the pregnant women.

c) Who will perform Obstetric USG?

Medical practitioner qualified under the PCPNDT Act/ Rules to perform obstetric USG may be any of the following:-

- Radiologist who possesses a post graduate qualification in Ultrasonography/ Radiology/ Imaging Sciences.
- Gynecologist who possesses a post graduate qualification in Obs. / Gyn.
- Registered Medical practitioner with six months' training imparted in the manner prescribed in the "the Pre-conception and Pre-natal Diagnostic Techniques (Prohibition of Sex Selection) (Six Months Training) Rules, 2014.
- Registered Medical practitioner who are conducting ultrasound procedures, with one year experience in conducting Obs /Gyn USG or 6-month Obs /Gyn USG training at a government institute, before the implementation of six months training rules 2014, should have a certificate of clearing the competency based exam before Jan1, 2017, as specified in the schedule of the Six Months Training Rules, 2014.

d) Purpose/ indication for USG

1. To detect chromosomal abnormalities, fetal structural defects and other abnormalities.
2. Estimation of gestational age which results in reduction in post term pregnancies.
3. To detect number of foetus and their chorionicity.
4. Evaluation of placental position and abnormalities.
5. Assessment of cervical canal and diameter of internal Os to detect incompetent Os.

e) Components of the routine obstetric ultrasound scan

The following systems are examined to assess for any congenital anomalies and screen for high-risk pregnancy.

- Foetal number, multiple gestations - chorionicity, amnionicity, comparison of foetal sizes, estimation of amniotic fluid volume (increased, decreased, or normal) in each gestational sac
- Qualitative or semi quantitative estimate of amniotic fluid
- Placental location, appearance, and relationship to the internal cervical Os
- Umbilical cord - number of vessels in the cord and placental cord insertion site
- Measurements: Bi-parietal diameter, head circumference, abdominal circumference, and femoral diaphysis length.
- Foetal anatomic survey:
  - ✓ Head, face, and neck:
  - ✓ Lateral cerebral ventricles, Choroid plexus, Midline falx, Cavum septi pellucidi, Cerebellum, Cistern magna, Upper lip
  - ✓ Chest: Shape/ Size of chest & Lungs
  - ✓ Heart: - Four-chamber view, Left ventricular outflow tract, Right ventricular outflow tract
  - ✓ Abdomen: - Stomach (visualization, size, and sites), Kidneys, Urinary bladder,
  - ✓ Umbilical cord insertion site into the foetal abdomen
  - ✓ Spine: Cervical, thoracic, lumbar, and sacral spine

✓ Extremities: Legs and arms

- Maternal anatomy: Evaluation of the uterus, adnexal structures, and cervix should be performed when appropriate.

f) Equipment and Maintenance

The USG machine should be registered with the concerned Appropriate Authorities as per PC&PNDT Act and Rules.

g) Consent forms and Reporting formats

(I) A written informed consent of the woman undergoing obstetric USG has to be taken in Form F as per PC&PNDT Act and Rules.

(ii) Reporting Format: The USG report has to be entered in the Form F for the purpose of PC-PNDT Act and Rules

(iii) Record Keeping: All the records, forms and reports required to be maintained under the PC& PNDT Act and the rules have to be preserved for a period 2 years or so as may be prescribed from time to time.

h) Follow up action

The cases having any abnormalities should be referred to the nearest obstetricians for further management. If the ultrasound examination could not be completed as per Performa, pregnant woman should be referred to higher Centre or second opinion should be obtained from an expert from the nearest teaching institutions.

➢ **Abnormality found in investigation.**

Anemia - Refer to Anemia chapter for detail management.

HIV - Refer to HIV chapter for detail management

RPR Positive- Refer to table 6 given below:

Table 6: Treatment schedule of Syphilis if RPR is positive

Early syphilis (primary/secondary/early latent) of not more than 2 years duration.	Benzathine penicillin G 2.4-million-unit intramuscular single dose. [If penicillin allergy and de sensitization not possible. Erythromycin 500 mg per oral QID for 14 days Or ceftriaxone 1 gm OD intramuscular for 10- 14 days. Or Azithromycin 2 gm orally single dose].
Late syphilis more than 2 years duration or unknown stage	Benzathine penicillin G 2.4 million units intramuscular once weekly for three consecutive weeks. If penicillin allergy and de sensitization not possible Erythromycin 500mg PO QID for 30 days

✓ **Key points:**

- For the treatment of syphilis during pregnancy, no proven alternatives to penicillin exist.
- All infants of pregnant women treated with a non-penicillin regimen should be treated at birth as other than penicillin no other drugs cross-placental barrier and thus does not treat fetus.
- Alternative to penicillin should be considered ONLY for those syphilis positive pregnant women who have a history of severe penicillin allergy (e.g. anaphylaxis) and desensitization is not possible.

✓ **Follow-up**

Follow-up should be done by Nontreponemal test (RPR/ VDRL) during postnatal care (PNC) visits and in addition, at 6 months and 24 months after the treatment is started.

✓ **Blood Group Rh Negative & Anti D prophylaxis in Rh Incompatible pregnancy**

If card test to screen for hepatitis B is positive, it is confirmed by ELISA. If ELISA positive too, then test and immunize the husband. Without intervention, infants born to HbsAg positive mothers have 90% risk of developing perinatal HBV infection.

Breast feeding is not contraindicated. Combined active passive immunization for newborn within 12 hours of birth is 85-95% effective in reducing perinatal transmission.

Hypothyroidism – Normal serum TSH values during pregnancy are as below:

- ✓ Ist trimester - 0.1-2.5mIU/l;
- ✓ IInd trimester -0.2-3mIU/l;
- ✓ IIIrd trimester -0.3-3mIU/l.

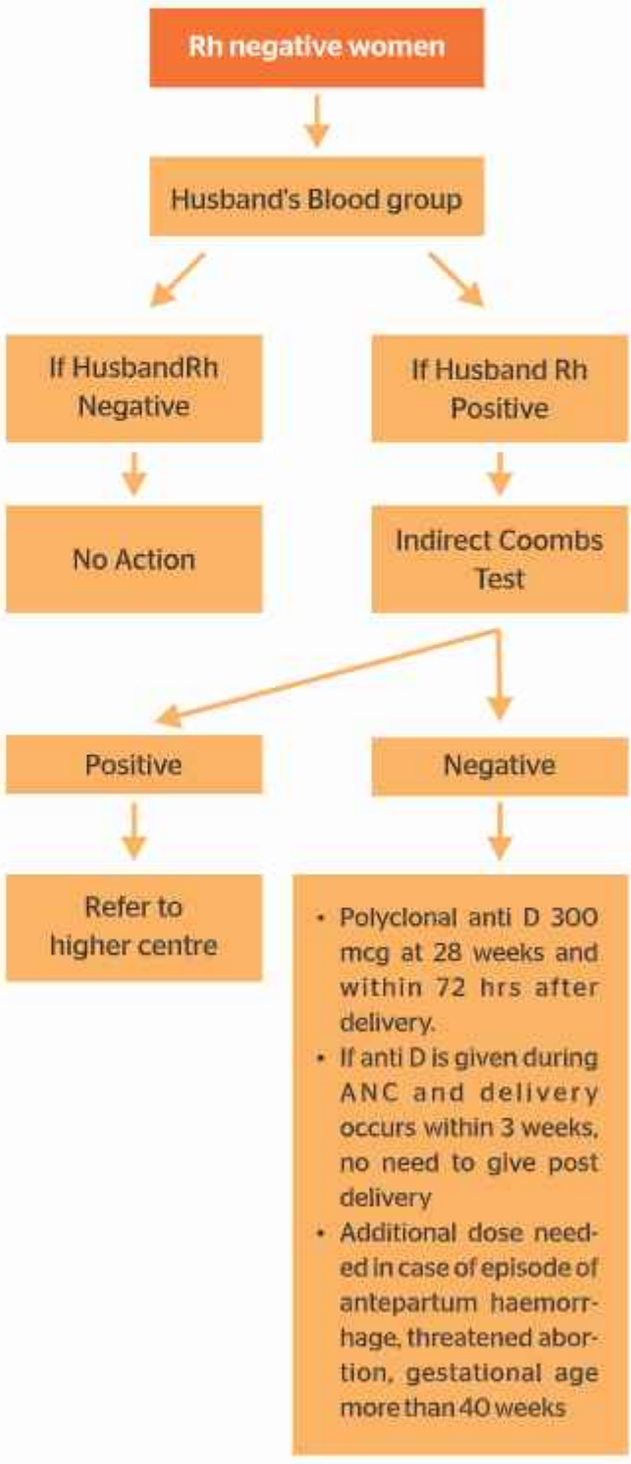
LT4 (Levothyroxine) adjustment should be made as soon as possible after pregnancy is confirmed to ensure euthyroid state during pregnancy.

- In the women who are on Thyroxine supplementation and are planning pregnancy, serum TSH should be evaluated pre-conceptionally and dose of Thyroxine should be adjusted to achieve a TSH value between the lower reference limit and 2.5mU/L.
- Hypothyroid women on Thyroxine supplementation with confirmed pregnancy-should undergo TSH testing as soon as possible and dose of Thyroxine should be adjusted according to Indian guideline (refer to Chapter on Hypothyroidism). Till the time reports are available, she should take additional tablets of same dose every 4th day.
- The increased LT4 dose requirements during gestation are due to pregnancy itself. Therefore, following delivery, maternal LT4 dosing should be reduced to pre-pregnancy levels, and serum TSH should be assessed 6weeks thereafterfd.

Blood Group Rh Negative & Anti D prophylaxis in Rh incompatible pregnancy

In Rh negative women, husband Rh blood group should be done and further management is decided

Figure 4:



SUPPLEMENTATION AND VACCINATION IN PREGNANCY

Besides antenatal history, examination and investigation, antenatal care includes an important component of essential drugs and medication needed for feto-maternal wellbeing in pregnancy. It is not advisable to give a pregnant woman any medication during the first three months of pregnancy (first trimester), unless absolutely essential. Even then it must be ensured that the drugs given are proven to be safe when taken during pregnancy and do not have teratogenic effects on the fetus.

➢ Supplementation

✓ Folic acid

Start the woman on a regular dose of Folic acid during the first trimester. Ideally all women in the reproductive age group should be advised to have folic acid for 2–3 months pre-conception and continue with it during the first 12 weeks of pregnancy. This remarkably reduces the incidence of neural tube defects in the foetus. A dose of 400 mcg folic acid orally is recommended daily (if 400 mcg folic acid is not available, take 500 mcg which is readily available).

✓ Iodized salts

Low iodine levels during pregnancy can cause cretinism, which can lead to mental/ physical retardation of the baby. So regular consumption of iodized salts is advised as a prophylactic measure.

✓ Iron & Folic acid supplementation

Anemia is a serious problem in the country. Iron and folic acid prevent maternal anemia, puerperal sepsis, low birth weight, andpre-term birth. All anemic women need special focus & guidance on nutrition & regular consumption of IFA. All anemic women need tracking by name by the MO for compliance to thetreatment. Stress on the need for increased requirement of iron during pregnancy and the danger of anemia inevery pregnant woman. Dietary advice for iron rich foods should be emphasized. All pregnant women need to be given one tablet of IFA (60 mg elemental iron and 0.5 mg folic acid) every day from the II trimester onwards for 180 days during pregnancy and 180 days during lactation. This is the **prophylactic dose of IFA.** (If patient is found to be anemic, refer to chapter on Anemia in Pregnancy).

Many women do not take IFA regularly due to some common side-effects. The necessity of taking IFA and the dangers associated with anemia should be explained to the mother.

* Though the tablets should be taken preferably 2 hours before meals to ensure an empty stomach. However, she may take the tablets 1 hr after meals or with meals or at night. This will help avoid nausea.
* She should not worry about black stools. This is normal while taking IFA tablets.
* IFA tablets can be taken with lime juice or citrus fruits to increase absorption of iron.
* If she has constipation, ask her to drink more water & take plenty of green leafy vegetables & fruits. This will help her get over constipation.
* These side-effects are not serious.
* She should avoid taking the tablets with tea, coffee or milk as they reduce the absorption of iron.
* Tablets containing calcium should not be taken at the same time as IFA tablets, as the absorption of iron is reduced in the presence of calcium.
* Although IFA tablets may make a woman feel less tired than before, advise her not to

stop the tablets despite feeling better.

* She should return to you if she has problems in taking IFA tablets.
* IFA Tablets are not a substitute for a nutritious diet.

✓ Calcium supplementation in pregnancy and lactation

Dietary requirement for different nutrients increases during pregnancy and lactation. The dietary intake of many Indian women, however, is significantly below recommended dietary requirements. Of these, two most important nutrients are iron and calcium.

Adequate calcium intake during pregnancy and lactation has the potential to prevent pre-eclampsia, pre-term birth, neonatal mortality (NNM), improve maternal bone mineral content, breast milk concentration and bone development of neonates.

The daily recommended dietary allowances (RDA) for calcium in pregnancy and lactation is 1200 mg per day. The National Nutrition Monitoring Bureau (NNMB) - 2012 data from 10 Indian states shows that the daily calcium intake during pregnancy and lactation for Indian women is less that 30% of RDA (which means it is only 400 mg/d). This shows that most pregnant and lactating women in India have low dietary calcium intake.

Considering the poor dietary calcium intake among pregnant and lactating women in India & high prevalence of hypertensive disorders in pregnancy, maternal calcium supplementation is recommended across the country.

Protocol for calcium supplementation

- All pregnant and lactating women to be counselled about intake of calcium rich foods.
- Oral swallowable calcium tablets to be taken twice a day (total 1g calcium/day) starting from 14 weeks of pregnancy up to six months post-partum.
- One calcium tablet should be taken post the morning/afternoon meal and the second tablet post the evening/night meal. It is not advisable to take both calcium tablets together as > 800 mg calcium at once interferes with iron absorption. Calcium tablets should not be taken empty stomach since it causes gastritis.
- Calcium and Iron Folic Acid (IFA) tablets should also not be taken together since calcium inhibits iron absorption.
- Each calcium tablet should contain 500 mg elemental calcium and 250 IU vitamin D3. The preferred formulation for calcium is calcium carbonate. The rationale for inclusion of Vitamin D is to enhance the absorption of calcium.

Details of Calcium supplementation in pregnancy can be accessed at - nhm.gov.in/nrhm-components/rmnch-a/maternal-health/guidelines.html

➢ Vaccination

✓ Vaccination during pregnancy

1. Two doses of Inj. Td atleast 28 days apart are to be given to all pregnant mothers at the first contact or as early as possible in pregnancy. If subsequent pregnancy occurs within 3 years, only 1 booster dose to be given.
2. Tetanus, Diphtheria and Acellular Pertussis (T-dap) vaccination can be considered instead of second dose of tetanus toxoid to offer protection against diphtheria and pertussis in addition to tetanus. The main objective is to facilitate transplacental passage of antibodies against pertussis antigens to fetus in order to offer protection to newborn or young infant.

✓ Postnatal Vaccination

Rubella, Hepatitis B, Varicella, Influenza, Tetanus and HPV vaccination is recommended for all postnatal non-immunized mothers.

✓ Pre-Pregnancy Vaccination

In pre- pregnancy period, elicit vaccination history of the women along with history of occurrence of vaccine preventable disease or any allergic reaction. It is desirable, that if the woman is unvaccinated, the vaccines against Rubella, Hepatitis B, HPV and Varicella can be taken if recommended by doctor.

✓ Injection Tetanus Toxoid and Diphtheria Vaccine (Inj. Td.) administration

- If a pregnant woman has not previously been vaccinated or if her immunization status is unknown, she should receive two doses of Td injection atleast 28 days apart the first contact or as early as possible in pregnancy. If subsequent pregnancy occurs within 3 years, only 1 booster dose to be given. The second dose should be given at least 2 weeks before delivery.
- The main objective is to facilitate trans-placental passage of antibodies against pertussis antigens to fetus in order to offer protection to newborn or young infant
- In most people, two doses protect against tetanus infection for 1-3 years.
- Administration of two doses of Inj. Td to a pregnant woman is an important step in the prevention of maternal and neonatal tetanus.
- If the woman skips one antenatal visit, give the injection whenever she comes back for the next visit.
- Inj. Td is to be given as 0.5 ml per dose, deep intramuscular (IM) in the upper arm.
- Inform the woman that there may be slight swelling, pain and/or redness at the injection site for a day or two which is normal and will subside spontaneously without any treatment.

➢ Deworming

Soil Transmitted Helminthes (STH) infections are common worldwide, contributing to a high burden of malnutrition and morbidity in resource poor settings. The most common STH parasites are Ascaris lumbricoides (roundworm), Trichuris Trichuria (whipworm), Ancylostoma duodenale and Necator americanus (hookworm). Hookworm infestation is one of the commonest STH infestations contributing to the burden of anaemia in the world.

The prevalence of intestinal worm infestation in India varies from 5% to 76%, which is similar to that in other developing countries. In areas where hookworm infestation is endemic, up to 90% of pregnant women (PW) are anaemic.

Worm infestation is therefore an important cause of maternal morbidity and mortality, pre-term birth, Intra Uterine Growth Restriction (IUGR), Low Birth Weight (LBW) and poor iron status in the infant.

- Deworming should not be done routinely for all pregnant woman.
- It is done only in areas where hookworm infestation is more than 20%.
- Deworming in pregnancy can be done on case to case basis, after the 1st trimester, during the 2nd trimester preferably in endemic areas.
- Tablet Albendazole (400mg) for deworming should be given orally to all pregnant woman.
- Pregnant women with the recent history of passage of worms in stool can be treated with Tab albendazole 400mg on case-to-case basis.

- If facility available advise stool examination for ova and cyst for confirmation.
- All states should ensure adequate measures for focused behavior change communication (BCC) for improving sanitation & hygiene among pregnant women.
- Counseling focused on improving sanitation and hygiene among pregnant women should be emphasized.
- WASH interventions, including social measures to curb unhealthy practices like open defecation etc., should be addressed.

(As per Anaemia Mukt Bharat Guidleines: For pregnant women and lactating mother one dose of 400 mg Albendazole (1 tablet), after the first trimester, preferably during the second trimester).

But preferably this should be followed only in hookworm endemic infested areas.

Details of Deworming in pregnancy can be accessed at- nhm.gov.in/nrhm-components/rmnch-a/maternal-health/guidelines.html

IDENTIFICATION OF AT-RISK PREGNANCIES

INDICATION	MEDICAL CONDITION
History based	• Previous stillbirth or neonatal loss • History of three or more consecutive spontaneous abortions • Birth weight of the previous baby >4000 g • Hospital admission for hypertension or severe pre-eclampsia/eclampsia in the previous pregnancy • History of surgery on the reproductive tract • Isoimmunization (Rh -ve) in the previous pregnancy • History of uterine surgery
First trimester	• Un-ruptured ectopic pregnancy • Ruptured ectopic pregnancy if facility of laparotomy not available, refer only after stabilization • Molar pregnancy (not bleeding actively), even after suction refer for work up and follow up • Multifetal pregnancy • Rh isoimmunized
Second trimester	• Fetal malformation or abnormality • Early onset Fetal growth restriction • Early onset preeclampsia
Third trimester	• Previous 2 LSCS • Placenta previa • Fetal growth restriction
Any period	• Pregnancy with heart disease, respiratory disease or any other medical complication

CHAPTER 3
SPECIAL NEEDS IN PREGNANCY

KEY LEARNING OBJECTIVES

By the end of this session, the participants will be able to diagnose and manage appropriately the below special needs during pregnancy:

A. **Adolescent pregnancy**
B. **Pregnancy with a Bad Obstetric History**
C. **Hyperemesis Gravidarum**
D. **Gestational Diabetes Mellitus**
E. **Anemia During Pregnancy & Post-Partum Period**
F. **Urinary Tract Infection**
G. **Malaria Prophylaxis and Treatment**
H. **HIV Infection in Pregnancy& PPTCT**
I. **Fever**
J. **Hypothyroidism**

➢ **Important Points:**

- Special needs of a pregnant woman should be taken into consideration when planning Antenatal care.
- Additional antenatal visits, special counseling & care may be required in addition to basic care.
- Adolescent pregnancy is a health threat to mother & baby both.
- Anemia is commonly seen during pregnancy & postpartum period & should be managed with oral or parental iron.
- Amoxicillin is the preferred antibiotic for Urinary Tract Infection in pregnancy.
- In malaria endemic areas, pregnant women should be routinely screened by RDK test in the first antenatal visit & every month thereafter.
- Chloroquine is used to treat uncomplicated malaria.
- All pregnant women should be offered voluntary counseling & testing for HIV infection
- Hyperemesis during pregnancy should not be ignored.

A. ADOLESCENT PREGNANCY

Adolescent pregnancy or "motherhood in childhood" is one of the most serious health threats to young women in India. About 16 million women aged 15-19 years give birth each year, which accounts for approximately 11 % of all births globally (WHO). The average adolescent birth rate in the middle- income countries is two times higher and in the low-income countries is five times higher as compared to high-income countries. Adolescent pregnancy can lead to morbidities (such as sexually transmitted diseases), mental disorders (such as depression) as well as higher neonatal mortality. Adolescent pregnancy is high-risk for both mother and child.

Adolescent fertility in India occurs mainly within the context of early marriage or sometimes as a result of sexual assault. As a result of early marriage, about half of all young women are sexually active by the time they are 18 years old; and almost one in

five by the time they are 15 years. As compared to women who married as adults, women who married as minors are more likely to report early, frequent and unplanned pregnancies (typically as the consequence of not using contraceptives), which have been consistently linked to increased risk of maternal and infant morbidity and mortality Their age-related risk is compounded by malnutrition and inadequate antenatal care (ANC). Several medical complications, such as preterm birth, poor maternal weight gain, pregnancy-induced hypertension, anemia, and sexually transmitted diseases are associated with adolescent pregnancy.

Factors such as illiteracy and poor socioeconomic conditions affect the outcome of pregnancy among adolescent women. Also, lack of prenatal care and delivery care contributes to higher risks of neonatal morbidity and mortality. Another key determinant is contraceptive use, which is important for better reproductive health in the adolescent years when pregnancy and childbirth should be avoided for as long as possible.

During examination of adolescents with pregnancy, keep the following things in mind-

- Obtaining consent
- Respecting modesty/privacy
- Explaining what to expect
- Listening to concerns may be especially important

Care of pregnancy in adolescents needs a compassionate approach. There is need of a strong personal support system so that adequate antenatal care can be provided and a companion accompanies her for every antenatal visit. Lifestyle advice such as avoiding heavy physical labor, taking adequate rest and eating balanced healthy diet must be given to the expectant mother. It is extremely important to involve family decision makers in birth and complication readiness plan counseling for safe sex and contraceptive practices is also provided. Reinforce importance of family planning/birth spacing, need for early initiation of breast feeding and adequate newborn care. There are a few local sources of support including woman's advocacy group, Public health agencies, Peer support groups and Community service organization.

B. PREGNANCY WITH BAD OBSTETRIC HISTORY

A detailed obstetric history needs to be elicited in a woman who has had a poor outcome in the past. Poor obstetric outcome can range from multiple abortions, ante-partum or intra-partum stillbirths, neonatal complications and even neonatal death.

Maternal, fetal or newborn complications during previous pregnancy, labor/childbirth, post-partum/newborn period may indicate underlying medical or obstetric condition so there is a need to be vigilant while conducting ANCs. Pregnancy in these women provides opportunity to emphasize on importance of having institutional delivery and of having a birth & complication readiness plan.

➢ Other complications

It is important to determine nature of previous complications and perform additional assessment and appropriate follow-up for cases with following history:

- ✓ Convulsions
- ✓ Three or more spontaneous abortions
- ✓ Cesarean section or other uterine surgery
- ✓ Third- or fourth-degree tears
- ✓ Newborn complications or death

✓ **Convulsions**

Determine cause of convulsion based on history or medical records:

- For Eclampsia-reinforce regular ANC check-up for blood pressure monitoring.
- For Malaria- reinforce importance of prompt diagnosis & use of bed nets.
- For Tetanus-reinforce TT/Td vaccine, immunization.
- For Epilepsy or unknown cause of seizures-facilitate non urgent referral/transfer.

✓ **Three or more spontaneous abortions:** Determine when abortions occurred based on history or medical use rather than: If all were before 14 weeks, be alert for vaginal bleeding and severe abdominal pain and if all were after 14 weeks-facilitate non urgent referral/transfer.

✓ **Previous C-section or Uterine Surgery:** Determine reason for surgery based on history or medical records whether it was laparotomy done for Ectopic pregnancy or Ruptured uterus.

If a woman had prior C-section, then if it was due to Cephalopelvic Disproportion or other complications requiring immediate delivery or Twin or breech delivery or Fetal distress. These women are advised to give birth in a facility equipped to perform emergency obstetric surgery. Women with one previous C-section may have "trial of labor" and women with two previous C-sections or uterine rupture must give birth by C-section only. Birth preparedness plan must be reinforced and ensured that the family is mentally prepared for surgical intervention.

✓ **Newborn complications or death:** If the outcome of previous pregnancy was some newborn complications or death, determine the nature of the same based on history or medical records i.e., whether it is due to maternal chronic illness or complications during labor/birth (e.g. C-section, maternal convulsions). Newborn complications like Newborn jaundice, feeding difficulties and other problems should also be asked for.

✓ **Previous 3rd or 4th Degree Tear:** Determine whether past repair is adequate and assess for related complications (e.g., fistula, rectal sphincter dysfunction). If repair is adequate and there are no present complications, reassure the woman and proceed with additional care. Deliver by LSCS. If repair is inadequate or there are any present complications, facilitate urgent referral/transfer.

✓ **Size-Date Discrepancy:** If there is a discrepancy of gestational age and fundal height, check her dates based on menstrual history and contraceptive history, confirm with physical examination findings and early pregnancy scan. If the dates are wrong, correct them now.

If pregnancy is early and fundal height is less than period of gestation, rule out missed abortion, ectopic pregnancy, molar pregnancy. In late pregnancy, if fundal height is small for dates-rule out malpresentation, fetal death and if large for dates- rule out multiple pregnancy, polyhydramnios. If the difference is 2 cm or less, reassure her and measure again in 2 weeks. If the difference still persists, arrange for a referral/transfer.

✓ **Domestic Violence:** Freedom from violence is a basic human right for every individual. Violence against women committed by intimate partner is an important public health and human rights issue. The WHO multi-country study on women's health and domestic violence against women found the prevalence ranging from 1% to 28%. Pregnancy may be a precipitating factor of violence—"punishment" for becoming pregnant. The woman may deny abuse and it is necessary to talk to her alone. Intimate partner violence during pregnancy

may have fatal and non-fatal outcomes. Adverse health behavior including alcohol, smoking, drug abuse in pregnancy is associated with intimate partner violence. Physical and mental health poor outcomes including injury, depression, stress, suicide attempts are also seen. Poor reproductive health indicators like low birth weight, pre-term delivery, STI/HIV, miscarriage and other obstetric complications are also more often seen with intimate partner or domestic violence.

To help a woman it is necessary to identify abuse-related condition or injury, help woman recognize abuse in her own life and take steps to protect herself and her children. It is important to ensure that she feels safe while receiving care. Help her recognize her right to high-quality ANC services and link her to appropriate healthcare or supportive services. Demonstrate empathy and understanding. Use kind, non-judgmental approach to comfort her. It is necessary to ensure complete confidentiality and privacy. Respect her right to make decisions about her life.

C. HYPEREMESIS GRAVIDARUM

➢ Definition

This condition occurs during pregnancy and is characterized by excessive vomiting and inability of the woman to retain anything taken orally, thus resulting in metabolic acidosis. It is more commonly seen in primigravida, in women with multiple pregnancies and in the presence of a hydatidiform mole. It can also be seen in patient with preexisting hepatobiliary disease, Meningitis, Diabetic coma, Uraemic coma, Peritonitis due to untreated septic abortion.

➢ Diagnosis

Hyperemesis gravidarum can be diagnosed when there is protracted nausea and vomiting with the triad of > 5% weight loss, dehydration and electrolyte imbalance.

On examination, you may find the following signs:

- Dehydration (dry tongue, loss of skin turgor, oliguria in severe cases).
- Tachycardia may be present.
- Ketonuria may be present.

➢ Differential diagnosis

Exclude the following conditions, which may result in vomiting when present during pregnancy.

- Jaundice
- Meningitis
- Diabetic coma
- Uremic coma
- Peritonitis due to untreated septic abortion.
- Worm Infestation

➢ Investigations:

- Full blood counts, Blood sugar, renal function test, Electrolytes.
- USG to rule out multiple pregnancy & Hydatidiform mole.

In Refractory cases, additional tests are-

- Thyroid function tests.
- Liver Function Tests: exclude other liver disease such as hepatitis or gallstones.
- Amylase: exclude pancreatitis.

➢ Management

- Admit the woman if required.
- Reassure the woman and her family. Adding

ginger to diet may help to reduce morning sickness.

- Monitor vital signs & urine output (it should be minimum-30ml/hour).
- IV Normal saline / RL is the most appropriate intravenous hydration.
- Dextrose infusions are not advised routinely but may have to be added if the woman is not able to accept orally at all.
- Repeat urine examination every four hours till it becomes negative for ketone bodies.
- Urea and serum electrolyte levels should be checked daily in women requiring intravenous fluids.
- First-line anti-emetics:
    - Antihistamines (H1 receptor antagonists e.g. doxylamine or a combination of doxylamine & pyridoxine which is vitamin B6 - Both are classified as Pregnancy category A).
    - If there is no relief, Metoclopramide is used (Pregnancy category B).
    - Ondansetron (Pregnancy category B) is used in refractory cases.
- Histamine H2 receptor antagonists or proton pump inhibitors: if gastro-esophageal reflux disease, oesophagitis or gastritis.
- Thiamine supplementation (either oral or intravenous) should be given to all women admitted with prolonged vomiting.
- Once the vomiting stops and dehydration is corrected, then start slowly on liquid diet followed by semi solids and then whole meal and discharge after 24 hours.
- Advise the woman to take small, frequent, light carbohydrate-rich meals and antacids.

D. GESTATIONAL DIABETES MELLITUS

Definition: Gestational Diabetes Mellitus (GDM) is defined as Impaired Glucose Tolerance (IGT) detected first time during pregnancy.

➢ Risk factors:

1. Overweight and obesity.
2. Lack of physical activity.
3. Previous gestational diabetes or prediabetes.
4. Polycystic ovary syndrome.
5. Diabetes in an immediate family member.
6. Previously delivering a baby weighing more than 9 pounds (4.1 kilograms).

➢ Protocol for investigation

- Testing for GDM is recommended twice during ANC.
- The first testing should be done during first antenatal contact as early as possible in pregnancy.
- The second testing should be done during 24-28 weeks of pregnancy if the first test is negative.
- There should be at least 4 weeks gap between the two tests.
- The test is to be conducted for all pregnant women even if she comes late in pregnancy for ANC at the time of first contact.
- If she presents beyond 28 weeks of pregnancy, only one test is to be done at the first point of contact.

- If the test is positive at any point, protocol of management should be followed as given in the GOI guideline on GDM.
- Single step testing using 75 g oral glucose & measuring plasma glucose 2 hour after ingestion.
- 75g glucose is to be given orally after dissolving in approximately 300ml water whether the pregnant woman comes in fasting or non-fasting state, irrespective of the last meal. The intake of the solution has to be completed within 5 min.
- A plasma standardized glucometer should be used to evaluate blood glucose 2 hours after the oral glucose load.
- If vomiting occurs within 30 min of oral glucose intake, the test has to be repeated the next day. If vomiting occurs after 30 minutes, the test continues.
- The threshold plasma glucose level of >=140 mg/dL (more than or equal to 140) is taken as cut off for diagnosis of GDM.

Complications: Immediate and long-term clinical effects of GDM are important contributors to the burden of non-communicable diseases in many countries. Moreover, women with GDM and their

Maternal complications	Foetal complications
Polyhydramnios	Intra-Uterine Death
Spontaneous Abortion	Stillbirth
Pre-Eclampsia	Congenital birth defects
Malformation	
Prolonged Labour	Shoulder Dystocia
Obstructed Labour	Birth Injuries
Caesarean Section	Neonatal
Hypoglycaemia	
Postpartum Haemorrhage	Infant Respiratory Distress Syndrome.

➢ Management of GDM

- All pregnant women who test positive for GDM for the first time should be started on Medical Nutrition Therapy (MNT) for 2 weeks.
- After 2 weeks ofMNT, a 2 hrs PPPG (post meal) should be done.
- If 2hr PPPG <120mg/dL repeat test every 2 weeks in second trimester & every week in third trimester.
- If 2hr PPPG >120mg/dL medical management to be started as per guidelines.
- Metformin or Insulin therapy is the accepted medical management of pregnant women with GDM not controlled on MNT.
- Insulin can be started any time during pregnancy especially if GDM is diagnosed before 20 weeks & MNT has failed.
- Metformin can be started at 20 weeks of pregnancy, if MNT has failed to control her blood sugar. The maximum dose is 2 gm/ day in divided doses. If the woman's blood sugar is not controlled with the maximum dose of metformin & MNT, Insulin is to be added.
- If Insulin is required in high doses, metformin may be added to the treatment.
- At PHC, MO should initiate treatment & refer pregnant women with GDM to a higher centre if blood sugar levels are not controlled or there is some other complication.
- If 2hr PPPG is >200mg/dL at diagnosis, starting dose of insulin should be 8 units pre-mixed insulin.

- The dose of Insulin should be adjusted on follow-up and at the same time MNT has to be followed. Frequency of monitoring to be decided by the treating doctor.

➢ **Medical Nutrition Therapy (MNT)**

MNT remains the cornerstone of treatment for GDM. The food plan should be designed to fulfill minimum nutrient requirements for pregnancy and to achieve glycemic goals without inducing weight loss and ketonemia.

Food plans should be culturally appropriate and individualized to take into account the patient's body habitus, weight gain, and physical activity and be modified as needed throughout pregnancy to achieve treatment goals. Individualisation is important when determining energy requirement, and adjustments should be made based on weight change patterns.

Nutrition interventions for GDM should emphasize overall healthy food.MNT for GDM primarily involves a carbohydrate controlled balanced meal plan which promotes:

✓ Optimal nutrition for maternal and fetal health.

✓ Adequate energy for appropriate gestational weight gain.

✓ Achievement and maintenance of normoglycemia.

Energy requirement during pregnancy includes the normal requirement of adult and an additional requirement for fetal growth plus the increase in the body weight of pregnant woman.

Energy requirement does not increase in the first trimester unless a woman is underweight. It increases during second and third trimester. Energy intake should be adequate enough to provide appropriate weight gain during pregnancy. As per Indian ICMR guidelines, for an average weight gain of 10-12 Kg, an addition of 350 kcal/day above the adult requirement is recommended during second and third trimester.

Severe caloric restriction is not recommended as it may result in ketonemia and ketonuria and impair physical and mental development in offspring. Hypocaloric diets in obese women with GDM can adversely impair fetal growth besides ketonemia and ketonuria. However, moderate caloric restriction (reduction by 30% of estimated energy needs) in obese women with GDM may improve glycemic control without ketonemia and reduce maternal weight gain.

Large amounts of carbohydrate foods eaten at one time will lead to high blood sugar level and should be avoided. Spreading carbohydrate foods over the day will help to prevent this. It is better to spread carbohydrate foods over 3 small meals and 2-3 snacks each day than taking 3 large meals. Complex carbohydrates (like whole-grain cereals like oats, bajra, jowar, ragi, whole pulses, vegetables and fruits with skins) should be preferred over simple carbohydrates like food with lots of added sugar or honey, or foods that are made from refined white flour. Some examples of simple carbohydrates include sweets, cakes, puddings, sweet biscuits, pastry, juice, soft drinks, chips, white bread, naan, pizza etc.

Counting the number of carbohydrate serves that the pregnant woman eats during the day will help her to eat the right amount of carbohydrate. As a guide, aim should be for 2-3 carbohydrate serves at each major meal and 1-2 carbohydrate serves at each snack. One serve = approximately 15 grams of carbohydrate. The woman must be advised to use less fat in cooking and avoid frying of foods. Encourage the use of low-fat dairy products in place of whole milk or full cream products and lean meat in place of red meat.

Choosing low fat snacks like substituting fresh fruit, salads, baked and steamed food items in

place of high-fat snacks such as cakes, biscuits, chocolates, pastries, samosas and pakoras etc. will aid the pregnant woman in controlling her blood sugar levels.

Protein requirement in pregnancy is increased (additional 23 g/day) to allow for fetal growth. At least 3 serving of protein foods are required every day to meet the increased demand. Sources of protein are milk and milk products, egg, fish, chicken, pulses (dal), nuts etcHigh fiber foods especially soluble fibre may help control blood sugar by delaying gastric emptying, retarding the entry of glucose into the blood stream and lessening the postprandial rise in blood sugar. Soluble fiber in flax seed, psyllium husk, oat bran, legumes (dried beans of all kinds, peas and lentils), and pectin (from fruit, such as apples) and forms in root vegetables (such as carrots) are helpful..

Refer to higher centre if one or more of the following conditions are met:

- Nausea & vomiting and not able to take food orally.
- Fasting blood glucose >200mg/dL with or without insulin.
- Fasting blood glucose >150 mg/dL or post breakfast>250 mg/dL even after giving insulin.
- Total dose of insulin (combined morning and evening dose) on each day exceeds 20 units.
- If she develops low blood glucose (hypoglycaemia) more than once in a day.
- If she refuses to take insulin injection

Special obstetric care for pregnant women with GDM

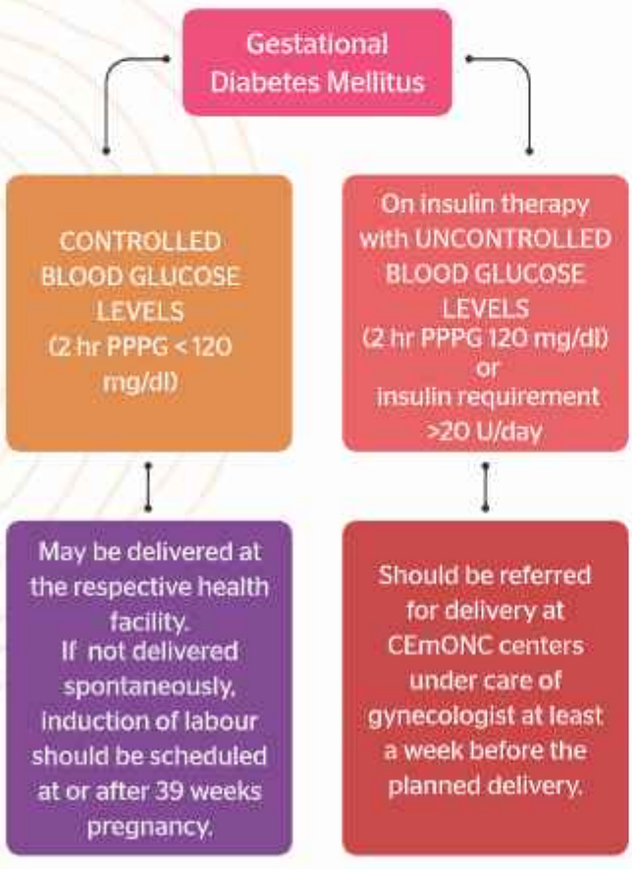
- In cases diagnosed before 20 weeks of pregnancy, a fetal anomaly scan by USG should be performed at 18-20 weeks.
- For all pregnancies with GDM, a fetal growth scan should be performed at 28-30 weeks gestation & repeated at 34-36 weeks gestation. There should be at least 3 weeks gap between the two ultrasounds and it should include fetal biometry & amniotic fluid estimation.
- Pregnant women with GDM in whom blood glucose level is well controlled & there are no complications, should go for routine antenatal care as per GOI guidelines.
- In pregnant women with GDM having uncontrolled blood glucose level or any other complication of pregnancy, the frequency of antenatal visits should be increased to every 2 weeks in second trimester & every week in third trimester.
- Monitor for abnormal fetal growth (macrosomia /growth restriction) and polyhydramnios at each ANC visit
- Pregnant women with GDM to be diligently monitored for hypertension in pregnancy, proteinuria and other obstetric complications
- In pregnant women with GDM between 24-37 weeks of gestation and requiring early delivery, antenatal steroids should be given as per GoI guidelines i.e. Inj. Dexamethasone 6 mg IM 12 hourly for 2 days. More vigilant monitoring of blood glucose levels should be done for next 72 hours following injection. In case of raised blood glucose levels during this period, adjustment of insulin dose should be made accordingly.

Fetal surveillance in pregnant women with GDM:

- Pregnant women with GDM are at an increased risk for fetal death in utero and this risk is increased in pregnant women requiring medical management. Hence fetal surveillance is required.
- Fetal heart should be monitored by auscultation on each antenatal visit.

➢ Labour & Delivery

- Timing of delivery: GDM pregnancies are associated with delay in lung maturity of the fetus; so routine delivery prior to 39 weeks is not recommended.
- Pregnant women with GDM with poor plasma glucose control, those with risk factors like hypertensive disorder of pregnancy, previous still birth & other complications should be delivered earlier. The timing of delivery should be individualized by the obstetrician accordingly.
- Vaginal delivery should be preferred and LSCS should be done for obstetric indications only.
- In case of fetal macrosomia (estimated fetal weight > 4 Kg) consideration should be given for a primary cesarean section at 39 weeks to avoid shoulder dystocia.



➢ Special precaution during labour

- Pregnant women with GDM on medical management (metformin or insulin) require blood sugar monitoring during labour by a glucometer.
- The morning dose of insulin/metformin is withheld on the day of induction/labour and the pregnant women should be started on 2 hourly monitoring of blood sugar.
- IV infusion with normal saline (NS) to be started & regular insulin to be added according to blood sugar levels.

➢ Immediate neonatal care for baby of mother with GDM

- All neonates should receive essential newborn care with emphasis on early breast feeding to prevent hypoglycemia.
- Newborns should be monitored for hypoglycemia. Monitoring should be started at 1 hour of delivery and continued every 4 hours (prior to next feed) till four stable glucose values are obtained. The cut off capillary blood glucose for hypoglycemia in normal birth weight newborn is <45 mg/ dL and <54 mg/dL in case of Intra-uterine growth restriction (IUGR), to initiate treatment.
- Neonate should also be evaluated for other neonatal complications like respiratory distress, convulsions, hyperbilirubinemia.

➢ Post-delivery follow up of pregnant women with GDM

- Women with GDM should be offered regular postpartum care after delivery.
- 75 g OGTT should be performed after 6 weeks.
- Test normal: Woman is counselled about lifestyle modifications, weight monitoring &

exercise. Advise women to get annual screening for DM in NCD clinic as per protocol.

- Test positive: Woman should be linked with NCD program for further management.
- Pregnant women with GDM and their off springs are at increased risk of developing Type II Diabetes mellitus in later life. They should be counselled for healthy lifestyle and behavior, particularly role of diet & exercise.

GESTATIONAL DIABETES MELLITUS

➢ KEY SUMMARY POINTS

- All pregnant women must be screened for GDM
- Testing for GDM is recommended twice during ANC.
- The first testing should be done during first antenatal contact as early as possible in pregnancy. The second testing should be done during 24-28 weeks of pregnancy if the first test is negative. There should be at least 4 weeks gap between the two tests
- All pregnant women who test positive for GDM for the first time should be started on Medical Nutrition Therapy (MNT) for 2 weeks.
- Metformin or Insulin therapy is the accepted medical management of pregnant women with GDM not controlled on MNT.
- In cases diagnosed before 20 weeks of pregnancy, a fetal anatomical survey by USG should be performed at 18-20 weeks.
- Pregnant woman with controlled blood glucose levels (2 hr PPPG < 120 mg/dl) may deliver spontaneously or may be induced at or after 39 weeks.
- Pregnant women with GDM with poor plasma glucose control, those with risk factors like hypertensive disorder of pregnancy, previous still birth & other complications should be delivered earlier. The timing of delivery should be individualized by the obstetrician accordingly.
- Vaginal delivery should be preferred and LSCS should be done for obstetric indications only.
- In case of fetal macrosomia (estimated fetal weight > 4 Kg) consideration should be given for a primary cesarean section at 39 weeks to avoid shoulder dystocia.

E. ANEMIA DURING PREGNANCY & POST-PARTUM PERIOD

➢ Definition

Anemia in pregnancy is defined as Hb level of <11 g/dl during pregnancy (and in the immediate postpartum period). A pregnant woman with Hb level of <7 g/dl is said to have severe anemia.

➢ Nutrition

A well-balanced diet consisting of a variety of food helps in the growth of the baby and mother and prevents anemia. The balanced diet concept should be informed to the pregnant mother and their relatives.

The nutritional advice is provided through counseling and the contents of balanced diet can be shown by pictorial presentation. Special food items which increase the iron content in the body can also be shown in the picture and pregnant women is advised to frequently consume them. In case of severe anemia, a special diet can be planned with dietitian and it should be ensured that the pregnant woman complies with that. Food items which can reduce the iron absorption should also be made known to the pregnant women.

Who will screen and place of screening

Health service provider at any point of ANC check-up (including Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA) day).

Nutritional Counseling during pregnancy

Good counseling is the key to improving adherence to nutritional advice and compliance to treatment in pregnancy. The following points need emphasis during every visit:

- Every mother should be informed about her Hb level and the management protocol thereby adopted.
- Every mother should be told about the common side effects of iron therapy like constipation, nausea, vomiting and diarrhea. It must be emphasized that these are self-limiting minor side effects.

During every visit, women should be asked about the side effects and they should be counseled to improve compliance.

Do's ☑

- Consume green leafy vegetables, whole grain cereals and pulses, dry fruits and nuts,
- Non-vegetarians: egg, chicken, fish and meat are good sources of iron.
- Vitamin C rich foods: amla, guava, orange, lemon juice and sprouted pulses should be consumed as these increase absorptions of iron.
- Dietary diversification using locally available iron rich food items should be practiced.
- **IFA tablet should be consumed 2 hours before meals to ensure an empty stomach. In case of any discomfort, consumption of IFA tablet should be 1 hour after meals or with meals or at night. This will help avoid nausea.**
- Calcium tablets should be consumed post meals. Calcium tablets should not be taken along with IFA tablets. At least 2 hours gap is required between the two since calcium also interferes with the absorption of iron.

Don'ts ☒

- Milk and milk products along with iron rich food or iron tablets should be avoided as these can hamper the absorption of iron.
- Tea, coffee, caffeinated milk or milk-based products should not be consumed with oral IFA tablet since it interferes with its absorption.
- Very high fiber foods should not be consumed with iron rich foods as it hinders absorption of iron
- Unhygienic water should not be used for cooking

Periodicity

Testing of anemia in pregnant women should be done during all ANC visits.

Diagnosis

Examine and investigate the woman for the following:

- Conjunctival pallor.
- Pallor of the tongue, palate and oral mucosa.
- Severe palmar pallor.
- Pedal oedema.
- Respiratory rate (count for 1 minute).
- Level of Hb.

Testing of anemia in pregnant women should be done at all ANC contact points.

Method: Sahli's Haemoglobinometer or Digital haemoglobinometer or Semi-Auto Analyzers.If facilities of auto-analyzer present, Peripheral smears should be done on all women to rule out megaloblastic or dimorphic anemia. Readings like RBC count and MCV from auto-analyzers may be used to rule out Thalassemia. MCV RBC ratio of less than or equal to 14 is suggestive of Thalassemia.

However, serum ferritin is more confirmatory and wherever possible, it should be doneto assess type of anemia.

Who will screen and place of screening

Health service provider at any point of ANC check-up (including Pradhan Mantri Surakshit Matritva Abhiyan {PMSMA} day).

Diagnostic framework to assess types of anemia		
Hb (in gm%)	**Laboratory parameters**	**Interpretation**
	>11	No anemia
	10 - 10.9	Mild anemia
	7-9.9	Moderate anemia
	<7.0	Severe anemia
MCV/RBC count ratio	>14	Iron deficiency anemia
	<14	Thalassemia
Peripheral smear	Macrocytesand megaloblasts	Megaloblastic anemia
	Microcytes and hypochromia	Iron deficiency anemia or haemolytic anemia
	Mix of microcytes and macrocytes/ megaloblasts	Dimorphic anemia
Serum ferritin (in μg/l)	<30 μg/l	Iron deficiency anemia

> Management

13% of women among those with moderate and severe anemia have dimorphic anemia that requires treatment with VitaminB12 or Folic acid along with Iron therapy. Since folic acid deficiency is much more common than B12 deficiency, in case of megaloblastic anemia picture, folic acid supplementation is given- around 1-5 mg/day. If the patient doesn't respond to Folic Acid, then investigate for B12 deficiency and give Vitamin B12 along with IFA tablet.

One tablet of vitamin B12 (0.1 mg/tab) should be consumed daily for about 3 months for the Vitamin B12 stores to be built up. The B12 tablets should be stored at room temperature away from moisture and heat. They can be taken with water any time during the day. Its absorption has no relationship with intake of food.

Treatment guidelines based on period of gestation and Hb levels

<table>
<tr><th>Hb (g/dl)</th><th>10-10.9 g/dl (Mild Anemia)</th><th>7-9.9 g/dl (Moderate Anemia)</th><th><7 g/dl (Severe Anemia)*</th><th><5g/dl (Very Severe Anemia)#</th></tr>
<tr><td rowspan="3">First trimester (0-12 weeks)</td><td>Folic acid
400 µgm</td><td>Folic acid
400 µgm</td><td>immediate attention for corrective actions like detecting the cause of anemia and its appropriate management such as blood transfusion etc.</td><td>immediate attention for corrective actions like detecting the cause of anemia and its appropriate management such as blood transfusion etc.</td></tr>
<tr><td rowspan="2">Dietary advice: Iron rich fruits and vegetables eg Bengal gram whole, horse gram whole, raisins, amaranth leaves (red)</td><td rowspan="2">Dietary advice: Iron rich fruits and vegetables
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<tr><td>Second trimester (13-28 weeks)</td><td>IFA (60 mg elemental iron and 0.5 mg folic acid)
2 tab OD</td><td>IFA (60 mg elemental iron and 0.5 mg folic acid)
2tab OD</td><td>Iv Iron Sucrose (after 14 weeks)
Consider BT if established heart failure</td><td>Blood Transfusion</td></tr>
<tr><td>Third trimester (29 weeks till term)</td><td>IFA (60 mg elemental iron and 0.5 mg folic acid)
2 tab OD</td><td>IV Iron Sucrose and then prophylactic IFA</td><td>Iv Iron Sucrose
• If 34weeks, and Hb is 7g/dl, blood transfusion is advised
• Immediate hospitalization is recommended at a health facility where round-the-clock specialist care and BT facilityis available</td><td>Blood Transfusion</td></tr>
</table>

Hb (g/dl)	10-10.9 g/dl (Mild Anemia)	7-9.9 g/dl (Moderate Anemia)	<7 g/dl (Severe Anemia)*	<5g/dl (Very Severe Anemia)#
			• If woman with Hb<7gms % is in labour, deliver her and simultaneously arrange for BT. If the BT facility not available in house, then inform the referral center and keep transport ready for prompt transfer.	

These recommendations address the use of iron supplements to treat IDA during pregnancy in the context of public health program. However, physicians can prescribe a treatment at their own clinical judgement depending on the patient's clinical condition

➢ ORAL IRON

Oral iron and folic acid tablet (each containing 60 mg elemental iron and 0.5 mg folic acid) are advised to be taken preferably 2 hours after dinner. This has to be consumed for a period of six months during pregnancy (from second trimester onwards) and continued until six months post-partum. In case she is anemic, the dose is to be doubled i.e. two tablets together after dinner is to be taken orally. Ideally absorption of iron is best when taken in empty stomach; but increased gastritis, nausea, vomiting and constipation may reduce the compliance. It is therefore, advised to take oral iron tablets after meals or at bed time.

Each large tablet contains dried Ferrous Sulphate IP eq. to Ferrous Iron 60 mg & Folic Acid IP 0.5 mg.

Indications: Iron deficiency anemia.

Contraindications: If on IV iron sucrose therapy.

Side effects: The side effects with oral iron are minor and self-limiting. The common side effects are nausea, vomiting, constipation and diarrhea.

➢ IV IRON

Specifications for IV iron sucrose: Each 5 ml ampoule contains 100 mg of elemental iron.

Always look for dosage content in product insert and ampoules of IV iron sucrose. The ampoules should be stored at room temperature away from sunlight

➢ Indication

- As first line of treatment in Pregnant women in IIIrd trimester of pregnancy i.e. 29weeks till term, with Hb 7-9.9 g/dl.
- For correction of anemia in cases of moderate anemia who are in 1st&IInd trimester of pregnancy and not able to tolerate IFA tablets.
- In cases of Refractory anemia, not responding

to oral iron therapy.

- Pregnant women in 15-34 weeks of gestation with Hb 5-6.9 g/dl.

➢ Contraindication

IV iron sucrose should best be avoided when a woman is suffering from:

- Liver disorder like jaundice, cirrhosis.
- Hypersensitivity to iron.
- Haemoglobinopathies like thalassemia, sickle cell anemia, history of blood transfusion.
- Allergic disorder like asthma.
- Acute cardiac failure.
- Severe infections; however, acute infections should be first treated and then IV iron sucrose can be administered.

➢ Calculating the total dose

Total dose to be administered depends on the pre-pregnancy weight of the pregnant women and the Hb concentration at the time of visit. The target Hb is 11 g/dl.The body weight should be measured using a well calibrated electronic weighing scale. Please note the following while measuring the weight:

- Request woman to remove footwear and heavy clothing.
- The woman to stand straight without support and look straight.
- Place the weighing machine on a flat hard surface.
- Ensure the weighing machine is showing 00:00 at the start.
- Note the weight and round it to the nearest whole number.

Recorded weight	Rounded weight
48.7	49
48.4	48
48.2	48
48.5	48

Example: The dose is calculated by the following formula where 500mg.

Total dose (mg) = Pre-pregnancy body weight (kg) x [Target Hb (11g/dl) - Actual Hb] x 0.24 + 500 mg

The body weight should ideally be pre pregnancy weight but since this may not be available in most instances, the weight recorded in the first trimester or anytime till 20 weeks should be considered.

For example, if weight of a woman is 47 kg and baseline haemoglobin is = 6.5 g/dl, target Haemoglobin = 11gm/dl, the total iron requirement is = 47 x [11-6.5] x 0.24 +500= 550. It should be rounded off to the nearest 100. So the total dose required will be 600mg.

If a woman gets registered after 20 weeks, the weight on the day of the registration should be recorded. For the calculation of iron sucrose dose, 4 kg should be deducted if she gets registered between 20 and 28 weeks. If she gets registered after 28 weeks, 8 kgs should be deducted from the recorded weight for calculating the dose of iron sucrose.

For example, if a woman gets registered at 29 weeks, her weight at the time of registration is 56 kgs and if her Hb is 6 gms/dl, her total iron requirement is= (56-8) x [11-6] x 0.24 +500= 557.6.

When rounded off to the nearest 100, the total dose required will be 600mg.

A nomogram is enclosed here that can be used as a guide for calculating the dose of IV iron sucrose.

Please note that the maximum dose that can be administered to a pregnant woman should not be more than 1000 mg.

> Mode of administration

No test dose is required. Plastic bottles containing 100 ml of 0.9% saline should be made available for the infusions. IV iron sucrose should be administered as a slow infusion of 200mg/dose in 100 ml 0.9% saline administered over 20-30 minutes. During the first five minutes, infusion should be given at the rate of 20-30 drops/minute and then increased to 80-90 drops/minute. It is important to administer the drug at this rate since too slow or too fast rates have been associated with side effects.

Not more than 200 mg can be given in one infusion. So, the number of infusions to be given is decided accordingly based on the dose calculated. In this example, 600 mg can be administered in 3 infusions. There should be a gap of at least 48 hours between any two successive doses. If the requirement is more than 1000 mg as per the calculation, then also only 1000 mg should be given in 5 infusions.

> Adverse reactions

Several evidences are there to show that IV iron sucrose is a safe drug. The serious side effects like anaphylactic reactions occur in less than 0.002% of cases. For every 100 infusions, minor immediate adverse drug reactions that have been reported includes headache (1.1%), nausea and vomiting (0.73%), feeling feverish (0.4%), metallic taste (0.13%), chest compression (0.06%), rashes (0.04%). The common adverse effects reported within 2-3 days of the infusion include: fever (2.1%), arthralgia and myalgia (1.8%), thrombophlebitis (1.2%), nausea and vomiting (1.7%), diarrhea (0.3%), and constipation (0.1%). Most of these adverse reactions are self-limiting. However, for more serious rare adverse events like anaphylactic reactions, an emergency tray should always be kept ready at the time of infusion. The medical team should be equipped to handle the adverse reactions.

IV sucrose infusion should be given in a day care setting with facilities to handle any severe adverse reactions under the supervision of a medical officer. The woman is to be kept under observation at least for 2 hrs after the infusion.

The dose can be administered ONLY by a doctor and can be given in:

- Medical colleges
- District Hospitals
- CEmONC centres

Please note that always freshly prepared solution should be used. Under no circumstances it should be kept prepared for later use

State Governments may take decision for taking it further down as per the states' capabilities and availability of logistics including Doctors and Specialists to handle any emergency.

Ensure readiness of emergency tray for management of anaphylactic reactions:

- ✓ The tray should be kept in the day care room where IV sucrose infusion is being done.
- ✓ Every day morning, the tray should be checked for replenishment of used drugs.
- ✓ Following drugs & consumables must always be available in the tray:

Inj Chlorpheniramine maleate, Inj Dexamethasone, Inj Hydrocortisone succinate, Inj Adrenaline, Inj Deriphylline, Inj Frusemide, Inj Dopamine, Inj Sodium bicarbonate, Oxygen, Ringer Lactate, disposable needles, gloves, cotton swabs.

Steps to be followed before start of the infusion

- The pregnant woman should be instructed to lie in supine position on a bed.
- Start an IV line (always use venflon and not a butterfly) and secure it well.
- Look FOR EXTRAVASATION to make sure the IV line is in place.
- Take a 100 ml 0.9% NaCl and look for any particulate matter.
- DISCARD IN CASE OF ANY PARTICULATE MATTER.
- Connect it to the infusion set and remove all the air in the IV set.
- Draw the medication (10ml containing 200mg of iron sucrose) from the ampoule(s) into a 10ml sterile syringe and add this to the saline.
- Once the medication diffuses evenly in the saline start the infusion at the rate and time defined.

Common adverse effects observed with administration of IV iron sucrose

	How to handle	If persists/severe
Immediate adverse effects		
Sweating, palpitations, hypotension, with or without rashes	• Disconnect the IV set from the infusion line and start Ringer Lactate • Administer IV adrenaline (0.3- 0.5 ml slow IV) [1:1000/ml] • Foot end elevation • Start oxygen by mask	
Feeling of chest compression, headache, rashes	• Slow down the infusion and observe for another 10 min	• Stop the drug infusion • Give 5% dextrose / ringer lactate drip • Let the woman lie down in left lateral position for 30 minutes • Further doses not recommended
Cramps, myalgia, metallic taste	• Self-limiting • Continue the Infusion till completion • Let the woman lie down in left lateral position for 30 minutes • Counsel her to come after 48 hours for subsequent dose	

	How to handle	If persists/severe
Late adverse effects		
Fever, giddiness, GI symptoms, thrombophlebitis, vomiting, arthralgia	• Self-limiting	

In case any of the adverse events does not subside within 30 minutes, the patient should be referred to higher facilities.

Medications to be kept in the emergency tray before start of the IV infusion

S.No.	Medication	Numbers of ampoules
1	InjChloropheniramine maleate	5
2	Inj Dexamethasone	5
3	Inj Hydrocortisone succinate	3
4	Inj Adrenaline	5
5	InjDeriphylline	10
6	InjFrusemide	5
7	Inj Dopamine	3
8	Inj Sodium bicarbonate	3
9	Syringes	5
10	IV fluid	5
11	IV drip set	5
12	Bottle of ringer lactate	3
13	Venflon	5
14	Oxygen cylinder with accessories	1
15	Drinking water	1 glass

➢ Quality Control

Iron sucrose injection needs to undergo a stringent molecular test to ensure right specifications. This is significant since the adverse reactions are largely due to poor quality products, which do not adhere to prescribed molecular weight

➢ Blood Transfusion

The indications of blood transfusion (BT) are the following:

A. Antepartum period

Pregnancy less than 34 weeks:

- Always indicated if Hb <5 gm% with/

without clinical signs of cardiac failure or hypoxia.

- Hb between 5-7 g/dl in the presence of established cardiac failure.

Pregnancy more than or equal to 34weeks:

- Hb7g/dl or below whether or not decompensated.

Anemia not due to hematinic deficiency (hemoglobinopathy, bone marrow failure)

- Hematologist should always be consulted.

Acute haemorrhage in pregnancy

- Always indicated if Hb <7 gm% or if patient becomes hemodynamically unstable during haemorrhage.

B. Intrapartum period

- Hb < 7gm% (in labour); BT to be given after or along with initial management as per protocol.

C. Postpartum Period

- Hb < 7gm% (Postpartum); Decision of Blood Transfusion depends on medical history or symptoms.

D. Post operative period

- In hemodynamically stable post operative surgical patients, transfusion should be considered ifHb<=8g/dl or in presence of symptoms of inadequate oxygen delivery.

E. Patients in the intensive care unit and with sepsis

- In critically ill, normovolaemic patients, transfusion is considered if Hb <7g/dl, with a target of attaining Hb% of 9 g/dl.
- During the early resuscitative phase of severe sepsis if there is evidence of inadequate oxygen delivery to the tissues, blood transfusion is considered to achieve a target Hb% of 9 g/dl.
- Blood transfusion should not be used to assist weaning from mechanical ventilation if the Hb is >7 g/dl.

F. Elective caesarean section

- When elective caesarean section is planned and there is a history of Ante-partum and post- partum haemorrhage and previous caesarean section.

Requisites for Blood Transfusion:

- **Informed Consent:** The patient should be informed about her need for blood, alternatives available, as well as risks involved in transfusion and non-transfusion. Her written consent should be taken in the language she understands best, only after providing information. For very sick or unconscious patients the attendant or family member should sign the informed consent.
- **Identification of Recipient and Donor Unit:** Immediately before transfusion, the doctor / transfusionist should verify the identification of the patient, the blood unit, blood group and cross matching report and associated records.
- **Supervision:** Transfusion should be prescribed and administered under medical direction. The doctor / qualified Nurse/ transfusionist should observe the patient for an appropriate time at the initial stage and during the transfusion.
- **Monitoring** the Patients during transfusion for changes in general appearance, temperature, BP, respiratory rate and signs of adverse reaction: Vital to be checked before starting

transfusion, as soon as transfusion is started, 15 minutes after starting transfusion, every hour during transfusion, on completion and 4 hours after completing the transfusion.

Protocol for starting blood transfusion

- BT has to be started by standard protocol.
- Follow all aseptic measures: wash your hands and wear sterile gloves.
- Select a vein on forearm.
- Apply methylated spirit at the site of cannulation.
- A 170-260-micron blood filter set/ available BT set should be used for transfusion.
- Use an 18 Gauge I.V. cannula and fix to skin.
- Insert the blood filter blood set aseptically with no touch technique.
- Air must not be introduced into the administration set or the blood/blood components bag.
- Ensure that blood component /blood product which is being transfused should be mixed by gently shaking the product.
- Transfusion should be started within half an hour of issue of the blood.
- Blood should be started at the rate of 1ml/min. Vital parameters have to be checked after 15 minutes.
- If no blood transfusion reaction is present, the transfusion rate should be increased by 4ml/minute.
- Total blood /blood product transfusion should be completed within 4 hours of issuing it.
- No drug should be added to the blood or blood product.

Monitoring of blood transfusion:

Symptoms of transfusion reaction like breathlessness, itching, loin tenderness, etc. should be watched for.

The following parameters should be checked before starting transfusion, as soon as transfusion is started, 15 minutes after starting transfusion, every hour during transfusion, on completion and 4 hours after completing the transfusion.

General condition

- Temperature
- Pulse rate
- Blood Pressure
- Respiratory rate
- Urine Output
- Oxygen saturation is advisable if Pulse Oxymeter is available.
- Skin rashes and bleeding from any site should be noted.
- Colour of urine changes to pink in case of Transfusion reaction.
- Oozing from wound, surgical site and IV sites should be checked.

Completion of blood transfusion:

- Following completion of the transfusion, post transfusion information should be documented on the patient's chart.
- Blood bag label should be removed and stuck to the blood transfusion notes after transfusion completion and not initially.

Blood transfusion reaction:

The following parameters should be monitored: Temperature 1.5-2°C above baseline, hypotension/ shock or hypertension, tachycardia, tachypnoea, wheeze, stridor, rigors or chills, nausea, vomiting or pain (local, chest, back), bleeding, skin rash. If there is a reaction to blood transfusion as determined by of the signs/ symptoms mentioned above, the following should be done.

- Transfusion should be stopped immediately.
- CALL FOR HELP.
- Urgent action should be taken due to possible life- threatening nature of acute transfusion reactions.
- Senior doctor on duty should be informed whenever reaction occurs.
- Blood Unit and administration set should be removed.
- The intravenous cannula should be left in place and a new administration set should be put.
- IV saline infusion should be started, so that urine output is maintained at 100ml/hr.
- Injection Chlorpheniramine 10 to 20 mg and Injection Hydrocortisone 100 mg should be given intravenously.
- Injection adrenaline 0.5 ml 1:1000 dilution should be given intramuscularly in case of anaphylactic shock.
- It should be repeated after 15 minutes if there is no significant response.
- Intramuscular adrenaline is the first line treatment for anaphylaxis, with intravenous adrenaline reserved for unresponsive anaphylaxis or circulatory collapse.
- Give Inj. Frusemide 20 mg i.v. stat if patient develops circulatory over loading or Transfusion-related acute lung injury (TRALI).
- In the case of simple, urticarial- type reactions with no other symptoms or signs, the patient should be given antihistaminic and the transfusion may be continued at a slower rate.
- Any adverse reaction to the transfusion of blood/blood components should be reported to blood bank personnel immediately by the Unit concerned/ responsible doctor.
- Diagnostic symptom(s) and sign(s) should be recorded.

If there is a massive loss of blood (1 blood volume within 24 hours or 50% loss within 3 hours or a rate of 150 ml/min), Massive Transfusion Protocol (MTP) should be followed.

Massive blood loss may be defined as the loss of 1 blood volume within a 24-hour period or 50%blood volume loss within 3 hours or a rate of loss of 150 ml/minute.Basic principle of MTP is **to treat aggressively, to prevent refractory coagulopathy and begin resuscitation with blood products as soon as possible.**

The use of MTPs facilitates rapid availability of components.

- Rule of Four (4): When there is massive haemorrhage or 1st possible sign of DIC, administerblood products in a ratio of 4 units Packed RBC (PRBC): 4 units Fresh Frozen Plasma (FFP): 4 unit Platelets (PLT): 4 unit Cryoprecipitate.
- FFP should be used for volume expansion so that replacement of clotting factor may be started early.
- The replacement therapy is guided by laboratory assessment. Platelet count should

be maintained above 50000/u. 1 unit of platelet raises the platelet count by 6000-10000/u.

- Fibrinogen level should be maintained above 150 mg/dl.4-8 units of Cryoprecipitate generally is sufficient to achieve this goal.
- Maintain Hb above 9.0 g/dL by transfusing red cells.
- Inj. Tranaxemic Acid is very useful. It is to be given earlier in time during the bleeding. It can save10-15% blood loss.

FOLLOW UP

Every pregnant anemic woman should be followed up every month as per the Anemia Mukt Bharat guidelines. The purposes are to check compliance to treatment and assess its impact by measuring Hb. The actions taken during follow up will depend on the category of anemia.

Mild anemia (Hb 10-10.9g/dl): If Hb levels have come up to normal level, discontinue the treatment and continue with the prophylactic IFA dose (1 tab/ day).

Moderate anemia (Hb 7-9.9g/dl): If Hb levels show an increasing trend, continue with the same treatment. If there is no improvement in haemoglobin (<1 g/dl increase) after one months of treatment or if the Hb levels fall despite good compliance, refer the woman to higher centre/ District Hospital (DH) for further investigations. If Hb levels have come up to normal level, discontinue the treatment and continue with the prophylactic IFA dose (1 tab/ day).

Severe anemia (Hb <7g/dl): If the woman receives IV iron sucrose, Hb levels should be measured after 2 weeks. If it shows an increasing trend, and complete dose has been given, there is no need for any further treatment except prophylactic IFA. However, monthly follow up should be done to counsel her about nutrition and diet.

If it shows an increasing trend, but complete dose replacement has not been done, she should be counseled for taking the remaining doses. In case of refusal, she may be given curative/prophylactic IFA dose. Hb must be estimated every month to monitor and counsel on diet. In case there is no rise in Hb after a month on IFA, she should be referred to Medical colleges for investigations. If the woman receives Oral Iron Therapy i.e. 2 tab of IFA a day, she should be followed up after every month. If it shows an increasing trend, then iron therapy is continued and Hb is estimated as periodic intervals till complete correction. In case of non-compliance or other medical symptoms such as cardiac failure etc. mange and follow-up as mentioned above.

All severely anemic women need to be tracked. A separate list of such severely anemic women should be maintained at the sub centre and PHC level along with monthly follow up record of all such listed women. Medical Officer in-charge of the PHC must review this list every month and ensure management and follow up of these cases. Timely referral along with referral slip for non-responsive cases must be done and the same has to be reported.

F. URINARY TRACT INFECTION

A urinary tract infection (UTI) in a pregnant/ postpartum woman may be in the form of an upper UTI (pyelonephritis), or a lower UTI (cystitis). In both the cases, she needs treatment with antibiotics.

➢ Signs and symptoms of UTI

- Fever may be high grade, i.e. >38 °C; may be accompanied with chills and rigors.
- Burning on urination.

- Increased frequency and urgency of urination.
- Abdominal pain.
- Dysuria.
- Flank tenderness.
- Supra pubic pain/ tenderness.

Asymptomatic bacteriuria: persistent colonization of the urinary tract by significant numbers of bacteria in women without any urinary symptoms.

Acute Cystitis: presence of symptoms such as dysuria, urgency, frequency, nocturia, hematuria and suprapubic discomfort in afebrile women with no evidence of systemic illness.

Acute pyelonephritis: significant bacteriuria in the presence of systemic illness and symptoms such as flank or renal angle pain, pyrexia, rigor, nausea and vomiting.

Diagnosis of fever and dysuria during pregnancy and labor

Symptoms and signs typically present	Symptoms and signs sometimes present	Probable diagnosis
• Dysuria • Increased frequency and urgency of urination.	• Retropubic/suprapubic pain during or after urination. • Abdominal pain	Cystitis
• Spiking fever/chills • Loin pain/tenderness • Costo-vertebral angle tenderness • Nausea/vomiting	• Retropubic/suprapubic pain during or after urination • Abdominal pain • Dysuria/Increased frequency and urgency of urination	Acute pyelonephritis

➢ Investigations

Dipstick, microscopy and urine culture tests (if available at the PHC), for WBCs, bacteria, RBCs, epithelial cells & casts, albumin or proteinurea, can be used to determine if UTI is present, but it will not differentiate between cystitis and acute pyelonephritis.

- Microscopy of the urine sample may show white cells in clumps, bacteria and, sometimes, red blood cells.
- Urine culture and sensitivity tests should be done, if available, to identify the organism and know its antibiotic sensitivity.

NOTE: Urine examination requires a clean-catch mid-stream sample to minimize the possibility of contamination.

➢ Treatment

General management

- Encourage increased fluid intake by mouth.
- Use a fan or tepid sponge to help decrease the body temperature.
- Oral Paracetamol (500 mg to 1000mg, 6 to 8 hourly to control fever, DO NOT EXCEED 4 gram in 24 hours).

Assume that a urinary tract infection involves all levels of the urinary tract, from the renal calyces to the urethral meatus.

✓ Urinary tract infection and Cystitis

- Treat with antibiotics.
- In first & third trimester Amoxicillin is the drug of choice.
    * Cap. Amoxicillin 500 mg orally, 3 times a day for 7-10 days.
- In second trimester the following drugs may be given in following doses:
    * Tab. Cefadroxil 500 mg 2 times a day for 7-10 days OR
    * Tab. Nitrofurantoin 100mg twice daily for 7-10 days OR
- Treatment with antibiotics should be based upon the urine culture and sensitivity report, if available.
- Treatment is recommended for 7 days and follow up cultures should be performed 1 - 2weeks after discontinuing therapy.
- If there is no response, i.e. the treatment fails OR in case of Recurrent UTI, refer the woman to higher facility for urine culture and sensitivity, and further management.

✓ Acute pyelonephritis

Acute pyelonephritis is an infection of the upper urinary tract, mainly of the renal pelvis, which may also involve the renal parenchyma.

- A woman with acute pyelonephritis needs to be admitted to a health care facility.
- If shock is present or suspected, initiate immediate treatment & refer to a higher centre.
- Immediate treatment includes IV infusion of IV fluids (RL or NS) @150 ml per hour.
- Start the woman on broad spectrum antibiotics.
    * Ampicillin 1 g IV every 6 hr Plus Inj Gentamicin 5mg/kg (max 500mg) in 2-3 divided doses over 24 hours OR Cephalosporins.
    * Modify antibiotic as per culture & sensitivity report.
- Give oral Paracetamol 500 mg to 1000mg orally (6 to 8 hrly) as needed to control the pain and lower the body temperature. DO NOT EXCEED 4 gram in 24 hours.
- Intravenous antibiotics therapy should be continued for 24 - 48 hours after the patient becomes afebrile and costo-vertebral angle tenderness subsides. After treatment of i.v therapy, start treatment with appropriate oral antibiotics for 10 to 14 days.
- Urine culture should be obtained each trimester for remainder of gestation period.
- After treatment of an episode of pyelonephritis, antibiotic suppression may be prescribed, if there are risk factors for its recurrence, after consultation with urologist and continued for remainder of pregnancy. (Nitrofurantoin 100 mg once or twice daily is an acceptable regimen).

✓ Retention of urine

During the late first trimester, dysuria or difficulty in passing urine may be present due to pressure of the retroverted gravid uterus on the bladder, though usually this does not present with any symptoms. After 12 weeks of gestation, spontaneous correction of the retroversion occurs and the uterus rises above the pelvic brim and becomes palpable per abdomen. Occasionally, the uterus remains retroverted even after 12 weeks of gestation and retention of urine occurs due to

stretching of the urethra.

Diagnosis

On abdominal examination, a cystic swelling (over distended bladder) is palpable in the lower abdomen arising from the pelvis. The swelling may be large enough to reach above the umbilicus.

- On vaginal examination.
    - The cervix is high up behind the symphysis pubis and directed downward and forward.
    - The uterus is retroverted, more than 12 weeks in size and is felt below the cervix.
    - There is a cystic mass in the anterior fornix.

Management

- Under all aseptic precautions, insert a self-retaining Foley catheter (G16 or G14) and attach a urobag. Drain the urine continuously for at least 48 hours and get urine routine & microscopy done.
- Encourage the woman to lie in prone position to correct retroversion partially.
- These measures allow the uterus to rise above the pelvic brim.
- Once the uterus is palpable P/A, remove the catheter and ensure that the woman can pass urine on her own.

G. MALARIA PROPHYLAXIS AND TREATMENT

- If a pregnant woman is diagnosed with malaria, start treatment in accordance **with National Vector Borne Disease Control Programme (NVBDCP) guidelines** as malarial fever can cause more harm to the health of the mother & the baby than the drugs used for its treatment.
- In endemic areas no chemoprophylaxis is recommended but insecticide treated bed nets/Long Lasting Insecticidal Net (LLIN) should be given on priority basis to all the pregnant women.
- In non-endemic areas, all clinically suspected cases as per National Vector Borne Disease Control Programme (NVBDCP) guidelines 2010 should preferably be investigated for malaria by Microscopy or Rapid Diagnostic Kit (RDK), if these are available.
- In high malaria endemic areas, pregnant woman should be routinely tested for malaria on the 1st ANC and subsequently screened for malarial infection every month by conducting the RDK tests even if she does not manifest any symptoms of malaria.
- If at any time a pregnant woman shows symptoms & tests positive, manage according to guidelines.
- Identify complicated/ severe malaria: Clinical: prostration, impaired consciousness, respiratory distress, pulmonary edema, convulsions, abnormal bleeding, DIC, Jaundice, hemoglobinuria. Laboratory: severe anemia, thrombocytopenia, hypoglycemia, acidosis, renal impairment, hyper parasitemia, meningitis, gram negative septicemia.

Treatment: As per the National Guidelines 2013

Treatment of uncomplicated P.falciparum cases in pregnancy:

1st Trimester:

Quinine salt 10mg/kg 3 times daily for 7 days.

ACT contraindicated in 1st trimester.

2nd and 3rd trimester: Area-specific ACT as per dosage

- Quinine may induce hypoglycemia
- Quinine should not be withheld during pregnancy, despite its alleged abortifacient properties at high dosage, since it safeguards the life of mother
- Pregnant women should not start taking quinine on an empty stomach and should eat regularly, while on quinine treatment.

North Eastern States	Other States
Artemisin based combination therapy (ACT-AL)	Artemisin based combination therapy (ACT-SP).
Artemether 20mg + Lumefentrine 120mg	Artesunate 4mg/kg body weight for 3days. Sulphadoxine 25mg/kg body weight - Pyremethamine 1.25mg /kg body weight.

a). Treatment of P. vivax in pregnancy:

Chloroquine 25mg/kg body weight divided over 3 days

Chloroquine	Day 1	Day2	Day3
No. of tablets	4	4	2
Dose	10mg/kg body weight	10mg/kg body weight	5mg/kg body weight

b). Treatment of severe malaria in pregnancy:

- Severe malaria in pregnancy is an emergency
- Treatment should be given as per severity and associated complications which can be best decided by the treating physicians.
- Before referring patients, do RDT and take blood smear; give a parenteral dose of artemisinin derivative or quinine in suspected cerebral malaria cases and send case sheet, details of treatment history and blood slide with patient.

Pregnant women with severe malaria in any trimester can be treated with artemisinin derivatives, which, in contrast to quinine, do not risk aggravating hypoglycemia.

Parenteral artemisinin derivatives or quinine should be used irrespective of chloroquine resistance status of the area with one of the following options:

Initial parenteral treatment for at least 48 hours: CHOOSE ONE of following four options.	Follow-up treatment, when patient can take oral medication following parenteral treatment.
Quinine: 20mg quinine salt/kg body weight on admission (IV infusion or divided IM injection) followed by maintenance dose of 10 mg/kg 8 hourly; infusion rate should not exceed 5 mg/kg per hour. Loading dose of 20mg/kg should not be given, if the patient has already received quinine.	Quinine 10 mg/kg three times a day. With clindamycin in pregnant women. - to complete 7 days of treatment.
Artesunate: 2.4 mg/kg i.v. or i.m. given on admission (time=0), then at 12 h and 24 h, then once a day. or Artemether: 3.2 mg/kg bwi.m. given on admission then 1.6 mg/kg per day. or Arteether: 150 mg daily i.m for 3 days in adults only (not recommended for children).	Full oral course of Area-specific ACT: In North Eastern states: Age-specific ACT-AL for 3 days. In other states: Treat with: ACT-SP for 3 days.

First trimester: (Uncomplicated Malaria)

P. vivax /ovale/malariae or knowlesi malaria:

Chloroquine base to be given as under:

Chloroquine base	Day 1	10mg/kg	4 tabs(stat)
Chloroquine base	Day 2	10mg/kg	4 tabs (stat)
Chloroquine base	Day 3	5mg/kg	2 tabs (stat)

P. falciparum malaria:

- Tab Quinine 10 mg/kg 3 times daily for 7 days PLUS.
- Tab Clindamycin 10 mg/kg twice daily for 7 days OR quinine monotherapy if clindamycin is not available.

Quinine should not be withheld during pregnancy, despite its alleged abortifacient properties at high dosage, since it safeguards the life of mother

First trimester: (Severe & Complicated Malaria)

- Parenteral Quinine is the drug of choice in first trimester.
- Loading dose:
  - 20 mg/kg on admission (IV infusion in 5% Dextrose/ Dextrose saline over 4 hours).
- Maintenance dose for 48 hours:
  - 10 mg/kg 8 hourly
  - Infusion rate should not exceed 5 mg salt/kg / hour.
- Parenteral Quinine is given for minimum of 48 hours & once the patient tolerates oral therapy, follow-up treatment is as under:
  - Tab Quinine 10 mg/kg thrice a day to complete a course of 7 days PLUS.
  - Tab Clindamycin 10mg/kg twice a day for 7 days.
  - Patient should always be instructed not to take quinine empty stomach and should eat regularly while on therapy as it may cause hypoglycemia.
- If Parenteral Quinine is to be given beyond 48 hours, reduce dose to 7 mg/kg 12 hourly.
- Parenteral Treatment should be given for a minimum of 24 hours once started.
- If Quinine is unavailable, Artemisinin derivatives may be used.

- Never give bolus injection of Quinine.
- Quinine is associated with severe and recurrent hypoglycemia in late pregnancy.
- Loading dose may not be given if the patient has already received quinine.
- Quinine dosing should be reduced to 12-hourly dosing if IV therapy extends more than 48 hours or if the patient has renal or hepatic dysfunction.
- Primaquine is contraindicated during pregnancy.
- Do not withhold Quinine in pregnancy despite its alleged abortifacient properties at high dosage as it safeguards life of mother.

Second & Third trimester: (Uncomplicated Malaria)

- **P. Vivax or other non-falciparum species:** Chloroquine base to be given as under:

Chloroquine base	Day 1	10mg/kg	4 tabs(stat)
Chloroquine base	Day 2	10mg/kg	4 tabs(stat)
Chloroquine base	Day 3	5mg/kg	2 tabs(stat)

- **P. falciparum malaria:**

Artemisinin Combination Therapy (ACT) is recommended as under.

ACT-SP Therapy	Day 1	Day 2	Day 3
Artesunate (AS) 50mg	4 tabs (Stat)	4 tab (Stat)	4 tab (Stat)
Sulfadoxine (SP)500mg + Pyrimethamine 25 mg	3 tabs (Stat)	Nil	Nil

Monotherapy of oral artemisinin derivative should not be given due to risk if resistance.

Second & Third trimester: (Severe & Complicated Malaria).

- Parenteral Artemisinin derivatives preferred in 2nd& 3rd trimesters.
- To be given as bolus dose as follows:
  - Inj. Artesunate 2.4 mg/kg IV or IM given on admission (0 dose).
  - Dose repeated at 12 hours & 24 hours.
  - Then 2 mg/kg once a day for 7 days.

  OR
  - Inj Artemether 3.2 mg/kg IM given on admission (0 dose).
  - Then 1.6 mg/kg/day for 7 days.

  OR
  - Inj A-ß Artemether 150 mg daily IM for 3 days.

Care should be taken to reconstitute Artesunate powder in 5% Sodium bicarbonate provided in the pack as under:

Artesunate Powder 60 mg + 5% Sodium bicarbonate + Saline Solution provided with the salt.

H. HIV INFECTION IN PREGNANCY& PPTCT

➢ **Key Messages**

- Routinely offer HIV counselling (Group/ Individual counselling) and testing to all pregnant women attending antenatal care, with 'opt out' option.
- Preferable to involve spouse and test him also and move from an "ANC centric" to a "Family centric" approach.
- Provide ART to all HIV infected pregnant women regardless of WHO staging and CD4 count results. Preferred regimen is TDF+3TC+EFV.
- Promote institutional delivery for all HIV infected pregnant women (ANMs/ASHAs, Community workers to accompany to institutions; reduction of stigma and discrimination by health care providers through sensitisation and capacity building).
- Provision of care for associated conditions (STI/RTI, TB & other Opportunistic Infections).
- Provide nutrition counselling and psychosocial support for HIV infected pregnant women.
- Provide counselling and support for initiation of exclusive breastfeeds within an hour of delivery as the preferred Option and continue for 6 months. After 6 months, complementary feeding should be given along with breastfeeds.
- Provide antiretroviral prophylaxis to infants from birth up to a minimum period of 6 weeks.
- Integrate follow-up of HIV-exposed infants (HEIs) into routine healthcare services including immunization.
- Ensure initiation of Co-trimoxazole Prophylactic Therapy (CPT) and Early Infant Diagnosis (EID) using HIV DNA PCR at 6 weeks of age onwards as per the EID guidelines.

- Strengthen follow-up and outreach through ANMs, ASHAs and District level networks and other outreach workers to support HIV infected pregnantwoman.

Parent-to-child transmission of HIV is a major route of new HIV infections in children. Children born to women with HIV, acquire HIV infection from their mother, either during pregnancy, labour/delivery or through breastfeeding. This is largely preventable with appropriate intervention, by providing Anti-retroviral (ARV) prophylaxis or Anti-retroviral therapy (ART).

In line with WHO standards for a comprehensive strategy, the National PPTCT programme recognizes the 4 elements integral to preventing HIV transmission among women and children. These include:

- **Prong 1:** Primary prevention of HIV, especially among women of childbearing age.
- **Prong 2:** Prevention of unintended pregnancies among women living with HIV.
- **Prong 3:** Prevention of HIV transmission from pregnant women infected with HIV to their child.
- **Prong 4:** Provide care, support and treatment to women living with HIV, her children and family.

Goals of National PPTCT Programme in India are:

- Primary prevention of HIV, especially among women in child-bearing age.
- Integration of PPTCT interventions with general health services such as basic Ante-natal Care (ANC), Natal and Post-Natal Services, Sexual Reproductive Health and Family Planning and Early Infant Diagnosis (EID), Paediatric ART andAdolescent Reproductive and Sexual Health (ARSH), TB and STI/RTI services.
- Strengthening post-natal care of the HIV-infected mother and her exposed infant.
- Provide the essential package of PPTCT services.

Components of PPTCT Programme

Offer HIV Counselling and Testing Services to all Pregnant Women

HIV Negative Pregnant Women

- Safe sex counselling
- Couple counselling.
- Linkages to family planning services.
- Free condoms.
- Behaviour change Communication (BCC) for high-risk women and her partner.
- Repeat HIV testing, considering window period if spouse is positive or s/he has high risk behaviour.
- Infant feeding and nutrition counselling

HIV Infected Pregnant Women

- Ante-natal Care (ensure at least 4 visits).
- Counselling on choices of continuation or medical termination of pregnancy (MTP)-to undertake with in the first 3 months of pregnancy only.
- Screening for TB (40 Gene-Xpert testing sites are being launched shortly) and other Opportunistic Infections.
- Screening and treatment for STIs.
- WHO clinical staging and CD4 testing.
- Counselling on positive living, safe delivery, birth-planning and infant feeding options.
- Couple and safe sex counselling and HIV testing of spouse and other living children.
- Linkage to ART services.
- Provide ART regardless of clinical stage and CD4 count
- Nutrition counselling and linkages to Government/ other nutrition programmes.
- Family Planning Services.
- EBF reinforcement/Infant feeding support through home visits.
- Psycho-social support through follow-up counselling, home visits and support groups.

HIV Exposed Infant (HEI)

- Exclusive breastfeeds up to 6 months and continued breastfeeds in addition to complementary feeds after 6 months up to 1 year for EID negative babies and up to 2 years for EID positive babies who receive Paediatric ART.
- Postpartum ARV prophylaxis for infant for minimum 6 weeks.
- Early infant diagnosis (EID) at 6 weeks of age; repeat testing at 6 months of age, 12 months of age & 6 weeks after cessation of breastfeeds.
- Co-trimoxazole prophylaxis (CPT) from 6 weeks of age.

- HIV care and Paediatric ART for infants and children diagnosed as HIV positive through EID.
- Growth and nutrition monitoring.
- Immunizations and routine infant care.
- Gradual weaning after 6 months and introduction of complementary feeds from 6 months onwards along with continuation of BF for at least 1 year for adequate growth & development of the child.
- Confirmation of HIV status of all babies at 18 monthsusing all 3 Antibody (Rapid) Tests

➢ Process of Screening ANC Women

- ANM at the village/sub-centre level will do screening test for HIV and Syphilis using whole blood fingerprick test.
- If the Syphilis test is reactive then the pregnant woman would be referred to designated STI/RTI clinics or PHC with RPR testingfacility for Syphilis confirmation.
- If the HIV test is reactive then the pregnant woman will be referred to stand alone ICTC for confirmation of HIV by rapid tests. The patient then undergoes pre-test counselling at the ICTC by the ICTC counsellor.
- The ICTC collects 5 ml blood for HIV rapid tests and RPR test.
- After HIV, the patient returns to the ICTC counsellor for post-test counselling.
- During post-test counselling the ICTC counsellor provides the HIV and Syphilis test report and counsels the patient to go to the STI/RTI clinic for further follow-up and advice from the STI/RTI counsellor and Medical officer for treatment if required.

Antenatal care during pregnancy and delivery:

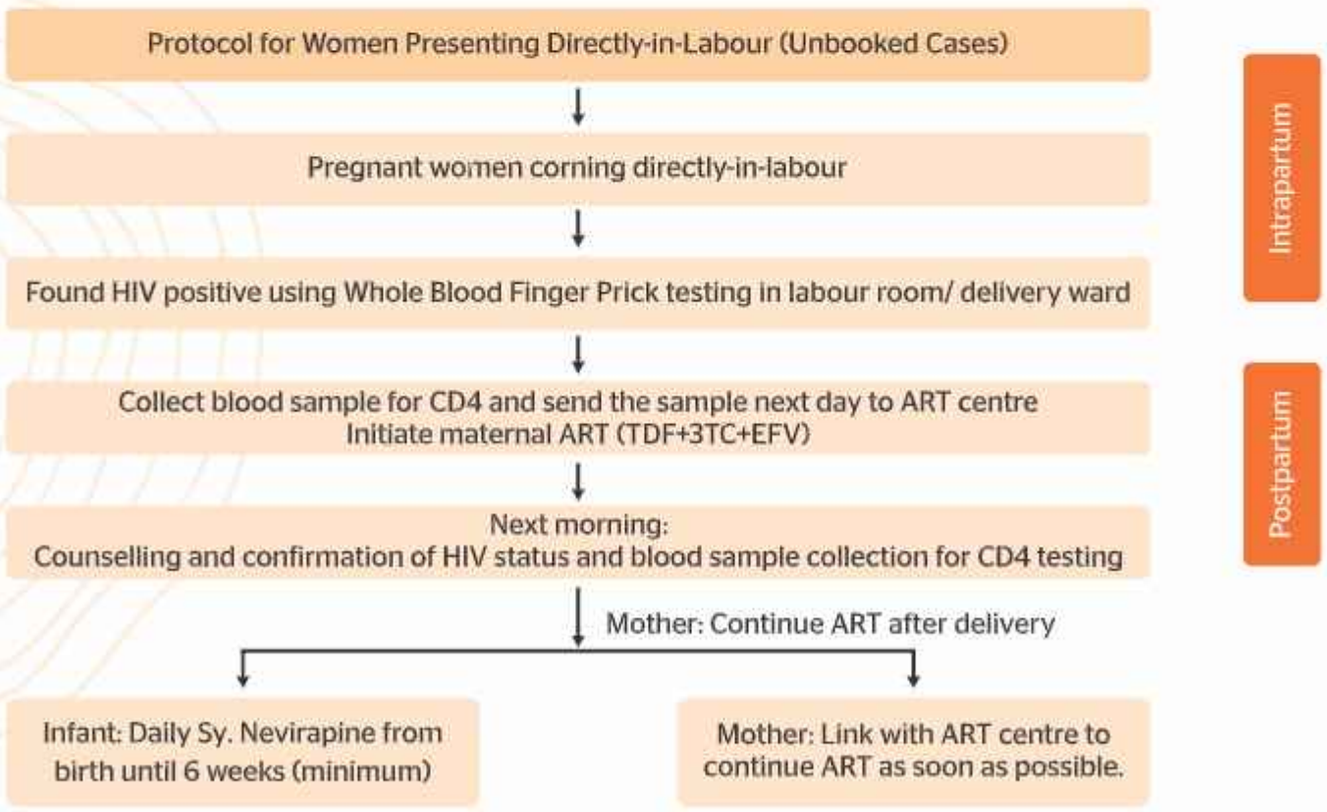
- Initiate lifelong ART in all pregnant women with confirmed HIV infection regardless of WHO clinical stage or CD4 cell count.
- The recommended first-line regimen for HIV infected Pregnant Women is Tenofovir (TDF) (300 mg) + Lamivudine (3TC) (300 mg) + Dolutegravir (50 mg) (if there is no prior exposure to NNRTIs (NVP/EFV) at any gestational Age (including pregnant women in the first trimester of pregnancy).
- ART shall be initiated only at ART centre.
- The indications for Co-trimoxazole initiation in pregnant women are same as those for other adults (CD4<250 cells/mm3). Co-trimoxazole prophylaxis is helpful in reducing morbidity and mortality as it prevents Opportunistic Infections (OIs) such as Pneumocystis Jiroveci pneumonia (PCP), Toxoplasmosis, Diarrhoea as well as other Bacterial infections. Co-trimoxazole should be started if CD4 count is <250 cells/mm3 and continued through pregnancy, delivery and breast feeding as per national guidelines (Dose: Double strength tablet - 1 tab daily).
- Counsel for exclusive breast feeding within an hour of delivery.
- No MIXED FEEDING (No breast feeding and other milk feeds during the first 6 months) under any circumstances.

Dose and Duration of Infant Daily NVP Prophylaxis:

Birth Weight	NVP daily dose (in mg)	NVP daily dose (in ml)*	Duration
Birth to 6 weeks:			
Infants with birth weight < 2000 gm	2 mg./kg. once daily. In consultation with a pediatrician trained in HIV care.	0.2 ml./kg. once daily	Up to 6 weeks irrespective of whether exclusively breast fed or exclusively replacement fed. (may be extended to 12 weeks, if mother has not received ART for adequate duration i.e atleast 24 weeks)
Birth weight 2000-2500 gm	10 mg. once daily	1 ml. once a day	
Birth weight more than 2500 gm	15 mg. once daily	1.5 ml. once a day	

*Considering the content of 10 mg Nevirapine in 1 ml suspension

Protocol for women presenting directly in labor



Caesarean section is not recommended for prevention of mother-to-child-transmission and done only if there is an Obstetric indication for the same.

When delivering HIV-infected women, observe:

- Standard/Universal Work Precautions (UWP).
- Do NOT rupture membranes artificially (keep membranes intact for as long as possible).
- Artificial rupture of membrane reserved for cases of foetal distress or delay in progress of labour.
- Don't shave the pubic area.
- Don't give enema.
- Minimize vaginal examination and use aseptic techniques.
- Vaginal Cleaning with 0.25% Chlorhexidine.
- Avoid invasive procedures like foetal blood sampling, foetal scalp electrodes.
- Avoid instrumental delivery as much as possible unless required in cases of foetal distress or significant maternal fatigue to shorten labour orthe duration of ruptured membranes.
- If indicated, low-cavity outlet forceps is preferable to Ventouse, as it is generally associated with lower rates of foetal trauma than Ventouse.
- Caesarean section is not recommended for prevention of mother-to-child-transmission and should be done only if there is an Obstetric indication for the same.
- Avoid routine episiotomy as far as possible.
- Safe disposal of tissue/placenta and other infectious materials.

> Intervention for Newborn

- Cut cord under cover of light gauge.
- Determine mother's feeding choice before attaching to the breast.
- Clean injection site with spirit before any injection.
- Do not use suction unless absolutely necessary.

Babies Receiving Exclusive Breastfeeds (EBF) for the First 6 Months	Babies Receiving Exclusive Replacement Feeds (ERF) for the First 6 Months
Mother	Mother
Life-long ART initiated as soon as possible including entire breastfeeding period.	Life-long ART initiated as soon as possible even though the Baby is getting exclusive replacement feeding.
Infant	Infant
1. At Birth: Start Sy.NVP Prophylaxis immediately and give until 6 weeks (or more as indicated) 2. At 6weeks: a. Start CPT and continue until baby is 18	1. At Birth: Start Sy.NVP Prophylaxis from birth until 6 weeks 2. At 6weeks: a. Start CPT and continue until baby is 18

months of age b. Immunization: Start 1st dose of DPT/OPV/Hep-B vaccine (2nddose) c. Early Infant Diagnosis (EID): Do DBS at 6weeks for all babies; if positive do WBS. If WBS positive, start Paediatric ART irrespective of CD 4% for babies less than 2 years. d. NO MIXED FEEDING is to be done during the first 6 months i.e. not to give along with Breastfeeds any other milk (tinned formula food or cow'smilk ordairy milk) liquid, juices or even water.	months of age (and may be thereafter, if baby's status is positive in the confirmatory test). b. Immunization: Start 1st dose of DPT/OPV/Hep-B vaccine (2nd dose) c. Early Infant Diagnosis (EID): Do DBS at 6 weeks for all babies; if positive do WBS. If WBS positive, start Paediatric ART irrespective of CD 4% for babies less than 2 years. d. NO MIXED FEEDING is to be done during the first 6 months i.e. not to give Breast feeds+any other milk (tinned formula food or cow's milk or dairy milk) liquid, juices or even water. No breastfeed to be given within first six months.

HIV positive women in Post natal period-

- Exclusive breast-feeding or top feed (in case of non-availability of breast milk) within an hour of delivery.
- No MIXED FEEDING under any circumstances
- Ensure regular ART/ARV prophylaxis to mother during breast feeding period as per national guidelines.
- Ensure daily Syrup Nevirapine to baby up to 6 weeks, then stop
- At 6 weeks, refer baby to ICTC for EID & initiation of Cotrimoxazole prophylaxis
- Continue exclusive breast feeding up to 6 months.
- Breast feed is recommended up to 12 months in HIV negative baby & up to 24 months HIV positive babies along with complimentary feed.
- Confirmation of HIV status of all babies at 18 months using all 3 Antibody (Rapid) Tests.

I. FEVER

The causes of fever (temperature >100 degree F) in pregnancy are varied and need evaluation and treatment.

Common causes of fever in pregnancy include the following (synonym: LEMDUS)

- Leptospirosis
- Enteric fever
- Malaria
- Dengue
- Urinary tract infection
- Scrub typhus

For leptospirosis, enteric fever, UTI and Scrub

Typhusstart empirical treatment with ceftriaxone (IV) plus azithromycin (oral or IV) whereas Malaria needs anti-malarials and Dengue needs supportive care. If fever persists, the patients are to be referred to a higher centre.

Upper and lower respiratory tract infection is also a common cause in which the patient will present with cough in addition to fever.

➢ General Management

- Encourage increased fluid intake by mouth.
- Use a fan or tepid sponge to help decrease the body temperature.
- Oral Paracetamol (500 mg to 1000mg, 6 to 8 hourly to control fever, DO NOT EXCEED 4 gram in 24 hours

✓ **Urinary tract infection** - refer to section on Urinary track infection mentioned above.

J. CALCIUM SUPPLEMENTATION IN PREGNANCY AND LACTATION

Dietary requirement for different nutrients increases during pregnancy and lactation. The dietary intake of many Indian women, however, is significantly below recommended dietary requirements. Of these, two most important nutrients are iron and calcium.

Adequate calcium intake during pregnancy and lactation has the potential to prevent pre-eclampsia, pre-term birth, neonatal mortality (NNM), improve maternal bone mineral content, breast milk concentration and bone development of neonates.

The daily recommended dietary allowances (RDA) for calcium in pregnancy and lactation is 1200 mg per day. The National Nutrition Monitoring Bureau (NNMB) - 2012 data from 10 Indian states shows that the daily calcium intake during pregnancy and lactation for Indian women is less that 30% of RDA (which means it is only 400 mg/d). This shows that most pregnant and lactating women in India have low dietary calcium intake.

Considering the poor dietary calcium intake among pregnant and lactating women in India & high prevalence of hypertensive disorders in pregnancy, maternal calcium supplementation is recommended across the country.

➢ Protocol for calcium supplementation

- All pregnant and lactating women to be counselled about intake of calcium rich foods.
- Oral swallowable calcium tablets to be taken twice a day (total 1g calcium/day) starting from 14 weeks of pregnancy up to six months post-partum.
- One calcium tablet should be taken post the morning/afternoon meal and the second tablet post the evening/night meal. It is not advisable to take both calcium tablets together as > 800 mg calcium at once interferes with iron absorption. Calcium tablets should not be taken empty stomach since it causes gastritis.
- Calcium and Iron Folic Acid (IFA) tablets should also not be taken together since calcium inhibits iron absorption.
- Each calcium tablet should contain 500 mg elemental calcium and 250 IU vitamin D3. The preferred formulation for calcium is calcium carbonate. The rationale for inclusion of Vitamin D is to enhance the absorption of calcium.

Details of Calcium supplementation in pregnancy can be accessed at - nhm.gov.in/nrhm-components/rmnch-a/maternal-health/guidelines.html

K. HYPOTHYROIDISM DURING PREGNANCY

Primary maternal hypothyroidism is defined as presence of elevated Thyroid Stimulating Hormone

(TSH) levels during pregnancy.

Hypothyroidism can be Overt (OH) or Subclinical (SCH). In overt hypothyroidism S.TSH levels are elevated and S.T4/Free T4 (FT4) levels are low. S.TSH>10mIU/l is taken as OH irrespective of FT4 levels. In SCH, the TSH level is elevated (>10mIU/l) with normal Serum T4/FT4.

The foetus is dependent on maternal transplacental thyroid hormone supply in the first trimester. This, along with other factors, leads to an increased thyroid hormone demand during pregnancy. To meet the increased demands, the thyroid hormone production increases by 50%. Even though, India is known to be relatively iodine sufficient, iodine deficiency is still prevalent in certain pockets like the hilly regions and foothills. Moreover, iron deficiency is common in India, and this also contributes to hypothyroidism.

➢ Consequences of untreated hypothyroidism

Untreated hypothyroidism in pregnancy is associated with adverse maternal effects like miscarriages (in early pregnancy), recurrent pregnancy losses, anaemia, pre-eclampsia, gestational diabetes, abruptio placentae, postpartum haemorrhage, increased caesarean sections due to fetal distress, and rarely myopathy and even congestive heart failure (CHF) in severe cases.

Hypothyroidism also results in preterm births, intrauterine growth restriction, intrauterine fetal demise, respiratory distress and increased perinatal mortality (PNM). In newborns, it leads to cognitive, neurological and developmental impairment as Thyroid hormone is critical for fetal brain development.

Prevalence of hypothyroidism in pregnancy in the Indian population is 4.8-12%

➢ High risk factors for hypothyroidism

- Residing in an area of known for moderate to severe iodine insufficiency (according to area mapping).
- Obesity (pre-pregnancy/first trimester Body Mass Index (BMI) >30 kg/m2) [BMI= weight in kg/height in m2].
- History of prior thyroid dysfunction or prior thyroid surgery.
- Symptoms of thyroid dysfunction or the presence of goiter.
- History of thyroid dysfunction in first degree relative (parents/siblings/children).
- History of diagnosed mental retardation in family/previous births.
- Known case of autoimmune diseases like Type I diabetes/Systemic Lupus Erythematosus (SLE)/Rheumatoid Arthritis (RA)/Addison's disease/Coeliac disease, etc.
- A History of recurrent miscarriages, pre-term delivery, intrauterine demise, pre-eclampsia/eclampsia, abruptio placentae.
- History of infertility (inability to conceive after one year of unprotected intercourse).
- Use of amiodarone or lithium, or recent administration of iodinated radiologic contrast.

➢ Screening for hypothyroidism is recommended in high-risk Pregnant Women.

TSH levels during pregnancy are lower as compared to TSH levels in a non-pregnant state. Pregnancy-specific and trimesterspecific reference levels for TSH are as follows:

- ✓ Ist trimester - 0.1-2.5mIU/l;
- ✓ IInd trimester - 0.2-3mIU/l;
- ✓ IIIrd trimester - 0.3-3mIU/l.

Hypothyroidism can be Overt (OH) or Subclinical (SCH). In overt hypothyroidism, S.TSH levels are elevated (TSH>2.5-3mIU/l) and S.T4/Free T4 (FT4) levels are low. S.TSH>10mIU/l is also taken as OH irrespective of FT4 levels. In SCH, the TSH level is

elevated (>10mIU/l) with normal Serum T4/FT4.

Hence, in pregnancy, SCH is defined as a serum TSH between 2.5 and 10mIU/L with normal FT4 concentration and OH is defined as serum TSH>2.5-3mIU/l with low FT4 levels or TSH>10mIU/l irrespective of FT4 levels.

➢ Protocol for management of hypothyroidism

Drug of choice for treatment is Levothyroxine

- Levothyroxine is to be taken orally, in the morning empty stomach, patient should be asked not to take anything orally for at least half an hour after intake of the medicine.
- Levothyroxine Sodium belongs to category A for use during pregnancy and can be used safely during pregnancy and lactation without any adverse effect on mother or fetus.
- If dose is missed on one day, the patient may take the same as soon as she remembers and should not eat anything for the next half hour.
- If she misses the tablet altogether, she should take double the dose on the next morning.

Treatment Plan:

- If TSH level is level is <2.5 in first trimester & <3 in second & third trimester, no further management is required & pregnant woman will continue routine pregnancy care.
- If TSH is between 2.5/3 to 10, PW will be started on 25mcg of levothyroxine per day.
- If TSH is >10, PW will be started on 50mcg of levothyroxine per day.
- If initial TSH was less than 10, treatment is to be stopped after delivery but if it was >10, treatment will continue in same dose after delivery.
- If PW is already taking treatment before this pregnancy, treatment will continue during pregnancy as per the normal ranges in pregnancy mentioned above.
- Once treatment has started, TSH levels should be repeated after 6 weeks of starting date of treatment.
- Dose of thyroxine should be adjusted depending upon TSH levels.
- Target range of TSH to be kept on follow-up after starting treatment.
- In first trimester - TSH should <2.5.
- In second/third trimester - TSH should <3.
- At all times, TSH<0.1 should be avoided by decreasing the dose of Levothyroxine.

Details of Hypothyroidism in pregnancy can be accessed at-nhm.gov.in/nrhm-components/rmnch-a/maternal-health/guidelines.html

CHAPTER 4
HYPERTENSIVE DISORDERS OF PREGNANCY

The hypertensive disorders of pregnancy are one of the common obstetric complications of pregnancy and contribute significantly to maternal and perinatal mortality. The pathophysiology of hypertensive disorders causes widespread spasm of the arterioles affecting multiple organs at the same time resulting in morbidity and mortality in both mother and fetus.

KEY LEARNING OBJECTIVES

By the end of this session, the participants will be able to diagnose and manage appropriately the below condition:

1. **Pre-eclampsia**
2. **Eclampsia**
3. **Chronic hypertension**

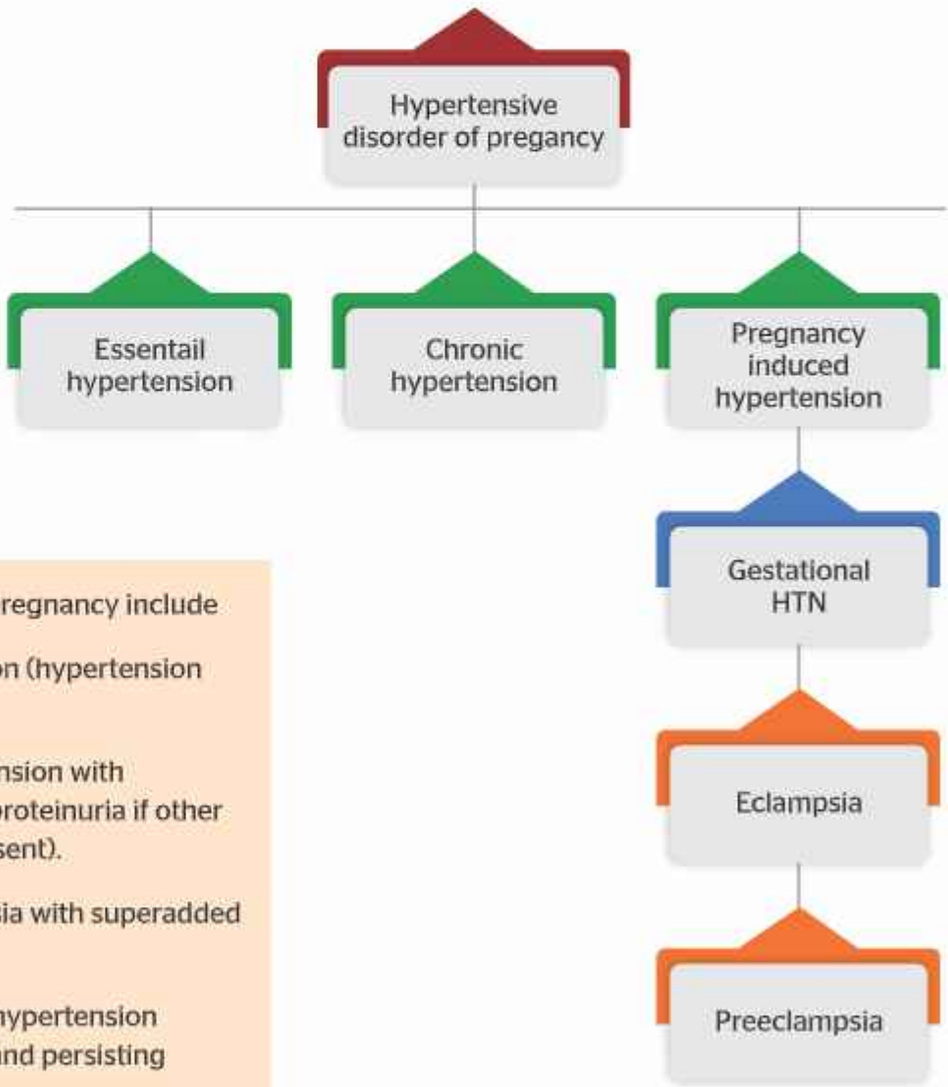
➢ **Important Points:**

- Hypertension in the first 20 weeks of gestation is called Chronic hypertension while that developing after 20 weeks is called Gestational hypertension
- To diagnose Hypertension BP should be 140/90 mm Hg on at least 2 occasions 4 hours or more apart.
- Pre-eclampsia is hypertension (140/90 mm Hg) with proteinuria 300 mg/ 24 hrs developing after 20 wks of gestation. However, presence of proteinuria is not essential if other features of severity are present.
- Pre-eclampsia is labeled as severe if any feature of severity like headache, blurring of vision, epigastric pain, oliguria, thrombocytopenia, deranged LFT or KFT and pulmonary oedema are present
- Eclampsia is Pre-eclampsia with super added convulsions
- Women with hypertension in pregnancy should be counseled about danger signs of severe Pre-eclampsia & eclampsia
- Antihypertensives should be given if Diastolic pressure is 100 mmHg
- Diuretics should not be given for hypertension in pregnancy
- General management, control of BP, control of fits, intensive maternal monitoring & delivery form the mainstay for management of Eclampsia.
- Magnesium sulphate is the drug of choice for control of convulsions

The hypertensive disorders of pregnancy include Chronic Hypertension (elevation of the BP before 20 weeks of gestation) and Gestational Hypertension (elevation of the BP after 20 weeks of gestation).

The possible presentations of hypertensive disorders of pregnancy are:

- A pregnant woman has an elevated B P.
- A pregnant woman or a woman, who has delivered recently, complains of severe headache and/or blurred vision.
- A pregnant woman or a woman, who has delivered recently, is found unconscious or is having convulsions.



Hypertensive disorders in pregnancy include

- Gestational hypertension (hypertension with no proteinuria).
- Pre-eclampsia (hypertension with proteinuria or without proteinuria if other features of severity present).
- Eclampsia (pre-eclampsia with superadded convulsions).
- Chronic hypertension (hypertension antedating pregnancy and persisting postpartum).
- Chronic hypertension with superadded pre-eclampsia or eclampsia.

Differential diagnosis of Hypertensive disorders of pregnancy

Symptoms and signs	Probable diagnosis
• BP >140/90 mmHg before 20 weeks of gestation	Chronic hypertension
• BP >140/90 mmHg before 20 weeks of gestation	Chronic hypertension with superimposed pre-eclampsia
• Proteinuria after 20 wks of gestation • Two readings of BP >140/90 mmHg taken at least 4 hours apart, after 20 weeks of gestation • No Proteinuria	Gestational hypertension
• Two readings of BP 140/90 mmHg but <160/110 mmHg, taken 4 hours apart, after 20 weeks of gestation • Proteinuria >1+ (>300 mg/L)	Non severe pre-eclampsia
• BP >160/110 mmHg after 20 weeks of gestation, at least 2 readings taken 10 mins apart. • BP may be >140/90 mm Hg with presence of any of the features of severity • Proteinuria may or may not be present with any of the features of severity • Features of severity: - Headache, new onset cerebral/ visual disturbance, severe persistent right upper quadrant or epigastric pain - Oliguria - Thrombocytopenia (Platelet count <100000/ L) - Impaired liver function (liver enzymes twice the normal limits) - S Creatinine > 1.1 mg/dL or doubling of levels over previous levels in absence of renal disease - Pulmonary oedema	Severe pre-eclampsia

Severe pre-eclampsia PLUS any two of the following: • Headache (increasing frequency, unrelieved by regular analgesics) • Vomiting • Blurring of vision • Pain in the upper abdomen (epigastric pain or pain in the right upper quadrant) • Oliguria (passing less than 400 ml urine in 24 hours) • Hyperreflexia (exaggerated knee jerk) • Pulmonary oedema	Danger signs of impending eclampsia
• Convulsions • BP >140/90 mmHg after 20 weeks gestation • Proteinuria > 1+	Eclampsia
• Convulsions continue one after the other unabated	Status eclampticus

1. PRE-ECLAMPSIA

Pre-eclampsia is a condition specific to pregnancy, arising after the 20th week of gestation, characterized by hypertension with or without proteinuria (if features of severity present).

➢ Hypertension

Hypertension is defined as:

- A BP of >140/90 mmHg on at least 2 occasions 4 hours apart after 20wks of gestation in a previously normotensive patient

An increase in diastolic pressure is more significant because, unlike the systolic pressure, it is not affected by posture or excitement.

➢ Proteinuria

- Proteinuria is defined as a protein concentration of > 300 mg (0.3g)/L OR protein/ creatinine ratio >0.3 OR Dipstick reading of > 2+ When proteinuria is present with a normal B P, it usually does not indicate pre-eclampsia but could indicate urinary tract infection (UTI), kidney disease or contamination of the sample and is also found after prolonged standing.

➢ Classification of pre-eclampsia

Pre-eclampsia may be classified as mild and severe. Table below lists the clinical features of both these categories.

Classification of Pre-eclampsia

Finding	Non severe pre-eclampsia	Severe pre-eclampsia
Blood Pressure	140/90 mmHg but <160/110 mmHg	BP > 160/110 mm Hg and Proteinuria > 300mg (0.3g) / 24-hour urine specimen or protein/creatinine ratio >0.3 in a random urine specimen or dipstick >2+ OR BP > 140/90 mm Hg with danger symptoms like severe headache, blurring, epigastric pain, decreased urinary output, breathing difficulty and or new onset end organ dysfunction: Platelet count <100,000/microL, Serum creatinine >1.1 mg/dL or doubling from baseline levels, Liver transaminases at least twice the upper limit of the normal, Pulmonary edema, Cerebral or visual disturbances like severe headache, flashes, partial or complete loss of vision.
Proteinuria	Present, >300mg (0.3 g) / 24-hour urine specimen or protein/creatinine ratio >0.3 in a random urine specimen or dipstick >2+	>300mg (0.3 g) /24-hour urine specimen or protein/creatinine ratio >0.3 in a random urine specimen or dipstick >2+
Proteinuria	Present, >300mg (0.3 g) / 24-hour urine specimen or protein/creatinine ratio >0.3 in a random urine specimen or dipstick >2+	>300mg (0.3 g) /24-hour urine specimen or protein/creatinine ratio >0.3 in a random urine specimen or dipstick >2+
Headache	Absent	Present **
Visual disturbances	Absent	Present **
Upper abdominal pain	Absent	Present **
Oliguria	Absent	Present **
Pulmonary oedema	Absent	Presnt **

• Thrombocytopenia (Platelet count< 100000/L) • Impaired liver function (liver enzymes twice normal) • S Creatinine > 1.1 mg/dL or doubling of levels in absence of renal disease	Absent	Present **
**It is not necessary that all these signs are present in all cases		

➢ Management of Non-severe pre-eclampsia

- At each prenatal visit, ensure to check the following:
  - BP.
  - Weight gain.
  - Urine for the presence of protein.
  - Danger signs for severe pre-eclampsia.
- Encourage every pregnant woman to come for the first ANC visit as early as possible in her pregnancy so that a baseline BP can be measured.
- If there is a rise in the BP, instruct the woman to visit the FRU bi-weekly.
- BP should be taken by MO/ Staff nurse.
- Woman should be counseled about diet. She is allowed to take normal salt in food but no extra salt should be added to the food. E.g. Avoid pickles, papad, chatni & bakery items.
- Few specialized investigations should also be advised like LFT including Bilirubin, SGOT, SGPT, Alkaline phosphatase, KFT (Urea & Creatinine) & Platelet count.

➢ Management of Non-severe pre-eclampsia: Gestation less than 37 weeks

- Allow the woman to stay at home if she can get a home BP monitoring daily, understands danger signs and can come to the hospital as soon as the need arises.
- Advise reduced physical activity in daytime.
- She should report to FRU for her antenatal check-up bi-weekly.

At each visit:

- Check the BP (by MO/Staff nurse)
- Test the urine for the presence of protein
- Weigh the patient (about 0.5 Kg/week or 2 kg/month in IInd and IIIrd trimester is normal. Excessive weight gain (>3 kg in a month or >1kg/week in 3rd trimester) is abnormal & should arouse the suspicion of pre-eclampsia, twins (multiple pregnancies), abnormal thyroid profile or diabetes.
- Check for generalized body oedema.

- Exclude danger signs of severe pre-eclampsia.
- Explain DFMC & ask the woman about foetal movements.
- Check the FHR.
- Monitor foetal growth (by symphysio-fundal height) & obstetric USG may be done if growth restriction is suspected. Doppler velocimetry may be done if available.
- Assessment of LFT (Bilirubin, SGOT/ SGPT, Alkaline phosphatase), KFT (Creatinine, Urea) & Platelets weekly.
- Doppler velocimetry may be done in FGR if available.

Pre-eclampsia with proteinuria is more likely to progress to severe pre-eclampsia than if the BP is raised without proteinuria.

Indications of admission at FRU:

- If systolic BP < 160mm Hg & Diastolic BP 100 mm Hg start anti-hypertensives & admit at FRU for investigation, evaluation & stabilization.
- The following antihypertensive may be started (BP should be taken by MO/ Staff nurse).
  - ✓ Tab Labetalol 100 mg orally twice/ thrice a day (maximum up to 2.4g in 24 hrs) OR
  - ✓ Tab Nifedipine sustained release preparation 10 mg orally twice/ thrice a day (maximum up to 80 mg in 24 hrs) OR
  - ✓ Tab Alpha Methyldopa 250-500 mg/6-8 hourly (max 2gm/day) (as per availability).
- Monitor B.P. (twice a day).
- **If the BP is controlled:**
  - ✓ Allow the woman to stay at home if she can get a home BP monitoring daily, understands danger signs and can come to the hospital as soon as the need arises.
  - ✓ Ensure bi-weekly visit to health facility.
  - ✓ Weekly assessment of liver enzymes, KFT & platelets.
- **If BP is not controlled:**
  - ✓ Keep woman in hospital for monitoring OR refer her to a District Hospital/ Medical College for further follow-up.
- If Systolic > 160 mm Hg &/or Diastolic BP >110 mm Hg admit her & manage as Severe Pre-eclampsia.
- If danger signs of eclampsia are present OR features of severity appear- admit immediately.

Encourage the woman for delivery at the FRU

➢ Management of Non-severe pre-eclampsia: Gestation more than 37 weeks

Admit the woman to the FRU for observation and management.

In the hospital:

- The woman is made to rest
- Check the BP 4-hourly
- Test the urine for the presence of protein twice daily
- Monitor the FHR twice daily

- Start antihypertensive drugs if the systolic pressure is < 160 mm Hg & diastolic pressure is 100 mmHg
  - Tab Labetalol 100 mg orally twice/ thrice a day may be given (maximum up to 2.4 g in 24 hrs) OR
  - Tab Nifedipine sustained release preparation 10 mg orally twice a day may be given (maximum up to 80 mg in 24 hrs) OR
- Maintain Systolic BP between 140-150 mm Hg and Diastolic BP between 90-100 mm Hg.
- Assess cervix & expedite delivery-
  - If cervix is favorable, rupture membranes with amniotic hook or a Kocher clamp and induce labor using Oxytocin.
  - If cervix is unfavorable, ripen the cervix using prostaglandins or Foley catheter or deliver by cesarean section.

Diuretics are not recommended in Pre-eclampsia

➢ Management of Severe pre-eclampsia.

- Hospitalize & stabilize patient.
- Start IV fluids @ 75 ml/hr.
- Catheterize bladder.
- Strict input output monitoring.
- Continue B.P monitoring every 15 minutes for 2 hours after stabilisation, then every 30 minutes for 1 hour. Then every hour, if in labour or 4 hours, if not in labour.
- Start oral anti-hypertensive agent if BP>150/100 mm Hg. Initiate therapy for acute hypertensive crisis if BP> 160/110 mm Hg as in eclampsia. Inj Labetalol 20 mg IV bolus, repeat 40 mg after 10 minutes if BP not controlled, repeat 80 mg every 10 minutes if needed (max 300 mg) with cardiac monitoring.

- Administration of IV Labetalol in pregnant or postpartum women with high BP does not require any intensive cardiac monitoring.
- Parenteral Labetalol should be avoided in women with asthma, heart disease or congestive heart failure.

- Tab Nifedipine orally immediate release 10 mg stat, repeat 10-20 mg after 20 min. If BP not controlled, repeat 10-20 mg after 20 min (max 30 mg). {Give through Ryle's tube if unconscious patient}. If no response switch to other antihypertensive drug. If BP still not controlled after 20 min switch over to Inj. Labetalol 40 mg IV slowly over 2 min.

- Concern about neuromuscular blockade & severe hypotension when Nifedipine is used with Magnesium sulfate is not proven in retrospective reviews.
- However, maternal vital signs like HR & BP should be judiciously monitored as it may increase maternal HR & cause overshoot hypotension.
- Nifedipine capsules should be administered orally and never punctured & administered sublingually.

- If IV access is not there and oral Nifedipine is also not available, Tab Labetalol 200 mg maybe administered orally & may be repeated after 30 min if appropriate fall in BP is not noted.

- Inj Hydralazine 5 mg IV slowly over 1-2 min, repeat 5-10 mg over 2 min after 20 min. If BP not controlled, again repeat 10 mg over 2 min (max 20 mg). If no response switch to other antihypertensive drug. Cardiac monitoring to be carried out. **Full loading & maintenance dose of Magnesium sulphate is to be given in all cases of severe pre-eclampsia.**
- Investigate - BG, RBS, CBC with peripheral smear, platelet count, LFT, KFT with serum electrolytes, Coagulation profile and fundus exam
- Urine output charting
- BP monitoring
- Keep the BP between 130-150 systolic and 80-100 diastolic

Anti hypertensive therapy for Severe pre-eclampsia

Labetalol	Hydralazine	Nifedipine
20 mg Labetalol slow IV over 2 min ↓ Measure BP after 10 min ↓ If BP uncontrolled- repeat 40 mg Labetalol slow IV over 2 min ↓ Measure BP after 10 min ↓ If BP uncontrolled- repeat 80 mg Labetalol slow IV over 2 min (Max dose 140 mg)	5-10 mg Hydralazine slow IV over 2 min ↓ Measure BP after 20 min ↓ If BP uncontrolled- repeat 20 mg Hydralazine slow IV over 2 min ↓ Measure BP after 20 min ↓ If BP still not controlled- consult physician or refer to higher centre	10 mg Nifedipine orally ↓ Measure BP after 20 min ↓ If BP uncontrolled- repeat 20 mg Nifedipine orally ↓ Measure BP after 20 min ↓ If BP uncontrolled- repeat 20 mg Nifedipine orally ↓ If BP uncontrolled give Inj Labetalol 20 mg slow IV over 2 min

All women with Severe pre-eclampsia should be referred to a MC/DH for delivery

Gestation < 24 weeks	Gestation 24 wks - <34 wks	Gestation 34 wks
• Fetal salvage is difficult so proceed with termination of pregnancy	reatment to be individualized • Give Inj. Dexamethasone 6 mg IM & repeat 12 hourly for 4 doses. • **If BP controlled:** - Keep woman under regular maternal & fetal surveillance in hospital. - Deliver at 34 wks or earlier if :	• Either induction of labour as per Bishop Score or C-section as per the indication

	* BP uncontrolled * Worsening of clinical/ biochemical parameter * Appearance of signs of fetal compromise * Appearance of danger signs • **If BP uncontrolled:** Deliver • **Either induction of labour as per Bishop Score or C-section as per the indication**	

- **Expectant management of Severe pre-eclampsia should only be tried at MC/DH and not at FRU**
- **Mode of delivery:**
  - Vaginal route is the preferred mode of delivery if cervix is ripe.
  - LSCS may be done for
    - deteriorating maternal condition
    - adverse fetal condition
    - failed induction
    - other obstetric indications

Prophylactic Magsulf should be given in Severe PET in full loading & maintenance dose to prevent eclampsia.

2. ECLAMPSIA

Eclampsia is a condition peculiar to pregnant or recently delivered women. It is characterized by convulsions/fits followed by more or less prolonged coma. The woman usually has hypertension and proteinuria. The convulsions may occur in the antepartum, intrapartum or the postpartum period.

Pre-eclampsia and eclampsia are part of the same spectrum of disorders with eclampsia being the severe form of the disease. Pre-eclampsia almost always precedes eclampsia. Not all cases follow an orderly progression from mild to severe disease; some women may develop severe pre-eclampsia or eclampsia suddenly.

Sometimes convulsions seem to occur at apparently normal BP levels (although this is rare); in such cases, one should consider what is normal for each person. In some women, the "usual/ normal" BP is low, in the order of 100/60 mmHg, and in these individuals, eclampsia could occur at a BP of 120/80 mmHg, which is usually considered normal, but represents hypertension in these women. Thus, it is re-emphasized that it is the rise in BP (above the "usual" values) that counts more than the absolute value.

In severe pre-eclampsia, woman can rapidly develop eclampsia.

- All cases of convulsion in pregnancy must be considered to be Eclampsia unless proved otherwise.
- Eclampsia is an obstetric emergency and management should start immediately.

Danger Symptoms and signs of eclampsia:

- Severe headache
- Drowsiness
- Mental confusion
- Visual disturbances (e.g. blurred vision, flashes of light, double vision)
- Epigastric pain
- Nausea, vomiting
- Decreased urinary output
- A sharp rise in the BP

➢ **Convulsions**

- can occur regardless of severity of hypertension
- are difficult to predict and typically occur in the absence of hyperreflexia, headache and visual changes.
- occur after childbirth in 25% of cases (postpartum eclampsia).
- are tonic-clonic and resemble grand mal epileptic fits.
- may occur in a rapid sequence.
- may be followed by coma that lasts for minutes or hours depending on the frequency of convulsions.

➢ **Status Eclampticus**

Status Eclampticus refers to a state in which convulsions or eclamptic fits continue one after the other. This condition is dangerous for both the mother and the fetus, and can lead to maternal and fetal mortality.

Differential diagnosis of convulsions during pregnancy.

Symptoms and signs typically present	Symptoms and signs sometimes present	Probable diagnosis
• Convulsions • BP 140/90 mmHg after 20 weeks of gestation; rarely BP may be lower • Proteinuria 1+		Eclampsia
• Trismus (difficulty in opening the mouth and chewing) is the first symptom, followed by: - spasms of the face, neck and trunk - arched back - board-like abdomen - spontaneous, violent spasms		Tetanus
• Convulsions • Normal BP • Past history of convulsions • Headache		Epilepsy

• Fever with chills and rigors • Muscle/joint pains	• Jaundice • Anemia • Enlarged & tender spleen • Convulsions	Complicated malaria (especially Plasmodium falciparum infection)
• Convulsions • Irritability	• Headache • Neck rigidity • Confusion • Drowsiness	Meningitis or Encephalitisa

If the diagnosis of eclampsia cannot be ruled out, continue treatment for eclampsia. If spinal fluid examination cannot be done, refer to a higher health facility.

➢ How eclampsia affects the mother and foetus

In eclampsia there is a widespread spasm of the arterioles which affects most organs in the body causing organ failure that endangers the lives of both the mother and the foetus. Hence, remember that **untreated hypertension in pregnancy can cause maternal and perinatal death.**

Effects on the mother.

These include.

- Respiratory (asphyxia, aspiration of vomitus, pulmonary edema, bronchopneumonia).
- Cardiac (heart failure).
- Brain (hemorrhage, thrombosis, edema).
- Renal (acute kidney failure).
- Hepatic (liver necrosis).
- HELLP syndrome (hemolysis, elevated liver enzymes, low platelet count).
- Hemorrhage due to coagulation defect, i.e. disseminated intravascular coagulopathy (DIC), which is often associated with eclampsia.
- Visual problems (temporary blindness due to edema of the retina and/ or occipital cortex in the brain).
- Injuries (fractures, tongue bite).

The most common causes of maternal death in eclampsia are:

- Aspiration of vomitus.
- Kidney failure.
- Intracerebral hemorrhage.
- Multi-organ failure (e.g. heart, liver & kidneys).

Effects on the foetus

Placental insufficiency leads to:

- Hypoxia: This may lead to permanent brain damage, which may result in.
  - physical handicap.
  - cerebral palsy.

- mental retardation.

- IUGR.
- Stillbirth.

➢ Risk factors for eclampsia

Pre-eclampsia and therefore the risk of eclampsia is more common in the following groups:

- Primigravidae (especially young teenagers and women over the age of 35 years).
- Obese women.
- Women with essential hypertension.
- Women with multiple pregnancy.
- Women with diabetes, hydatidiform mole, polyhydramnios.
- Women with a history of pre-eclampsia or eclampsia in a previous pregnancy.
- Women with a family history of eclampsia.

The following factors increase the chances of death due to eclampsia in a woman with hypertensive disorder of pregnancy:

- Failure to monitor the BP and urine for proteins during prenatal care.
- Failure to counsel the woman and her family about the danger symptoms of pre-eclampsia and the importance of prenatal care.
- Delay in referral of a woman with eclampsia.
- Lack of a clear-cut management strategy for dealing with pre-eclampsia and eclampsia.
- Lack of proper equipment and drugs to treat eclampsia.
- Failure to carry out timely management of complications arising due to eclampsia.

➢ Management of Eclampsia

Eclamptic fits can begin before, during or after delivery. The management is the same in each case but if the patient has not delivered, carry out the delivery as soon as possible. The management of eclampsia involves six major steps:

1. Immediate management
2. Controlling the fits
3. Controlling the BP
4. Delivering the baby in 12 hours
5. Maintaining fluid balance
6. Postpartum care

1. Immediate management

This is achieved in four steps:

- Keep the patient in a bed with padded rails on sides (eclampsia bed) OR in the obstetric ICU/HDU if available. Placing the woman, tilting face, mouth gag to prevent tongue fall, clear the airway, oxygenation, wide bore cannula, IV fluid, catheterization, quick history and initial assessment.
- Clean the mouth and nostrils by applying gentle suction and remove the secretions.
- Prevent tongue bite during convulsions by a tongue blade/ pad Give oxygen by mask / nasal cannula @ 4-6 L/min & continue for five minutes after each convulsion or longer if cyanosis persists. Monitor and maintain SPO2 > 95%.

Management: pritchard's/ zuspan's regimen

- Instruct the nursing staff to make sure that:
  - Patient's airway remains clear.
  - Injury especially to the tongue (tongue

bite) is prevented during the clonic stage of convulsions. This can be done by placing padded tongue blades or pads between her teeth. (Do NOT attempt this during a convulsion.).

- Start IV line with RL/NS @ 75 ml/hr after collecting blood sample for bedside clotting test.
- Catheterize patient.
- Send investigations - Hb, LFT (Bilirubin, SGOT, SGPT, Alkaline phosphatase), KFT (Urea, Creatinine), LDH, platelet count, Coagulation profile (PT,PC,INR) and fundus examination.

2. Controlling the fits

- Magnesium sulphate is the drug of choice for management of Eclampsia.
- Magnesium sulphate has been shown to be more effective than Diazepam or Phenytoin in preventing the recurrence of fits.

Magnesium Sulphate

Loading Dose: Give Inj. Magnesium sulphate 4 g (20 ml of 20% solution) slow IV in 5 min.

Note: Magnesium sulphate should not be given as a bolus rapidly as it causes respiratory depression in mother & fetus.

- Loading dose of Magnesium sulphate may be given without checking Urine Output on admission.
- Then administer Inj. Magnesium sulphate 10 gm deep IM, 5 g in each gluteus muscle (10 ml of 50% solution, in each buttock), with 1 ml of 2% Lignocaine in the same syringe.

Preparation of 20% Magnesium sulphate solution for loading dose

- Inj. Magnesium sulphate (MgSO4) is supplied as a 50% solution either in 2 ml (1 g) ampoule or 10 ml (5 g) vial.
- If 2 ml (1 g) ampoule is available: 1 amp contains 2 ml 50% solution = 1 g MgSO4.
- 4 amp of 2 ml 50% solution = 4g MgSO4 in 8 ml solution.

  Add
- 12 ml distilled water or saline.

  To make
- 20 ml 20% MgSO4 solution
- Give slow IV in 5 min

  5 amp of 2 ml 50% solution = 5 g MgSO4

  Give 5 g MgSO4 deep IM in each buttock (total 10 amp = 10 g given).

If convulsions recur after 15 minutes, give an additional 2 g of Magnesium sulphate (10 ml of 20% solution) IV over 5 minutes and consult a physician OR refer to MC/DH.

(to check: how to reconstitute magnesium sulphate).

Maintenance Dose

Give 5 g of 50% Magnesium sulphate solution IM with 1 ml of 2% Lignocaine every 4 hours alternately in each buttock. Magnesium sulphate to be continued till 24 hrs after delivery or the last convulsion whichever occurs later.

Preparation of 50 % Magnesium sulphate for maintenance dose

- 1 amp contains 2 ml 50% solution = 1 g MgSO4
- 5 amp of 2 ml 50% solution = 5 g MgSO4
- Give deep IM in alternate buttock every 4 hourly (total 5 g given)

- Before giving the next dose of Magnesium sulphate, check for signs of magnesium toxicity
- Ensure that:
- The urine output is >100 ml per 4 hours
- Knee jerk reflexes are present
- The RR is >16 breaths/ minute
- Withhold the next dose if the above criteria are not met
- Serum creatinine must be done in all cases of Eclampsia & if it is > 1 mg%, then maintenance dose should be withheld

Precautions:

- Do NOT give 50% Magnesium sulphate solution IV without diluting it to 20%
- Do NOT give a rapid IV infusion of Magnesium sulphate as it can cause respiratory failure or death.

In case of Magnesium Sulfate Toxicity

- Withhold magnesium sulfate temporarily if:
  - Patellar reflexes are absent
  - Urine output 100 ml during preceding 4 hours
  - If respiratory depression occurs (RR <16 breaths/min) after giving Magnesium sulphate, discontinue the drug.
- If woman is unarousable or in case of respiratory arrest:
  - Assist ventilation
  - Give antidote Calcium gluconate 1g IV (10ml of 10% solution) over a period of 10 minutes.

3. Controlling the blood pressure

Antihypertensive therapy:

- If the diastolic BP > 100 mmHg or more, antihypertensives are recommended.
- The goal of treatment is to keep the diastolic pressure between 90 and 100 mmHg to prevent cerebral hemorrhage.
- Management of hypertension is the same for eclampsia & severe pre-eclampsia.
- There is no good evidence that any one antihypertensive is better than another for reducing the BP. However, Diazoxide is best avoided.

4. Delivering the baby

- The patient should be delivered soon after stabilization irrespective of period of gestation.
- There is no role of conservative management.
- The mode of delivery should be decided depending on whether or not the woman has gone into labour and the stage and progress of labour.
  - **If woman is in active labor:** Monitor the progress of labor and deliver.
  - **If woman is not in labor:** Assess condition ofcervix and induce labor.
  - The decision regarding mode of delivery depends on.
  - Maternal & Fetal condition
  - Fetal presentation
  - Condition of cervix.
  - **Perform LSCS if:**
  - Cervix unfavorable

- Fetal distress
- Fits not controlled
- Labor not progressing well despite induction/ augmentation
- Deteriorating maternal condition
- Any other obstetric indication

- **Choice of anesthesia for LSCS is to be decided by the anesthetist.**

- All cases of severe pre-eclampsia should ideally be delivered within 24 hours of onset of symptoms
- All cases of Eclampsia should ideally be delivered within 12 hours of onset of symptoms
- Woman may be left for vaginal delivery if maternal condition is stable and she is in active labour at the end of 24 hr & 12 hr respectively.

5. Maintaining the fluid balance

- Insert an indwelling urinary catheter with an open drainage system to measure the urinary output.
- Record the urine output every 4 hours. Suspect kidney failure if the urine output is less than 100 ml per 4 hours.
- Record the fluid intake. Give all the necessary fluids slow IV @ 75 ml (maximum) per hour.
- If there is an unusual fluid loss from vomiting, diarrhea, or excessive blood loss at delivery, no more than 125ml per hour may be given.
- Maintenance of proper fluid balance is essential to prevent water intoxication, dehydration, hypernatremia, or pulmonary edema.

DIURETICS SHOULD NOT BE USED

Utero-placental perfusion is reduced in pre-eclampsia so diuretics are contraindicated.

6. Post Partum Care

It is important to realize that fits can also occur for the first time after delivery, especially in the immediate postpartum period. Fits can also recur after delivery. Therefore, the patient must be carefully observed during the immediate postpartum period.

- Nurse the patient in the labour ward or other area like HDU/ ICU where she can be closely observed.
- NSAIDs should not be given.
- Continue treatment as required.
- Monitor the BP every hour. Continue giving antihypertensives as and when required, to maintain diastolic BP between 90 - 100 mm Hg.
- Monitor input-output carefully every hour. A woman in such a condition tends to retain fluid. This is because the kidneys are slow to excrete the extra circulating fluid after delivery. This may lead to a rise in the B P. Be careful not to give too much fluid intravenously during this period.
- Ensure that the urine output is > 30ml/hr in last 4 hours. Respiratory rate is not reduced, serum magnesium levels are checked.
- Patient should be kept in the hospital at least for 48 hrs after delivery.

- If patient is well oriented & mobile and her BP is controlled, she may be discharged after 48 hrs.
- If her BP is not controlled (> 150/ 100 mm Hg), she may be given some antihypertensive drug & a close follow up for her BP should be done.
- Advise the woman to have her BP checked every 4 hours for a few days. If regular BP checks are not feasible at home, do not discharge the woman for at least 72 hours after delivery.

- Anti-hypertensives to be stopped if BP < 130/80 mmHg.
- Anti-hypertensive of choice is Labetalol or Nifedipine.

- Arrange for follow up 7-10 days after delivery.
- Counsel about Danger signs & instruct to report back in case of any emergency.
- **Problems and complications:** Continued fits: Refer such cases to District Hospital/ Medical College WITHOUT ANY DELAY after properly filling the REFERRAL FORM.
- **Following eclampsia, the BP may:**
  - return to normal within a few days of delivery (48-72 hours).
  - return to normal after a few weeks.
  - remain high permanently.
- If BP remains high, (Diastolic BP >100 mm of Hg) Labetatol is given.
- The patient must be referred to a physician, to decide whether long-term management is necessary.

Postpartum counseling & education:

- Educate patient & family about need to check BP after 6-8 weeks of delivery
- Educate about risk of recurrence of Pre-eclampsia in subsequent pregnancy (2-7%).
- Educate about long term risk of Cardiovascular & Kidney disease.
- Patient should be linked to NCD clinic for further follow up.

All delivery to be conducted at FRU where EmOC trained MBBS doctors/ Specialists are available.

Refer a patient to DH/MC with severe PET/ Eclampsia if:

- Patient is unconscious
- Status Eclampticus
- Pulmonary oedema
- Patient has aspirated
- Uncontrolled BP
- Decreased urine output
- Deranged KFT

** In all these cases stabilize woman, administer loading dose of MgSO4 and refer to higher centre (DH/MC) after necessary communication and filling up the Referral form.

Care during transport-

- Put woman on her left with a mouth gag in place to avoid aspiration.
- Ensure woman is accompanied by medical/ paramedical person on stretcher with padded rails/ pillows on side to avoid fall/ injury down during transport.
- Pt should have indwelling catheter & secure IV line.

3. CHRONIC HYPERTENSION

- Counsel for early antenatal registration and regular follow up.
- If woman was on antihypertensive drugs before pregnancy &BP is well-controlled, continue same medication if acceptable in pregnancy.
- Atenolol & ACE inhibitors are NOT recommended in pregnancy.
- Drug of 1st choice - Labetatol.
- Calcium channel blockers may be used if required.
- DP to be maintained <100 mm Hg.
- If proteinuria or other signs and symptoms are present, consider superimposed pre-eclampsia and manage as accordingly.
- Monitor fetal growth.
- If there are no complications, deliver at term.
- If pre-eclampsia develops, manage as non severe pre-eclampsia or severe pre-eclampsia & deliver accordingly.
- If fetal growth restriction is severe and pregnancy dating is accurate, assess the cervix and consider childbirth at 37 weeks.
- If cervix is favorable, rupture membranes and induce labor.
- If cervix is unfavorable, ripen cervix.
- If there are fetal heart rate abnormalities, suspect fetal distress & consider for LSCS.
- Observe carefully for complications in postpartum period.

CHAPTER 5
VAGINAL BLEEDING IN EARLY PREGNANCY

KEY LEARNING OBJECTIVES

By the end of this session, the participants will be able to diagnose and manage appropriately the below during pregnancy:

1. **Types of abortions –**
   a) **Spontaneous abortion- Threatened, inevitable, incomplete and Missed abortion**
   b) **Induced abortion**
   c) **Unsafe abortion**
   d) **Septic abortion**
2. **General management of vaginal bleeding in early pregnancy**
3. **Ectopic pregnancy**
4. **Molar Pregnancy**

➢ **Important Points:**

- Vaginal bleeding occurring during the first 20 weeks of pregnancy is called vaginal bleeding in early pregnancy. It can be due to abortions, ectopic or molar pregnancy
- Initially confirm pregnancy with Urine pregnancy test
- Inevitable & incomplete abortion <12 weeks require uterine evacuation by MVA
- MVA is preferred means for uterine evacuation.
- If pregnancy >12 weeks, give Oxytocin infusion or repeated doses of Tablet Misoprostol & await spontaneous expulsion of products of conception in case of inevitable and incomplete abortion. Uterine evacuation may be required in few cases of retained placental bits.
- Sepsis is a frequent complication of unsafe abortion involving instrumentation
- Reassurance & appropriate contraception counseling is essential following all abortions
- Manage shock in ruptured ectopic pregnancy & refer or perform emergency laparotomy & salpingectomy
- Evacuate uterus in molar pregnancy if patient bleeding excessively otherwise refer.
- Contraception & follow up of these patients for next 1 year is essential. Refer to District Hospital/ Medical College for further workup & follow up.

BACKGROUND

Vaginal bleeding during pregnancy has many causes. Some are serious, whereas others are not. The cervix may bleed more easily during pregnancy because more blood vessels are developing in this area. Bleeding can occur early or later in pregnancy. Bleeding in early pregnancy is common. In many cases, it does not signal a major problem. Bleeding later in pregnancy can be more serious. Bleeding in the first trimester happens to about 15-25% of pregnant women. Light bleeding or spotting can occur 1-2 weeks after fertilization when the fertilized egg implants in the lining of the uterus.

Vaginal bleeding during early pregnancy (up to 20 weeks of gestation) can be due to various types of abortions (95%), ectopic pregnancy, or the presence of a hydatidiform mole (molar pregnancy). Patient will present with bleeding per vaginam with or without lower abdominal pain/backache, depending on the amount and duration for which the patient has been bleeding, vitals may be deranged.

1. ABORTIONS

Definition:

Abortion is the expulsion or extraction from its mother of an embryo or foetus weighing 500gm or less when it is not capable of independent survival (WHO).

1. Spontaneous abortion: is defined as the spontaneous loss of a pregnancy at a period of gestation before the stage of fetal viability (i.e. 20 weeks gestation).

The stages of spontaneous abortion include:

- Threatened abortion (the pregnancy may continue).
- Inevitable abortion (the pregnancy will not continue and will proceed to incomplete/ complete abortion).
- Incomplete abortion (the products of conception are partially expelled).
- Missed abortion (the products of conception are retained in uterus after fetal demise).

*Complete abortion (the products of conception are completely expelled).

2. Induced abortion: defined as a process by which the pregnancy is deliberately terminated before fetal viability.

3. Unsafe abortion: is defined by the WHO as a procedure for terminating a pregnancy that is performed by an individual lacking the necessary skills, or in an environment that does not conform to minimal medical standards, or both e.g. use of medical methods of abortion by unqualified/ uncertified persons e.g. use of medical methods of abortion by unqualified/ uncertified persons.

4. Septic abortion: defined as abortion complicated by infection.

- Sepsis may result from infection if the organisms ascend from the lower genital tract following either a spontaneous or an unsafe abortion.
- Sepsis is more likely to occur if there are retained products of conception and evacuation has been delayed.
- Sepsis is a frequent complication of unsafe abortion involving instrumentation.

Vaginal bleeding during early pregnancy (up to 20 weeks of gestation) can be due to various types of abortions, ectopic pregnancy or the presence of a hydatidiform mole (molar pregnancy).

Ectopic pregnancy: An ectopic pregnancy is one in which implantation occurs outside the uterine cavity. The fallopian tube is the most common site of ectopic implantation (greater than 90%). Symptoms and signs are extremely variable depending on whether the pregnancy has ruptured.

Differential diagnosis

Following table lists the symptoms and signs for differential diagnosis of vaginal bleeding during early pregnancy.

Symptoms and signs for the differential diagnosis of Vaginalbleeding during early pregnancy

Symptoms and signs typically present	Symptoms and signs sometimes present	Probable diagnosis
✓ Light bleedinga ✓ Closed cervix ✓ The size of the uterus corresponds to the gestational period	• Cramping/lower abdominal pain • Uterus softer than normal	Threatened abortion

✓ Heavy bleedingb ✓ Dilated cervix ✓ The size of the uterus corresponds to the gestational period	• Cramping/lower abdominal pain • No expulsion of the products of conception • The uterus is tender	Inevitable abortion
✓ Heavy bleeding ✓ Dilated cervix ✓ The size of the uterus is smaller than that expected for the gestational period	• Cramping/lower abdominal pain • History of partial expulsion of the product of conception	Incomplete abortion
✓ Light bleeding or brownish discharge ✓ The size of the uterus may be smaller than that expected for the gestational period	• Brownish discharge • Uterus soft & larger than normal size.	Missed abortion
✓ Light Bleeding ✓ Closed cervix ✓ The size of the uterus is smaller than that expected for the gestational period ✓ Uterus softer than normal.	• Light cramping/ abdominal pain • History of expulsion of the products of conception	Complete Abortion
✓ Light bleeding ✓ Abdominal pain, may be severe ✓ Closed cervix ✓ The size of the uterus is slightly larger than normal ✓ Uterus softer than normal ✓ Cervical motion tenderness present	• Amenorrhoea / irregular bleeding • Fainting • Presence of tender adnexal mass	Ectopic Pregnancy
✓ Heavy bleeding ✓ Uterus softer than normal (doughly feel) ✓ The size of the uterus is larger than that expected for the gestational period ✓ Fetal parts not felt, nor any fetal movement ✓ Absence of fetal heart sound ✓ Dilated cervix ✓ Partial expulsion of the products of conception which resemble grapes	• Nausea/vomiting • Bleeding • Cramping/lower abdominal pain • Presence of ovarian cysts (easily ruptured) • Early onset of pre-eclampsia • No evidence of a fetus.	Molar Pregnancy

Light bleeding: Takes 1-2 hours or more for a clean pad or cloth to be soaked

Heavy bleeding: Soaking about 2 pads per hour for continuously 2 hours

Guidelines for complete clinical assessment of a woman with spontaneous abortion

Complete clinical assessment for bleeding during early pregnancy	
History (Ask about and record the information)	• Period of amenorrhoea (ask her the date of her LMP) • Bleeding (duration and amount) • Abdominal cramping (duration and severity) • Foul-smelling vaginal discharge • Abdominal or shoulder pain • Allergy to drugs • H/o passage of the products of conception/fetus/blood clot • H/o inserting something into the vagina (suggestive of an illegal abortion)
Routine physical examination	• Check the vital signs (temperature, pulse, respiratory rate, blood pressure) • Examine the general condition of the woman • Look for pallor • Examine the respiratory system, cardiac system and extremities
Abdominal examination	• Assess for uterine size (rule out smaller or larger than gestational age). If gestational age is less than 12 weeks, uterus will not be palpable. • Auscultate for bowel sounds (absent in peritonitis due to septic abortion) • Check whether the abdomen is distended (hemoperitoneum due to ruptured ectopic pregnancy) • Assess the presence, location and severity of pain • Palpate for abdominal rigidity (tense and hard) and guarding (peritonitis, ectopic pregnancy) • Palpate for rebound tenderness
Pelvic examination	• External pelvic and vaginal examination: ✓ Look for lacerations outside the vagina, or over the external genitalia ✓ Assess the amount of bleeding (light/heavy) ✓ Look for protruding products of conception lying outside the vaginal canal

	• P/S examination: ✓ Any visible product of conception protruding from the cervical os or visible in the vaginal canal ✓ Foul-smelling vaginal/cervical discharge ✓ Cervical lacerations (indicative of instrumentation; may be suggestive of illegal abortion) ✓ Foreign bodies in the vagina • P/V examination ✓ Assess the amount of bleeding (light/heavy) ✓ Check whether the cervical os is open or closed (to determine the stage of abortion) ✓ Bimanual examination ✓ Estimate the size of the uterus ✓ Palpate for any pelvic masses ✓ Examine for pelvic tenderness (note severity, location, and cause of tenderness).
Investigation	Hb%, urine examination, blood group&Rh status should be a part of routine investigations during the clinical assessment in cases of abortion.

Note:

- The uterine sizeis measured in weeks passed after the last menstrual period (LMP).
- To check for rebound tenderness, keep a hand over the abdomen & press gently. Then suddenly remove your hand to release the pressure rapidly. If removal of the hand causes pain or worsens it, there is rebound tenderness. Rebound tenderness is a sign of peritoneal inflammation.

Management of bleeding in early pregnancy

Condition	Management
Threatened abortion	• Advise minimal physical activity. • No medication required.
Inevitable abortion	• If pregnancy is < 12 weeks: Evacuate the uterus using MVA. • If pregnancy is > 12 weeks: control the bleeding or augment the process of evacuation by giving a drip of oxytocin (20U in 500 ml of R/L @ 40 drops/min) OR Tab Misoprostol 400 mcg sublingual/vaginal 3 hrly, max 5 doses (2000mcg).

	• Await expulsion of products of conception and evacuate uterus to remove any retained products.
Incomplete abortion	• Carry out digital evacuation of the protruding products of conception. • If pregnancy <12 weeks, evacuate the uterus using MVA. • If pregnancy> 12 weeks dive Tab Misoprostol 400 mcg sublingual/vaginal 3 hrly, max 5 doses (2000 mcg). • If placenta retained, delivered it by augmenting uterine contractions with Inj. Oxytocin (20U in 500 ml R/L @ 40 drops/min). • If the bleeding is heavy, evacuate uterus by MVA.
Complete abortion	• Check for any retained products of conceptions and/or bleeding. • No further management is required if the condition of the women is stable.
Missed abortion	• Perform bedside BT, CT to access coagulation profile. • If pregnancy less than 12 weeks, give Tab Mifepristone 200 mg orally state dose & after 48 hrs administer Tab Misoprostol 400 mcg. sublingual/buccal/vaginal/oral (pregnancy<49 days) or Tab Misoprostol 800 mcg sublingual/buccal/vaginal (pregnancy > 49 days). • The above protocol is also used for induced abortions upto 63 days (9weeks). • If the pregnancy is more than 12 weeks, give T. Mifepristone 200mg orally. After 48 hrs, give Tab Misoprostol 400 mcg sublingual/vaginal 3 hrly (max 5 doses= 2000 mcg).
Septic abortion	• Give tab Paracetamol 500 mg 6 hourly to control fever (temp>38 degree C). • Examine for the presence of any foreign body in the vagina. • Thoroughly clean the vagina to remove any herbs, local medications or caustic substances. • Give the following antibiotics: • Inj. Ampicillin 2g IV, every 6 hours PLUS. • Inj. Gentamycin 5mg/kg body weight, IV, every 24 hours PLUS. • Inj. Metronidazole 500 mg IV, every 8 hours, until the woman has no fever for 48 hours. • (To avoid phlebitis, change the infusion site every three days or at the first sign of inflammation). • If bleeding is minimal, evacuate the uterus after 48 hours of antibiotics coverage; preferably use MVA. • If bleeding is heavy, evacuate uterus immediately & continue antibiotics.

Ectopic pregnancy	• Keep her warm. • IV access (two lines; 16-18 G) with fluids. • Oxygen by mask. • Urinary catheter. • Pulse oximeter if available. • Accompanying person with referral slip duly filled. • Monitoring and follow up visit after 4-6 weeks of management.
Molar pregnancy	• Supportive therapy to restore the blood loss and to prevent infection. • To evacuate the uterus as soon as the diagnosis is made. • Regular follow up for early detection of persistent trophoblastic disease. • If the diagnosis of molar pregnancy is certain and patient is bleeding, evacuate the uterus. • If cervical dilatation is needed, use a para- cervical block. • Use vacuum aspiration. Manual vacuum aspiration is safer and associated with less blood loss. The risk of perforation using a metal curette is high. • Have three MVA syringes charged and ready for use during the evacuation. The uterine contents are copious, and it is important to evacuate them rapidly. • Where facilities are available, evacuation should be done by suction evacuation with accompanying oxytocin infusion. • Infuse oxytocin 20 units in 500 ml IV fluids (Normal saline or Ringer's Lactate) @ 40 drops per minute to prevent hemorrhage once evacuation is under way. • In hydatidiform moles of gestational age greater than 16 weeks, the risk of pulmonary embolization of molar tissue is high and referral to higher centre is a better option.

2. GENERAL MANAGEMENT OF VAGINAL BLEEDING IN EARLY PREGNANCY

Universal measures

Monitor the woman's vital signs and general condition. Take steps to stabilize her condition, before giving management for the specific condition. If the condition of the patient suddenly worsens, reassess for shock or other complications and treat as appropriate. If shock suspected, immediately begin resuscitation.

Oxygen

If the woman is stable and there are no life-threatening complications (i.e. she is not in shock and vital signs are normal), oxygen is NOT required. If woman is in shock, manage accordingly.

Fluids

If the woman is stable and there are no complica-

tions (i.e. she is not in shock and the vital signs are normal), IV fluids are NOT required. If woman is in shock manage, accordingly.

Medicines

Oral medicines may be given if the woman is stable and there are no life-threatening complications. If a woman is in shock, manage accordingly.

Antibiotics

Antibiotics should preferably be given intravenously. If an evacuation is needed, start antibiotics before carrying out the evacuation. In case of septic abortion, give the woman broad spectrum antibiotic cover for at least 48 hours before carrying out uterine evacuation.

Tetanus toxoid and Diptheria (Td)

If there is a possibility that the woman was exposed to tetanus (abortion not performed with sterile instruments, and/or contamination of instruments or wound with dirt) and her vaccination history is uncertain, give her Inj. Td. (0.5 mg IM) in the deltoid muscle.

Pain control

For pain, give Inj Paracetamol IV or Inj. Tramadol hydrochloride 50 mg IM. Monitor the Respiratory Rate. If woman is stable, give oral analgesic (tablet Ibuprofen 400 mg) 60 minutes before the procedure along with paracervical block during the procedure for managing pain for uterine evacuation with MVA.

Additional measures

The woman's Rh status is routinely assessed. If she is Rh negative, give a dose of anti-D globulin (100 g if pregnancy <12 weeks and 300 g if pregnancy> 12 weeks) within 72 hours of uterine evacuation.

Do Hb% & urine examination.

Emotional and psychological support is explained in chapter on counseling.

Referral

- Start IV line and infuse RL/NS
- Put in an indwelling catheter
- Oxygen if required
- Send attendant/ paramedical personnel
- Inform about the need for blood donors
- Inform referral facility and fill referral form

Complications Of Abortion

Patients who bleed in early pregnancy may also present with complications of abortion. In these cases, there will invariably be a history of induced abortion at the hands of unqualified personnel. Following table gives the diagnosis and management of complications of abortion.

Diagnosis and management of complications of abortion

Complications	Signs & Symptoms		Management
Injuries Uterine, vaginal, urinary bladder or bowel injury (if left unattended, these injuries can get infected and lead to sepsis)	Symptoms	• Abdominal pain/cramping • Shoulder pain • Nausea/vomiting • Vaginal bleeding • Retention of urine or dysuria or incontinence • Fever (if associated with infection/sepsis) • Distended abdomen • Rigid (tense and hard) abdomen • Vaginal hematoma	• Start an IV line; infuse R/L as a maintenance drip. • Start antibiotics • Refer to higher facility with properly filled referral form.
Infection/ sepsis (it might result from aseptic techniques & interventions, or might occur as a complication of the injuries mentioned above.)	Symptoms Signs	• Pain in the lower abdomen • Malaise • Prolonged bleeding • Foul- smelling vaginal discharge • Fever • Rebound tenderness • The uterus is tender to touch • Purulent cervical discharge • Tenderness on moving the cervix	• Start an IV line; infuse R/L • Give Paracetamol to control the fever • Begain antibiotics as soon as possible & continue till the woman is fever free for 48 hours. • Ampicillin 2 g IV every 6 hours PLUS • Gentamycin 5mg/kg body weight IV every 24 hours PLUS • Metronidazole 500 mg IV every 8 hours. • If bleeding minimal evacuate uterus after 48 hr of antibiotic coverage by MVA. • If bleeding heavy, evacuate uterus immediately & continue antibiotics.

Follow-up of women who have had an abortion

Before discharge, counsel the woman who has had an abortion that:

- Spontaneous abortion is common and occurs in at least 15% (1 in 7) of clinically recognized pregnancies.
- The chances of a subsequent successful pregnancy are usually good unless there has been sepsis or there is h/o recurrent abortions, which may have an adverse effect on future pregnancies (this is rare).
- It is better to delay the next pregnancy for 6 months till the woman has completely recovered, even though she may want to become pregnant soon after having an abortion.
- Fertility returns as early as 10 days following an abortion and hence contraceptive method should be chosen and started immediately after an abortion.

Contraceptive counseling

Depending on the reproductive decision of the couple, contraceptive counseling should be offered. This is especially important for women who have had an unsafe abortion. If pregnancy is not desired, certain methods of family planning can be started immediately (within 7 days), provided:

- there are no severe complications requiring further treatment and
- the woman receives adequate counseling to help her select the most appropriate family planning method.

Family planning methods advisable after an abortion

Type of Contraceptive	Advise to start
Hormonal (pills, injections, implants)	• Immediately after the surgical abortion or within preferably 7 days of the procedure. • After 7 days, any interim method is suggested till these contraceptives are started. Also, a fresh pregnancy needs to be ruled out then. • In MMA, usually can be started immediately at the time of medical abortion. The exact timing can vary with the type of contraception. For example, COCs can be advised to start with the first medication (Mifepristone) or the last medication (Misoprostol), or after it has been established that the abortion is completed.
Condoms	• Immediately after surgical abortion or within preferably 12 days of the procedure.
Intrauterine Contraceptive Device	• Immediately after surgical abortion or within preferably 12 days of the procedure. • In medical method of abortion usually on follow up visit on 15th day. • If injection is present or suspected, delay insertion till it is cleared. Provide an interim method (e.g. condom). • If the level of hemoglobin (Hb) is less than 7g/dl, delay until the anemia improves. Provide an interim method (e.g. condom).

Voluntary Tubal Ligation	• Immediately after the surgical abortion or within preferably 7 days of the procedure • After 7 days, any interim method is suggested till this is done. Also, a fresh pregnancy needs to be ruled out then. • In MMA, after the next menstrual cycle. Give an interim method like condoms/COCs till her next periods for protection. • If infection is present or suspended, delay surgery until it is cleared. Provide an interim method (e.g. condom) • If the HB level is less than 7 g/dl, delay until anemia improves. Provide an interim method (e.g. condom).

3. ECTOPIC PREGNANCY

An ectopic pregnancy is one in which implantation occurs outside the uterine cavity. The fallopian tube is the most common site of ectopic implantation (greater than 90%). Symptoms and signs are extremely variable depending on whether or not the pregnancy has ruptured.

Symptoms and signs of ruptured and unruptured ectopic pregnancy

Unreuptured ectopic pregnancy	Ruptured ectopic pregnancy
• Symptoms of early pregnancy (irregular spotting or bleeding, nausea, swelling of breasts, bluish discoloration of vagina and cervix, softening of cervix, slight uterine enlargement, increased urinary frequency). • Abdominal and pelvic pain. • Carefully perform vaginal examination if an ectopic pregnancy is suspected. Examination may cause rupture during examination.	• Collapse and weakness, pale, sweating. • Fast, weak pulse (110 per minute or more) • Low BP, drowsy, irritable. • Hypotension • Hypovolemia • Acute abdominal and pelvic pain • Abdominal distension • Rebound tenderness, Pallor • Pallor • PV examination- soft uterus), closed cervix, light bleeding, tender mass in one fornix, tenderness with cervical movement.

Distended abdomen with shifting dullness may indicate free blood.

Differential Diagnosis

The most common differential diagnosis for ectopic pregnancy is threatened abortion. Others are acute or chronic PID, ovarian cysts (torsion or rupture) and acute appendicitis.

If available, ultrasound may help distinguish a threatened abortion or twisted ovarian cyst from an ectopic pregnancy.

Immediate Management of ruptured ectopic pregnancy.

- Cross-match blood and arrange for immediate laparotomy if facilities are available. Do not wait for blood before performing surgery.
- If facilities of surgery not available then resuscitate the patient, transfuse blood and refer the patient at the nearest center for urgent laparotomy.
- At surgery, inspect both ovaries and fallopian tubes:
    - If there is extensive damage to the tubes, perform salpingectomy (the bleeding tube and the products of conception are excised together). This is the treatment of choice in most cases.
- Unruptured ectopic pregnancy must be referred immediately to medical college/ higher centre.

Subsequent Management

- Prior to discharge, counsel the women about prospects for fertility and advise accordingly. Given the increased risk of future ectopic pregnancy, family planning counseling and provision of a family planning method, if desired, is especially important.
- Correct anemia with Iron supplementation for 6 months. Schedule a follow-up visit at 4 weeks.

4. MOLAR PREGNANCY

KEY MESSAGE:

- If fundal height more than the period of gestation or if history of bleeding especially with passage of grape likes vesicles: suspect molar pregnancy.
- USG in early pregnancy is the best method to confirm diagnosis.
- If the diagnosis of molar pregnancy is certain, evacuate the uterus if patient is bleeding otherwise refer to higher center. Details of MVA procedure is given in the end of the chapter.
- If the patient is bleeding and no facilities for evacuation, begin resuscitative measures and refer.
- Prior to evacuation: check Hemoglobin, send blood for Serum HCG estimation &serum TSH, T4 and do Chest X ray.
- Tissue should be sent for histopathology after evacuation.
- Partial mole shows a fetus with early onset growth restriction, reduced liquor and thick placenta in USG.
- Complete mole shows whole uterus filled with heteroechoic cystic spaces giving snow storm appearance in USG.
- Hydatidiform mole should be treated by evacuating the uterus. The patient must then be followed by serial HCG titres at District hospital/medical college.
- Follow up with beta HCG is very important since both partial mole and complete mole carry risk of development of gestational trophoblastic neoplasia (10-20%).

Molar pregnancy is characterized by an abnormal proliferation of chorionic villi.Signs and Symptoms seen in Molar pregnancy:

- Amenorrhoea
- Exaggerated symptoms of pregnancy
- Absence of ballottement
- Fetal parts not felt

Immediate Management

- Supportive therapy to restore the blood loss and to prevent infection.
- To evacuate the uterus as soon as the diagnosis is made.
- Regular follow up for early detection of persistent trophoblastic disease.
- If the diagnosis of molar pregnancy is certain and patient is bleeding, evacuate the uterus.
- If cervical dilatation is needed, use a para-cervical block.
- Use vacuum aspiration. Manual vacuum aspiration is safer and associated with less blood loss. The risk of perforation using a metal curette is high.
- Have three MVA syringes charged and ready for use during the evacuation. The uterine contents are copious and it is important to evacuate them rapidly.
- Where facilities are available, evacuation should be done by suction evacuation with accompanying oxytocin infusion.
- Infuse oxytocin 20 units in 500 ml IV fluids (Normal saline or Ringer's lactate) @ 40drops per minute to prevent hemorrhage once evacuation is under way.
- In hydatidiform moles of gestational age greater than 16 weeks, the risk of pulmonary embolization of molar tissue is high and referral to higher centre is a better option.
- Anti-D Immunoglobulin should be given if patient is Rh negative blood group.

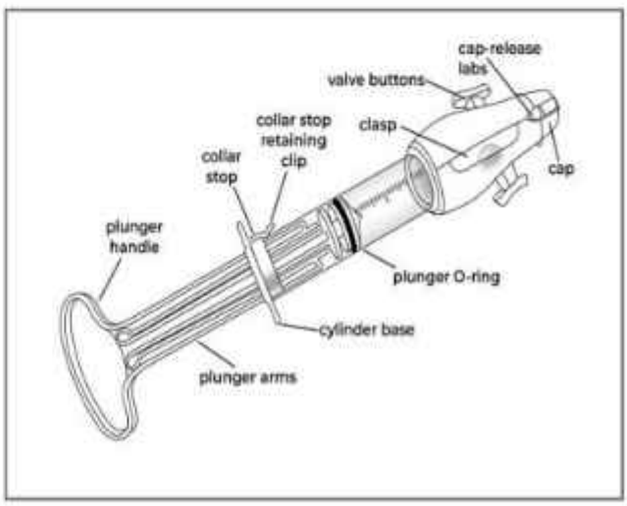
Subsequent Management

- Refer to District Hospital/ Medical College for further work up & follow up.
- Once Beta-HCG level have normalized, the combined oral contraceptive pill may be used as hormonal family planning method (Mala D, Mala N, Novelon) for at least 1 year to prevent pregnancy. Voluntary tubal ligation may be offered if the woman has completed her family.

Details of MVA Equipment & Procedure

Different parts of the aspirator and their functions:

- **60 cc cylinder:** holds the products of conception (POC) easily for up to 12 weeks gestation.
- **Plunger:** is pulled out to create vacuum.
- **Collar stop with retaining clip:** prevents the plunger from coming out of the cylinder, while creating vaccum.
- **Valve assembly:** includes hinged valve with cap, removable liner and valve buttons. It controls release of the vacuum. The advantage of double valve aspirator is that it can be used for pregnancy termination upto 12 weeks.



CHAPTER 6
VAGINAL BLEEDING IN LATE PREGNANCY AND LABOUR

KEY LEARNING OBJECTIVES

By the end of this session, the participants will be able to diagnose and manage appropriately the below during pregnancy:

A. Antepartum Hemorrhage

1. **Placenta Praevia**
2. **Abruptio Placenta**
3. **Ruptured Placenta**

B. Coagulopathy (Clotting factor)

➢ **Important Points:**

- Antepartum hemorrhage (APH) is an important cause of maternal mortality & can lead to death within 24 hrs. of bleeding
- Placenta previa & Abruptio placentae are two important causes of APH
- Vaginal examination is contraindicated in placenta previa
- Caesarean section should be done regardless of period of gestation to save life of the woman if the bleeding is heavy & continuous and patient is in shock
- Offer a single course of antenatal corticosteroids to women between 24 weeks and 37 of gestation at risk of preterm birth. The corticosteroid of choice is Dexamethasone, dose is 6 mg intramuscular repeated every 12 hours x 4 doses.
- Dexamethasone is preferred over betamethasone as the latter is more costly and less stable at high temperatures. However, in individual cases where Inj. Dexamethasone is not available the service provider may use Inj. Betamethasone to give the advantage of corticosteroids to the newborn.
- If the foetus is compromised, a caesarean section is the appropriate method of delivery with concurrent resuscitation of the mother
- Assessment of clotting status is important in Abruptio placentae
- Anti-D Ig should be given to all non-sensitised RhD-negative women after any presentation with APH, independent of whether routine antenatal prophylactic anti-D has been administeredor not.
- In women who have experienced a massive blood loss, a crude clotting test can be performed at the bedside by placing 5 mL of the patient's blood in a tube with no anticoagulant for 10 minutes. Failure to clot within this time or dissolution of an initial clot implies impairment of coagulation, and is suggestive of a low fibrinogen level. Prolonged oozing from needle puncture sites also suggests coagulopathy.
- Massive blood loss is defined as loss of one blood volume within a 24hours period, or blood loss >150 ml/min, or >50% blood volume loss in 3 hours and /or signs of clinical shock)
- Clotting studies (clotting time) and a platelet count should be urgently requested and advice from a haematologist should besought. For massive blood loss, transfusion of PRBC, FFP and Platelets should be in 1:1:1 ratio.

Definitions

Vaginal bleeding occurring after 20 weeks of pregnancy or during labour (but before delivery of the baby) is known as Antepartum hemorrhage (APH).

APH can be due to 3 causes:

- Placenta praevia: This is defined as implantation of the placenta in the lower uterine segment.
- Abruptio placentae (Accidental haemorrhage): This is due to detachment of a normally located placenta from the uterus before the foetus is delivered.
- Ruptured uterus

Clinical features and diagnosis

Following table gives the clinical features and differential diagnosis of APH.

Diagnosis of Antepartum Haemorrhage

Criteria	lacenta praevia	Abruptio	Uterine rupture
Nature of the bleeding	• Painless, causeless recurrent • The bleeding is always revealed • Sudden onset	• Painful; pain is often localized to start with and later becomes generalized and continuous • Attributed to pre-eclampsia or trauma • The bleeding is revealed, concealed, or usually mixed	• The bleeding often occurs after the woman has been in labour for a long time. • The bleeding may be concealed or mixed • Sudden onset • Cruciating pain initial and then decrease of pain
General condition and anaemia	Proportional to the amount of blood loss	Out of proportion to the visible blood loss in the concealed variety	Out of proportion to the visible blood loss
Features of pre-eclampsia	Not relevant	Present in one-third of cases	Not relevant
Height &feel of the uterus	Proportional to the gestational age, soft and relaxed	May be disproportionately enlarged in the concealed type; may be tense, tender and rigid	Uterine contour not felt; occasionally the uterus is felt separately on one side Tense tender abdomen Guarding , rigidity
Malpresentation	Common; the head is high and floating	Unrelated; head may be engaged	Foetal parts felt superficially; malpre-sentation may be present

Criteria	Iacenta praevia	Abruptio	Uterine rupture
Fetal heart	Usually present	Present, may be irregular	Usually absent, occasionally present if incomplete
Localization of placenta	Placenta is in the lower segment of the uterus	Placenta is in the upper segment	The placenta may be attached to the uterus or may be lying free in the peritoneal cavity
Vaginal examination	Placenta is in the lower segment so P/V is contraindicated	The placenta is not felt in the lower segment	The presenting part is high up or not felt; the contracted uterus may be felt on one side

General management

- Make a rapid evaluation of the general condition of the woman including vital signs (Pulse, BP, RR, Temperature).

  - Do Rapid initial assessment of patient
  - Call for help
  - Do NOT carry out a vaginal examination at this stage

- While evaluating the woman, keep the possibility of shock in mind even if signs of shock are not present because her status may worsen rapidly.
- If shock is suspected, immediately begin treatment.
- If shock develops:
  - Start IV infusion.
  - Give oxygen by nasal catheter.
- Assess the clotting status using a bedside clotting test. A crude clotting test can be performed at the bedside by placing 5 ml of the patient's blood in a tube with no anticoagulant for 10 minutes. Failure to clot within this time or dissolution of an initial clot implies impairment of coagulation, and is suggestive of a low fibrinogen level. Prolonged oozing from needle puncture sites also suggests Coagulopathy.
- Do not sedate a woman with APH even if she is in pain, as sedation may mask the signs of hypoxia should it occur as a consequence of haemorrhage and shock.
- Collect blood for Hb gm %, blood grouping & cross matching.
- Assess degree of shock.
- Put in an indwelling catheter.
- Start antibiotics, as appropriate.

Management of Vaginal Bleeding in Late Pregnancy & Labor

- Start IV fluids
- Collect blood for Hb %, blood grouping & cross matching
- Assess degree of shock
- Put in indwelling catheter
- Start antibiotics
- Immediate Laparotomy

→ Transabdominal ultrasound if available

- Start IV fluids
- Collect blood for Hb %, blood grouping & cross matching
- Assess degree of shock
- Expectant management till 37 wks if bleeding controlled
- LSCS if
  - Gestation 37 weeks
  - Heavy bleeding
  - Fetus dead

Placenta praevia

- Bleeding is painless, causeless & recurrent
- Uterus is relaxed
- FHS usually present (may be absent)

- Start IV fluids
- Collect blood for Hb %, blood grouping & cross matching
- Assess degree of shock
- Expectant management till 37 wks if bleeding controlled
- LSCS if
  - Gestation 37 weeks
  - Heavy bleeding
  - Fetus dead

Abruptio placentae

- Abdominal pain
- Anemia out of proportion to blood loss (concealed abruption)
- Uterus is tense and tender
- Foetal parts are not easily felt
- FHS is usually absent (may be present)

- Start IV fluids
- Collect blood for Hb %, blood grouping & cross matching
- Assess degree of shock
- Put in indwelling catheter
- Amniotomy f/b oxytocin augmentation

LSCS if
- Fetal distress
- Heavy bleeding occurs
- No progress, cervix unfavourable
- Oliguria
- Falling fibrinogen levels

Ruptured uterus

- Shock
- Abdomen - tender
- Uterine contour not felt/ may be felt on one side of lower abdomen
- Superficial fetal parts
- FHS absent

- Start IV fluids
- Collect blood for Hb %, blood grouping & cross matching
- Assess degree of shock
- Put in indwelling catheter
- Start antibiotics
- Immediate Laparotomy

Whenever patient with APH in shock is taken for caesarean section, consent for hystrectomy should always be obtained.

1. PLACENTA PRAEVIA

Placenta is normally located in fundal part of uterus. If placenta is abnormally placed in the lower segment of the uterus it is called as placenta previa. Newest classification for placenta previa is as following:

1. Placenta previa: The internal os is covered partially or completely by the placenta. (Figure 1A,1 B).
2. Low-lying placenta: Implantation in the lower uterine segment is such that the placental edge does not reach the internal os and remains outside a 2-cm wide perimeter around the os. (Figure 2).

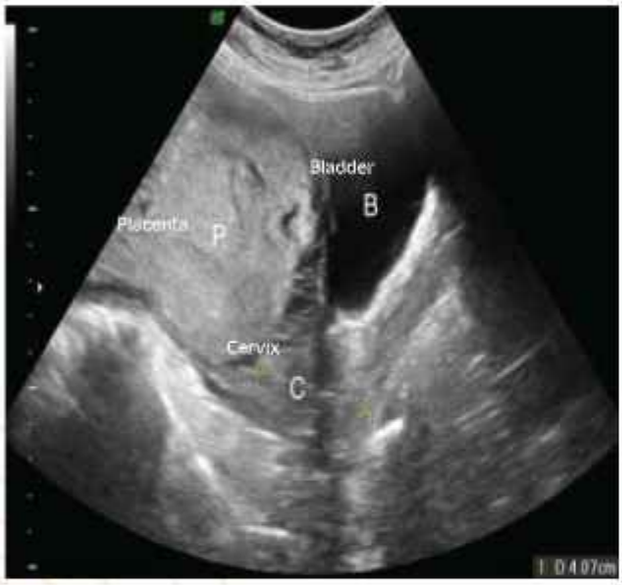


Fig. 1A

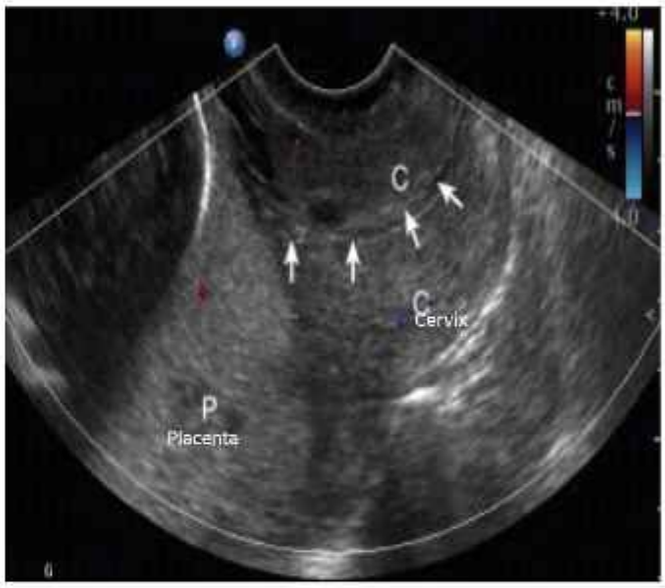


Fig. 1B

FIGURE 1A:TRANSABDOMINAL ULTRASOUND IMAGE OF PLACENTA PREVIAFIGURE 1B:TRANSVAGINAL ULTRASOUND IMAGE OF PLACENTA PREVIA

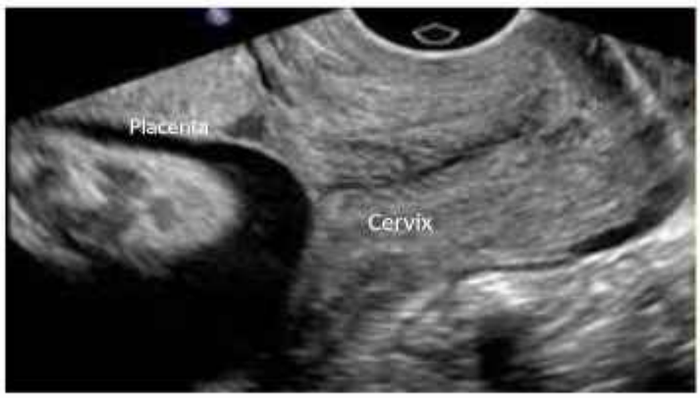


Figure 2: Transabdominal image of lowlying placenta

Management: Women with placenta previa are managed depending upon their individual clinical circumstances. Factors, on which the management depends, are gestational age, fetal maturity & severity of bleeding. Prevention and treatment of anemia in antenatal period is recommended. Advise to avoid sexual intercourse and exercise after 20 weeks of gestation and to decrease overall physical activity in third trimester should be given to women with placenta previa.

1. **Low lying placenta:** Vaginal delivery can be tried in patients with low lying placenta. Induction of labour with amniotomy and oxytocin should be done. If, severe bleeding or fetal distress occurs, immediate caesarean delivery should be done.

2. **Placenta previa:**

A. Asymptomatic placenta previa should be terminated by caesarean section at 37 weeks.

B. Conservative management after acute bleeding episode: If a woman presents to the hospital after an acute bleeding episode and is in stable condition, fetus is preterm and not in distress (reactive NST), conservative management as per Macafee and Johnson regimen (1945) can be done.

- Keep the woman in the hospital until delivery.
- Offer a single course of antenatal corticosteroids, preferably dexamethasone, to women between 24 weeks and 37 weeks of gestation at risk of preterm birth. Refer to previous chapter for detailed dosage schedule of dexamethasone.
- Correct anaemia (blood transfusion/ parenteral iron/ oral iron) depending upon hemoglobin levels.
- Ensure that blood is available for transfusion, if required;
- If bleeding recurs, decide management after weighing benefits and risks for the woman and fetus of further expectant management versus immediate delivery.

C. Actively bleeding placenta previa:

An actively bleeding placenta previa is a potential obstetrical emergency. If there is evidence of persistent, severe vaginal bleeding, maternal hypotension, or a non-reassuring fetal heart rate pattern, delivery is generally expedited by a caesarean section regardless of gestational age.

Maternal assessment is done by pallor, pulse, blood pressure, urine output and estimation of blood loss. The fetal heart rate should be monitored. Blood should be sent for blood grouping, baseline complete blood count and antibody screen in Rh negative group. One or two large bore intravenous lines are secured and crystalloid (Ringers lactate or normal saline) is infused to achieve/maintain hemodynamic stability and adequate urine output (at least 30 mL/hour). Transfusion of blood products in a woman with an actively bleeding placenta previa should be guided by the volume of blood loss over time and changes in hemodynamic parameters (eg, blood pressure, maternal and fetal heart rates, peripheral perfusion, and urine output), as well as the hemoglobin level. A reasonable approach is to begin red cell transfusions in hypotensive patients whose blood pressure fails to improve after two liters of crystalloid have been rapidly infused.

If a woman is hemodynamically unstable or if the fetal status is nonreassuring, General Anaesthesia should be the choice of anesthesia. However, regional anesthesia is an acceptable choice in hemodynamically stable women with reassuring fetal heart rate.

If delivered by caesarean section and there is bleeding from the placental site:

- Under-run the bleeding sites with sutures;
- Infuse Oxytocin 10 units in 500 ml IV fluid (Normal saline or Ringer lactate) @ 40-60 drops per minute and Injection Tranexamic acid 1 gram intravenous.
- If postpartum hemorrhages occur, manage according to guidelines.

Note: Women with placenta praevia are at high risk for postpartum hemorrhage and/or placenta accreta/increta, a common finding at the site of a previous caesarean scar.

Incidentally detected adherent placenta while performing LSCS

If encountered this at emergency Caesarean

- Arrange blood
- Deliver fetus through classical caesarean section
- Check the extent of adherence by palpation. If accreta- can be manually removed if the plane can be felt
- If increta -Do not remove placenta
- Proceed to subtotal hysterectomy
- Ask for help from the nearest expertise if possible

If doing elective caesarean, close the abdomen and refer to higher center.

If encountered this at emergency Caesarean

- Arrange blood
- Deliver fetus through classical caesarean section
- Check the extent of adherence by palpation. If accreta- can be manually removed if the plane can be felt
- If increta -Do not remove placenta
- Proceed to subtotal hysterectomy
- Ask for help from the nearest expertise if possible

2. ABRUPTIO PLACENTAE

Abruptio placentae is the detachment of a normally located placenta from the uterus before the fetus is delivered.

This can be of three types:

1. **Revealed abruption:** Retroplacental haemorrhage is revealed externally from the vagina. It is the most common and mild type with general condition being proportionate to bleeding.
2. **Concealed abruption:** The haemorrhagic blood is internal and gets collected between

placenta and uterine wall. It is rare but severe type with shock being out of proportion to visible blood loss.

3. **Mixed abruption:** It is combination of revealed and concealed type of abruption. It is quite common and severe.

Management:

- Rapid initial assessment of patient and stabilize the patient.
- Send investigations Complete haemogram, ABO and Rh grouping, Kidney function test, Liver function test, Serum electrolytes, Coagulation profile (PT , APTT, INR including FDP, D dimer) A crude clotting test can be performed at the bedside by placing 2 ml of the patient's venous blood in a small, dry, clean, plain glass test tube (approx 10 x 75 mm). Hold tube in your closed fist to keep it warm (+ 37°C). After 4 minutes, tilt tube slowly to see if clot is forming. Then tilt it again every minute until blood clots and tube can be turned upside down.
- Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy. Prolonged oozing from needle puncture sites also suggests coagulopathy.
- To maintain adequate organ perfusion, haematocrit of at least 30%, and urine output of at least 30 ml/hour should be ensured.
- Transfuse as necessary. Give Packed red blood cells according to pallor. In case of concurrent coagulopathy, FFP should also be given. Also, in case of massive blood loss, give 4 units of FFP for 6 units of PRBCs transfused.
- Till the blood is not available, hypovolemia should be corrected with crystalloids.
- **If bleeding is heavy** (evident or hidden), deliver as soon as possible:
  - If the cervix is fully dilated, deliver by vacuum extraction (MVA)
  - If vaginal delivery is not imminent, deliver by caesarean section.
- **If bleeding is light** to moderate (mother is not in immediate danger), the course of action depends on the fetal heart sounds:
- **If fetal heart rate is normal or completely absent,** deliver as follows-
  - If cervix is favorable, rupture the membrane with a kocker clamp and augment labor with oxytocin.
  - If woman in labour and uterine contractions are weak, augment labour with Oxytocin.
  - If cervix is unfavourable (firm, thick, closed) and patient is clinically deteriorating (hypotension, tachycardia, increasing pallor and increasing abruption) decision of performing caesarean section should not be delayed.
- If fetal heart rate is abnormal (less than 110 or more than 160 beats per minute or irregular).
  - Perform rapid vaginal delivery.
  - If vaginal delivery not possible deliver by immediate LSCS.
  - Ruptured uterus: Giving away of the uterine musculature with fetus inside the uterus or in the peritoneal cavity is a catastrophic event. Uterus may rupture during pregnancy or during labour. Most common cause of rupture in unscarred uterus is obstructed labour. Bleeding from a ruptured uterus may occur vaginally unless the foetal head blocks the pelvis. Bleeding may also occur intra-abdominally.

Rupture of the lower uterine segment into the broad ligament, however, will not release blood into the abdominal cavity, rather, it may form a haematoma in the broad ligament.

❖ COAGULOPATHY (CLOTTING FAILURE)

Coagulopathy is both a cause and a result of massive obstetric haemorrhage. It can be triggered by abruptio placentae, fetal death in-utero, eclampsia, amniotic fluid embolism and many other causes. The clinical picture ranges from major haemorrhage, with or without thrombotic complications, to a clinically stable state that can be detected only by laboratory testing.

Note: In many cases of acute blood loss, the development of coagulopathy can be prevented if blood volume is restored promptly by infusion of IV fluids (Normal Saline or Ringer's lactate).

- Treat the possible cause of coagulation failure:
  - Abruptio placentae
  - Eclampsia
- Use blood products to help control hemorrhage:
  - Give Packed red blood cell to correct anemia and components to replace clotting factors and platelets;
  - Arrange the following depending on clinical situation, blood reports and availability:
    - Fresh Frozen Plasma for replacement of clotting factors (15 mL/kg body weight).
    - Cryoprecipitate to replace fibrinogen;
    - Platelet concentrates (if bleeding continues and the platelet count is less than 20000/cu.mm).

Whenever patient with APH in shock is taken for caesarean section, consent for hystrectomy should always be obtained.

If one is not confident in performing the surgery in patients with shock, they should be resuscitated and transferred to nearby DH/ tertiary care centre. And to be accomapnied by a nurse / doctor.

CHAPTER 7

RAPID INITIAL ASSESSMENT (RIA), TRIAGE & MANAGEMENT OF SHOCK, FLUID THERAPY, BLOOD TRANSFUSION

KEY LEARNING OBJECTIVES

By the end of this session, the participants will be able to diagnose and manage appropriately the below during pregnancy:

A. **Rapid initial assessment and triage**

B. **Type of Shock**

1. **Hemorrhagic shock**
2. **Septic shock**
3. **Anaphylactic shock**

C. **Maternal Collapse**

D. **Pulmonary Oedema**

E. **Asthma**

D. **Convulsions**

➢ **Important Points:**

- All Women should be screened for danger signs and subjected to RIA & Triage
- Urgently mobilize all available personnel and emergency equipment, drugs & consumables
- Do a quick check of the consciousness levels, vital signs (PR, SPO2, BP, Respiratory Rate, Temperature), bleeding PV, and Fetal Heart sounds to assess the need for emergency care/ stabilization.
- If the patient is in shock, rapidly infuse Normal Saline or Ringer Lactate & stabilize the patient
- Perform additional assessment according to danger signs & provide additional care
- Reassess the patient & evaluate the need for possible referral or transfer.
- Clotting studies (clotting time) and a platelet count should be urgently requested and advice from a haematologist should besought. For massive blood loss, transfusion of PRBC, FFP and Platelets should be in 1:1:1 ratio.

A. RAPID INITIAL ASSESSMENT AND TRIAGE

Every pregnant woman or those in post-partum period coming to emergency needs a rapid initial assessment to understand and rule out any complications or risk factors and additional assessment & care if necessary.

All Women should be screened for danger signs and subjected to RIA & Triage.

Important points to be kept in mind about RIA & Triage:

- Stay calm. Think logically & focus on the needs of the woman.
- Do not leave the woman unattended.
- Triage team should be pre-defined with respect to roles & responsibilities.
- CALL FOR HELP (in case of emergency) and gather emergency equipment& supplies. (e.g. oxygen cylinder, emergency kit / crash cart).
- Women with following symptoms & signs may require immediate resuscitation:
  - Unconscious/ Altered Sensorium/ Convulsing.
  - Shock.
  - Unable to Breath/Difficulty in Respiration/ Frothing at Mouth/ Cyanosis.
  - Bleeding PV.
  - High fever (>103 F or 39.40C).

Assess the patient for responsiveness using Glasgow coma scale.

Look for pulse and respiration, if Respiration present -ABC.

And if No Respiration- CAB.

IF RESPONSIVE: If Pulse & Respiration present then use the ABC approach, preferably simultaneously

A: Airway management -

Maintain Patency & Protection (head tilt, chin lift and jaw thrust, insert airway to maintain patency).

B: Breathing Function -

Maintain SpO2 > 94%.

C: Circulation -

Maintain BP (by fluids &/or Vasopressors).

IF NON-RESPONSIVE: If Pulse &/or Respiration absent, use CAB approach for initiation of CPR

C: Circulation -

Maintain.

- Chest compressions @ 100 - 120/min.
- Depth of 5 - 6 cm.
- Complete Recoil & Minimise interruption.
- Early Defibrillation.

A: Airway management -

- Maintain Head Tilt - Chin lift.
- Appropriate airway device.
- Ambu Bag - mask ventilation.

B: Breathing Function -

- Maintain Ventilation at rate 10 breaths/ min
- Compression : ventilation - 30:2.

Ministry of Health and Family Welfare
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LAQSHYA

OBSTETRIC TRIAGE PATHWAY

Standard clinical triage assessment (initial assessment)

- **Short history**
- **Vitals (HR, BP, SpO2, RR, Temperature)**
- **Pain score**
- **Abdominal palpation, foetal heart rate**
- **Level of alertness (mental status)**

RED-IMMEDIATE

Seen by doctor immediately. Shifted to labor/delivery room immediately or to HDU/ICU after stabilization.

- Life–threatening conditions
- Vitals: (Mother)
  - HR >130/min or < 60/min
  - RR > 30/min or < 16/min
  - Systolic BP ≥ 160 mm Hg or ≤ 80/mm Hg
  - SpO2 < 92%
  - Fetal Bradycardia < 110/min
  - Fetal Tachycardia >160/min
  - Temperature < 95°F/35°C or >102.0°F/39°C
- Women is unresponsive or altered in mental status
- Detected high risk pregnancy during ANC check up
  - Cardiac problem
  - Respiratory distress
  - Eclampsia/any fits
  - Bleeding per vaginum
- Frequent contractions with urge to push
- No/decreased fetal movements/fetal distress
- Cord/hand prolapse (protruding from vagina)
- Signs of uterine rupture
- High grade fever

URGENT YELLOW

Should be seen within 30 min, and have a check by triage nurse or doctor every 15 min.

- All women in labour with frequent contractions (>3 contractions in 10 mins)
- Multipara in active labour
- Abdominal pain
- Pre-eclampsia
- Preterm labour or preterm rupture of membranes
- Trauma or accident
- Psychiatric disorders
- High grade fever

EXPECTANT GREEN

Should be informed of the delay and the possible time of a checkup. In case of a delay should be monitored at 30 min intervals.

- Nausea/vomiting/diarrhoea
- Urinary complaints
- Stable gestational hypertension
- Wound infection/Check-Up
- Upper respiratory infection
- Vaginal discharge
- Skin suture removal
- Injections, lab draws
- Booking for antenatal care
- Review of reports

THE STEPS IN TRIAGE ARE:

1. Greet the patient, ask her name, obstetric or non-obstetric complaint.
2. Triage protocol– coded red, yellow or green.
3. Initial assessment and coding is entered on assessment form after checking vitals.
4. Unconscious patient is always coded red, with code blue activation, resuscitation and shift to ICU.
5. Do not shift an unstable patient without stabilization.

GLASGOW COMA SCALE

The Glasgow Coma Scale (GCS) is used to objectively describe the extent of impaired consciousness in all types of acute medical and trauma patients. The scale assesses patients according to three aspects of responsiveness: eye-opening, motor, and verbal responses. Reporting each of these separately provides a clear, communicable picture of a patient's state.

Response	Points
Eye opening response	
- Opens spontaneously with blinking	- 4
- Opens to verbal command	- 3
- Opens to pain	- 2
- No response	- 1
Verbal response	
- Oriented	- 5
- Confused conversation	- 4
- Inappropriate words	- 3
- Incomprehensible speech	- 2
- No response	- 1
Motor response	
- Obeys commands for movement	- 6
- Purposeful movement to pain	- 5
- Withdraws in response to pain	- 4
- Flexion in response to pain	- 3
- Extension in response to pain	- 2
- No response to pain	- 1

The findings in each component of the scale can aggregate into a total Glasgow Coma Score which gives a less detailed description but can provide a useful 'shorthand' summary of the overall severity.[2] The score expression is the sum of the scores as well as the individual elements. For example, a score of 10 might be expressed as GCS10 = E3V4M3.

(Jain S, Iverson LM. Glasgow Coma Scale. [Updated 2022 Jun 21]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK513298/).

Rapid Initial Assessment

Assess	Danger signs	Consider following diagnosis
Circulation (signs of shock)	Examine: • Skin: cold and clammy • PR: rapid (> 110/min) & thread • BP: low (SP>90 mmhg)	• Shock
Airway and breathing	Look for: • Difficulty in breathing • Cyanosis • Respiratory Rate > 30 breaths/min Examine: • Lungs: wheezing or rales	• Severe Anemia • Heart Failure • Pneumonia • Asthma • Embolism • Shock

Vaginal bleeding (early or late pregnancy or after childbirth)	Ask if: • Pregnant, length of gestation • Recently given birth • Placenta delivered Examine: • Vulva • Amount of bleeding • Retained placenta • Perineal, vaginal, cervical tears • Uterus: contour and consistency • Bladder: full DO NOT DO A VAGINAL EXAM IF BLEEDING OCCURS IN LATE PREGNANCY	Early Pregnancy • Abortion • Ectopic pregnancy • Molar pregnancy Late Pregnancy • Abruptio placentae • Ruptured Uterus • Placenta praevia After Childbirth • Atonic uterus • Tears of cervix and vagina • Retained placenta • Inverted uterus
Unconscious or convulsing	Ascertain: • Pregnant, length of gestation • Recently given birth Examine: • BP: (DP>90 mm hg) • Temperature: >38 degree C	• Eclampsia • Malaria • Epilepsy • Meningitis/Encephalitis • Tetanus • High Fever • Septic shock
Abdominal Pain	Ask if: • Pregnant, length of gestation Examine: • BP: low(SP>90 mm Hg) • PR: >110/min • Temperature: >38 degree C Uterus: corresponding to state of pregnancy, contraction & contour	• Ectopic Pregnancy • Possible term or preterm labour • Amnionitis • Abruptio placentae • Rutured Uterus • Ovarian cyst • Appendicitis
Fever	Ask if: • Weak, lethargic • Frequent, painful urination Examine: • Temperature: >38 degree C	Fever in early pregnancy • Septic abortion Fever during pregnancy • Urinary tract infection • Malaria

	• Unconscious • Neck: stiffness • Lungs: shallow breathing, crepitations, absent breath sounds. • Abdomen: severe tenderness • Vulva: purulent discharge • Breasts: tender • Calf tenderness	• Pneumonia Fever after childbirth • Metritis • Pelvic abscess • Peritonitis • Breast infection • Deep Vein Thrombosis.

B. SHOCK

Shock is characterized by failure of the circulatory system to maintain adequate perfusion of the vital organs. It is a life-threatening condition that requires immediate and intensive treatment.

Suspect or anticipate shock if at least one of the following is present:

- Bleeding in early pregnancy (e.g. abortion, ectopic or molar pregnancy).
- Bleeding in late pregnancy or labour (e.g. placenta praevia, abruptio placentae, ruptured uterus).
- Bleeding after childbirth (e.g. ruptured uterus, uterine atony, tears of genital tract, retained placenta or placental fragments).
- Severe Infection (e.g. unsafe or septic abortion, amnionitis, metritis, pyelonephritis).
- Trauma (e.g. injury to uterus or bowel during abortion, ruptured uterus, tears of genital tract).

- If shock is suspected, respond immediately to provide appropriate management.
- Even if signs of shock are not present, keep shock in mind as you evaluate the woman further because her status may worsen rapidly.
- If the woman is conscious, talk to her and help her to stay calm. Ask what happened and what symptoms she is experiencing.
- Perform a quick examination including vital signs (blood pressure, pulse, respiration, temperature, oxygen saturation) and skin colour.
- Estimate the amount of blood lost and assess symptoms and signs.

Symptoms and signs of shock

Diagnosis shock if the following symptoms & signs are present

- Fast, weak pulse > 110/min, rapid and shallow breathing.
- Low blood pressure (SP<90 mm Hg).
- Pallor (especially of inner eyelid, palms or around mouth).
- Not: BP is a late sign of shock. Earlier signs are thread pulse and rapid breathing.

Other symptoms & Signs of shock include.

- RS: Rapid breathing (RR > 30 breaths/min), s/s of Pulmonary edema.
- CNS: Anxiousness, confusion or unconsciousness.
- Skin: Sweatiness or cold clammy skin, warm peripheries in septic shock in early stages.
- Kidney: Scanty urine output (< 30 ml/hr).

Rate of fluid infusion	ml/hr	Drops/min
1 L in 15 min	4000 ml/ hr	1000 drops/min
1 L in 30 min	2000 ml/ hr	500 drops/min
1 L in 2-3 hrs	500-333 ml/hr	80-100 drops/min
1 L in 6-8 hrs	170-125 ml/hr	30-45drops/min
1 L in 12 hrs	83 ml/hr	20 drops/min

GENERAL MANAGEMENT APPLICABLE TO ALL TYPES OF SHOCK-

- Provide lifesaving basic management before referring out.
- Ensure patent airway, start oxygen and IV fluids (preferably Crystalloids) and give one dose of antibiotic or Magnesium Sulphate, IF REQUIRED before referral.
- Do not give antibiotics by mouth to a woman in shock.
- Notify the forward linked facility about the status of woman to ensure readiness.

TYPE OF SHOCK	CAUSE	CLINICAL SIGNS	MANAGEMENT
Hemorrhagic/ Hypovolemic: • Any bleeding before 20 weeks of gestation e.g. abortion, ectopic pregnancy • Any bleeding after 20 weeks or during labour but before delivery e.g. placenta praevia, abruption placentae or ruptured uterus. • Any bleeding after childbirth e.g. ruptured uterus, uterine atony, tears of genital tract, retained placenta or placental fregments	• Bleeding in pregnancy • Vomiting/ Diarrhoea • Dehydration	• Low BP • Fast, thread pulse • Cold clammy skin • Decreased urinary output • Air hunger	• Establish airway and give oxygen • Cover the women with blanket to prevent hypothermia. • Rapid infusion of crystalloids using two large bore IV lines. • Blood transfusion if available • Give uterotonics, Inj. Transexamic acid and uterine massage. • Do bimanual compression or aortic compression, or insert UBT • If still bleeding, prepare or refer for surgery or further management with life saving measures and UBT.

• Septic Shock: A subset of sepsis in which underlying circulatory, cellular & metabolic abnormalities are profound enough to substantially increase mortality	• Sepsis in pregnancy/ puerperium • Prolonged rupture of membrane • Acute pyelonephritis	• Early warm phase • Low BP • Fast, thread pulse • Fever with/ without rigors • Flushed skin • Patient alert • Late cold phase • Cold clammy skin • Mottled cyanosis • Purpura • Jaundice • Mental confusion	• Establish airway & give oxygen • Begin administration of 30 ml/ Kg crystalloids for hypotension • Collect appropriate samples (blood, urine, pus) for microbial cultures before starting antibiotics, if facilities are available • Start broad spectrum antibiotics • Inj. ampicillin 2g IV every 6 Hours OR • Inj. 3rd generation Cephalosporin 1 g IV every 8 hours PLUS • Inj. Gentamicin 80 mg IV every 8 hours • Refer to higher centre/ FRU after first line of antibiotic and life support measures.
Cardiogenic	• Ischemic heart disease • Severe arrhythmia • Valvular heart disease	• Hypotension • Brady/ tachycardia/ irregular pulse • Cold & clammy peripheries • Raised JVP • Basal Crepts • Pedal oedema • Hepatomegaly	• Refer to higher centre/ FRU

➢ **Determining and managing the cause of shock**

Determine the cause of shock at the earliest following initial resuscitation and immediate life-threatening problems have been addressed.

1. HEMORRHAGIC SHOCK

- **If heavy bleeding is suspected as the cause of shock:**
- Determine the cause of bleeding and manage:
- If bleeding occurs during first 20 weeks of pregnancy- suspect abortion, ectopic or molar pregnancy.
  - ✓ If bleeding occurs after 20 weeks or during labour but before delivery- suspect placenta praevia, abruptio placentae or ruptured uterus.
  - ✓ If bleeding occurs after childbirth- suspect ruptured uterus, uterine atony, tears of genital tract, retained placenta or placental fragments.
- Take steps simultaneously to stop bleeding (e.g. oxytocics, uterine massage, bimanual compression, aortic compression, preparations for surgical intervention depending on the cause of bleeding).
- Inj. Tranexamic acid - 1 g administered over 10 minutes as detailed earlier.
- Transfuse fluid as soon as possible to replace blood loss.
- Replace blood loss with whole blood or blood components (if available) at the earliest especially in class III and IV volume of blood loss.
- Reassess the woman's condition for signs of improvement.

Classification of circulation volume lost

A pregnant woman has a circulation volume of about 100ml/kg (for a woman of 60kg this is 6 litres).

Class	Circulating	Signs	Management
I	< 15% (around 700 ml)	• PR normal (< 100/min) • BP normal • Pulse pressure normal/ increased • RR 14-20/min • Slightly anxious	• Use crystalloids to replace fluid loss • Treat cause • If pt not anemic, no need for blood transfusion
II	15-30% (over 1.5 litres)	• Tachycardia (>100/min) • Tachypnoea (20-30/min) • Pulse pressure decreased (<30mmHg) • Normal systolic pressure • Mildly anxious	• Use crystalloids to replace fluid loss • Treat cause • Blood transfusion to be guided by lab values

III	30-40% (over 2 litres)	• PR >120/min • Fall in Systolic BP • Pulse pressure decreased (<30mmHg) • RR 30-40/min • Anxious, confused, restless • Cold clammy pale skin • Oliguria (<30 ml/hr)	• Use crystalloids to replace fluid loss • Treat cause • Blood/ blood components transfusion as needed (according to blood loss, & lab values)
IV	>40% (over 2.5 litres)	• HR >140/min • Fall in Systolic BP • Profound hypotension • Pulse pressure decreased (<30mmHg) • RR >35/min • Peripheral pulses very feeble • Only carotid pulse felt • Confused, lethargic	• Use crystalloids to rapidly replace fluid loss as it is life threatening • Treat cause • Immediate Blood/ blood components transfusion as needed (according to blood loss, & lab values)

Reassessment

- Reassess the woman's response to fluids within 30 minutesto determine if her condition is improving.
- Signs of improvement include:
  - stabilizing pulse (PR < 90/ min).
  - increasing BP (SP > 100 mm Hg).
  - improving mental status (less confusion or anxiety).
  - increasing urine output (30 mL/hour).

If Improving

- Adjust IV infusion rate to 1 L in 6 hours.
- Continue management for cause of shock.

If the woman's condition fails to improve- further management required or refer to a higher center with appropriate referral form.

Management Of Hemorrhagic Shock

Replacement of Fluids

Replacement fluids are used to replace abnormal losses of blood, plasma or other extracellular fluids by increasing the volume of the vascular compartment. They are used principally in:

- Management of women with established hypovolumia (e.g. haemorrhagic shock).
- Maintenance of normovolumia in women with on-going fluid losses (e.g. surgical blood loss).

Intravenous replacement therapy

Intravenous replacement fluids are first-line treatment for hypovolemia. Initial treatment with these fluids may be life-saving and can provide

some time to control bleeding and obtain blood for transfusion if it becomes necessary. Volume required is three times the volumes lost.

Crystalloid fluids

- Crystalloid replacement fluids:

- contain a similar concentration of sodium as is there in plasma.

- cannot enter cells because the cell membrane is impermeable to sodium.

- pass from the vascular compartment to the extracellular space (normally only a quarter of the volume of crystalloid infused remains in the vascular compartment) compartment.

- To restore circulating blood volume (intravascular volume), infuse crystalloids in a volume at least three times the volume lost.

- Common crystalloids: Normal Saline, Ringer's Lactate.

Colloid fluids

- Colloid solutions are composed of a suspension of particles that are larger than crystalloids. Colloids tend to remain in the blood where they mimic plasma proteins to maintain or raise the colloid osmotic pressure of blood.

- In many conditions where the capillary permeability is increased (e.g. trauma, sepsis), leakage out ofthe circulation will occur and additional infusions will be necessary to maintain blood volume.

- Common colloids: albumin, dextrans, gelatins, hydroxyethyl starch solutions

- Limited role of colloids for resuscitation

Plain Dextrose (glucose) solutions are poor replacement fluids.

Safety measures before giving any IV infusion:

- Check that the seal of the infusion bottle or bag is not broken

- Check the expiry date

- Check that the solution is clear and free from visible particles

Maintenance fluid therapy

Maintenance fluids are crystalloid solutions used to replace normal physiological losses through skin, lungs, faeces and urine. The volume of maintenanc fluids required will vary with patients, e.g. if the woman has fever or if there is high ambient temperature or humidity, when losses increase.

Replacement of Blood & Blood Products

Obstetric care may require blood transfusions. It is important to use blood & blood products appropriately and to be aware of the principles designed to assist health workers in deciding when (and when not) to transfuse.

The appropriate use of blood products is defined as the transfusion of safe blood products to treat a condition leading to significant morbidity or mortality that cannot be prevented or managed effectively by other means.

- Packed red blood cells (PRBC) to be administered for ongoing blood loss &/ or Anemia.

- Fresh Frozen Plasma can be transfused in presence of coagulopathy.

- Platelets to be transfused in presence of documented thrombocytopenia like in HELLP syndrome.

Conditions that may require blood transfusion include:

- Postpartum haemorrhage leading to shock.
- Loss of a large volume of blood at in operative delivery.
- Severe Anemia, especially in later pregnancy or if accompanied by cardiac failure.

District hospitals should be prepared for the urgent need for blood transfusion. It is mandatory for obstetric units to keep stored blood available; especially type O negative blood and fresh frozen plasma, as these can be life-saving.

Risks of transfusion

Before prescribing blood or blood products for a woman, it is essential to consider the risks of transfusing against the risks of not transfusing.

- The transfusion of blood products carries a risk of incompatible transfusion and serious haemolytic transfusion reactions.
- Blood products can transmit infectious agents-including HIV, hepatitis B, hepatitis C, syphilis, malaria and Chagas disease-to the recipient.
- Any blood product can become bacterially contaminated and very dangerous if it is manufactured or stored incorrectly.
- There are very few clear indications of plasma transfusion e.g. coagulopathy. The risks often outweigh the possible benefit.

Blood safety

The risks associated with transfusion can be reduced by:

- Effective blood donor selection, deferral and exclusion.
- Screening for transfusion-transmissible infections in the blood donor population.
- High quality blood grouping, compatibility testing, component separation and storage and transportation of blood products.
- Appropriate clinical use of blood and blood products.
- Quality assurance programmes

Screening for infectious agents

Every unit of donated blood should be screened for transfusion- transmissible infections using the most appropriate and effective tests, in accordance with both national policies and the prevalence of infectious agents in the potential blood donor population.

All donated blood should be screened for the following:

- HIV-1 and HIV-2
- Hepatitis B surface antigen (HBsAg)
- Treponema pallidum antibody (syphilis)

Where possible, all donated blood should also be screened for:

- Hepatitis C
- Chagas disease, in countries where the seroprevalence is significant.
- Malaria, in low-prevalence countries when donors have travelled to malarial areas. In areas with a high prevalence of malaria, blood transfusion should be accompanied by prophylactic antimalarials.

- No blood or blood product should be released for transfusion until all nationally required tests are shown to be negative.
- Perform compatibility test on all blood components to be transfused even in the case of life-threatening emergencies. Blood bags shouldn't be issued to the patient without performing compatibility test.

Principles of clinical transfusion

- Transfusion is only one element of the management of women presenting with shock.
- Blood loss should be actively managed to reduce the woman's need for transfusion.
- Women with acute blood loss should receive initial resuscitation (IV replacement fluids, oxygen, etc.) while the need for transfusion is being assessed.
- The woman's haemoglobin value, although important, should not be the sole deciding factor in starting the transfusion. The decision to transfuse should be supported by the need to relieve clinical signs and symptoms and prevent significant morbidity and mortality.
- Prescription for transfusion should be based on national guidelines for clinical use of blood taking individual patient needs into account.
- Transfusion should be prescribed, only when the benefits to the woman are likely to outweigh the risks.
- The indication for transfusion should be properly recorded.
- A trained person should monitor the transfused woman and respond immediately if any adverse effects occur.
- All adverse effects should be investigated & reported.
- Records should be maintained by the clinicians.
- In anemic woman give Inj. Furosemide 20 mg IV before starting transfusion.

Before starting a transfusion

- Check the name & blood group of patient with that on the Blood bag.
- Check the date of expiry of blood.
- Look for signs of hemolysis.

Monitoring the transfused woman

For each unit of blood transfused, monitor the woman at the following stages:

- Before starting transfusion.
- At the onset of transfusion.
- 15 minutes after starting transfusion.
- At least every hour during transfusion.
- At 4-hour intervals after completing transfusion.

At each of these stages, record the following information on the woman's chart:

- General appearance.
- Temperature.
- Pulse.
- Blood Pressure.
- Respiration.
- Fluid balance (oral and IV fluid intake, urinary output).

In addition, record:

- The Time the Transfusion is started.
- The Time the Transfusion is completed.
- The Volume and Type of All Products Transfused.
- The Unique Donation Numbers of All Products Transfused.
- The Name of The Bank from Where Blood Is Issued.
- Any Adverse Effects

Responding to a Transfusion reaction

- Transfusion reactions may range from a minor skin rash to anaphylactic shock.
- Stop the transfusion, whenever any unwanted reaction occurs during the transfusion.
- Keep IV line patent with IV fluids (normal saline or Ringer's lactate) while making an initial assessment of the acute transfusion reaction and seeking advice.
- If reaction is minor, give tab Promethazine/ Chlorpheniramine 10 mg by mouth and observe.
- If reaction is severe e.g. anaphylactic shock from mismatched blood transfusion
- Manage as for shock and give Fluid replacement along with the following:

➢ Dilute Inj. Adrenaline 1 ml in 10 ml Normal saline or Ringer's lactate and give 1 ml of this solution IV OR 3-5 ml IM.

➢ Inj. Chlorphenaramine 10 mg IV/ IM.

➢ Inj. Hydrocortisone 200 mg IM / IV.

- If bronchospasm occurs start bronchodilator therapy with Salbutamol (inhaled or IV), Salmeterol (inhaled), Ipratropium (inhaled), Aminophylline (IV).
- Watch for airway compromise/ oedema.
- Monitor renal, pulmonary and cardiovascular functions.
- Transfer to higher center if condition does not improve.
- Combine resuscitation measures above till woman stabilized.

Documenting a transfusion reaction

Immediately after the reaction occurs, take the following samples and send with a request form to the blood bank for laboratory investigations.

- Immediate post-transfusion blood samples:
  - 1 clotted blood sample (2 ml venous blood in plain vial).
  - 1 anticoagulated blood sample from the vein opposite the infusion site (2 ml venous blood in EDTA vial).
  - the blood unit and transfusion set containing red cell and plasma residues from the transfused donor blood.
  - first specimen of the woman's urine following the reaction for evidence of hemolysis.
- If septic shock is suspected due to a contaminated blood unit, take a blood culture in a special blood culture bottle.
- Complete a transfusion reaction report form (same form that you get from the blood bank).
- After the initial investigation of the transfusion reaction, send blood samples at 12 hours and 24 hours after the start of the reaction to the blood bank for investigation:

- 1 clotted blood sample (2 ml venous blood in plain vial).
- 1 anticoagulated blood sample taken from the vein opposite the infusion site (2ml venous blood in EDTA vial.
- All urine for at least 24 hours after the start of the reaction.

- Immediately report all acute transfusion reactions, with the exception of mild skin rashes, to the blood bank that supplied the blood.
- Record the following information on the woman's chart:
  - Type of transfusion reaction;
  - Length of time after the start of transfusion that the reaction occurred.
  - Volume and type of blood products transfused.
  - Unique donation numbers of all products transfused.

2. SEPTIC SHOCK

Septic shock is a subset of sepsis in which underlying circulatory, cellular & metabolic abnormalities are profound enough to substantially increase mortality.

Goals of management following identification of septic shock:

- Begin rapid administration of 30 ml/kg crystalloid for hypotension.
- Collect appropriate samples (blood, urine, pus) for microbial culture before starting antibiotics, if facilities are available.
- Administer inotropic agents (Inj. Noradrenaline) as discussed earlier if MAP < 65 mmHg despite fluid administration.
- Measure lactate levels, if possible (Target lactate level < 2 mmol/L, levels > 4 mmol/L are abnormal).
- Start Broad spectrum antibiotics.
- Inj. Ampicillin 2 g IV every 6 hours.

  OR

- Inj. 3rd generation Cephalosporin 1 g IV every 8 hours PLUS.
- Inj. Metronidazole 500 mg IV every 8 hours PLUS.
- Inj. Gentamicin 80 mg IV every 8 hours (Administration should be stopped if urine output decreased or kidney function tests become abnormal).

We can also follow recent recommendations for antibiotics if available..

- Inj. Piperacillin-tazobactam 4.5g IV every 8 hours OR
- Inj. Meropenem 1g IV every 8 hours OR
- Inj. Cefepime 2g IV every 8 hours PLUS Inj. Metronidazole 500mg IV every 8 hours OR
- Inj. Linezolid 600mg IV every 12 hours PLUS Inj. Levofloxacin 750mg IV every 24 hours.

- Give the woman a combination of antibiotics to cover aerobic & anaerobic infections and continue antibiotics until she is fever-free for 48 hours.
- Remove any source of sepsis like Retained Products of Conception (RPOC) at the earliest (preferably within 12 hours).
- Reassess the woman's condition for signs of improvement.

- If possible, perform a detailed USG if response to therapy is inadequate.
- Refer woman to DH/ MC for unresponsive Septic shock.

Do not give antibiotics by mouth to a woman in shock.

3. ANAPHYLACTIC SHOCK

Anaphylactic shock is often life-threatening allergic reaction to an antigen and is associated with systemic vasodilatation that causes low blood pressure.Common antigens include insect venoms, foods & medications including antibiotics, local anesthetics, muscle relaxants, Non-Steroidal Anti-Inflammatory Drugs (NSAIDs), radio contrast agents and blood or plasma transfusion.

Clinical features:

- Cutaneous manifestations like edema, flushing, pruritis, angioedema, urticarial rash.

Danger signs:

- Rapidly progressing clinical symptoms.
- Hypotension.
- Respiratory distress (due to airway oedema & hypoxia).
- Chest pain, collapse.
- Persistent cough, developing stridor.

General management:

- Manage ABC.
- Monitor vitals.
- Oxygen by mask/ nasal cannula.

Specific Management:

- Stop contact with suspected allergen (for all cases).
- Give Hydrocortisone 100 mg IV stat and then 6th - 8th hourly.
- Give Diphenhydramine 50 mg IM or IV slowly, then 50 mg by mouth every six hours (when woman is conscious & stable).
- Bronchodilator therapy with Salbutamol (inhaled or IV), Ipratropium (inhaled).

In case of severe symptoms / danger signs-

- Inj adrenaline 0.3 to 0.5 mg IM preferably in mid outer thigh OR 0.1 mg slow IV.
- Can repeat the doses every 5-15 minutes depending upon clinical symptoms.
- IV fluids
- Continuous monitoring of patient.
- Place patient in left lateral position
- Nebulization with Salbutamol 2.5 mg to 5mg in 3 ml NS
- Important to anticipate airway edema and airway collapse which may require immediate intubation preferably by skilled personnel. Any delay may lead to complete airway collapse in case of severe symptoms.
- Shift patient to higher referral centre after stabilization.

C. MATERNAL COLLAPSE

Maternal collapse is a rare but life-threatening event, which can affect a woman during pregnancy or puerperium. The airway, breathing & circulation may be compromised, threatening the life of the mother. It can be due to many reasons. The outcome for mother and foetus depends on prompt and effective resuscitation.

Frequent causes of maternal collapse	
Severe bleeding (most frequent) Thromboembolic disease Heart disease Sepsis Drug toxicity (magnesiumsulfate, localanaesthetic drugs) Eclampsia	Intracranial haemorrhage Anaphylaxis Metabolic disorder/ electrolytes (hypoglycemia) Hypoxia due to impaired airway and/ or pulmonary disease.

Management of Maternal collapse/ cardiac arrest (Follow ABC vs CAB algorithm as given above)

- Assess for responsiveness and breathing.
- If the woman does not breath or breathes abnormally, check the carotid artery pulse quickly (no more than 10seconds).
- Prop up the woman on her left side if she is at a gestational age of >20 weeks (with uterus above the umbilicus).
- Manual uterine displacement to be done to relieve aorto-caval compression using one hand or two hand displacement technique.
- If no pulse is palpable, perform cardiopulmonary resuscitation immediately.
- Chest compressions and ventilation are provided in a ratio of 30:2 (30 chest compressions followed by 2 breaths).
- Chest compressions are performed just above the mid-sternum.
- Place the heel of your first hand on the top of the other & interlock the fingers of both hands. Keep the midline to ensure that pressure is not applied over the ribs. Do not apply pressure over the abdomen or bottom tip of the sternum.
- Lean well over the woman & with your arms straight, press down vertically on the sternum to depress it approximately 4-5 cm at a rate of 100-120 compression/ min.
- After30 compressions, re-open the airway and ventilate twice.
- Then continue chest compression and ventilation at a ratio of 30:2.
- Tilt the woman´s head backwards, keep it tilted and lift chin forward to open airway.
- Jaw thrust may be needed in some patients. It is performed by placing fingers behind patient's jaw& lifting jaw forward.
- Inspect mouth and remove foreign body if present and easily visible.
- Two rescue breaths by bag and mask or mouth to mouth or mouth to nose breathing-
- If the pulse is palpable, ventilate with bag and mask or by mouth once every5-6 seconds. Ensure that the chest rises visibly. Check the carotidpulseevery 2minutes.

↓

- If there is absence of breathing in the presence of an open airway, take this as absence of circulation.
- Assess for shock & manage accordingly.

- If woman responds, regains consciousness AND starts breathing normally, continue to:
- Give oxygen @ 6-8 L/ min by mask OR 2-4 L/minvianasalcannula.
- Give fluids & inotropes as necessary.
- Continue monitoring respiratory rate and other vital signs.

Important points for Cardiopulmonary Resuscitation in a pregnant woman

- Chest compressions: place the hands slightly higher on the sternum.
- Perform manual left uterine displacement, or place a firm wedge under the resuscitation board to tilt patient approximately 30 degrees.
- Obtain intravenous access above the diaphragm.
- Anticipate difficult airway management- call for expert.
- Discontinue magnesium sulfate (if applicable) and administer calcium chloride or calcium gluconate.
- If need for Defibrillation: remove both internal and external fetal monitors.
- If spontaneous circulation does not return within 4 minutes of cardiac arrest, immediate hysterotomy or cesarean delivery may be performed if gestational age > 20 weeks aiming for delivery within 5 minutes of cardiac arrest as termination improves maternal survival.
- Continue resuscitation during and after caesarean section.

Search for possible contributing factors for cardiac arrest in maternal collapse & manage (BEAU-CHOPS) according to cause:

- Bleeding/disseminated intravascular coagulation.
- Embolism: coronary/pulmonary/amniotic fluid embolism.
- Anaesthetic complications.
- Uterine atony.
- Cardiac disease (myocardial infarction/ischemia/ cardiomyopathy).
- Hypertension/preeclampsia/eclampsia.
- Other: differential diagnosis included in standard ACLS algorithms (5Hs, 5Ts).
- Placenta abruption/previa.
- Sepsis.

Role of USG if available:

- Ultrasound examination is useful in detecting intra-abdominal haemorrhage that caused collapse.
- Treat the causes of collapse or refer.

Differential diagnosis in pregnant women presenting with difficulty in breathing

SYMPTOM AND SIGNS TYPICALLY PRESENT	SYMPTOMS AND SIGNS SOMETIMES PRESENT	PROBABLE DIAGNOSIS
• Difficulty in breathing • Pallor of the conjunctiva, tongue, nail beds and/or palms • Haemoglobin <7g/ dL • Haematocrit <20% or less	• Lethargy and fatigue • Flat or concave nails	• Severe anaemia
• Difficulty in breathing • Symptoms and signs of severe anaemia (as above)	• Oedema • Cough • Rales • Swelling of legs • Enlarged liver • Prominent neck veins	• Heart failure due to anaemia
• Difficulty in breathing • Diastolic murmur and/or • Harsh systolicmurmur with palpable thrill	• Irregular heart beat • Enlarged heart • Rales • Cyanosis • Cough • Swelling of legs • Enlarged liver • Prominent neck veins	• Heart failure due to heart disease
• Difficulty in breathing • Wheezing	• Cough with expectoration • Rhonchi/rales	• Asthma
• Difficulty in breathing • Hypertension • Proteinuria	• Rales • Frothy cough	• Pulmonary oedema associated with pre-eclampsia

• Difficulty in breathing • Fever • Cough with expectoration • Chest pain	• Consolidation • Congested throat • Rapid breathing • Rhonchi/rales	• Pneumonia

D. PULMONARY OEDEMA

Pulmonary edema is a condition caused by too much fluid in the lungs. This fluid collects in the many air sacs in the lungs, making it difficult to breathe.

Pulmonary edema that develops suddenly (acute pulmonary edema) is a medical emergency that needs immediate care. Pulmonary edema can sometimes cause death. Prompt treatment might help. Treatment for pulmonary edema depends on the cause but generally includes additional oxygen and medications.

Symptoms

Sudden (acute) pulmonary edema symptoms

- Difficulty breathing (dyspnea) or extreme shortness of breath that worsens with activity or when lying down.
- A feeling of suffocating or drowning that worsens when lying down.
- A cough that produces frothy sputum that may have blood in it.
- A rapid, irregular heartbeat (palpitations).
- Anxiety, restlessness or a feeling that something bad is about to happen.
- Cold, clammy skin.
- Wheezing or gasping for breath.

Long-term (chronic) pulmonary edema signs and symptoms.

- Awakening at night with a cough or breathless feeling that may be relieved by sitting up.
- Difficulty breathing with activity or when lying flat.
- Fatigue.
- More shortness of breath than usual when you're physically active.
- New or worsening cough.
- Rapid weight gain.
- Swelling in the legs and feet.
- Wheezing.

Pulmonary oedema is seen frequently in severe pre-eclampsia, severe anemia or heart disease complicating pregnancy.

Management

- Prop up the woman
- Give oxygen at 6-8 L/ min by mask or 2-4 l/ min by nasal cannulae
- Give Inj. Frusemide 40 mg IV as a single dose.
- Close & continuous vital monitoring.
- Start management of hypertension or eclampsia if indicated.
- Urgent call for Physician / LSAS opinion OR refer to higher centre.

E. ASTHMA

Bronchial asthma complicates 3-4% of pregnancies. Pregnancy is associated with worsening of the symptoms in one-third of affected women.

Management

- If bronchospasm occurs, give bronchodilators-
  - Salbutamol 200-400 mcg OR Salmeterol 100 mcg 2 puffs every 15 minutes OR nebulized Salbutamol (2.5-5 mg) OR Salbutamol 4 mg orally 4 hourly.
  - Inhaled Ipratropium bromide puffs of 20-40 mcg OR nebulisation with 250-500 mcg can be added.
  - If there is no response to bronchodilators, give corticosteroids. Inhalational corticosteroids may be considered before administering injectable corticosteroids such as Inj Hydrocortisone IV 2 mg/kg body weight every four hours as needed.
- If there are signs of infection (bronchitis), give Inj Ampicillin 2 g IV 6 hourly.
- After acute exacerbation has been managed, ensure that the woman has been seen by a physician & advised to continue treatment with inhaled bronchodilators and inhaled corticosteroids to prevent recurrent acute episodes.
- If no response, refer to a higher centre.

Note:

- Do NOT use prostaglandins F2 (Prostodin/ Carboprost) in these women.
- For prevention and treatment of postpartum haemorrhage give Inj Oxytocin 10 units IM or methyl Ergometrine 0.2 mg IM or Tab Misoprostol 800 g per rectally.

Reduced level of consciousness / Convulsions

- A rapid assessment of level of consciousness level is made using AVPU.
  - A- Is the patient Alert
  - V- Is she responding to Voice
  - P- Is she only responding to Pain
  - U- Is she Unresponsive
- The decrease in the level of consciousness is the marker of cerebral insult (lack of oxygen). The deeper the level of unconsciousness, the more serious is the insult to the brain.
- Assess the causes of reduced level of consciousness-
  - Has there been a recent convulsion (eclampsia).
  - Is she a known epileptic.
  - Is there any sign of neck stiffness (meningitis)
  - Does she have fever(temp>38°C).
- Assess pupils for reaction (to check if cerebral bleed has occurred).
- Assess vital signs: pulse rate, breathing, BP, temperature.
- In case patient convulsing or has a history of fits, manage as the case of Eclampsia.

F. CONVULSIONS

Treat all women with convulsions for Eclampsia unless proved otherwise

Usually, these women have high blood pressure but a small proportion may have normal BP.

Differential diagnosis of convulsions

SYMPTOM AND SIGNS TYPICALLY PRESENT	SYMPTOMS AND SIGNS SOMETIMES PRESENT	PROBABLE DIAGNOSIS
• Convulsions • Systolic BP >140mm Hg • Diastolic blood pressure 90 mmHg or more after 20 weeks gestation	• Coma (unconscious) • Other symptoms and signs of severe pre-eclampsia • Proteinuria 1+ or more	• Eclampsia
• Convulsions • Past history of convulsions • Normal blood pressure		• Epilepsy
• Fever • Chills/rigors • Headache • Muscle/joint pain • Coma • Anaemia	• Convulsions • Jaundice	• Severe/complicated malaria
• Headache • Stiff neck • Photophobia • Fever	• Convulsions • Confusion • Drowsiness • Coma	• Meningitis or Encephalitis

General Management

After a convulsion:

- Position the woman on her left side to reduce risk of aspiration of secretion & vomitus.
- Do Suction of mouth and throat as necessary.

- Check airway & breathing.
- Suction mouth & throat as needed.
- Give oxygen at 4-6 L per min- by mask.
- Put woman on eclampsia bed with side rails to protect her from injury but do not actively restrain her.
- Treat her as Eclampsia until & unless proved otherwise.
- Follow on lines of Eclampsia.
- Monitor vital signs (pulse, blood pressure, respiration), reflexes and fetal heart rate.

- If systolic BP > 160 mm Hg, diastolic BP > 110 mm Hg, give antihypertensive drugs. Reduce the systolic BP to < 150 mm Hg but not below 140 mm Hg, diastolic BP to <100 mm Hg but not below 90 mm Hg.
- Magnesium sulphate loading dose to be given to pregnant woman.
- Give loading dose of Magnesium Sulfate solution.
- Give 4 g (20ml of 20% solution) slow IV over 5 minutes.
- Then give 10 g deep IM, 5 g in each buttock (10ml of 50 % solution, in each buttock), injection with 1 ml 2% lidocaine in same syringe.
- Start an IV infusion and infuse IV fluids@ 75 ml/ hr.
- Catheterize the bladder to monitor urine output.
- Maintain a strict fluid balance chart (monitor the amount of fluids administered and urine output) to prevent fluid overload.
- Monitor patient for
- Respiratory rate.
- Deep tendon jerks.
- Urine output.
- Withhold Inj. MgSO4 if respiratory rate < 16/ min, urine output <30 mL/ hr or absent deep tendon jerks.
- Monitor for the development of pulmonary oedema.
- Auscultate the lung bases hourly for rales indicating pulmonary oedema. If rales are heard, withhold fluids and give frusemide 40 mg IV once.
- Never leave the woman alone. A convulsion followed by aspiration of vomit may cause death of the woman and fetus.
- Assess clotting status with a bedside clotting test.

Assess other Danger Signs

- Severe headache, blurred vision, or elevated blood pressure.
- Decreased or absent fetal movements, absent fetal heart tones, abnormal fetal heart rate.
- Fever or foul-smelling vaginal discharge.
- Severe abdominal pain in early/later pregnancy (through/after 22 weeks).
- Contractions before 37 weeks gestation.
- Manage according to cause.

Bedside Clotting Test

- Take 2 mL venous blood in a small, dry, clean, plain glass test tube (approx 10 x 75 mm)
- Hold tube in your closed fist to keep it warm (+37°C)
- After 4 minutes, tilt tube slowly to see if clot is forming.
- Then tilt it again every minute until blood clots and tube can be turned upside down
- Failure of a clot to form after 7 minutes or a soft clot that breaks down easily suggests coagulopathy

Transport of critically ill to higher centers

- For optimal maternal outcome decide whether to Stabilise & treat Vs. Stabilise & refer.
- Timely Intrauterine transport is also associated with improved neonatal outcomes as compared to neonatal transfer after delivery.
- Maintain maternal cardiac output-
  - Shift in Left lateral position.
  - IV fluid to be continued.
  - Continue vasopressors (Noradrenaline) as indicated.
- Maintain maternal oxygenation.
- Monitor maternal vitals.
- Take care of the lines/drains/tubes.
- The attending physician should be aware of the setting inside the ambulance.
- Defibrillator, O2 cylinder, emergency drugs and fluids, airway equipments, portable ventilator and monitor for ECG, BP, SPO2 should be checked and made available.
- Referral form to be appropriately filled.
- In addition to these, try to contact the referral unit in advance and inform about the mother's condition so that the emergency team can be kept ready for immediate assessment and treatment.

CHAPTER 8
NORMAL LABOR & DELIVER

KEY LEARNING OBJECTIVES

By the end of this session, the participants will be able to diagnose and manage appropriately the below during pregnancy:

A. **Assessment and diagnosis of labor**

B. **Monitoring and management of labor**

1. **Management of first stage of labor**
2. **Management of second stage of labor**
3. **Episiotomy**
4. **Care of the baby after delivery**
5. **Active management of third stage of labor**
6. **Immediate post-partum care of mother -fourth stage of labor**

C. **Counselling in the ward**

➢ **Important Points:**

- True labor pain is accompanied by uterine contractions, passage of show & cervical changes.
- Let the woman choose the position she desires & feels comfortable in during labor
- Ensure adequate hydration & analgesia during first stage of labor.
- In active phase of first stage of labor maternal condition, fetal condition & progress of labor should be monitored using a partograph.
- There is an urgent need for intervention if the partograph moves to the right of action line
- Controlled delivery of fetal head &perineal support is essential at time of delivery.
- Episiotomy should not be performed routinely.
- Active management of third stage of labor (AMTSL) must be performed in each delivery
- Initiate breast feeding within the first hour of birth.
- Must ensure separate sets of instruments for each delivery, autoclaved as a set.

A. ASSESSMENT & DIAGNOSIS OF LABOUR

Introduction

Normal labour is a spontaneous process of expulsion of the foetus and placenta. However it is important to remember that during the intra partum period the woman and the baby go through physical as well as mental trauma. One has the responsibility of providing the necessary care for the management of labour as well as emotional support, and must ensure a successful outcome for the mother and the baby.

Assessment of Labor

History

➢ Inquire about the woman's history of labour, asking the following questions:

- When did the contractions begin?
- How frequent are the contractions? How strong are they?
- Has there been any watery discharge? If so, what colour was it?
- Has there been any bleeding? If so, how much?

o Is the baby moving?

o Are there any other complaints?

➢ Check the woman's record for history of the present pregnancy, e.g. the haemoglobin status, TT immunization, Rh status, HIV status, any complications and any other significant history. If there is no record, then take detailed history with emphasis on the following:

- When was the LMP/what is the period of amenorrhea? On this basis, determine the period of gestation.
- Ask for any significant history of any past pregnancy.
- Any other significant history.

➢ True labor pain versus false labor pain: True labor pain has the following features and can be clearly differentiated from false labor pain.

True vs False labour pain

True Labour Pains	False Labour Pains
• May begin irregularly but becomes regular and predictable. • Felt first in the lower back and sweeps around to the abdomen in a wave pattern. • Continues no matter what is the woman's level of activity. • Increases in duration, frequency and intensity with the passage of time Accompanied by 'show' (blood-stained mucus discharge). • Achieves cervical effacement and cervical dilatation.	• Begins irregularly and remains irregular. • Felt first abdominally and remains confined to the abdomen and groin. • Often disappears with ambulation or sleep. • Does not increase in duration, frequency or intensity with the passage of time. • Show isabsent. • Does not achieve cervical effacement and cervical dilatation.

General Examination

- Conduct general physical examinations, record the temperature, pulse, blood pressure, height and weight, and check for pallor, pedal edema & edema at any other site, etc.

Abdominal Examination

- Always examine the abdomen before examining the vagina.
- Conduct an abdominal examination to assess the foetal lie, presentation, FHR, and frequency and duration of contractions.

Vaginal Examination

- Near term or at the onset of labor, a vaginal examination helps to assess the following:
  - Pelvic Adequacy
  - Stage of Labor

Remember

- During labor, vaginal examination should not be attempted more than once every four hours (to avoid infection).
- Do not carry out a vaginal examination if the woman is bleeding at the time of labor or at any time during pregnancy. Manage this as a case of 'vaginal bleeding in pregnancy.
- Do not start a vaginal examination during a contraction.

Steps for doing a P/V examination

Always examine the abdomen before examining the vagina

- Do not shave the perineal area.
- Explain to the woman what is being done and always ask for her verbal consent before doing a vaginal examination.
- Ask the woman to pass urine.
- Wash your hands with soap and water before and after each examination. Carry out the vaginal examination under strict aseptic conditions.
- Place the woman in the supine position with her legs flexed and apart.
- Perform the vaginal examination very gently, wearing clean/sterile gloves in both hands.
- Clean the vulva and perineal area with a mild antiseptic solution. Wipe the vulva first, then labia majora and lastly labia minora with cotton swabs from the anterior to the posterior direction. Use a swab only once. Use separate swabs for each side.
- Separate the labia with the thumb and forefinger of the left hand and clean the area once again.
- Use two fingers of the right hand (index and middle fingers) and insert them gently into the vaginal orifice without hurting the woman.

Pelvic adequacy

- Pelvic assessment is important in the case of both primi gravidas and multigravidas, who have a past history of prolonged or difficult labor which could be associated with Cephalo Pelvic Disproportion (CPD).
- Ask patient to evacuate bladder.
- Make her lie in dorsal position with buttocks at edge of table.
- After scrubbing wear gown & HLD/sterile gloves.
- Clean & drape the patient.
- Insert 2 fingers in vagina after lubricating with antiseptic cream.
- Look for the
  - Sacral curve

- Sacral promontory
- Side walls
- Ischial spines
- Inter ischial diameter
- Subpubic angle
- Sacrococcygeal joint mobility
- Trans ischial tuberosity diameter (TDO)

In a normal pelvis:

- The sacral promontory is not reached signifying adequacy of pelvic inlet. If it is reached then assess the distance between the sacral promontory and the inferior border of pubic symphysis. This distance should be more than 11.5cm.
- The sacrum is well curved.
- The ischial spines are not prominent and both ischial spines cannot be felt by the index & middle finger inserted at the same time signifying mid cavity adequacy.
- Space between two ischial tuberosities admits four knuckle of closed fist signifying pelvic outlet adequacy.
- The sub pubic space permits 2 fingers to be inserted easily and the subpubic angle is > 90 degrees.

Assessment of Progress of Labor

The progress of labor is assessed by:

- Assessing the changes in cervical effacement and dilatation (by conducting a P/V examination).
- Assessing the progress in foetal descent (by conducting an abdominal &/or a P/V examination).

Abdominal examination to assess the descent of the presenting part

Abdominal palpation should be conducted to assess the descent of the presenting part. If the head is above the symphysis pubis it is fully palpable & mobile. If the head is entirely below the symphysis pubis it is not palpable abdominally.

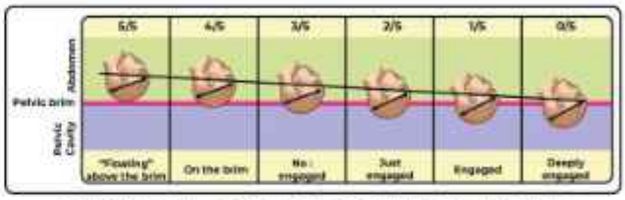


Fig. 13.20: Progressive descent of the head, assessed in "in fifths" palpable above the brim

Vaginal examination to assess the stage and progress of labour

During a vaginal examination, determine the following:

- Cervical effacement: This is progressive shortening & thinning of the cervix during labour.
- Cervical dilatation: Dilatation of cervical Os is measured in cm.
- The presenting part. Try and judge if it is hard, round and smooth (the head). If not, try and identify the presenting part. In case the vertex is not the presenting part, manage the case as a mal presentation.
- The position or the station of the presenting part.
- Feel for the membranes. Are they intact?
- If the membranes have ruptured, check whether the colour of the amniotic fluid is clear or meconium-stained.
- Feel for the umbilical cord. If it is felt, it is a case of prolapsed cord. If the cord pulsations are felt, explain to the woman and her family that a caesarean section may be required. Manage the woman as given under the management of "Prolapsed cord".

The progress of labour can be decided as follows

- If the cervix is dilated < 4 cm, the woman is said to be in the latent phase of the first stage of labour.
- If the cervix is dilated 4 cm, the woman is said to be in the active phase of first stage of labour till full dilatation of cervix.
- Full cervical dilatation (10 cm), cervix no longer felt on vaginal examination, a bulging thin perineum, a gaping vagina and anus, and the head visible through the introitus, even in between contraction mark the second stage of labour, and indicate that the delivery is imminent.

Stage of labour

Assessment of cervical dilatation & effacement helps to decide the stage of labour.

First stage*	This is the period from the onset of labor pain to the full dilatation of the cervix, i.e. to 10 cm. This stage takes about 12 hours in primigravidas and 6-8 hours for multigravidas. It is divided into the latent and active stages. • Latent phase (not in active labour): Cervix is dilated <4 cm Contractions weak (less than 2 contractions in 10 minutes) • Active phase: Cervix is dilated >4 cm - Contractions 3 per 10 min - Rate of dilatation 1cm / hour or more - Descent of presenting part present
Second stage**	• This is the period from full dilatation of the cervix to the delivery of the baby. This stage takes about two hours for primigravidas and about half an hour for multigravidas. • Full cervical dilatation • Bulging thinned out perineum • Gaping anus and vagina • Head visible at the perineum
Third stage	This is the period from after delivery of the baby to delivery of the placenta. This stage takes about 15 minutes to half an hour, irrespective of whether the woman is a primigravida or multigravida.
Fourth stage	This is the first two hours after the delivery of the placenta. This is a critical period as PPH, a potentially fatal complication, is likely to occur during 3rd as well as 4th stage.

*The use of the following definitions of the latent and active first stages of labour is recommended by WHO 2018 guidelines for practice.

- The latent first stage is a period of time characterized by painful uterine contractions and variable changes of the cervix, including some degree of effacement and slower progression of dilatation up to 5 cm for first and subsequent labours.
- The active first stage is a period of time characterized by regular painful uterine contractions, a substantial degree of cervical effacement and more rapid cervical dilatation from 5 cm until full dilatation for first and subsequent labours.

In view of these revised guidelines, it is recommended that diagnosis of non-progress of labour & prolonged labour should not be made & intervention like oxytocin augmentation & caesarean section should not be done till 5cm dilatation as long as the maternal & fetal condition is reassuring.

**Women should be informed that the duration of the second stage varies from one woman to another. In first labor, birth is usually completed within 3 hours whereas in subsequent labors, birth is usually completed within 2 hours (as per 2018 WHO guidelines) so again unnecessary interference should not be done as long as maternal & fetal condition is reassuring.

B. MONITORING & MANAGEMENT OF LABOR

Management of different stages of labour

It is very important that while managing a woman in labour one should be polite, caring & follow all principles of respectful maternity care. Do perineal scrubing & bathing. Encourage ambulation. Give light diet. Give analgesics, if needed.

1. MANAGEMENT OF FIRST STAGE OF LABOR

The first stage of labour starts with onset of labour pains to full dilatation of the cervix. It consists of two phases:

- Latent phase: Cervix dilated < 4 cm
- Active phase: Cervix dilated ≥ 4 cm

In Latent Phase of Labour- The cervix is dilated < 4 cm

Monitor the following every one hour:

- ✓ Contractions:
- ✓ Frequency-how many contractions in 10 minutes.
- Duration-for how many seconds each contraction lasts.
- FHR: Normal FHR is between 110 and 160 beats/ minute.
- Presence of any sign of an emergency (difficulty in breathing, shock, vaginal bleeding, convulsions or unconsciousness).

Monitor the following every 4 hours.

- Cervical dilatation (in cm)
- Temperature, Pulse, BP
- Descent of head per abdominally

- Record the time of rupture of the membranes and the colour of the amniotic fluid. - Always do P/V at rupture of membrane to rule out cord prolapse.
- Never leave the woman alone.

Prolonged Latent Phase: If latent phase of labour lasts for more than 8 hrs it is said to be prolonged.

- If after 8 hours, the contractions are regular, stronger and more frequent, but there is no progress in cervical dilatation with or without rupture of the membranes, this is a case of non-progress of labour. Manage accordingly.
- If after 8 hours, there is no increase in the intensity/frequency/duration of contractions, and the membranes have not ruptured and there is no progress in cervical dilatation, but maternal & fetal condition is reassuring, ask the woman to relax. This is probably false labour. Examine her when the pain/discomfort increases, and/or there is vaginal bleeding, and/or the membranes rupture.
- If the membranes were already ruptured on admission then wait for progress of labour for 6 to 12hours & if no spontaneous increase in contractions then augment labour with oxytocin or misoprostol as detailed in the section on induction of labour.

In Active Phase of Labour

The cervix is dilated ≥ 4 cm. Start maintaining a Partograph & do not leave the woman alone.

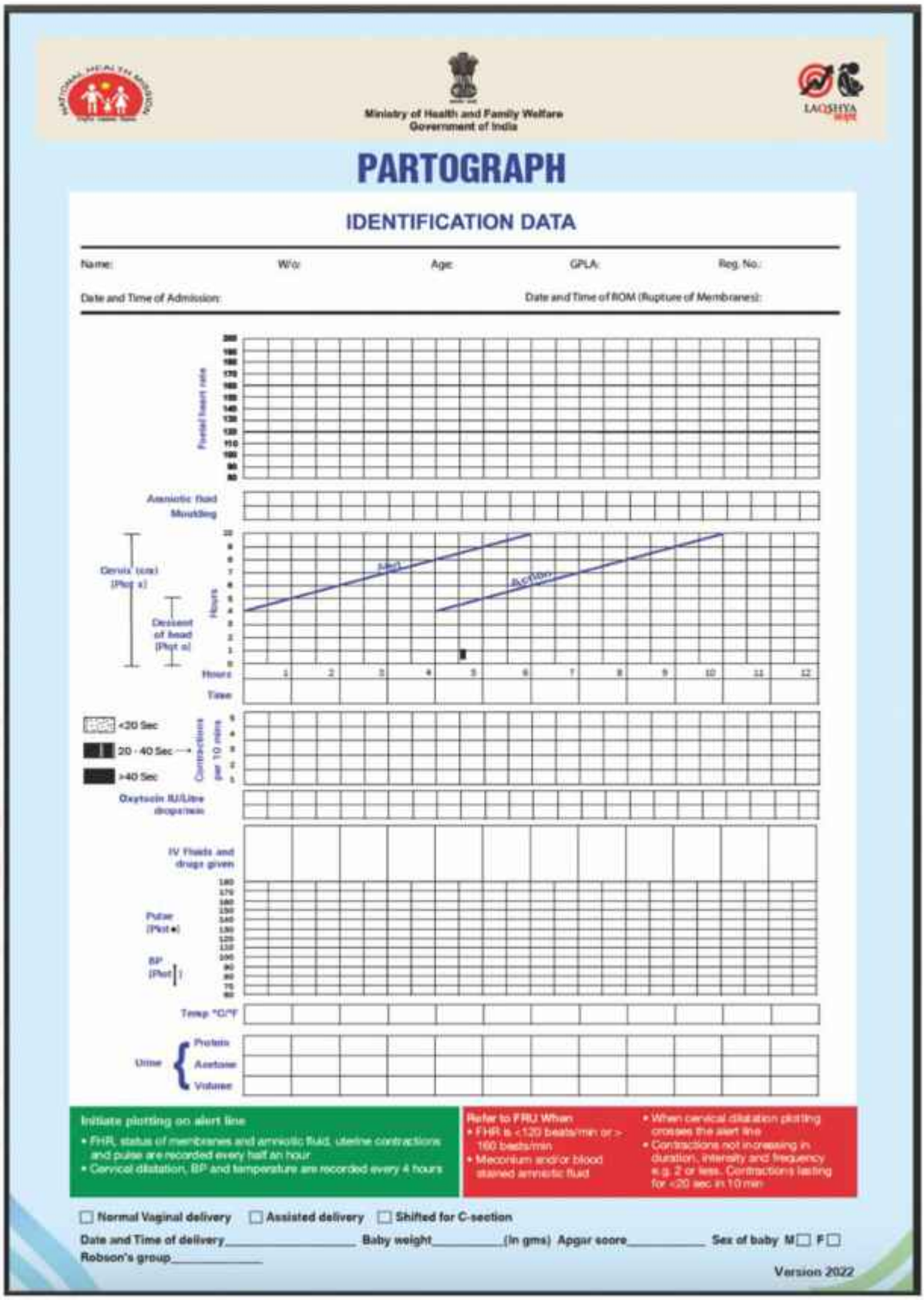
Partogram must be made in all cases

- **Monitor the following on a partograph:**
  - Fetal condition
  - Progress of labour
  - Maternal condition
- Monitor every 30 minutes:
  - Maternal pulse, uterine contractions and FHR
  - Look for presence of Meconium or blood-stained liquor or cord prolapse.
- Monitor every 4 hours:
  - Descent of fetal head per abdominally
  - Cervical dilatation (in cm) by P/V
  - Temperature&Blood pressure

PARTOGRAPH

A partograph is a graphic recording of the progress of labour and salient features of the mother and foetus. It is a tool to assess the progress of labour and recognize the need for action and referral at the appropriate time.

The instructions for filling the partograph are given below.



Ministry of Health and Family Welfare
Government of India

LAQSHYA

PARTOGRAPH

IDENTIFICATION DATA

Name: W/o: Age: GPLA: Reg. No.:

Date and Time of Admission: Date and Time of ROM (Rupture of Membranes):

Foetal heart rate

Amniotic fluid
Moulding

Cervix (cm)
[Plot x]

Descent of head
[Plot o]

Hours

ALERT

ACTION

Hours
1 2 3 4 5 6 7 8 9 10 11 12

Time

<20 Sec
20 - 40 Sec
>40 Sec

Contractions per 10 mins

Oxytocin IU/Litre drops/min

IV Fluids and drugs given

Pulse
[Plot •]

BP
[Plot |]

Temp °C/°F

Urine
Protein
Acetone
Volume

Initiate plotting on alert line

- FHR, status of membranes and amniotic fluid, uterine contractions and pulse are recorded every half an hour
- Cervical dilatation, BP and temperature are recorded every 4 hours

Refer to FRU When

- FHR is <120 beats/min or > 160 beats/min
- Meconium and/or blood stained amniotic fluid
- When cervical dilatation plotting crosses the alert line
- Contractions not increasing in duration, intensity and frequency e.g. 2 or less. Contractions lasting for <20 sec in 10 min

☐ Normal Vaginal delivery ☐ Assisted delivery ☐ Shifted for C-section

Date and Time of delivery_____ Baby weight_____(in gms) Apgar score_____ Sex of baby M☐ F☐

Robson's group_____

Version 2022

The instructions for filling the partograph are given below.

Identification Data

Note down the woman's name and age, parity, date and time of admission, registration number and time of rupture of the membranes.

Foetal condition

- The FHR should be counted and recorded every half-an-hour. Count the FHR for one full minute. The rate should preferably be counted immediately following a uterine contraction. A FHR of >160 beats/minute or <110 beats/minute indicates foetal distress. Manage as given under "Foetal distress". Each of the small boxes in the vertical column of a partograph represents half-hour intervals.
- Simultaneously record the condition of the membranes and colour of the amniotic fluid as visible at the vulva every 30 minutes as:
  - Intact membranes (mark 'I')
  - Clear liquor (mark 'C')
  - Meconium stained (mark 'M')
  - No liquor (mark 'A')
- Assess Moulding of fetal head every 4 hrs at P/V examination & grade it as follows:
  - 1+: Suture apposed
  - 2+: Suture overlapped but reducible
  - 3+: Suture overlapped but not reducible

Labour

- Monitor contraction every 30 minutes & chart on the partograph as per protocol.
  - of frequency (fill the appropriate no. of boxes as number of contractions in 10 minutes).
  - of duration
    - less than 20 sec
    - between 20 & 40 sec
    - more than 40 sec
- Record cervical dilatation in cm (X) every four hours. The initial recording is at the alert line (cervical dilatation must be 4 cm and above, i.e. the woman must be in active labour before you start plotting the graph). Normally the line should continue to remain at or to the left of the **alert line**. Write the time accordingly in the row for time.
- Record descent of head abdominally every 4 hrs.

Other Indications for Vigilant Monitoring & Management

- Pulse rate >100/min
- Blood pressure >140/90mm Hg
- Temperature>100.40 F (>380)
- Membranes are ruptured > 12 hrs and delivery is not impending
- Head remains high despite of good uterine contraction for 2 hrs
- Moulding of the fetal head (++)

Prolonged Active Phase

- If the alert line is crossed (the graph moves to the right of the alert line), it indicates prolonged labour, and you should be alert that labour is not progressing as it should. Note the time when the alert line is crossed. Assess uterine contractions. Dilatation between 4 to 5 cm may be slow, so avoid intervention as long as maternal & fetal condition is reassuring.

- If contractions are inefficient (less than 3 contraction in 10 min, each lasting 40 sec), suspect inadequate uterine activity.
- If contractions are efficient (3 or more contractions in 10 min each lasting more than 40 sec), suspect cephalopelvic disproportion, obstruction or malposition.
- Crossing of the action line (the graph moves to the right of the action line) indicates the need for intervention. There is a difference of 4 hours between the alert and the action line. By the time the action line is crossed, the woman should ideally have received appropriate and timely intervention.

Maternal conditions

- Record the maternal pulse every half-an-hour and plot them on the graph with a dot (•). Record both the systolic and the diastolic BP using a vertical arrow, with the upper end of the arrow representing the systolic BP and the lower end indicating the diastolic BP(↕). Record temperature & BP every 4 hrs.
- Record presence of any emergency signs.
- Record whenever mother passes urine - volume & presence and absence of sugar and ketones.

Intervention

- Mention here any drug that you have administered during labour, including the dose and route of administration, and when. Also include the food items and liquids consumed by the woman during that period.

Robson's group

Identification of pregnant woman as per the modified Robson's criteria mentioned in the GoI C-Section Audit form (Chapter 21) should be done.

2. MANAGEMENT OF THE SECOND STAGE OF LABOUR

The second stage of labour starts from full dilatation of cervix to delivery of the fetus.

- If the cervix is fully dilated or the perineum is thin and bulging with the anus gaping and the head of the baby visible at the vaginal introitus, it is the second stage of labour.

Monitor

- the uterine contractions every 30 min by noting number of contractions in 10 min, duration and intensity of contractions.
- FHR every 5 min.
- Perineal thinning and bulging.
- Visible descent of the foetal head during contractions.
- Presence of any signs indicating an emergency- excessive bleeding, convulsions etc.
- The upright positions such as standing, sitting or squatting makes pushing easier. Therefore, if the woman finds it difficult to push in lying position, or there is slow descent of the presenting part, you should change the position of the woman.
- During the second stage of labour the woman should be allowed to push down when she has contractions or if she has the urge to do so.
- Bearing down efforts are required after the cervix is fully dilated, and even more so when the head is distending the perineum. Occasionally, the woman feels the urge to push before the cervix is fully dilated. This should be discouraged as it can result in oedema of the cervix which may delay the progress of labour.

- To prevent pushing at the end of the first stage of labour (before the cervix is fully dilated), teach the woman to pant, i.e. to breathe with an open mouth, take in two short breaths followed by a long breath out.
- Asking the woman to hold her breath and bear down in the second stage of labour should NOT be done. Holding the breath is potentially harmful. It may reduce the quantity of blood reaching the uterus and placenta. It may also reduce the supply of oxygen to the foetus.
- Giving oxytocics to shorten the second stage of labour is NOT advisable.
- Avoid ironing the perineum (or using the "Sweep and stretch" technique) to hasten delivery.
- Fundal pressure should NOT be given.

3. EPISIOTOMY

Episiotomy should **NOT** be performed routinely.

Episiotomy should be considered only in the case of:-

- Tight perineum leading to prolonged second stage
- complicated vaginal delivery (breech, shoulder dystocia, forceps, vacuum);
- scarring from female genital cutting or poorly healed third or fourth degree tears;
- scarring from improperly sutured episiotomy/ perineal tears.
- Fetal distress.

- Review general care principles and apply antiseptic solution to the perineal area.
- Provide emotional support and encouragement. Use local infiltration with lignocaine.
- Make sure there are no known allergies to lignocaine or related drugs.
- **Preparation of lignocaine 1% solution**

Combine 1 part Lignocaine 2% (concentration in which it is commonly available) with

1 part Normal saline or sterile distilled water (Do not use glucose solution as it increases the risk of infection).

- Infiltrate beneath the vaginal mucosa, beneath the skin of the perineum and deeply into the perineal muscle using about 10 mL 0.5% lignocaine solution.
- **Note:** Aspirate (pull back on the plunger) to be sure that no vessel has been penetrated. If blood is returned in the syringe with aspiration, remove the needle. Re check the position carefully and try again. Never inject if blood is aspirated. The woman can suffer seizures and death if IV injection of lignocaine occurs.
- Wait 2 minutes and then pinch the incision site with forceps. If the woman feels the pinch, wait 2 more minutes and then retest.

✓ Anaesthetize early to provide sufficient time for effect

✓ Infiltration of perineal tissue with local anesthetic

- Wait to perform episiotomy until:
- the perineum is thinned out; and
- 3-4 cm of the baby's head is visible during a contraction.

✓ Performing an episiotomy will cause bleeding. It should not, therefore, be done too early

- Wearing high-level disinfected gloves, place

two fingers between the baby's head and the perineum.

- Use scissors to cut the perineum about 3-4 cm in the mediolateral direction.
- Control the baby's head and shoulders as they deliver, ensuring that the shoulders have rotated to the midline to prevent an extension of the episiotomy.
- Carefully examine for extensions and other tears and repair.

Making the incision while inserting two fingers to protect the baby's head (PICTURE TO BE INSERTED)

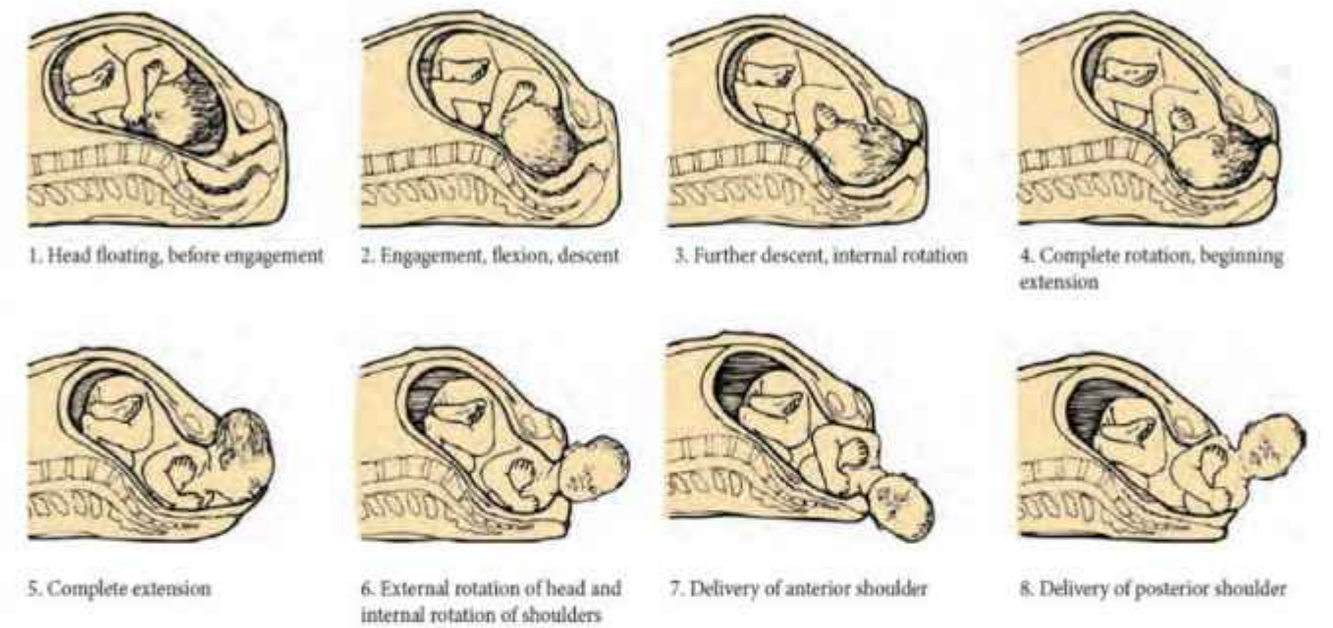
Delivery of head

- Ensure a controlled **delivery of the head** by taking the following precautions:
  - Encourage the woman to push only during pains (a contraction).
  - Keep one hand gently on the head as it advances with the contractions.
  - Support the perineum with the other hand during delivery and cover the anus with a pad held in position by the side of the hand.
  - Leave the perineum visible (between the thumb and the index finger).
  - Ask the mother to breathe steadily and to not push during delivery of the head.
  - Encourage rapid breathing with the mouth open.
  - Do NOT apply fundal pressure to hasten delivery of the head.
- Feel gently around the baby's neck for the presence of the umbilical **cord around** the neck. If the cord is present around the neck:
  - And if it is loose, deliver the baby through the loop of the cord, or slip the cord over the baby's head.
  - If the cord is tight, doubly clamp and cut in between, and then unwind it from around the neck.

Delivery of the shoulders and the rest of the baby

- Wait for spontaneous rotation and delivery of the shoulders. This usually happens within 1-2 minutes.
- Perineal tears can be prevented by delivering one shoulder at a time. If there is difficulty in delivering the shoulder, suspect shoulder dystocia. Ask the woman to take a position with extreme flexion at the knees and hips with the knees wide apart. The shoulder may be released from behind the symphysis pubis and may deliver.(Refer section on shoulder dystocia) Fortunately, shoulder dystocia is rare in India.
- Apply gentle pressure downwards to deliver the anterior shoulder.
- Then lift the baby up, towards the mother's abdomen, to deliver the lower (posterior) shoulder.
- The rest of the baby's body smoothly follows out.
- Maintain perineal support during delivery of shoulders also.
- Note the time of birth.
- Put an identification tag on baby & mother.

Figure: Delivery of head and shoulders: Fetal head movements during labour (left occiput anterior position)



4. Care of baby after delivery

- Place the baby on the mother's abdomen or on a warm surface beside the mother. **Do not hang the baby upside down or slap the baby.**
- Look for meconium. If there is none, proceed to dry the baby with a warm towel or piece of clean cloth. (Do not wipe off the white greasy substance covering the baby's body. This substance, called vernix, helps to protect the baby's skin.).
- After drying, the wet towels or clothes should be replaced and the baby is loosely wrapped in a clean, dry and warm towel. If the baby remains wet, it leads to heat loss.
- Wipe both the eyes (separately) with sterile gauze.
- If meconium is present and the baby is not crying, apply suction to the mouth and then the nose.
- Assess the baby's breathing:
  - If the baby is breathing well and the chest is rising regularly, between 30-60 times a minute, provide routine care.
  - If the baby is not breathing or is gasping, call for help. The steps of resuscitation (as described in neonatal resuscitation) need to be carried out immediately.
  - Anticipate the need for resuscitation, especially if the woman has a history of eclampsia, bleeding, prolonged/obstructed labour or pre-term birth.
- Note the time of delivery.

Important steps in management of mother & baby immediately after delivery.

- If baby is crying put baby on mother's abdomen on which prewarmed towel is kept.
- Dry the baby& change towel.
- Rule out twin & give Inj Oxytocin 10 IU im for AMTSL.
- Clamp & cut cord after 1-3 minutes.
- Keep watch on both mother & baby.
- If baby requires resuscitation, then clamp & cut cord immediately & resuscitate baby.

Cutting the cord- Put two clamps at the cord 2 cm and 5 cm away from the baby's abdomen & cut in between with a scissors, 1-3 mins after delivery as it takes about 1-3 min for the cord pulsation to stop.

- Put the disposable cord clips on the baby's side of the cord after removing the clamp.
- Look for oozing of blood from the stump. If there is oozing, place a second tie between the baby's skin and the first tie.

5. ACTIVE MANAGEMENT OF THE THIRD STAGE OF LABOUR (AMTSL)-

(Must be performed in all cases.)

Aim:

- To decrease the blood loss during IIIrd stage of labour& delivery.
- For prophylaxis of PPH.

The active management of third stage of labor consists of following three steps:

- Inj Oxytocin (uterotonic) 10 U I/M after the birth of the baby after excluding another fetus in utero.
- Controlled cord traction & delivery of placenta.
- Put hand over suprapubic area and if uterus is relaxed, perform Uterine massage.

Details of AMTSL are given below:

Uterotonic drugs

Following Uerotonic drugs may be used.

- Inj. Oxytocin 10 IU im is the drug of choice for AMTSL.
- Tab Misoprostal 600 mcg orally/sublingually/ per-rectally after the birth of baby.

Remember - Inj Oxytocin must be stored in the fridge but not in the freezer.

Controlled cord traction (CCT)

This is a technique to assist the expulsion of the placenta and helps to reduce the chances of a retained placenta and subsequent PPH. It must be performed only with a contracted uterus otherwise may lead to inversion.

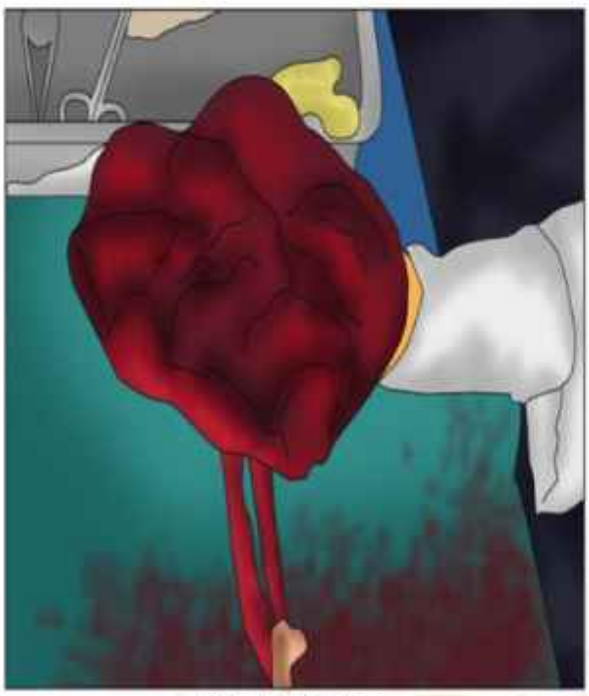
Steps for CCT

- Clamp the maternal end of the umbilical cord close to the perineum with a pair of forceps.
- Hold this clamped end and the forceps with one hand.
- Place the other hand just above the woman's pubic bone. This is to stabilize the uterus by applying counter-traction (pressure in the opposite/upward direction) on the uterine fundus.
- Maintain slight tension on the cord and wait for a strong uterine contraction. The uterus may be massaged abdominally to stimulate uterine contraction. This will prevent complications such as inversion of the uterus.
- When the uterus contracts, as will be evidenced by the uterus becoming hard and globular, or when the extra-vulval portion of the cord lengthens, gently pull downwards on the cord to deliver the placenta. Continue to apply counter-traction on the uterus with the other hand.
- If the placenta does not descend within 30-40 seconds of CCT, i.e. there are no signs of placental separation, do NOT continue to pull on the cord.
- Signs of placental separation.
  - Uterus contracts& becomes hard &globular.

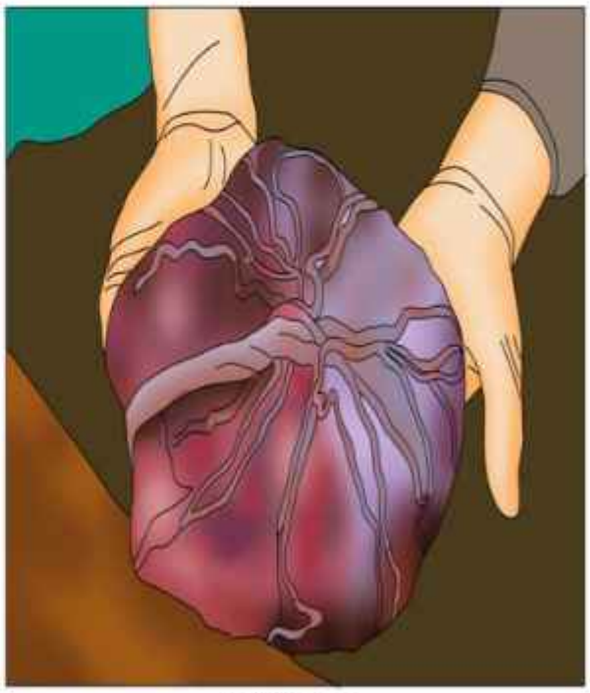
- Supra pubic fullness due to separated placenta in lower uterine segment.
- Lengthening of cord at extra vulval end.
- Sudden gush of blood.

- Wait for the next uterine contraction and repeat CCT with counter-traction.
- As the placenta delivers, hold it with both hands to prevent tearing of the membranes.
- Conduct uterine massage (bimanual compression) and continue oxytocin drip (Total oxytocin not to exceed 100 IU in 24 hrs).
- If the membranes do not slip out spontaneously, gently turn the placenta so that the membranes are twisted into a rope and move them up and down to assist, separation. If pulled at, the thin membranes can tear off and may be retained in the uterus.
- If the membranes tear, gently examine the upper vagina and cervix and use your fingers or a pair of sponge forceps to remove any pieces of membrane that might be present.
- Remember, you should never apply cord traction (pull) without applying counter-traction (push) above the pubic bone with the other hand and you should never apply cord traction unless the uterus is contracted.
- Do NOT exert excessive traction on the cord while performing CCT. Never squeeze or push the uterus to deliver the placenta.
- Examine the placenta carefully to ensure that none of the pieces are missing. Retained placental fragments or pieces of membrane will cause PPH. This can be suspected if a portion of the maternal surface of the placenta is missing or there are torn membranes with vessels. Ensure that the placenta is delivered completely with all the membranes.

Examination of Placenta:



Maternal Surface



Fetal Surface

Uterine massage

This technique helps in contraction of the uterus and thus prevents PPH.

Steps of Uterine Massage:

- Place the cupped palm on the uterine fundus and feel for the state of contraction.
- If the uterus is soft and not-contracted, massage the uterine fundus in a circular motion with the cupped palm until the uterus is well contracted. A well contracted uterus feels like a cricket ball or the forehead.
- When the uterus is well contracted, place the fingers behind the fundus and push down in one swift action to expel clots.
- Estimate and record the amount of blood loss approximately.
- Encourage the attendant to help the woman to breast feed.

Disposal of Placenta

Dispose of the placenta in the correct, safe and culturally appropriate manner. Use gloves while handling the placenta. Put the placenta into a yellow leak-proof bag with bleaching powder solution. Dispose off by incineration or deep burial, at least 10 m away from a water source, in a 2 m deep pit/ trench.

Disposal of Dead Foetus/Abortus

Use gloves while handling the abortus/dead foetus. Put the abortus into a yellow leak-proof bag with bleaching powder solution. Dispose off by incineration or deep burial, at least 10 m away from a water source, in a 2 m deep pit/ trench. Dead fetus/Still should be given to the parents to be buried as per religious norms.

Repair of Episiotomy

It is important that absorbable sutures be used for closure. Polyglycolic sutures are preferred over chromic catgut for their tensile strength, non-allergenic properties and lower probability of infectious complications and episiotomy breakdown. Chromic catgut is an acceptable alternative, but is not ideal.

- Close the vaginal mucosa using continuous 2-0 suture:
- Start the repair about 1 cm above the apex (top) of the episiotomy. Continue the suture to the level of the vaginal opening;
- At the opening of the vagina, bring together the cut edges of the vaginal opening
- Bring the needle under the vaginal opening and takeout through the incision and tie.
- Close the perineal muscle using interrupted 2-0 sutures.
- Close the skin using interrupted (or subcuticular) 2-0 sutures.

6. IMMEDIATE POSTPARTUM CARE OF MOTHER - FOURTH STAGE OF LABOUR

- The first two hours after delivery of the placenta is sometimes referred to as the fourth stage of labour.
- After delivery of the placenta, check that the uterus is well contracted, i.e. it is hard and globular, and there is no heavy bleeding. Repeat the checking every 5 minutes. If the uterus is not well contracted, massage the uterus and expel the clots. If bleeding continues even after 10 minutes, manage as "Postpartum haemorrhage."
- Examine the cervix, vagina, vulva & perineum for tears. If present, manage as "Vaginal,

cervical and perineal tears."

- Estimate and record the amount of blood lost throughout the third stage and immediately afterwards. If the loss is around 250 ml, but the bleeding has stopped, observe the woman for the next 24 hours.
- Ideally all delivered women should be observed in LDR for 4 hours post delivery. If LDR not available then monitor for at least 2 hours after delivery.
- Monitor following every 15 minutes for the first 2 hours.
    - BP, pulse, temperature
    - Vaginal bleeding
    - Uterus, to make sure that it is well contracted.
- Clean the woman and the area beneath her. Put a sanitary pad or a folded cloth under her buttocks to collect blood. This will also help in estimating the amount of blood lost, by counting the number of pads/cloths soaked. Help her change her clothes, if necessary.
- Ensure that the mother has enough sanitary napkins or clean clothes to collect the vaginal blood.
- Keep the mother and the baby together; do not separate them. Encourage early breastfeeding.
- Encourage the woman to eat and drink, and rest.
- Encourage the woman to pass urine. If the woman has difficulty in passing urine, or the bladder is full (as evidenced by a swelling over the lower abdomen) and she is uncomfortable, help her pass urine by gently pouring water over her vulva.
- Instruct the birth companion to stay with the mother & newborn. Ask the companion to call for help if any of the following occurs:
- The bleeding increases.
- The woman feels dizzy.
- The woman has severe headache.
- The woman has visual disturbance.
- The woman has epigastric distress.
- The woman complains of breathlessness.
- The woman complains of increased abdominal or perineal pain.
- Enter the following information in the labour register:
- Name of the woman.
- Age of the woman.
- Parity.
- ANC received (or not): mention the number of ANC visits received.
- Mode of delivery (normal or assisted).
- Date & Time of delivery.
- Birth weight of the baby.
- Apgar score of the baby at 1 minute and 5 minutes after delivery.
- Date & Time of discharge.
- Do not discharge the woman for 48 hours after delivery. This is a crucial period for the occurrence and management of PPH. The woman must be kept under observation during this time.

Immediate Newborn care

- Maintain the body temperature and prevent hypothermia by wrapping baby in dry towel.
- Maintain the airway and breathing.
- If the baby does not cry in 30 seconds, take steps to resuscitate the baby.
- It is recommended that the umbilical cord stump be left dry. Do not apply any substance to the stump.
- Note the Apgar score of the baby at 1 minute and at 5 minutes after delivery.
- Leave the baby on the mother's chest for skin-to-skin contact.
- Cover the baby to prevent loss of body heat. If the room is cool, use additional blankets to cover the mother and the baby.
- Weigh the baby.
- Encourage the mother to initiate breast feeding.
- Breast feed the newborn.
- Take care of the cord.
- Take care of the eyes.

C. COUNSELING IN THE WARD

Counsel the woman regarding the aspects discussed below.

A) Postpartum care and hygiene

Advise and explain to the woman:

- To always have someone near her for the first 24 hours after delivery to respond to any change in her condition.
- Not to insert anything into the vagina.
- Episiotomy care: To wash the perineum daily and after passing stools. Wash in an anteroposterior direction from the vulva to the anus.
- To change the perineal pads every 4-6 hours, or more frequently, if there is heavy lochia.
- To bathe daily.
- To have enough rest and sleep. For the first 6 weeks postpartum, advise the woman to not do anything except look after herself and her baby.
- To avoid sexual intercourse for the first six weeks or until the perineal wound heals, whichever is later.

To wash her hands before handling the baby.

B) Nutrition

- Advise the woman to eat a greater amount and variety of healthy foods. Give her examples of the types of food and how much to eat.
- Reassure the mother that she can eat normal food; these will not harm the breastfed baby.
- Spend more time on nutrition counseling with very thin women and adolescents.
- Determine if there are important food taboos, especially against foods that are nutritionally healthy. Advise the woman against these taboos.
- Talk to family members e.g. her husband or mother-in-law, to encourage them to help ensure that the woman eats enough &avoids heavy physical work.

C) Contraception

Advise the woman regarding birth spacing or limiting as the case may be.

D) Breast feeding

Counsel mother to start breast feeding immediately after birth and about the advantages of breast feeding

E) Registration of birth

Emphasize to the woman that she must get the birth of the baby registered with the local Panchayat, or any other appropriate registering authority. This is a legal requirement. Also, the birth certificate issued is an important document stating the date of birth of the child, and is required for many purposes, e.g. to gain admission to a school.

F) Postpartum visit

- Inform the woman about the next routine postpartum visit.
- As the woman is kept under observation for the first 24 hours after delivery, the first postpartum visit is taken care of during her stay at the health facility.
- The subsequent postpartum visit should be planned on 3rd day, 7th day & 6weeks after delivery. Either ask the ANM or ASHA of that area to pay a visit to the woman and her baby, or ask the woman to return to the health facility for a postpartum check-up.
- The 6 weeks visit should be at the facility.
- There should be three additional visits in case of babies with low birth weight on 14th day, 21st day & 28th day of delivery.
- At the time of discharge inform her regarding the danger signs and when to return.

G) Danger signs

- Advise the woman to visit the nearest health facility as soon as possible in case she suffers from any of the following symptoms:
- Excessive vaginal bleeding, i.e. soaking more than 2 or 3 pads in 20-30 minutes after delivery, OR bleeding increases rather than decreases after the delivery.
- Convulsions.
- Fast or difficult breathing.
- Fever and weakness; inability to get out of bed.
- Severe abdominal pain.

H) Preparing for discharge

For the Baby	For the Mother

• Ensure that the baby is warm, breathing normally, and accepting & retaining breast milk, and that the cord is clean.
• The baby should receive:
  • BCG
  • OPV-0
  • Hepatitis B-0
• Vaccinations preferably before discharge from the health facility. A record of these vaccinations should be entered in the baby's card.
	Ensure that the uterus is hard and is not bleeding
	Counsel the mother about:
	• Diet and rest.
	• Exclusive breast feeding.
	• Need to take iron and calcium tablets for 6 months.
	• Family planning.
	• Hygiene to prevent infection of Mother & her baby.
	• Avoiding sexual intercourse till Perineal wound heals.
	• Returning for follow-up at 6 weeks.
	• Complete immunization of the baby.

Danger signs- return immediately, if: • Baby is breast feeding poorly • Baby develops fever or feels cold to touch • Breaths fast • Has difficulty in breathing • Has blood in the stool • The palms and soles are yellow • Has convulsions	Danger signs- return immediately, If: • Increase in vaginal bleeding • Convulsions • Fast or difficult breathing • Mother has fever and is too weak to get out of bed • Severe abdominal pain • Swollen, red or tender breasts • Dribbling of urine or inability to pass urine • Pain in the perineum or draining pus • Foul smelling lochia

Vaginal Delivery Set

Tray with lid- (Large size)
Kidney tray (Large size)
Sim's Speculum (Large size)
Artery Forceps
Perineal Pads
Cord Clamp
Urinary Catheter
Sponge holding forceps
Bowl for Antiseptic solution
Gauze pieces and cotton swabs
Scissors
Gloves

Episiotomy Tray Set

Tray with lid- (Large size)
Episiotomy Scissors
Artery forceps
Allis forceps
Sponge holding forceps
Toothed forceps
Kidney tray
Needle holder
Needle (round body and cutting)
Chromic catgut no.0
10 ml disposable syringe with needle
Inj. Xylocaine 2%
Thumb forceps
Cotton swabs&Gloves
Antiseptic lotion
Gauze pieces

Baby Tray

Two pre-warmed towels/sheets for wrapping the baby
Cotton swabs
Mucus extractor
Bag and mask
Sterilized thread for cord/cord clamp
Nasogastric tube
Gloves
Inj. Vitamin K
Needle and syringe (Baby should be received in a pre-warmed towel. Do not use metallic tray)

CHAPTER 9
SPECIAL SITUATIONS IN LABOR AND DELIVERY

KEY LEARNING OBJECTIVES

By the end of this session, the participants will be able to diagnose and manage appropriately the below condition:

A. **Induction and augmentation of labor - Surgical and Medical**
B. **Instrumental delivery**
   1. **Forceps delivery**
   2. **Vacuum extraction/ventouse delivery**
C. **Prolonged labor**
D. **Obstructed labor**
E. **Breech delivery**
F. **Transverse lie and shoulder presentation**
G. **Twins**
H. **Preterm labor**
I. **Premature or pre-labor rupture of membranes (PROM)**
J. **Fetal distress**
K. **Prolapsed cord**
L. **Shoulder dystocia**

➢ **Important Points:**

- Routine induction & augmentation f labor without indication is not recommended.
- Bishop's score is used for cervical assessment for induction of labor.
- Review indication for induction properly as failed induction is followed by cesarean section
- Pre induction cervical ripening (Bishop's score 5) can be done using PGE2 gel, PGE1 tablets (Misoprostol) or Foley catheter.
- Induction & Augmentation of labor can be done surgically by ARM & medically by Oxytocin.
- Monitor uterine contraction & FHR carefully during Oxytocin administration.
- Misuse of oxytocics should be avoided as it may lead to fetal distress, tachysystole & rupture uterus

A. INDUCTION AND AUGMENTATION OF LABOUR

Induction of labour and augmentation of labour are performed for different indications but the methods are the same.

- Induction of labour: stimulating the uterus to begin labour.
- Augmentation of labour: stimulating the uterus during labour to increase the frequency, duration and strength of contractions.

Adequate uterine contractions are said to be established when there are three contractions in 10 min, each lasting 40 - 60 seconds

Indications for induction of Labor:

- Maternal
  - Hypertension
  - Renal Disease
  - Liver Disease
  - Diabetes mellitus
  - Hypothyroidism associated complications
- Fetal
  - Prolonged Pregnancy
  - IUGR
  - Intra Uterine Death
  - Lethal Congenital Malformation in baby
- Combined
  - Pre- eclampsia / eclampsia
  - Abruptio Placentae
  - PROM

Contraindication for induction of labor:

- Gross CPD or contracted pelvis
- Transverse/ oblique Lie
- Placenta Praevia
- High Risk Pregnancies with severely compromised fetus.
- Pregnancy following classical cesarean section.

Induction of labour in cases of previous one lower segment caesarean section (LSCS) should be undertaken only in centers with 24hour availability of facilities for performance of emergency caesarean section within 30 minutes of decision. If these facilities are not available then such patients must be referred to higher facility for induction.

Induction of labour must NOT be undertaken in cases of previous two lower segment caesarean sections or previous myomectomy where uterine cavity was entered.

Methods of Induction/Augmentation of Labor:

a) Surgical: ARM

b) Medical: Oxytocin

If Induction of labour is planned, it needs to be monitored as per the chart placed at the end of the document.

Assessment of the Cervix for Induction of Labour (Bishop's Score).

The success of induction of labour is related to the condition of the cervix at the start of induction. To assess the condition of the cervix, a cervical exam is performed and Bishop's score is assigned based on the criteria:

- If the cervix is favorable (has a score of 6 or more), labour is usually successfully induced with oxytocin alone.
- If the cervix is unfavorable (has a score of 5 or less), ripen the cervix using prostaglandins or a Foley catheter before induction.

Assessment of cervix for induction of labour (Bishop's Score)				
	Rating			
Factor	0	1	2	3
Dilatation of OS (cm)	Closed	1-2	3-4	=/>5
Effacement (%)	0-30	40-50	60-70	=/> 80
Consistency	Firm	Medium	Soft	-
Position	Posterior	Mild	Anterior	-
Descent by station of head (cm from Ischial spines)	-3	-2	-1, 0	+1,+2

Pre-Induction Cervical Ripening

Stripping of membranes

Stripping of membranes at per vaginal examination by sweeping the examining finger between the uterus & fetal membranes has also been found to be effective in ripening the cervix & inducing labour by causing release of prostaglandins. It reduces the need for formal induction with pharmacological agents. Placenta previa must be ruled out before performing it. The woman may experience discomfort during the procedure & there may be some vaginal bleeding following the stripping so women must be counseled accordingly.

Prostaglandin E2 gel

ProstaglandinE2 gel is highly effective in ripening the cervix during induction of labour.

- Use contraindicated in patients with prior uterine surgery including cesarean section.
- Check pulse, blood pressure, contractions and fetal heart rate before instillation.
- Review for indications.
- Prostaglandin E2 is available in a gel form (Dinoprostone gel 0.5 mg). It is inserted intra-cervically and may be repeated upto 3 doses 6 hours apart each, if required.

Monitor uterine contractions and fetal heart rate of all women undergoing induction of labour with prostaglandins.

- Discontinue use of prostaglandins and begin oxytocin infusion if:
  - membranes rupture.
  - cervical ripening has been achieved.
  - good labour has been established.
  - 6-12 hours must have passed after last dose of PG E2 gel.

Misoprostol

Use of misoprostol for induction of labour is not yet approved by DCGI.

Foley Catheter

The Foley catheter is an effective alternative to prostaglandins for cervical ripening and labour induction. It should, however, be avoided in women with obvious cervicitis or vaginitis. All degrees of placenta previa must be ruled out. It can be used in patients with prior one lower segment caesarean section.

- Review indications.
- Insert the catheter (14-26F) with a high-level disinfected forceps beyond the internal os and inflate bulb with 30-80ml saline.

- The catheter is left until contractions begin & it is spontaneously expelled. If catheter is not expelled spontaneously, deflate the bulb & remove the catheter after 12 hrs.
- If cervix ripened start Oxytocin for induction of labor.
- If cervix is still not ripened Prostaglandin may be used for cervical ripening followed by Oxytocin induction.

If there is a history of bleeding PV, ruptured membranes or obvious vaginal infection do not use a Foley catheter.

a) Surgical Induction:

If the membranes are intact, it is recommended practice in both induction and augmentation of labour to first perform artificial rupture of membranes (ARM). In some cases, with a ripe cervix, this is all that is needed to induce labour. Membrane rupture, whether spontaneous or artificial, often sets off the following chain of events:

- Amniotic fluid is expelled;
- Uterine volume is decreased;
- Prostaglandins are produced, stimulating labour;
- Uterine contractions begin (if the woman is not in labour) or become stronger (if she is already in labour).

Artificial Rupture of Membranes

- Review for indications.
- Note: In areas of high HIV prevalence, it is prudent to leave the membranes intact for as long as possible to reduce perinatal transmission of HIV.
- Listen to and note the fetal heart rate.
- Ask the woman to lie on her back with her legs bent and knees apart.
- Wearing high-level disinfected gloves, use one hand to examine the cervix and note the consistency, position, effacement and dilatation.
- Use the other hand to insert an amniotic hook or a Kocher clamp into the vagina.
- Guide the clamp or hook towards the membranes along the fingers in the vagina.
- Place two fingers against the membranes and gently rupture the membranes with the instrument in the other hand. Allow the amniotic fluid to drain slowly around the fingers.
- Note the color of the fluid (clear, greenish, bloody). If thick meconium is present, suspect fetal distress.
- After ARM, listen to the fetal heart rate during and after a contraction. If the fetal heart rate is abnormal (less than 110 or more than 160 beats per minute), suspect fetal distress.
- If good labour is not established 1 hour after ARM, begin oxytocin infusion.
- If labour is induced because of severe maternal disease (e.g. sepsis or eclampsia), begin oxytocin infusion at the same time as ARM. Note: in areas of high HIV prevalence leave membranes intact for as long as possible to reduce perinatal transmission of HIV.

b) Medical Induction:

Oxytocin

Use oxytocin with great caution as fetal distress can occur from hyperstimulation and, rarely, uterine rupture can occur. Multiparous women are at higher risk for uterine rupture. Carefully observe women receiving Oxytocin.

The effective dose of Oxytocin varies greatly between women. Best way to administer oxytocin is by using syringe infusion pump but if it is not available cautiously administer oxytocin in IV fluids (RL or Normal saline), gradually increasing the rate of infusion until good labour is established (three contractions in 10 minutes, each lasting more than 40 seconds). Maintain this rate until delivery. The uterus should relax between contractions.

- Monitor the woman's pulse, blood pressure and contractions and check the fetal heart rate.
- Review for indications.
- Be sure induction is indicated, as failed induction is usually followed by caesarean section.
- Ensure that the woman is in a comfortable position preferably not supine.
- Record the following observations every 30 minutes on a chart provided at the end of the chapter.
  - rate of infusion of Oxytocin.
  - duration and frequency of contractions.
  - fetal heart rate-listen every 15minutes, always immediately after a contraction. If the fetal heart rate is less than 110 beats per minute, stop the infusion.

Note: Changes in arm position may alter the flow rate of Oxytocin.

Women receiving oxytocin should never be left alone.

Also, while on oxytocin, ensure that the woman is on her left side.

- Infuse oxytocin 2.5 units in 500 mL of (RL or Normal saline) at 15 drops per minute and.
- Increase the infusion rate by 15 drops per minute every 30 minutes until a good contraction pattern is established (contractions lasting more than 40 seconds and occurring three times in 10 minutes) or rate reaches 60 drop/min.
- Maintain this rate, 2.5 units in 500ml @ 60 drop/min, until delivery is completed.
- If uterine contractions are inadequate with this rate, increase Oxytocin concentration to 5 units in 500 mL of RL (or normal saline) and adjust the infusion rate to 30 drops per minute (20mIU per minute). Increase the infusion rate by 15 drops per minute every 30 minutes until a satisfactory contraction pattern is established or the maximum rate of 60 drops per minute is reached.
- If labour has still not been established using the higher concentration of oxytocin (5U at 60 drops/ min), label as failed induction & deliver by caesarean section.
- Increase rate of oxytocin infusion only to the point where good labour is established & then maintain infusion at that rate.
- If any contraction lasts longer than 60 seconds or if there are more than five contractions in 10 minutes, stop the infusion, change position, administer oxygen and may relax the uterus using tocolytics:
  - Terbutaline 250 mg sc OR
  - NTG patch if available maybe applied.

Oxytocin infusion rates for induction of labour (Note 1 mL=15 drops)

Time Since Induction (hour)	Oxytocin concentration	Drops per Minute	Approximate Dose (mIU/min)	Volume Infused (in ml)	Total Volume Infused (in ml)
0.00	2.5 units in 500 ml RL or normal saline (5mIU/ml)	15	5	0	0
0.50	Same	30	10	30	30
1.00	Same	45	15	60	90
1.50	Same	60	20	90	180
2.00	5 Units is 500 ml RL or normal saline. (10mIU/ml)	30	20	120	300
2.50	Same	45	30	60	360
3.00	Same	60	40		

Cautions for use of Oxytocin:

Prevention

Oxytocin should be used carefully only when really indicated. The dose should be carefully titrated & maternal & fetal conditions should be monitored. Any hypertonic contraction, fetal distress or abnormal progress of labour should be urgently managed.

Complications of injudicious use of Oxytocin

- Fetal distress
- tachysystole with or without FHR changes
- Rupture Uterus

If tachysystole occurs, with or without FHR changes (if there are more than five contractions in 10 minutes) or any contraction lasts longer than 60 seconds, stop infusion and relax uterus using tocolytics:

- Terbutaline 250 g subcutaneous; OR
- NTG patch if available maybe applied

Restrict Oxytocin use to 2.5 U @ 60 drops/ min in previous LSCS. If woman is not responding, refer to District Hospital/ Medical College.

Previous LSCS on Oxytocin drip should be vigilantly monitored by a doctor.

Chart for induction of labour

Name: W/O:

Age: Parity:

Diagnosis:

Risk factors

Indication of induction -

Findings at start of Induction- Pulse: .....

BP: .....

P/A: .....

P/V: .....

Condition of membranes: .....

Cervical ripening by

- Sweeping of membranes
- PGE2 gel Dose 1
- Dose 2
- Dose 3
- Intra cervical Foley

Induction started on ---------- at ---------- AM/PM with oxytocin

Monitoring chart-

Date	Time

Date & Time	Rate/ Dose	GC	Pulse	BP	Hydration	Urine	FHS	Uterine contraction	P/V
Date & Time	Rate/ Dose	GC	Pulse	BP	Hydration	Urine	FHS	Uterine contraction	P/V

B. INSTRUMENTAL DELIVERY

IMPORTANT POINTS

- Forceps delivery or vacuum extraction may be done to assist or hasten vaginal delivery.
- It should be attempted only for proper indications after confirming that the prerequisites have been fulfilled.
- Proper application of forceps is essential. Difficulty in locking indicates incorrect application.
- Traction should be applied only during contraction.
- In between contractions check FHR.
- Rule of three pulls-with first pull the head should descent, with second pull it should be seen through introitus and with third pull it should deliver.
- Genital tract must be explored after instrumental delivery to rule out any tears.

Instrumental vaginal delivery may be required to assist vaginal delivery or hasten it as per indication.

There are two types of instrumental vaginal deliveries- Forceps delivery & Vacuum (Ventouse) extraction.

1. Forceps Delivery

An obstetric forceps is an instrument designed to assist in the extraction of fetal head. Although there are various types of forceps applications like Outlet forceps, Low forceps, mid forceps & High forceps, only outlet forceps delivery is currently advocated.

Indications for Forceps delivery

- Fetal distress in second stage including cord prolapse
- Maternal distress in second stage
- Prolonged second stage >3hours in primigravida & > 2hours in multigravida. In both an additional 1 hour may be allowed if woman has been given epidural analgesia.
- Prophylactic forceps: when forceps are applied to cut short the second stage in conditions like.
    - Medical diseases e.g. cardiac diseases, respiratory diseases, pre-eclampsia, eclampsia, severe anemia & sedated patient when either the patient cannot bear down or bearing down can be detrimental to mother.
    - Ocular ailment contraindicating bearing down e.g. glaucoma.

Note: In all these cases the delivery is expedited to minimize the distress of labor for the mother

Pre-requisites for Forceps applications

- **Power-** uterus must be contracting and relaxing.
- **Passage-** should be no outlet contraction, cervix must be fully dilated and effaced.
- Passenger- presentation must be suitable i.e. - vertex presentation or face presentation with chin-anterior or entrapped after-coming head in breech delivery with head bulging at perineum and 0/5 palpable per abdominally.
- Sagittal suture should be in the midline and straight, guaranteeing an occiput anterior or occiput posterior position.
- bladder & rectum must be empty.
- membranes must be ruptured.

Types of Forceps

- **Short curved forceps** - Wrigley's forceps- used for outlet forceps delivery.
- **Long curved forceps** - used for all abnormal positions/ presentations like occipito posterior & after coming head of breech.

Parts of Forceps

- Handles- to grip the forceps.
- Lock- holds the two blades together - only in long curved forceps.
- Shank- connects handle and blade.
- Blades- There are two blades right and left which enclose the fetal head.
- Diameter- widest distance between the two blades, 7.5 cm.
- Curves-
    1. Only cephalic (fits the shape of fetal head) in short curved forceps.
    2. 2 curves - cephalic & pelvic (for the pelvic shape) in long curved forceps.

Preparing for a Forceps delivery

- Ensure that the application of forceps is indicated.

- Prepare necessary equipment.
- Take a written consent from the patient for the procedure.
- Provide emotional support and encouragement to the woman.
- Arrange for an assistant.
- Put the patient in the lithotomy position
- Put on a pair of high-level disinfected or sterile gloves.
- Prepare the parts with antiseptic cleaning and sterile drapings.
- Catheterize the bladder.
- Examine the pelvis to confirm the position and presentation.
- Select the appropriate forceps for the application (Wrigley's outlet forceps).
- In cases of occipito-posterior position & after coming head of breech long curved forceps are to be used always.
- Assemble the forceps before application. Ensure that the parts fit together and lock well.
- Lubricate the blades of the forceps using soframycin ointment or liquid paraffin or xylocaine jelly whichever is available.
- Provide the appropriate anaesthesia (best carried out with a skin infiltration at episiotomy site).
- Ensure that the uterus is preferably contracting & relaxing, as a safeguard against PPH.
- Perform a mediolateral episiotomy if required.

Application Procedure

A biparietal, bimalar application is the only safe technique for the application of outlet forceps.

- Identification of the right and left blades: Hold the blades of the forceps locked with the pelvic curve up and directed towards the patient in the position in which they will be when finally applied. The blade that is placed against the left side of the woman's pelvis (with the handle in your left hand) is the left blade and vice versa.
- Insert two fingers of the right hand into the vagina on the side of the foetal head. Grasping the handle of the left blade with your left hand, slide the blade gently between the fetal head and your fingers, to the left lateral wall of the woman's pelvis, so that it rests on the side of the foetal head, in front of the left ear of the foetus.
- Ask assistant to hold the blade.

Applying the left blade of the forceps

- Repeat the same manoeuvre on the other side, by sliding in your left hand into the maternal pelvis and using the right blade of the forceps.

Applying the right blade of the forceps

- Depress the handles and lock the blades in position.
- Difficulty in locking usually indicates that the application is incorrect. In this case, remove the blades and recheck the position of the head. Reapply only if rotation of the head is confirmed.
- Apply traction upward (anteriorly, towards the ceiling) for the whole head to deliver.

Now Unlock the forceps

Locking & applying traction using forceps.

- Remember, the head should descend with each pull. Only 2-3 pulls necessary.
- Between contractions, check the foetal heart rate.

- Proceed further as with a normal delivery.
- Examine the baby for injuries.
- Manage the third stage of labour actively.
- Repair of episiotomy and monitoring the woman after delivery is the same as for a normal delivery.
- Look for genital tract injuries (third degree perineal tear, cervical tear, lacerations or extension of episiotomy incision) and if present do immediate repair. If you are unable to repair the tear, pack the vagina with a sterile pad and refer to higher facility for further management. Give Inj. Ampicillin 2g i.v.
- Maintain a complete record.
- Postpartum haemorrhage (PPH): This may occur because of tears or rupture of the uterus or atonic PPH. Manage accordingly.
- The uterus may rupture and this requires immediate referral to higher facility.
- If forceps delivery fails, immediately perform caesarean section.
- Forceps delivery should be abandoned if forceps are not easily locked, slipping of forceps, and head does not advance with one or two pulls. Otherwise, the head may get impacted and delivery of head during caesarian may be more difficult.

The alphabet mnemonic makes it easy to remember the steps of forceps application-

A Assistance & Anesthesia.

B Bladder should be empt.y

C Cervix should be fully dilated and membranes should be ruptured.

D Determine position of head.

E Equipment check.

F Forceps applied.

G Gentle traction.

H Hand elevation.

I Incision/ episiotomy if required.

J Jaw - remove forceps when jaw is visible.

Failed forceps-

- Forceps application is called as failed if:
  - fetal head does not advance with each pull.
  - fetus is undelivered after three pulls.
  - If forceps delivery fails, perform a caesarean section.

Every application should be considered a trial of forceps. Do not persist if there is no descent with every pull.

Complications

Fetal Complications

- Injury to facial nerves requires observation. This injury is usually self-limiting.
- Lacerations of the face and scalp may occur. Clean and examine lacerations and do suturing if necessary.
- Fractures of the face and skull require expert consultations.
- Cephalhematoma requires observation & usually clears in 3-4 wks. Reassure patient, however neonate must be watched for anemia and hyperbilirubinemia.
- Intracranial hemorrhage requires referral to higher center.

Maternal Complications

- Tears of the genital tract may occur. Examine the woman carefully and repair any tears on the cervix or vagina & extension of episiotomy.
- Uterine rupture may occur and requires immediate referral.

Medicolegal Aspects-

- Written informed consent must be taken before the procedure.
- Indication for forceps application should be clearly mentioned in the case record.
- Delivery notes must be carefully written.

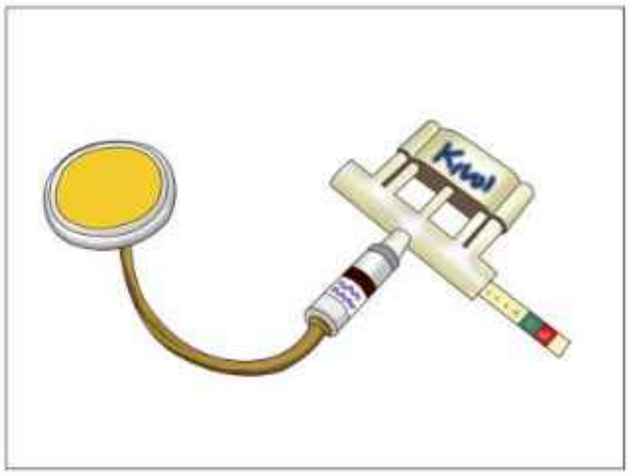
2. Vacuum Extraction (Ventouse Delivery)

A ventouse or a vaccum extractor is a traction device used to assist in the delivery of the fetal head. It is attached to the fetal scalp by suction forces.

Getting Ready

- Take written informed consent.
- Tell woman what is going to be done, provide emotional support & encouragement.
- Prepare necessary equipment.
- Check all the connections and test the formation of a vacuum on a gloved hand.
- Select the largest cup size that is available.
- Review that pre-requisites are fulfilled.
- Arrange for an assistant.
- Put on personal protective equipment.

Vacuum extractor



Description of the instrument

A ventouse (vacuum extractor) has two components (i) suction cups and (ii) a suction machine.

Suction cups can be made of metal or of silastic material. Metal cups are no longer used.

Silastic cups

These are soft cups made of silastic. The edges are either straight or are everted (no "chignon" effect). The traction and suction ports are integrated into one port at the centre of the cup and this causes a higher incidence of cup "pop-off" (disengagement from the fetal head) due to lateral traction. Two sizes are available in this variety-6 cm and 5 cm.

NOTE: Always try to use the largest possible cup as it gives a better traction with lesser chances of cup pop-off.

Hand held ventouse

This is a small hand held ventouse which is convenient to use. Two types of cups are available for it

- Omni cup which can be used in all positions of the vertex

- Pro cup should be used only with occipito anterior position.

Indications

- Maternal exhaustion.
- Fetal distress.
- Prolonged second stage of labour (3 hours in primi and 2 hours in multigravida as described under forceps delivery.)
- Delivery of the second twin where the maternal passage has already been prepared and dilated during the course of the delivery of the first twin; one can take up a high ventouse application with the head of the second twin in mid-cavity.
- Prophylactic vacuum extraction in.
- Medical diseases like cardiac diseases, pre-eclampsia, eclampsia, severe anemia & sedated patient.

✓ Ventouse must never be applied in preterm labour.

Contraindications

- Non-vertex presentation.
- Foetal coagulopathies.
- Following recent scalp blood sampling.
- Known macrosomia.
- Prematurity-Gestational age < 36 weeks.
- Intra uterine death.

Prerequisites for vacuum extraction:

- vertex presentation.
- term fetus.
- cervix fully dilated.
- membranes ruptured.
- Uterine Contractions are present.
- foetal head is below '0' station (even if it is not rotated, as the vacuum will rotate the head). You must ensure that the head is not palpable per abdomen, as sometimes the caput is mistaken for the head during a per vaginum (P/V) examination.
- Bladder empty.
- There should be no caput succedaneum.
- No outlet contraction.

Preparing for a vacuum extraction:

- Review the pre requisites fulfilled Take written consent for vacuum delivery.
- Provide emotional support and encouragement
- Check all the connections and test the formation of a vacuum on a gloved hand.
- Give perineal infiltration for conducting an episiotomy.
- While carrying out a ventouse/ vacuum extraction, it is important that the woman has good uterine contractions accompanied with effective bearing-down efforts.
- Select the largest cup size that is available.
- Arrange for an assistant.
- and put on personal protective equipment.

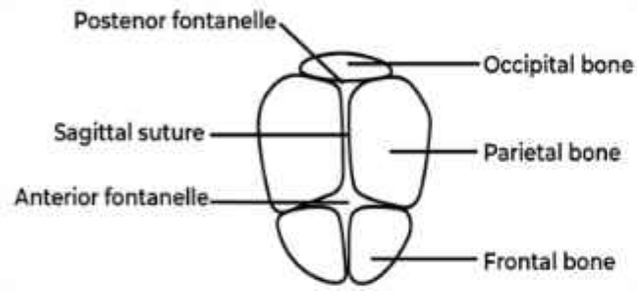
Procedure for ventouse /vacuum extraction

Application of the cup

Proper cup placement over the foetal head is the most important determinant in the success of the application.

- Put on a pair of high-level disinfected or sterile gloves and assess the position of the foetal head by feeling the sagittal suture line and the fontanelles.
- Identify the posterior fontanelle.

Landmarks of the fetal skull



- Separate the labia with the thumb and forefinger of the left hand, and insert the cup in a-transverse manner.
- Apply the largest cup that will fit, with the centre of the cup over the sagittal suture at the flexion point and 1 cm anterior to the posterior fontanelle. This placement will promote flexion, descent and auto rotation with traction.

Precautions while applying the vacuum cups

- Anterior placement nearer the anterior fontanelle will aggravate deflexion. Therefore, apply the cup as near the posterior fontanelle as possible.
- Asymmetrical placement relative to the sagittal suture will aggravate asynclitism.
- Apply on the bone and not on the fontanelle.
- For proper placement an episiotomy may be needed at this time. If an episiotomy is not necessary for placement, delay the episiotomy until the head stretches the perineum or the perineum interferes with the axis for traction. This will avoid unnecessary blood loss.
- Check the application. Ensure that there is no maternal soft tissue (cervix or vagina) between the cup and the foetal head.

Creation of vacuum

- Connect the cup to the suction machine and create an initial vacuum of 0.1 kg/cm2 negative pressure. In case a metal cup is used, increase the vacuum slowly-an increment of 0.2 kg/cm2 every 2 minutes to reach 0.8 kg/cm2 in about 8 minutes (to give time for the chignon to develop and expand into the cup.
- In case of hand held Ventouse, initiate cup seal by raising vacuum to about 100mmHg (yellow zone) on palm pump, check no maternal tissue entrapped in cup- how.

Traction

- After achieving maximum negative pressure, start applying traction during a contraction by holding the traction rod perpendicular to the cup (otherwise the cup will come out). If the foetal head is tilted to one side or not flexed well, traction should be directed in a line that will help in correcting the tilt or deflexion of the head (i.e. to one side or the other, not necessarily in the midline).
- Exert traction intermittently coordinating with the uterine contraction and maternal expulsive efforts.
- The number of the traction should not exceed 3 pulls coinciding with uterine contractions.
- While applying the traction the two fingers of the other hand over the cup are used to prevent slipping of the cup

- If the vacuum cup slips more than once, do not apply again.
- Between contractions, check for the following:
  - the foetal heart rate.
  - application of the cup.

Applying traction

The alphabet mnemonic makes it easy to remember the steps of vaccum cup application-

A Assistance & Anesthesia.

B Bladder should be empty.

C Cervix should be fully dilated and membranes should be ruptured.

D Determine position of head.

E Equipment check.

F Fontanelle check to place cup.

G Gentle traction.

H Halt in between contractions/ if more than 3 pulls/ if more than 2 pop offs.

I Incision/ episiotomy if required.

J Jaw - remove vacuum cup when jaw is visible.

Do's & Don'ts of Ventouse Application

- Do not apply in preterm fetus.
- Never use the cup to actively rotate the baby's head. Rotation of the baby's head will occur with traction.
- The first pull helps to find the proper direction for pulling.
- Do not continue to pull between contractions/ expulsive efforts.
- With progress, and in the absence of fetal distress, continue the "guiding" pulls for a maximum of 3 pulls.

Failed Ventouse

- Vacuum extraction has failed if:
  - The head does not advance with each pull;
  - The fetus is undelivered after three pulls with no descent;
  - The cup slips off the head twice at the proper direction of pull with a maximum negative pressure.
- Every application should be considered a trial of vacuum extraction. Do not persist if there is no descent with every pull.
- If vacuum extraction fails, perform caesarean section.

Complications

Complications usually result from not observing the conditions of application or from continuing efforts beyond the time limits stated above.

Fetal Complications

- Localized scalp oedema (artificial caput or chignon) under the vacuum cup is harmless and disappears in a few hours.
- Cephalohaematoma requires observation and usually will clear in 3-4 weeks. Reassure patient.
- Scalp abrasions (common and harmless) and lacerations may occur. Clean and examine lacerations to determine if sutures are necessary. Necrosis is extremely rare.
- Intracranial bleeding is extremely rare and requires immediate intensive neonatal care.

Maternal Complications

- Tears of the genital tract may occur. Examine the woman carefully and repair any tears to the cervix or vagina or repair episiotomy.
- Vaginal hematoma - drain if required

Care of Woman after Instrumental Vaginal Delivery

- After forceps/ Ventouse vaginal delivery woman should be given one dose of antibiotic.
- Inj. Ampicillin 2 gm IV.
- Care of episiotomy should be done as after normal vaginal delivery.
- AMTSL should be followed & rest of the 3rd stage management is same.

Sterilization of Ventouse after use

- Remove suction cups after use.
- Decontaminate by soaking in 0.5% bleaching solution for 10 min.
- Rinse with clean water.
- Soak in Glutaraldehyde solution for 10-12 hrs.
- Rinse with sterile water, air dry & store.
- Metal cups can be autoclaved.

Medicolegal Aspects -

To safeguard yourself from legal litigations, keep the following points in mind related to documentation and the case records:

- A written informed consent should be taken before conducting the procedure. This should have the thumb impressions/signatures of the patient and the witnesses. This consent form should be filed along with the case paper.
- The indication for forceps delivery should be clearly written in the case record.
- Pertinent factors of pre and post-delivery foetal status, details of station, position and presentation at the time of application of forceps, the instrument and type of procedure used as well as details of the degree of difficulty encountered during the procedure should be clearly recorded in the delivery notes.

❖ PROLONGED/OBSTRUCTED LABOUR

Key Learning Points

- A partograph is an important tool to diagnose prolonged labor and prevent obstructed labor.
- Incoordinate uterine action & cephalo pelvic disproportion are important causes of prolonged labor.
- Bandl's ring is a late sign of obstructed labor.
- Uterine rupture is a life-threatening complication of neglected obstructed labour.
- Birth asphyxia can occur in prolonged & obstructed labor which may result in cerebral palsy or mental retardation in the baby.

C. PROLONGED LABOUR

Prolonged labour is active labour with regular uterine contractions but without adequate cervical dilatation and/or descent of the presenting part, lasting for more than 12 hours.

Prolonged labour can be due to:

- Incoordinate uterine contractions: These are contractions that are weak or not effective enough to result in cervical dilatation and/or foetal descent. There is no mechanical obstruction in these cases.

If not managed properly, these cases may ultimately develop uterine fatigue. An ascending infection may also occur, especially if the membranes have ruptured. There is a danger of foetal death in these cases.

- Foetopelvic disproportion: This means that it is difficult or impossible for the foetus to pass safely through the pelvis. As the cephalic end is the most common presenting part, this condition is also known as Cephalopelvic disproportion (CPD). This condition, if not managed in time, will lead to obstructed labour.

CPD occurs when the foetal head is large compared with the pelvis. CPD may be due to a small pelvis with a normal-sized head, or a normal pelvis with a large foetus, or a combination of a large baby and small pelvis. CPD cannot be diagnosed before the 37th week because before that the head has not reached its birth size.

D. OBSTRUCTED LABOUR

Obstructed labour means that, in spite of strong uterine contractions, the foetus cannot descend because of mechanical factors. Obstruction may occur at the inlet, within the cavity or outlet of the pelvis. Though CPD is the commonest cause of obstructed labour, other factors such as malpresentation (transverse lie, brow presentation, mentoposterior presentation) and rarely large tumours in the pelvis may cause mechanical obstruction leading to obstructed labour.

Complications resulting from obstructed labour can be avoided if a woman in obstructed labour is identified early, and appropriate action is taken. In such cases, a caesarean section is often required for delivery.

Diagnosis of prolonged/obstructed labour

A partograph, as described earlier is a tool to assess the progress of labour. When, despite good uterine contractions for 8 hours, the woman is still in the latent phase of labour, or when the partograph crosses the "Alert line" it is an indication that the labour is not progressing normally and that the woman needs surgical intervention.

Complications following obstructed labour

Maternal complications

✓ **Maternal fatigue**

Due to prolonged labour, the mother may be dehydrated and may go into ketoacidosis.

✓ **Uterine rupture**

This occurs when there is rupture of the membranes and the amniotic fluid has drained away. The uterus is tonically retracted over the foetus and does not relax at all. In these cases the foetal parts cannot be palpated clearly. Alternatively, the foetus is forced into the lower uterine segment and, with continuing uterine contractions, the lower segment becomes thin and is likely to rupture.

Rupture of the uterus following obstructed labour is more common in multiparous women and in those with a uterine scar due to a previous caesarean section.

Rupture of the uterus results in haemorrhage (usually internal) and shock. If not managed immediately, it can result in maternal and fetal death.

✓ **Infection including intrapartum chorioamnioitis & Puerperal sepsis**

The chances of infection are increased in obstructed labor.

✓ **Fistulae**

These occur due to excessive pressure of the head on the tissues of the bladder, vagina and rectum, which are trapped between the obstructed foetal

head and the pelvic bones. Due to decreased oxygenation, the tissues undergo ischemic necrosis, forming various types of fistulae such as vesicovaginal (between the bladder and vagina), vesicocervical (between the bladder and the cervix), or rectovaginal (between the rectum and vagina). These fistulae allow leakage of urine or faeces from the vagina, and represent the extreme morbid conditions that may occur following the neglected or poorly managed obstructed labour.

✓ **Maternal death**

The mother may die either due to uterine rupture and the resultant haemorrhage and shock, or death may result from the DIC.

Fetal complications

✓ **Caput succedaneum**

This is a boggy swelling on the foetal scalp formed due to pressure of the maternal pelvic bones on the foetal skull. It usually subsides on its own after a few days.

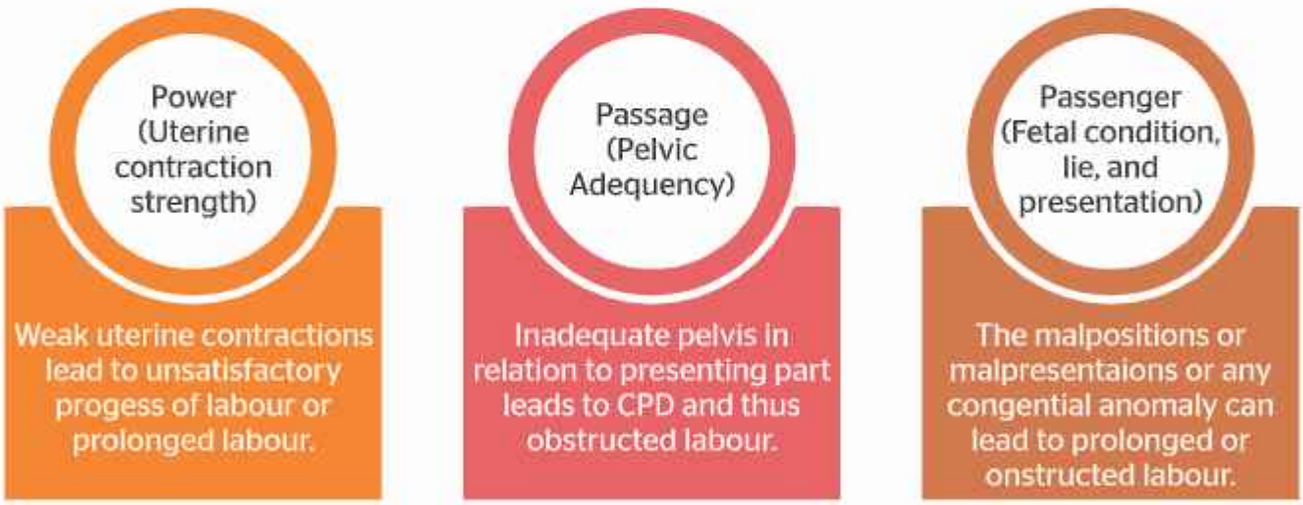
✓ **Excessive moulding of the foetal skull**

This may cause a change in the shape of the baby's head.

✓ **Birth asphyxia and its complications**

Birth asphyxia can lead to foetal death/stillbirth. If the baby survives, it may have complications like cerebral palsy and/or mental retardation.

Factors influencing delivery process PPP-



Risk factors for obstructed labour

1. Teenage pregnancy.
2. Grand multiparity.
3. Malpresentations&malpositions
4. Contracted pelvis, CPD.
5. Pelvic deformities.
6. Short stature.
7. Fetal malformations eg. hydrocephalus.

Diagnosis of Obstructed labour

1. H/O prolonged labour pains & ruptured membranes.
2. Patient is exhausted & dehydrated.
3. Uterus may show hour glass appearance due to Bandl's ring.
4. Often large size baby or abnormal presentation.
5. Vagina is hot & dry.
6. May find hand prolapse or big caput succedaneum if cephalic presentation.

Clinical picture

History

- The following points must be asked to any woman who comes to FRU with suspected obstructed/ prolonged labour.
- History of prolonged pains.
- History of prolonged rupture of membranes
- Dai handling.
- If partogram is made then line will be to right of alert line.

Examination

General examination

In cases of obstructed labour, the following signs are present:

- Physical and mental exhaustion.
- Dehydration and ketoacidosis (ketonuria, dry mouth, tachycardia).
- Fever (in cases of sepsis).
- Shock (as evidenced by tachycardia, low B P, cold extremities, pale complexion, history of oliguria or anuria). The cause of shock may be a ruptured uterus or sepsis.

Abdominal examination

In cases of obstructed labour, abdominal examination may reveal the following:

- Part of the foetal head (or the presenting part) can be felt above the pelvic brim because it is unable to descend inspite of good uterine contractions as there may be some obstruction in the passage (like brim contraction, mid pelvic contraction or outlet contraction).
- In case of abnormal presentations like transverse lie, the shoulder may be impacted or there may be hand prolapse.
- The woman may have frequent and strong uterine contractions. But if she has been in labour for a long time, the contractions may have stopped because of uterine exhaustion/ inertia or because of rupture of the uterus.
- The uterus may have gone into tonic contraction and is tightly moulded around the foetus.
- Bandl's ring may be seen

* Bandl's ring is the name given to the area between the upper and lower uterine segments when it becomes visible and/or palpable during labour. It should not normally be seen or felt on abdominal examination.

* Bandl's ring is a late sign of obstructed labour. It can be seen as a depression across the abdomen at about the level of the umbilicus. Above this is the retracted upper uterine segment. The level of the Bandl's ring keeps rising. Below the Bandl's ring is the distended lower uterine segment. This is dangerously thin and can rupture if not managed in time.

* Palpation will reveal a tender contracted uterus, absent liquor and the fetal heart may not be located.

Findings of clinical examination

Abdominal Examination

- Foetal head above pelvis brim
- Women may have frequent & strong contractions or they may have stopped due to uterine inertia or rupture of the uterus.
- Bandl's Ring may be seen at:
  - Area between upper and lower uterine segments when it becomes visible/ palpable.
  - Depression across the abdomen at the level of umbilicus.
  - Shape of uterus looks like a peanut shell.

Vaginal examination

Look for the following danger signs related to obstruction:

- The vagina will be hot and dry, Amniotic fluid may be foul smelling.
- Oedema of the vulva may be seen, especially if the woman has been bearing down for long time.
- Cervix may be oedematous and loose hanging. It may be or maynot be fully dilated.
- A large caput succedaneum, or any other abnormal presentation, can be felt.
- The cause of the obstruction may be felt, e.g. a severely moulded head stuck in the pelvis, shoulder presentation, any other abnormal presentation, prolapsed arm, or a compound presentation such as head with hand, cord, etc.

Urine examination

Test the woman's urine for the presence of ketone bodies using a ketostix, if available.

Symptoms and signs suggestive of ruptured uterus.

Symptoms

- There may be severe abdominal pain orH/O severe pain followed by relief in pain.
- Vaginal bleeding may or may not be present.

Signs on abdominal examination

- Shock may be present.
- Abdominal tenderness is present.
- The foetal parts felt superficially.
- The uterine contour is not felt.
- The FHS is not heard.

Signs on vaginal examination

- The presenting foetal part is either very high up, or may not be felt at all.

Management of obstructed labour

Explain the situation to the relatives. Take the written high-risk consent.

1. Rehydrate the patient

It is essential to maintain a normal plasma volume and prevent or treat dehydration and ketosis.

- Start an IV line. Use a large needle or cannula (no. 18).
- Infuse with R/L or normal saline.
- Run the fluid at a moderate rate of approximately 25-30 drops/minute.

2. Give antibiotics

To prevent puerperal sepsis, which may occur due to frequent vaginal examinations and premature rupture of membranes, the following antibiotics need to be administered to the woman stat:

- Inj. Ampicillin 1 g IV, after sensitivity testing (AST).
- Inj. Gentamicin 80 mg IV.
- Inj. Metronidazole 500 mg, preferably IV (if available), otherwise orally.

3. Catheterize bladder

4. Perform LSCS

Management of rupture uterus.

- Explain the situation to the relatives.
- Start management of shock, give intravenous antibiotics.
- Send blood for grouping.
- Catheterise.
- Refer patient to district hospital/medical College after initiating treatment.

E. BREECH DELIVERY

KEY LEARNING POINTS

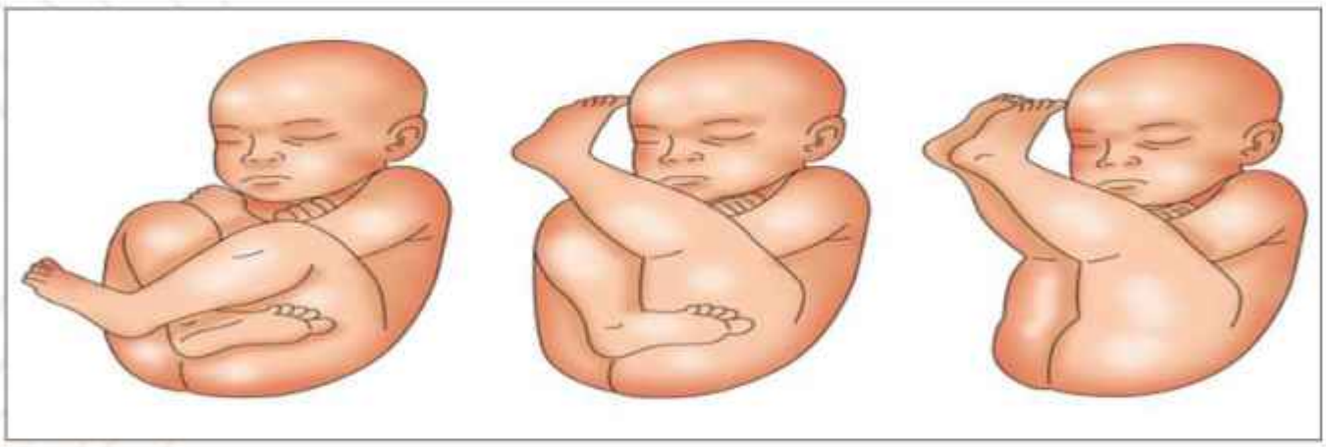
- Every breech delivery should take place in a hospital with surgical capability.
- Elective LSCS for breech presentation should be done in double footling breech, large fetus, hyper extended or deflexed head & any other obstetric indication.
- Elective LSCS does not improve outcome in preterm breech delivery.
- Vaginal breech delivery should be conducted carefully & gently by a skilled obstetrician.
- Meconium is common with breech labor & is not a sign of fetal distress if FHR is normal.

This is malpresentation where the podalic pole (fetal buttocks or the lower extremity) presents at the pelvic inlet. Depending upon the relation between the lower extremities & the buttocks, there are four types of breech presentations:

- Complete breech: Flexion at hip & knees.
- Frank breech: Flexion at hip & extension at knees.
- Footling presentation: Extension at hip & knees of both limbs or one limb.
- Knee presentation: Extension at hip & flexion at knees of both limbs or one limb?

Etiology of breech presentation:

Factors predisposing to breech presentation are due to abnormal uterine shape, excessive fetal mobility or interference in foeto-pelvic relationship. An important point to be kept in mind in cases of breech presentation is that the underlying cause maybe congenital anomaly of the baby (which should preferably be ruled out by USG prior to doing an elective caesarean section) or a congenital malformation of the uterus.



A. Complete breech B. Footling breech C. Frank breech

Ideally, every breech delivery should take place in a hospital with surgical facilities. All cases of breech presentation persisting at 37 weeks must be referred to district hospital/ medical college.

Caesarean Section for Breech Presentation A caesarean section is safer than vaginal breech delivery and recommended in cases of:

- hyper-extended or deflexed head.
- double footling breech.

- small or malformed pelvis.
- very large fetus.
- previous scarred uterus.

Note: Elective caesarean section does not improve the outcome in preterm breech delivery.

Diagnosis of Breech Presentation.

- Ballotable head in fundal grip.
- Podalic pole in pelvic grip.
- Fetal heart sound above or near umbilicus.
- Podalic pole or feet are felt on p/v examination.
- Anal opening & sphincter may also be felt after rupture of membranes.

Confirmation of Diagnosis

- Ultrasonography.
- X-ray abdomen.

Prerequisites for breech vaginal delivery

- Adequate gynaecoid pelvis.
- Estimated fetal weight <3kg.
- Frank or flexed breech presentation.
- Onset of spontaneous labor - induction & augmentation of labor is not recommended.

Complications

Fetal complications of breech presentation include:

- cord prolapse
- birth trauma as a result of extended arm or head, incomplete dilatation of the cervix or foetopelvic disproportion.
- asphyxia from cord prolapse, cord compression, placental detachment or arrested head.
- damage to abdominal organs.
- broken neck.

Breech Delivery

Risks of vaginal delivery must be clearly explained to the relatives. Delivery should be conducted by an experienced doctor. Pediatrician should be available for the newborn.

A vaginal breech delivery by a skilled health care provider is safe and feasible under the following conditions:

- complete or frank breech; adequate clinical pelvimetry
- fetus is not too large.
- non scarred uterus.
- flexed head.
- Examine the woman regularly and record progress on a partograph.
- If the membranes rupture, examine the woman immediately to exclude cord prolapse.

Note: Do not rupture the membranes.

- If the cord prolapses and delivery is not imminent, deliver by caesarean section,

Note: Meconium is common with breech labour and is not a sign of fetal distress if the fetal heart rate is normal.

✓ **The woman should not push until the cervix is fully dilated. Full dilatation should be confirmed by vaginal examination.**

- Review for indications. Ensure that all conditions for safe vaginal breech delivery are met.
- Review general care principles and start an IV infusion.
- Provide emotional support and encouragement. If necessary, use a pudendal block.
- Perform all maneuvers gently without undue force.

Pre-Procedure Task

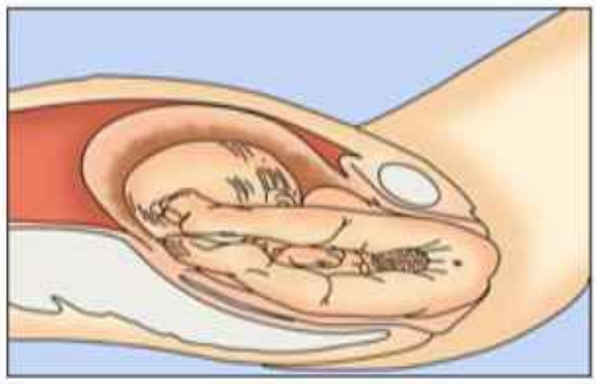
- Wash hands thoroughly with soap & water, dry with sterile cloth or dryer & put on sterile gloves.
- Clean the vulva with antiseptic solution.
- Drape the mother.
- Catheterize the bladder if necessary.

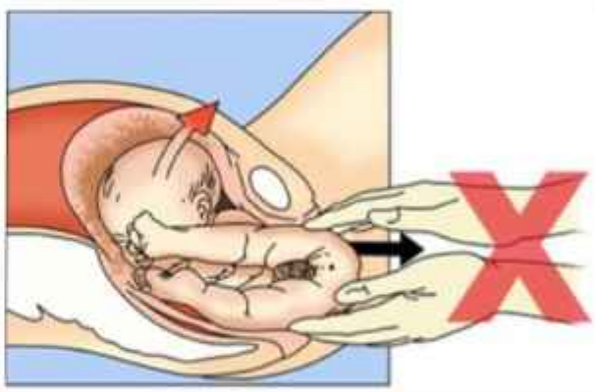
How to conduct assisted vaginal breech delivery

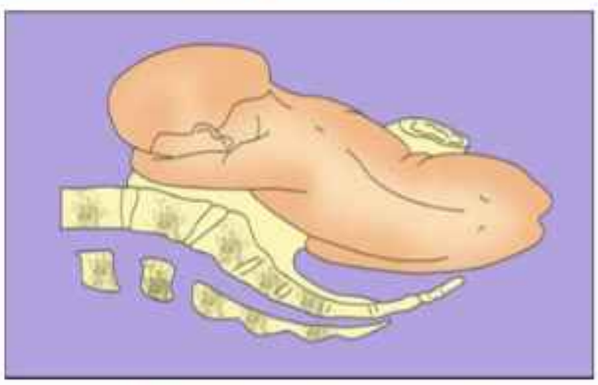
Delivery of Buttocks and Legs

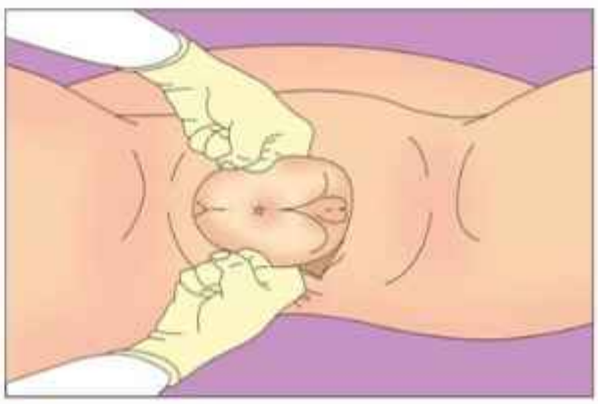
- Once the buttocks have entered the vagina and the cervix is fully dilated, tell the woman she can bear down with the contractions when she feels the urge.
- A passive second stage to allow the descent of the breech to the perineum prior to active pushing is recommended.
- If the perineum is very tight, perform an episiotomy.
- Let the buttocks deliver until the lower back and then the shoulder blades are seen.
- Gently hold the buttocks in one hand, but do not pull. Keep the back uppermost towards pubic symphysis.
- If the legs do not deliver spontaneously, deliver one leg at a time:
- Push behind the knee to bend the leg;
- Grasp the ankle and deliver the foot and leg;
- Repeat for the other leg.

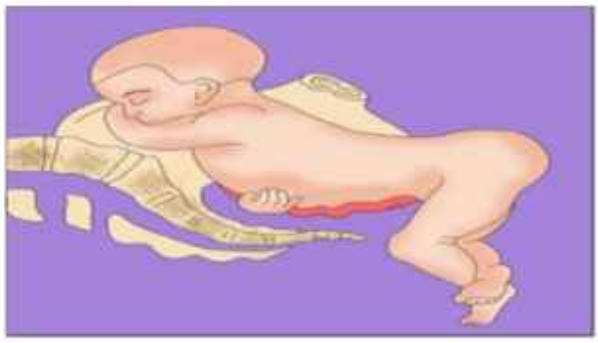
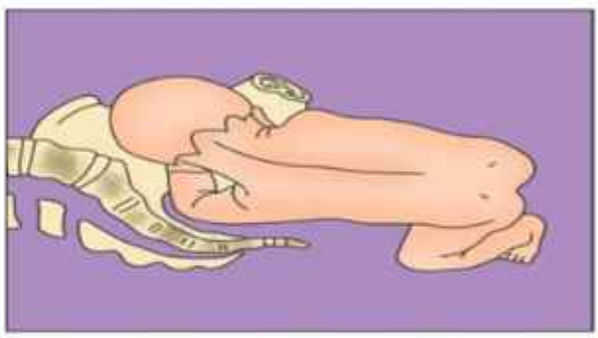
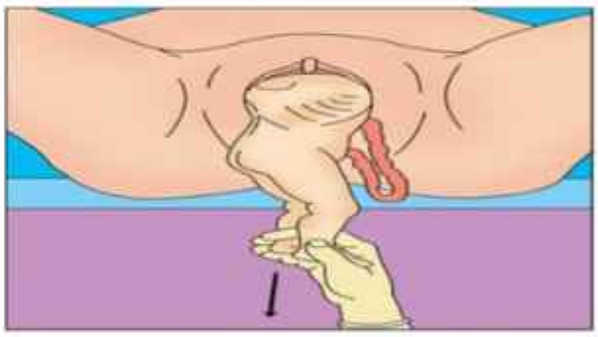
Do not pull the baby while the legs are being delivered.







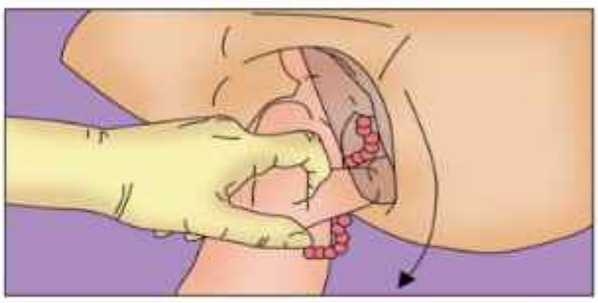


- Assisted delivery of extended legs. With the fingers splint the femur at the popliteal fossa, slightly abduct the thigh and then flex the hip and knee.	  
The manner of grasping the breech for rotation and traction.	
Arms Are Felt on Chest • Allow the arms to disengage spontaneously one by one. Only assist if necessary. • After spontaneous delivery of the first arm, lift the buttocks towards the mother's abdomen to enable the second arm to deliver spontaneously. • If the arm does not spontaneously deliver, place one or two fingers in the elbow and bend the arm, bringing the hand down over the baby's face.	

Gentle rotation of the shoulder girdle facilitates delivery of arm.

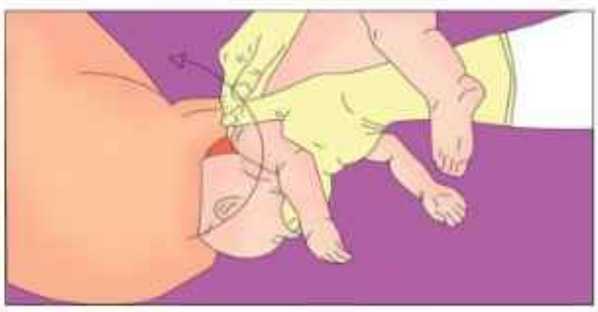
Use the Lovset's manoeuvre if arms are extended:

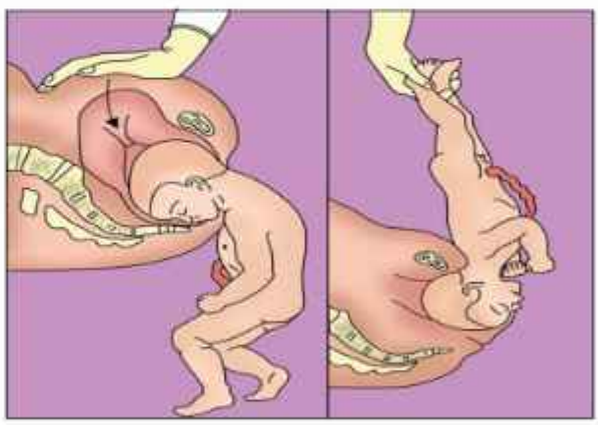
- Hold the baby by the hips and turn half a circle, keeping the back uppermost and applying downward traction at the same time, so that the arm that was posterior becomes anterior and can be delivered under the pubic arch.
- Assist delivery of the arm by placing one or two fingers on the upper part of the arm. Draw the arm down over the chest as the elbow is flexed, with the hand sweeping over the face.
- To deliver the second arm, turn the baby back half a circle, keeping the back uppermost and applying downward traction, and deliver the second arm in the same way under the pubic arch.



Bringing down the posterior extended arm when Lovset's maneuver is not possible as Baby's **Body Cannot Be Turned**

- If the baby's body cannot be turned to deliver the arm that is anterior, first deliver the shoulder that is posterior.
- Hold and lift the baby up by the ankles.
- Move the baby's chest towards the woman's inner leg. The shoulder that is posterior should deliver.
- Deliver the arm and hand.
- Lay the baby back down by the ankles. The shoulder that is anterior should now deliver.
- Deliver the arm and hand.

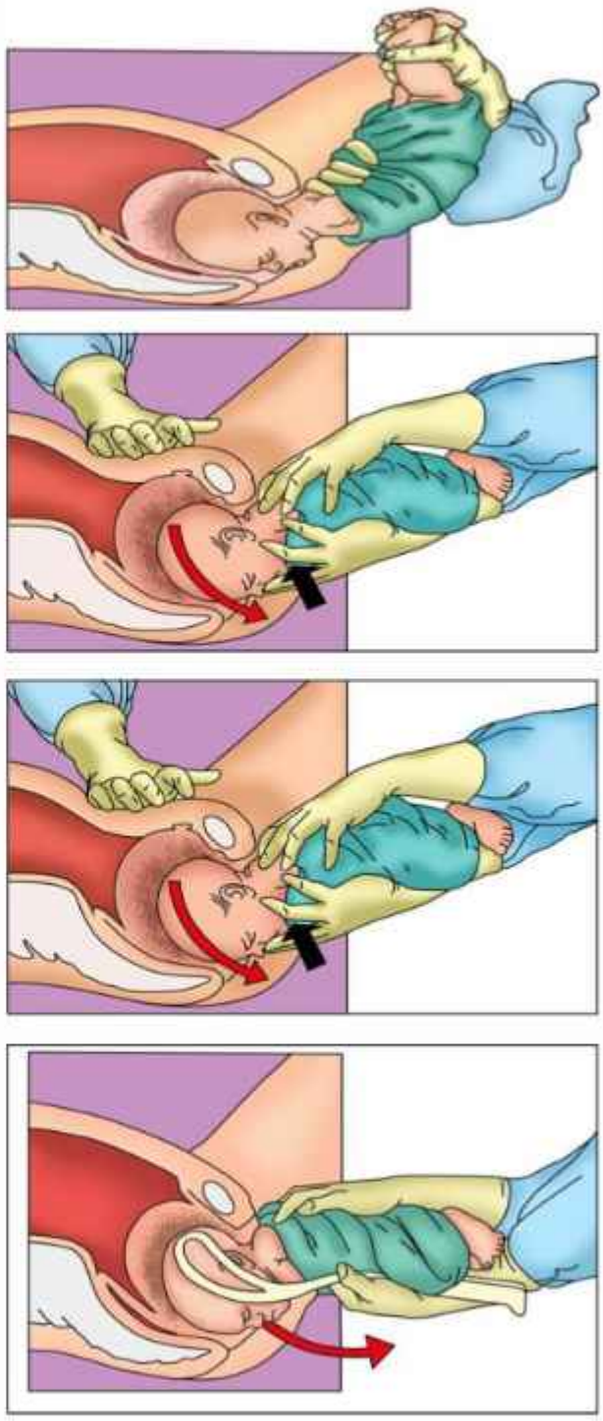


Bringing down the posterior extended arm when Lovset's maneuver is not possible as Baby's **Body Cannot Be Turned** • If the baby's body cannot be turned to deliver the arm that is anterior, first deliver the shoulder that is posterior. • Hold and lift the baby up by the ankles. • Move the baby's chest towards the woman's inner leg. The shoulder that is posterior should deliver. • Deliver the arm and hand. • Lay the baby back down by the ankles. The shoulder that is anterior should now deliver. • Deliver the arm and hand.	
Nuchal arm. The body is rotated 90° freeing the forearm from the occiput.	
After delivery of arms the fetus is suspended vertically, partially supported by the operator's hands. An assistant provides suprapubic pressure. This combination promotes descent and flexion of the fetal head. Wait till the nape of neck is visible before trying to deliver the fetal head.	
Following delivery of the arms, the fetus is wrapped in a towel for control and slightly elevated. The fetal face and airway may be visible over the perineum. Excessive elevation of the trunk is avoided.	

Mauriceau-Smellie-Veit-manoeuvre-

- Deliver the head by the Mauriceau Smellie Veit manoeuvre as follows:
- Lay the baby face down with the length of its body over your hand and arm.
- Place the first and third fingers of this hand on the baby's cheekbones and flex the head.
- Use the other hand to grasp the baby's shoulders.
- With two fingers of this hand, gently flex the baby's head towards the chest, while applying downward pressure on the cheekbones to bring the baby's head down until the hairline is visible.
- Pull gently to deliver the head.
- Raise the baby until the mouth and nose are free.

Note: Ask an assistant to push above the mother's pubic bone as the head delivers. This helps to keep the baby's head flexed.



After coming Head may also be delivered using Forceps-

- Catheterize the bladder.
- Have an assistant available to hold the baby while applying Piper or long forceps. DO NOT USE WRIGLEY'S FORCEPS.
- Be sure the cervix is fully dilated.
- Wrap the baby's body in a cloth or towel and hold the baby up.
- Place the left blade of the forceps from below the baby's body.
- Place the right blade and lock handles.
- Use the forceps to flex the baby's head and deliver the head.
- If unable, to use forceps, apply firm pressure above the mother's pubic bone to flex the baby's head and push it through the pelvis.

What to do when- fetal anatomical landmarks and sequence of manoeuvres

Fetal anatomical landmark	Delivery Manoeuvre
Anterior buttock	Pudendal block (if Epidural / spinal not in place)
↓	↓
Anus/bead of meconium	Episiotomy
↓	↓
Posterior buttock	Hands Off!
↓	↓
Hips	Deliver legs
↓	↓
Umbilicus	Gently pull-down loop of cord
↓	↓
Scapula	Deliver arms
↓	↓
Nape of neck	Deliver head

Footling Breech

A footling breech baby should usually be delivered by caesarean section.

Single footling breech presentation, with one leg extended at hip and knee

Vaginal delivery of a footling breech baby only in following conditions:

- advanced labour with fully dilated cervix;
- preterm baby that is not likely to survive after delivery;
- delivery of second twin that has presented with footling.

To deliver the baby vaginally:

- Grasp the baby's ankles with one hand.
- If only one foot presents, insert a hand (wearing high-level disinfected gloves) into the vagina and gently pull the other foot down.
- Gently pull the baby downwards by the ankles.
- Deliver the baby until the buttocks are seen.

v Proceed with delivery of the arms.

Breech Extraction - Only recommended in a dead fetus or 2nd twin

Wearing high-level disinfected gloves, insert a hand into the uterus and grasp the baby's foot.

- Hold the foot and pull it out through the vagina.
- Exert traction on the foot until the buttocks are seen.
- Proceed with delivery of the arms.
- Give a single dose of prophylactic antibiotics after breech extraction:

ampicillin 2 g IV PLUS metronidazole 500 mg IV;

OR cefazolin 1 g IV PLUS metronidazole 500 mg IV.

Post-Delivery Care

- Suction the baby's mouth and nose.
- Clamp and cut the cord.
- Give oxytocin 10 units IM within 1 minute of delivery and continue active management of the third stage of labour.
- Examine the woman carefully and repair any tears to the cervix orvagina or repair episiotomy.

F. TRANSVERSE LIE AND SHOULDER PRESENTATION

All cases of transverse lie must be delivered by caesarean section unless the fetus is too small to survive. Monitor for signs of cord prolapse. If the cord prolapses and delivery is not imminent, deliver by caesarean section.

Note: Ruptured uterus may occur if the woman is left unattended in transverse lie & shoulder presentation.

✓ In modern practice, persistent transverse lie in labour is delivered by caesarean section whether the fetus is alive or dead.

G. TWINS

Key Learning points

- Emphasize on frequent antenatal visits & rest in later trimester of pregnancy.
- Keep an eye for complications & counsel woman about danger signs.
- If woman with twin pregnancy presents in first stage of labor, refer to higher facility for delivery.
- Do NOT give Inj.Oxytocin after delivery of first twin.
- Do not attempt to deliver placenta until last baby is delivered.

- Carry out active management of third stage of labor essentially.
- Be prepared for atonic PPH. Keep the PPH tray available.
- Arrange blood.
- Perform elective LSCS if first baby transverse.
- LSCS may be done for second twin if lie is transverse & external & internal version fails.

Definition

When more than one fetus develops simultaneously in the uterus, it is called multiple pregnancy. Simultaneous development of two fetuses (twins) is the commonest; but rarely development of three fetuses (triplets), four fetuses (quadruplets), etc. may also occur. The cause of twinning and other multiple pregnancy is either hereditary or it may be due to multiple ovulation occurring either naturally or induced by drugs used for infertility treatment, or in an in vitro fertilization (IVF) programme.

Diagnosis

Early diagnosis and appropriate management will go a long way in preventing complications associated with twin pregnancy.

History

- H/o ovulation-inducing drugs, especially gonadotrophins and clomiphene for the management of infertility.
- Family h/o twins.
- Increased nausea and vomiting in the first trimester.
- Breathlessness in the later months of pregnancy due to overdistension of the uterus.

Examination

- Unduly enlarged, barrel-shaped abdomen
- The height of uterus is more than the period of amenorrhoea. This discrepancy may become evident only from mid-pregnancy onwards.
- The foetal bulk seems disproportionately larger in relation to the foetal head.
- Palpation of multiple foetal parts, finding two foetal heads or three foetal poles makes the diagnosis almost certain.
- Auscultation for the FHS can help confirm the diagnosis. If two independent observers listening simultaneously hear two FHS distinctly in two different areas, well separated from each other, with the foetal hearts differing in frequency by at least 10 beats/minute, it is likely to be a twin pregnancy. However, it would be unwise to rely on auscultatory findings alone to make a diagnosis.
- Multiple pregnancy is associated with polyhydramnios in 12% of cases. The presence of polyhydramnios makes abdominal palpation and auscultation for FHS difficult.
- Diagnosis during labour: Occasionally the diagnosis of twins may be missed during pregnancy, and the presence of the second foetus may be discovered only during labour.

* The presence of one cephalic pole felt distinctly on vaginal examination and another pole at the fundus during abdominal palpation points towards the presence of twins.

* The size of the head (or the breech) on pelvic examination during labour may be smaller than expected from abdominal examination.

Complications associated with twinning

Antenatal complications

There are increased chances of antenatal

complications like gestational hypertension and preeclampsia in women with multiple pregnancy. Importance of institutional delivery must be repeatedly emphasized at all ANC visits. Moreover, women with multiple pregnancies should receive extra iron supplementation & should be counseled to pay extra attention to their dietary intake.

These women should be encouraged to come for more frequent antenatal visits with impetus on counseling regarding possibility of following antenatal complications.

- Hyperemesis gravidarum
- Mechanical distress
- Abortion
- APH
- Anaemia
- Pre-eclampsia
- Polyhydramnios
- IUGR
- IUD
- Congenital malformations

Intranatal complications

There are increased chances of the following:

- Malpresentation
- Preterm labour
- Prolonged labour
- Abruptio placentae
- Placenta previa
- APH following the birth of the first baby
- Atonic PPH
- Locked Twins

Postnatal complications

There are increased chances of the following:

- Subinvolution of the uterus
- Puerperal sepsis
- Problems in lactation

Management of twins

Antenatal management

- Keep the complications mentioned above in mind while providing ANC to a woman carrying twins.
- Once the diagnosis is made, provide routine ANC.
- Refer patient for opinion to District Hospital or Medical College for evaluation and definite decision regarding site of delivery & further management.
- All complicated twin pregnancies should be delivered at District Hospital / Medical College.
- Keep an eye for complications and if they develop, manage them accordingly.

Management during labor

- If the woman having twins presents in the early first stage of labour, monitor her carefully in labor & perform intermittent auscultation of FHR.
- If the woman presents in late first stage or the second stage of labour conduct delivery carefully.

All combinations of intrapartum twin presentations can be classified into three groups:

- Twin A vertex, twin B vertex.
- Twin A vertex, twin B non-vertex.

- Twin A non-vertex, twin B vertex/ non vertex.
- Both twin vertex:
- Preferably deliver vaginally.
- LSCS should be considered for obstetric indications as in case of singleton pregnancies.
- Twin A vertex, twin B non-vertex.
- Deliver Twin A vaginally.
- Palpate abdomen to assess lie of Twin B.
- If twin B non-longitudinal lie correct to longitudinal lie by ECV if possible.
- Check fetal heart rate.
- Deliver accordingly.
- Twin A non vertex, twin B vertex/ non vertex.
- Perform LSCS.
- **Delivery of the first twin**
- Check presentation of first twin.
- Allow labor to progress & monitor progress using partograph.
- Give episiotomy if needed under lignocaine skin infiltration.
- Conduct the delivery as usual.
- Do not give Inj. Oxytocin for AMTSL after delivery of first twin.
- After delivery of first twin, Cord must be clamped immediately at two places and cut in between, after delivery of 1st twin because if twins are monochorionic then delayed clamping of cord may lead to exsanguinations of 2nd twin.
- **Delivery of the second twin**
- After delivery of the first baby, ask your assistant/ staff nurse to do an abdominal examination to check the lie of the twin. Also check the FHS of the twin.
- If the lie is longitudinal &vertex, do a vaginal examination to confirm abdominal findings, exclude cord prolapse and see if the membranes have ruptured or not. If not, fix the presenting part and carry out artificial rupture of the membranes.
- If the contractions are not effective, start 5 U of Oxytocin infusion @ 30 drops/ min.
- Otherwise conduct a normal vaginal or assisted breech delivery in the usual manner.
- If lie is transverse:
- If membrane intact, attempt external version. If external version fails, do ARM (in cases where membranes are already ruptured do not attempt external version but proceed directly to internal podalic version. Insert your right hand into the vagina and feel for the fetal foot (confirmation that it is foot & not hand is by feeling the heel), grasp it and gently pull downwards while an assistant guides the fetal head towards the fundus abdominally thereby converting the transverse lie to a breech presentation. Complete the delivery by breech extraction.
- After the delivery of the second baby, clamp the cord after 1-3 minutes as it is done in case of singleton pregnancy.
- Carry out active management of the third stage of labour using Inj. Oxytocin 10 U IM.
- In addition, give 10 U of Oxytocin to 500 ml RL & start infusion @ 20 drops/ min to prevent atonic PPH, which is more common in the case of twin deliveries.
- The interval between deliveries should ideally be within 15 min & certainly not more than 30 min.

H. PRETERM LABOUR

KEY LEARNING POINTS

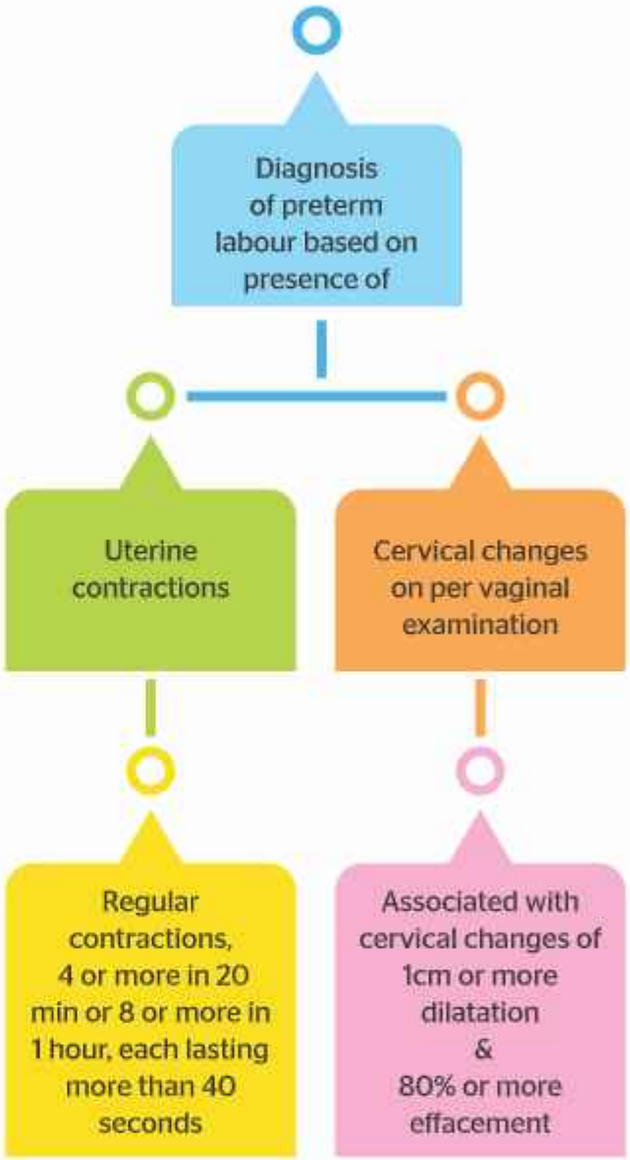
- Diagnosis of preterm labor is important.
- Preterm delivery is associated with a higher perinatal morbidity and mortality.
- Tocolyticsshould be given if gestation is > 24 weeks&< 34 weeks.
- Risk factors likepreterm prelabour rupture of membranes (PPROM), chorioamnionitis, placenta abruption, cardiac disease, pre- eclampsia, active bleeding or fetal distress should be excluded before attempting tocolysis.
- Antenatal corticosteroid should be given to improve fetal lung maturity.
- Nifedipine is the preferred tocolytic.
- If labor continues, refer patient to higher center/prepare for resuscitation of baby.
- Avoid Ventouse application for delivery of preterm baby.

Definition

- Preterm labour refers to the onset of labour after 24 weeks&before 37 weeks of gestation.

Diagnosis of preterm labour

- Based on presence of uterine contractions & cervical changes on pervaginal examination.
- Regular contractions, 4 or more in 20 min or 8 or more in 1 hour, each lasting more than 40 seconds.
- Associated with cervical changes of 1cm or more dilatation & 80% or more effacement.
- Women with regular uterine contractions &>4cm cervical dilatation are considered to be in established preterm labor.



Risk factors for preterm labour

- Prior preterm birth - associated with 1.5 to 2 times increased risk.
- Short cervical length < 25mm at less than 24 weeks.
- Prior cervical surgery like conisation, loop electrosurgical excision procedure, dilatation & curettage.
- Urinary tract infection during pregnancy.

- Low prepregnancy BMI.
- Periodontal disease.
- Short interpregnancy interval<18 months.
- Smoking.

Prevention

Transvaginal cervical length screening between 19 to 24 weeks has been recommended in all pregnant women & if cervical length so detected is found to be < 25mm then vaginal progesterone supplementation 200mg daily has been found to be effective in preventing preterm birth. Cervical cerclage in such cases has not been found efficacious.

In cases who are already on intramuscular progesterone due to H/O prior preterm birth & are found to have short cervical length, addition of vaginal progesterone is not advantageous, but cervical cerclage Macdonald stitch has been found to be effective.

No interventions for preventing preterm labour have been found to be effective in cases of twin pregnancy.

Management during pregnancy in high-risk cases

The most important risk factor identified has been prior history of preterm birth. While taking history it is important to differentiate between spontaneous preterm birth & indicated preterm birth as risk increases only with spontaneous preterm birth. **All cases with H/O prior spontaneous preterm birth must be referred to a district hospital/ medical college for further antenatal care.** In such cases giving **17α hydroxyl progesterone caproate** 500mg intramuscularly from 16 weeks till 36 weeks in singleton pregnancies has been found to be effective in reducing incidence of repeat preterm birth.

Transvaginal cervical length screening between 19 to 24 weeks has been recommended in all pregnant women & if cervical length so detected is found to be < 25mm then vaginal progesterone supplementation 200mg daily has been found to be effective in preventing preterm birth. Cervical cerclage in such cases has not been found efficacious.

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No interventions for preventing preterm labour have been found to be effective in cases of twin pregnancy.

Management during labour

Management of preterm labour consists of tocolysis (trying to stop uterine contractions) or allowing the labour to progress.

Tocolysis

- Attempt tocolysis if:
  - The period of gestation is > 24 weeks &< 34 weeks.
  - The cervix is <4 cm dilated.
  - There is no amnionitis, pre-eclampsiaor active bleeding.
  - There is no foetal distress
  - Tocolysis is only to be given for 48 hours to allow steroid coverage. There is no role of maintenance tocolysis.
- If the gestation period is > 24 weeks but < 37 weeks, give corticosteroids to the mother to improve foetal lung maturity and the chances of survival of the newborn.

  - Dexamethasone 6 mg IM, four doses, 12 hours apart (recommended in India by GOI) OR

- Inj. Betamethasone- In India Betamethasone acetate + phosphate salt, which requires only two doses, is not available. The available salt in India is Betamethasone phosphate which is short acting and requires more frequent administration as compared to dexamethasone. Hence, its dosage schedule is same as that of dexamethasone.

  - If gestation is < 34 weeks and delivery is expected within next 7 days &>14 days have elapsed since last course of steroids then a rescue dose of steroids maybe given.

- In cases presenting between 24 to 33 weeks it is recommended to give 4g magnesium sulphate 20% solution slow intravenous over 20 min to decrease chances of cerebral palsy in the offspring.

- Give a tocolytic drug and monitor the maternal and foetal condition (pulse, B P, signs of respiratory distress, uterine contractions, loss of amniotic fluid or blood, FHR, fluid balance, blood glucose).

- If the period of gestation is < 34 weeks, and labour continues despite tocolysis, or if the woman is already in an advanced stage of labour (cervical dilatation >4 cm) refer to District Hospital with NICU/ SNCU facility/ Medical College for delivery. If patient is in advanced labor, deliver vaginally & refer to District Hospital/ Medical College after stabilizing newborn & documenting Baby notes in referral form.

- There is no role of antibiotics in prevention & management of preterm labour

Table 2: Indications and Contraindications for using Corticosteroids in Antenatal Period

Indications	Contraindications
• True preterm labour • Following conditions that lead to imminent delivery: • Antepartum haemorrahge • Preterm premature rupture of membrane • Severe pre-eclampsia	Frank Chorioamnionitis is an absolute contraindication for using antenatal corticosteroids. Following signs and symptoms in the mother suggests Frank amnionitis: • History of fever and lower abdominal pain. • On examination: foul smelling vaginal discharge, tachycardia and uterine tenderness. • Fetal tachycardia

Maternal diabetes, pre- eclampsia and hypertension are not contraindications for using injection corticosteroids in pregnant women. Dexamethasone can be administered if otherwise indicated with a careful watch on blood sugar and blood pressure (If chlorioamnionitis is suspected, consider delivering the baby).

Drug	Initial Dose	Subsequent Dose	Side- Effects & Precautions	Contraindications
Nifedipine to stop uterine contractions in preterm labour.	20-30 mg orally.	10-20 mg 4-6 hourly till contractions stop or maternal pulse exceeds 120 beats/min. Max dose 90 mg/day. If contractions stop, maintain same dose till steroids cover is complete or at least 8 hrs after the last contractions. Then taper the dose slowly.	If maternal pulse increases (more than 120 beats/min) or hypotension occurs- increase dose interval or stop drug altogether.	• Bleeding PV (Abruptio placentae & Placenta Previa) • Cardiac Disease • Chorioamnionitis • Acute/ Chronic fetal compromise • Simultaneous use of Magnesium Sulphate or Betamimetics

Allowing labour to progress

- Allow labour to progress if
  - The period of gestation is >37 weeks.
  - The cervix is >4cm dilated.
  - There is active bleeding.
  - The foetus is distressed, dead or has an anomaly incompatible with survival.
  - There is amnionitis or pre-eclampsia.
- Monitor the progress of labour using a parto-graph.
- If labour continues and the gestation period is < 37 weeks.
  - Avoid delivery by ventouse as the risk of intracranial bleeding in a preterm baby is high.

Prepare for management of preterm or LBW baby and anticipate the need for resuscitation.

- If needed, refer neonate to the nearest NICU/ SNCU after appropriately stabilizing new born & documenting Baby notes in Referral form.

Contra-indications to Tocolysis-

- Bleeding PV (Abruptio Placentae & Placenta Previa).
- Maternal Cardiac Disease & severe anaemia.
- Maternal condition indicating early delivery eg severe preeclampsia, eclampsia.
- Chorioamnionitis.
- Acute/ Chronic fetal compromise.
- Gross fetal congenital malformation.
- Woman in active labour (cervix >4cm dilated).
- Intrauterine fetal demise.

I. PREMATURE OR PRELABOUR RUPTURE OF MEMBRANES (PROM)

Key Learning Points

- Do a per speculum examination aseptically to confirm diagnosis.
- If vaginal discharge bloody with constant abdominal pain suspect abruption & manage accordingly.
- Conservative management should be done under strict supervision & monitoring for signs of chorioamnionitis.
- Give antibiotics to prevent infection & steroids for lung maturity.
- Do not use corticosteroids in presence of frank infection.
- Terminate pregnancy at earliest diagnosis of infection.
- Deliver at higher center with facility to manage premature newborn.

Definition

Spontaneous rupture of membranes anytime beyond 28th week of pregnancy but before the onset of labour is called pre labour rupture of the membranes (PROM).

When rupture of membranes occurs beyond 37th week but before onset of labour it is called term PROM and when it occurs before 37 completed weeks it is called PRETERM PROM. Rupture of membranes for more than 24 hours before delivery is called prolonged rupture of membranes.

Causes

In majority of cases the causes are unknown. The most probable causes are as follows.

Increased friability of the membranes	Choriomnionitis
Decreased tensile strength of the membranes	Urinary tract infection
Polyhydramnios	Lower genital tract infections
Cervical Incompetence	Cervical length less than 2.5 CM
H/o preterm labour in previous pregnancies Multiple pregnancy	Low BMI (<19 kg/m2)

Diagnosis

The diagnosis of PROM may not be difficult when the membranes have ruptured recently. In such cases, a profuse watery discharge with the typical odour of the amniotic fluid may be seen at the introitus on inspection. But when the leakage is gradual, diagnosis may be difficult.

The following signs and symptoms may be seen in PROM.

- A P/S examination done under aseptic conditions may reveal a pool of amniotic fluid lying in the vagina, or amniotic fluid coming out of the cervix, particularly when the woman is made to cough.
- A sterile pad placed over the vulva and examined after an hour may show the pad soaked with amniotic fluid.
- Litmus paper test by putting a drop of fluid on pink litmus paper which turns blue in presence of amniotic fluid due to a higher pH. The test maybe falsely positive in presence of blood, infection or semen.

NOTE:

If a woman complains of bleeding after 20 weeks of gestation, DO NOT perform a digital vaginal examination. A P/V in no way helps to establish the diagnosis of PROM. Instead, it may add to the complication by way of introducing infection.

Differential diagnosis of vaginal discharge during pregnancy

Symptoms and signs typically present	Symptoms and signs sometimes presen	Probable diagnosis
Watery vaginal discharge	• Sudden gush or intermittent leaking of fluid • Fluid seen at the introitus • No contractions within 1 hour • Pink litmus paper turns blue	PROMOR depending on gestation
State where periodic watery discharge occurs probably due to excessive decidual gland secretions.		Hydrorrhea gravidarum
In later months of pregnancy		Urinary incontinence
• Foul-smelling watery vaginal discharge after 20 weeks of gestation • Fever/chills • Abdominal pain	• Maternal tachycardia • History of loss of fluid • Tender uterus • Rapid foetal heart rate • Light vaginal bleeding	Amnionitis
• Increased vaginal discharge • No history of loss of fluid	• Itching • Frothy/curdy discharge • Dysuria • Abdominal pain	Vaginitis
Bloody vaginal discharge	• Abdominal pain • Loss of foetal movements • Heavy, prolonged vaginal bleeding	Abruptio placentae
Blood-stained mucus discharge	• Cervical dilatation & effacement • Contractions	Labour (May be term or preterm)

Management

- If there is vaginal bleeding with intermittent or constant abdominal pain, suspect Abruptio placentae & manage accordingly.
- If there are no signs of infection, assess & confirm period of gestation.
- **If pregnancy is < 24 weeks** gestation then no role of conservative management & pregnancy is to be terminated. Refer to centre with gynaecologist for termination.
- **If pregnancy > 24 weeksbut< 34 weeks** woman may be managed conservatively under strict supervision & monitoring in

hospital for signs of development of chorio-amnionitis.

- Ideally, she should be referred to a facility where NICU/ SNCU facility is available to provide care to a premature newborn & manage other complications.
- Start prophylactic antibiotics to reduce maternal & neonatal infective morbidity & delay delivery.
  - IV ampicillin [2 g every 6 hours] and erythromycin succinate [250 mg IV every 6 hours] for 48 hours followed by oral amoxicillin [250 mg every 8 hours] and oral erythromycin base [333 mg every 8 hours] or erythromycin succinate 250mg per oral every 8 hours continued for 7 days.
  - Do not give the amoxicillin clavulanic acid combination as it increases chances of necrotizing enterocolitis in the newborn.
- Give corticosteroids for fetal lung maturity.
  - Inj. Dexamethasone 6 mg IM 4 doses 12 hrs. apart (preferred) OR
  - Inj. Betamethasone- In India, Betamethasone acetate + phosphate salt which requires only two doses, is not available. The available salt in India is Betamethasone phosphate which is short acting and requires more frequent administration as compared to dexamethasone. Hence, its dosage schedule is same as dexamethasone.
- In cases presenting between 24 to 33 weeks it is recommended to give 4g magnesium sulphate 20% solution slow intravenous over 20 min to decrease chances of cerebral palsy in the offspring.
- In case patient is being shifted to a higher center, ensure she is stable & Referral form is duly filled with details & time of treatment given.
- If patient is not being shifted, manage in hospital conservatively with:
  - Modified bed rest.
  - Antibiotics.
  - Corticosteroids for fetal lung maturity.
  - Magnesium sulphate for neuroprotection.
  - Serial evaluation for symptoms & signs of chorio-amnionitis, labour& placental abruption.
  - Fetal growth & well-being should also be serially assessed.
- Pregnancy should be terminated -
  - If the patient goes intolabour,
  - Signs & symptoms of chorio-amnionitis appear,
  - placental abruption ensues,
  - fetal distress occurs or
  - pregnancy >34 weeks,
  - Grossly congenitally malformed baby.
  - IUD.
- **If pregnancy ≥ 34 weeks** start prophylactic antibiotics as for PROM & deliver following induction of labour. Steroid coverage maybe given at 34 to 37 weeks.

Antibiotics in PROM/PPROM

PROM-

- Inj Ampicillin 2g IV stat & 6hourly till delivery.

PPROM-

- Inj ampicillin [2 g every 6 hours] IVand.
- Inj erythromycin succinate [250 mg every 6 hours] IV for 48 hours followed by oral amoxicillin [250 mg every 8 hours] and erythromycin base [333 mg every 8 hours] continued for 7 days

- **If there are signs of infection, always suspect chorio-amnionitis. Patient should be delivered irrespective of gestational age**

Symptoms & Signs of Chorio-amnionitis

- Maternal:
  - Fever
  - Lower abdominal pain
  - Foul smelling vaginal discharge
  - Tachycardia
  - Uterine tenderness
  - Hot vagina
  - Leucocytosis
- Fetal: Tachycardia

In case of chorioamnionitis start following antibiotics

- Inj. Ampicillin 2 g IV 6 hrly PLUS.
- Inj. Gentamycin 5 mg/kg IV every 24 hrs PLUS.
- Inj. Metronidazole 500 mg IV 8 hrly.

Plan for Delivery in PROM/PPROM

- If patient is in labour, assess the cervix.
  - If cervix is favourable (soft, thin and partly dilated), this could signify the beginning of labour. Induce labour& deliver the woman under antibiotic cover. If there are no signs of infection after delivery, discontinue antibiotics.
  - If cervix is unfavourable, induce or perform LSCS as indicated.
- If patient not in labor (no palpable uterine contraction or blood-stained discharge) she may ideally be referred to a centre with NICU/ SNCU facility after administering first dose of antibiotics for induction & delivery. If she cannot be transferred, induce & deliver.

- **DO NOT use corticosteroids in the presence of frank infection**
- **DO NOT give Tocolytics in PPROM**

J. FETAL DISTRESS

Key Learning Points:

- Normal FHR is between 110 & 160 beats/ min.
- Foetal bradycardia, tachycardia & late deceleration indicates foetal distress.
- Meconium-stained liquor without FHR abnormalities does not indicatefoetal distress.
- Left lateral position of patient, Ringer Lactate or normal saline infusion & oxygen through mask is used to manage FHR abnormalities.
- If FHR abnormalities persist or there are additional signs of distress (thick meconium stained liquor), plan delivery

Fetal distress is a manifestation of fetal hypoxia. If prolonged, it can lead to serious fetal damage including fetal death. Fetal distress is an ill-defined term used to express intrauterine fetal jeopardy; hence the term non reassuring fetal status is being used.

Definition: Non-reassuring foetal status is characterized by tachycardia (?160 beats/min) and bradycardia (<110beats/min) reduced FHR variability accelerations and absence of acceleration spontaneous or elicited.

Table: Etiology of non-reassuring foetal status

ACUTE	CHRONIC
DURING PREGNACY (LESS COMMON)	Chronic placental insufficiency
Placental separation in placenta previa or abruption placenta	IUGR
Following external cephalic version due to cord entanglement	
During oxytocin induction	
Diabetes	
Hypertension	
DURING LABOR (COMMON)	
Uterine hyperstimulation following oxytocin for augmentation of labor	
Placental abruption	
Uterine rupture or scar dehiscence	
Cord prolapsed	
Injudicious administration of oxytocin, analgesic and anesthetic agents	
Maternal hypotension- as in epidural analgesia	

Table : Causes of Foetal tachycardia and bradycardia

Foetal Tachycardia (FHS>160bpm)	Foetal Bradycardia (FHS<110bpm)
Drugs given to mother (isosuxprine, ritodrine, atropine).	Fetal acidosis.
Infection: both maternal &foetal.	Fetal sepsis, anomalies.
Anemia: both maternal and foetal.	Use of local anaesthetic drugs, epidural analgesia.
	Drugs to mother (pethidine, antihypertensives-methyldopa, propranolol, Magnesium sulfate).
	Foetal heart conduction defect (SLE).

Diagnosis of fetal distress

During labour, fetal distress can be diagnosed by

- Abnormal FHR with or without thick meconium-stained amniotic fluid

Abnormal FHR

- A normal FHR is between 110 and 160 beats/minute.
- A slow FHR <110 beats/min (foetalbradycardia) if present persistently in the absence of contractions is indicative of foetal distress.
- A normal FHR may slow down during a contraction but usually recovers to normal as soon as the uterus relaxes. If the abnormal FHR persists for a long time during a contraction (late deceleration) or persists beyond 3 contractions it indicates foetal distress.
- A rapid FHR >160 beats/minute (foetal tachycardia) may be a response to maternal tachycardia. This may be due to maternal fever, intake of drugs such as terbutaline, ritodrine, etc., hypertension or amnionitis& should be managed appropriately. In the absence of maternal tachycardia, a rapid FHR should be taken as a sign of foetal distress.
- Irregular foetal heart rate

Meconium staining of the amniotic fluid

- Meconium staining of the amniotic fluid is seen frequently as the foetus matures and therefore by itself does not indicate foetal distress. A slight degree of meconium staining without heart rate abnormalities is anearly warning sign& indicates the need for vigilance.
- Thick meconium staining along with FHR abnormalities suggests foetal distress.
- Thick meconium suggests the passage of meconium in a decreased volume of amniotic fluid, and may indicate the need for an expedited delivery and cleaning of neonatal upper airway at birth to prevent meconium aspiration.
- In a breech presentation, meconium is passed during labour due to compression of the fetal abdomen. This is not a sign of fetal distress unless it occurs in early labour.

Management of fetal distress

General management

This is aimed at improving the placental perfusion and foetal oxygenation.

- Prop up the woman or place her on her left side (left lateral position) to relieve aortocaval compression by improving the cardiac output and placental perfusion.
- Stop Oxytocin if it is being administered.
- Give oxygen @ 4-6 L/min through a mask or cannula.
- Rapidly infuse about 1 L of Ringer Lactate or normal saline to expand the intravascular volume provided there are no contraindications for such an infusion.

Specific management

- If a maternal cause for FHR abnormality is identified (maternal fever, drugs) initiate appropriate management.
- If no maternal cause is identified for abnormal FHR & it remains abnormal for atleast three contractions, perform a vaginal examination to check for any explanatory signs of distress and manage accordingly.
    - If there is vaginal bleeding with intermittent or constant abdominal pain,

suspect abruptio placentae and manage accordingly.

- If there are signs of infection (fever, foul-smelling vaginal discharge) suspect amnionitis, start the woman on antibiotics (Ampicillin, Gentamicin and Metronidazole) and expedite delivery.
- If the cord is prolapsed below the presenting part, or in the vagina, manage appropriately.

- If FHR abnormalities persist or there are additional signs of distress (thick, meconium-stained fluid) plan for delivery.
  - If the cervix is fully dilated and the foetal head is low down, expedite delivery by ventouseextractionor forceps application.
  - If the cervix is not fully dilated or delivery is not imminent (the foetal head is high) perform LSCS.

K. PROLAPSED CORD

KEY LEARNING POINTS:

- Prolapsed cord is an obstetric emergency.
- Failure of immediate diagnosis & management can lead to foetal death.
- If cord is pulsating &the baby is alive, deliver immediately.
- In first stage of labor, relieve cord compression by pushing presenting part up or distending the bladder; perform urgent LSCS.
- In second stage of labor expedite delivery by forceps or ventouse.
- Make arrangements for neonatal resuscitation.

Definition

A prolapsed cord is a condition in which the umbilical cord lies in the birth canal below the presenting part, with the foetal membranes ruptured. The same condition, but with the membranes intact, is known as a cord presentation. The cord may be visible at the introitus or lying outside it. The immediate complication of cord prolapse is cord compression which can lead to foetal distress, and which can further lead to foetal death if immediate intervention is not carried out. Cord prolapse is usually a result of improper fit of the presenting part over the pelvic brim, which is often due to foetopelvic disproportion or foetalmal presentation.

Cord presentation or prolapse should be excluded at every vaginal examination inlabour and after spontaneous rupture of membranes if risk factors are present.

Risk Factors:

1. Malpresentation: breech, transverse lie.
2. Contracted Pelvis.
3. Prematurity.
4. Twins.
5. Hydramnios.
6. Iatrogenic: Low rupture of membranes, manual rotation of head.

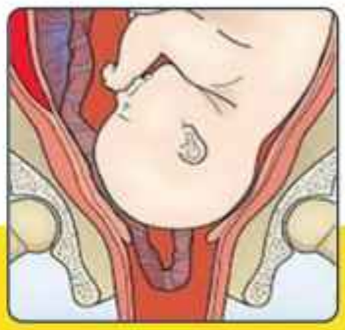
Types of cord prolapse

OCCULT PROLAPSE

- Descent of the umbilical cord alongside the presenting fetal part, but has not advanced past the presenting fetal part.
- Can occur with both intact or ruptured membranes.

CORD PRESENTATION

- The cord has not passed the opening of the cervix.
- The membranes are not yet ruptured.



CORD PROLAPSE

- Descent of the umbilical cord past the presenting fetal part.
- Rupture of membranes has occured.

Prevention of cord prolapse

Upward pressure on the presenting part should be kept to a minimum in women during vaginal examination and other obstetric interventions in the context of ruptured membranes because of the risk of upward displacement of the presenting part and cord prolapse.

Management

General measures

Call for help.

Give the woman oxygen through a mask to improve foetal oxygenation.

Specific measures

Scenario 1: No pulsations can be felt in the umbilical cord

If the cord is not pulsating, the foetus is dead. Deliver in a manner that is safest for the woman. Allow labour to progress normally if there are no contraindications for a vaginal delivery.

Scenario 2: The cord is pulsating, and cord prolapse occurs during the second stage of labour with the cervix fully dilated

If the cord is pulsating and the cervix is fully dilated, it means that the foetus is alive and has a reasonable chance of surviving after delivery.

Expedite the delivery with an episiotomy and Ventouse extraction or outlet forceps application.

Be prepared to resuscitate the newborn. If < 24 weeks of gestation, immediately make arrangements to refer the baby for NICU care.

Scenario 3: The cord is pulsating, and cord

prolapse occurs during the first stage of labour with the cervix not yet fully dilated.

If the mother is in the first stage of labour

1. Ask the mother to adopt the knee-elbow position: to turn over to face the bed and crouch on all fours raising her buttocks in the air above her shoulders. The mother can stay in this position during transfer if option 3 below is not available.

2. Manually keep the presenting part out of the pelvis:

   Wear sterile gloves, insert a hand into the vagina and push the presenting part up to decrease pressure on the cord and dislodge the presenting part from the pelvis.

   Place the other hand on the abdomen on the suprapubic area and keep the presenting part out of the pelvis.

   Once the presenting part is firmly held above the pelvic brim (if this is possible), remove the other hand from the vagina. Keep the hand on the abdomen until the time that the caesarean section is performed. Try and replace the cord into the vagina if visible outside.

   It is usually only possible to maintain this position for a short time only, such as when preparing the mother on the operating table prior to caesarean section or while inserting a catheter.

3. Fill the bladder:

   Insert a Foley catheter (with balloon) and drain the urine, then fill the bladder through the catheter with 500ml normal saline then blow up the balloon and clamp the catheter.

   Attach the catheter bag as normal but keep the catheter clamped, with fluid in catheter balloon until the baby is delivered. Catheter clamp will be removed during c-section.

   If the mother is in the second stage of labour.

   Expedite the delivery with an episiotomy and ventouse extraction or outlet forceps application.

   Be prepared to resuscitate the newborn

How to avoid cord prolapse

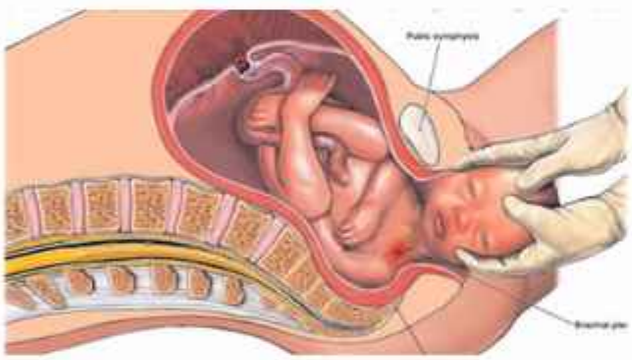
- Elective admission to hospital after 37+0 weeks of gestation in case of transverse, oblique or unstable lie and women should be advised to present urgently if there are signs of labour or suspicion of membrane rupture.
- Women with non-cephalic presentations and preterm prelabour rupture of membranes should be recommended inpatient care.
- Artificial membrane rupture should be avoided whenever possible if the presenting part is mobile and/or high.
- If it becomes necessary to rupture the membranes with a high presenting part, this should be performed with arrangements in place for immediate Caesarean section.
- Upward pressure on the presenting part should be kept to a minimum in women during vaginal examination and other obstetric interventions in the context of ruptured membranes because of the risk of upward displacement of the presenting part and cord prolapse.

L. SHOULDER DYSTOCIA

KEY LEARNING POINTS

- To be able to anticipate & identify cases at high risk of shoulder dystocia.
- To be able to diagnose shoulder dystocia.
- To be able to manage shoulder dystocia.

Shoulder dystocia is a condition where the shoulders fail to deliver following delivery of fetal head. It is an emergency as mismanagement results in high perinatal mortality.



It is more common in diabetic mothers with macrosomic fetus but may occur even in low-risk cases.

Fetal complications include brachial plexus injury & iatrogenic clavicular fracture. Fetal death ensues in neglected cases.

Maternal morbidity is increased particularly in PPH & 3rd& 4th degree perineal tears.

Risk Factors:

Previous h/o shoulder dystocia	Post maturity
Diabetes	Multiparity
Obesity (BMI>30kg/m2)	Anencephaly
Induced Labour	Mid-pelvic instrumental delivery (more following ventouse)
Prolonged first stage or second stage of labour	Foetal ascites
Secondary arrest of labour	Macrosomia (>4.5Kg)

Complications:

Maternal	Foetal
PPH	Asphyxia
Cervical laceration	Brachial plexuses injury leading to erb's / Klumpke's palsy
Vaginal tear	Humerus fracture
Perineal tear	Clavicle or sternomatoid hematoma during delivery
Rupture uterus, bladder	
Sacroiliac joint dislocation	

Prevention, anticipation & early identification of high risk:

Shoulder dystocia is difficult to predict or prevent. Yet, Prolonged first or second stage of labour, secondary arrest of labour and difficult mid pelvic instrumental delivery are important signs to look for and predict shoulder dystocia.

Management:

- Anticipate& be prepared in high-risk cases.

- **Diagnosis of shoulder dystocia-**
- Lapse of more than 60 seconds between delivery of the fetal head and delivery of the body.
- Gentle downward traction has failed to affect the delivery of the shoulders.
- Difficulty with delivery of the face and chin.
- Head either tightly applied to the vulva or retracting, "turtle sign.
- Restitution of the fetal head, and failure of the shoulders to descend.

- Call for Help-
- Employ Team Approach-Assistant, Senior Obstetrician, Anesthetist, Paediatrician.

- Note Time of delivery of Head,

- Ask the woman to stop pushing.

- Ensure Empty Bladder.

- Do Episiotomy.

- McRoberts' maneuver (hyperflex& slightly abduct thighs) along with Suprapubic pressure (given from back of fetus pushing shoulder backwards & laterally).
- Usually shoulders deliver but if they don't deliver by above technique following maybe tried.

- Woods Cockscrew Method- Put hand in vagina& try to push posterior shoulder to oblique diameter from AP diameter. **Do NOT use the head to rotate shoulder.**
- Try to Deliver Posterior arm of the baby by putting your hand in vagina & going upto cubital fossa or hand & try to bring down the posterior hand.
- Anterior shoulder should deliver easily after delivery of posterior shoulder.

- Gaskin maneuver, the patient is moved onto her hands and knees and delivery of posterior shoulder tried again

- If baby is dead, do cleidotomy by cutting clavicle of fetus with stout scissors & deliver.

- **Post-delivery Tasks**
- Perform AMTSL.
- Be alert for PPH.
- Assess for any cervical/ vaginal tear.

- Assessment of fetal well-being by paediatrician.
- Counseling of the patient and family must be done.
- Events of the delivery must be documented by all care-team members.

Mnemonic for remembering steps in management of shoulder dystocia.

REMEMBER ALARM

A - Ask for help

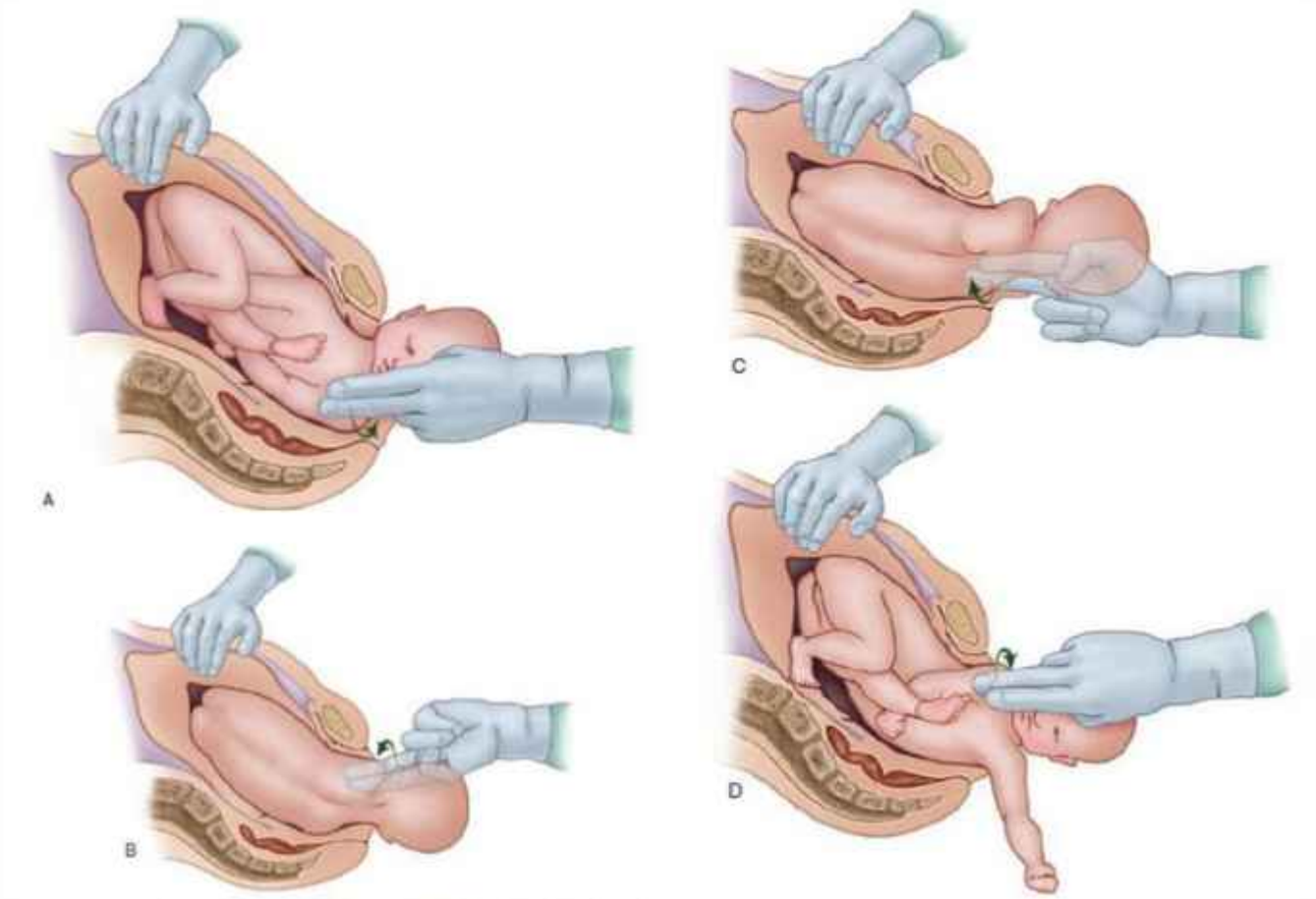
L - Lift - the buttocks
- the Legs) Mc Rober's manoeuver

A - Anterior disimpaction of shoulder
-Rotate to oblique
- suprapubic pressure

R - Rotation of the posterior shoulder
- Woods' manoeuver

M - Manual removal of posterior arm
Move patient to ALL four position

WOOD SCREW MANEUVER



McROBERTS MANEUVER

GASKIN MANEUVER: the patient is moved onto her hands and knees and delivery of posterior shoulder should be tried again.

o If baby is dead, do cleidotomy by cutting clavicle of foetus with stout scissors &deliver.

ZAVANELLI MANEUVER: pushing the foetus back to the uterus and delivering by caesarean section.

All manoeuvres must be clearly documented.

Post-delivery Tasks

- ✓ Perform AMTSL.
- ✓ Be alert for PPH.
- ✓ Assess for any cervical/ vaginal tear.
- ✓ Assessment of foetal well-being by paediatrician.
- ✓ Counselling of the patient and family must be done.
- ✓ Events of the delivery must be documented by all care-team members.

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