

# OBSTETRICS MANAGEMENT PROTOCOL FOR HOSPITALS



**ጤና ሚኒስቴር - ኢትዮጵያ**  
**MINISTRY OF HEALTH-ETHIOPIA**

**የዜጎች ጤና ለሃገር ብልፅግና!**  
**HEALTHIER CITIZENS FOR PROSPEROUS NATION!**

MAY 2021



## FOREWORD

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Ethiopia has made a significant achievement in the last two decades to reduce maternal and neonatal mortality. However, reduction in preventable mortality is still a challenge. A number of factors contributed to high maternal and neonatal mortality. In addition to a diverse range of individual and household problems, health system challenges like poor infrastructure and supply, shortage of skilled manpower, weak referral system and poor quality of care, lack of standard guidelines and protocols along the continuum of care are the most important factors.

High impact interventions like preconception care, family planning service, access and quality emergency obstetric and newborn care services, skilled care during child birth and delivery, skilled postnatal care and comprehensive abortion care service will significantly reduce maternal and newborn mortality and morbidity which will help achieve the sustainable development goal.

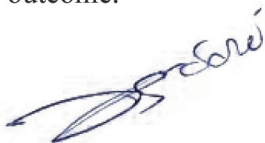
Even among those who received skilled care at continuum of care, adverse obstetric outcomes remain higher than expected in most low-income countries. This might be due to poor access to timely and appropriate obstetric care within health facilities. Sometimes there is potential for important steps of management to be missed in emergency obstetric and newborn situations, even in the presence of many health care team members.

Cognizant with this, Ministry of Health-Ethiopia, revised the 2010 hospital protocol by organizing three series of workshops involving experts in the field from universities, partners and Ministry of Health staff. Relevant evidence based up to date global and national guidelines and recommendations were used in the protocol revision considering the national policy and plan, strategy, standards, potential implementation capacity and challenges on maternal and newborn health care.

Having evidence based revised version of this obstetric protocol at each level of hospitals will help to ensure standardized care and practice, continuity of care and promotes positive health outcomes. In addition, this obstetric protocol uses systematic approach to manage specific obstetric and newborn conditions which helps to avoid serious mistakes and variation in treatment. It also helps to order correct investigations and to institute optimal treatment. The protocol is designed for use by health professionals involved in maternal and newborn health care at all levels of the hospitals (primary, general and tertiary), for pre-service health education, private and non-government organization hospitals and maternity centers.

This protocol touches on the management of obstetric problems encountered during clinical practice. As evidences are subject to change with time, health professionals can use their experience and judgment if there is the need or if there are new recommendations which are not included in this protocol.

This protocol will contribute significantly in improving quality of care and patient safety for every woman and every newborn and is critical to implement it as soon as possible in order to accelerate reductions in maternal and new born mortality and morbidity. Hence, this is to underscore that the ministry of health will put all its effort for the realization of all recommendations included in this protocol to ensure a positive pregnancy and child birth outcome.



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We appreciate members of universities, partners and professional associations for giving their feedback during the revision.



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## ACRONYMS

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Act D	Actinomycin D	DW	Dextrose in Water
AIDS	Acquired Immuno deficiency Syndrome	ECV	External Cephalic Version
ALAT	Alanine Amino Transferase	EDD	Expected date of Delivery
AMTSL	Active Management of Third Stage of Labor	ERCS	Elective Repeat Caesarean Section
ANC	Antenatal care	FA	Folic Acid
APH	Antepartum Hemorrhage	FBS	Fasting Blood Sugar
ARM	Artificial Rupture of Membranes	FDP	Fibrin Degradation Product
ARV	Anti Retrovirals	FFP	Fresh Frozen Plasma
ASAT	Aspartate Amino Transferase	FGC	Female Genital Cutting
AZT	Azathioprine	FHR	Fetal Heart Rate
BCG	Bacille Calmette Guerin	FP	Family planning
BMI	Body Mass Index	FPD	Feto Pelvic Disproportion
BP	Blood Pressure	GA	Gestational Age
BPD	Biparietal Diameter	GDM	Gestational Diabetes Mellitus
BPM	Beats Per Minute	GS	Gestational Sac
BPP	Biophysical Profile	GTD	Gestational trophoblastic disease
CBC	Complete Blood Count	HAART	Highly Active Anti Retroviral Treatment
CCT	Controlled Cord Traction	HBsAG	Hepatitis B Surface Antigen
CIN	Cervical Intraepithelial Neoplasia	hCG	Human Chorionic Gonadotrophin
CNS	Central Nervous System	Hct	Hematocrit
COC	Combined Oral Contraceptive	HEENT	Head, Eye, Ear, Nose and Throat
CPD	Cephalo Pelvic Disproportion	HEP	Hepatitis Vaccine
CS	Cesarean Section	HG	Hyperemesis Gravidarum
CST	Contraction Stress Test	HIV	Human Immunodeficiency Virus
CTG	Cardio Tocography	HPV	Human Papiloma Virus
CVA	Cerebro-Vascular Accident	HTPs	Harmful Traditional Practices
CVP	Central Venous Pressure	ICU	Intensive Care Unit
D & C	Dilatation and Curettage	IFG	Impaired Fasting Glucose
DM	Diabetes Mellitus	IGT	Impaired Glucose Tolerance
DPT	Diphtheria, Pertusis, Tetanus	IM	Intramuscular
DT	Diphtheria, Tetanus	ITN	Insecticide Treated Net
DS	Dextrose in Saline	IU	International Unit
DTR	Deep Tendon Reflex	IUD	Intrauterine device
DVT	Deep Venous Thrombosis		

IUFD	Intrauterine Fetal Death	PMTCT	Prevention of mother to child transmission
IUGR	Intrauterine Growth Restriction	PO	Per Oral
IUP	Intrauterine pregnancy	PPFP	Postpartum family planning
IV	Intravenous	PPH	Postpartum Hemorrhage
JVP	Jugular Venous Pressure	PROM	Premature Rupture of Membranes
LAM	Lactational Amenorrhea Method	PSTT	Placental Site Trophoblastic Tumors
LBW	Low Birth Weight	PT	Prothrombine Time
LDH	Lactate Dehydrogenase	PTT	Partial Thromboplastine Time
LFT	Liver Function Test	RFT	Renal Function Test
LGA	Large for Gestational Age	Rh	Rehsus
LMP/LNMP	Last normal menstrual period	RMC	Respectful Maternity Care
LOA	Left Occipito Anterior	ROA	Right Occipito Anterior
MA	Mento Anterior	ROM	Rupture of Membranes
MEC	Medical Eligibility Criteria	RPR	Rapid Plasma reagin
MRN	Medical Record Number	RR	Respiratory Rate
MTCT	Mother To Child Transmission	RUQ	Right Upper Quadrant
MTX	Methotrxate	SFH	Symphysis Fundal Height
MVA	Manual Vacuum Aspiration	SGA	Small for Gestational Age
mU	milli Units	SIL	Squamous Intraepithelial Lesion
NaCL	Sodium Chloride	SoB	Shortness of Breath
NGT	Naso Gastric Tube	SST	Saline Suspension Test
NPO	Nothing Per Os	STDs	Sexually Transmitted Diseases
NRFHR	Non reassuring Fetal Heart Rate	STI	Sexually Transmitted Infection
NST	Non Stress Test	TAT	Tetanus Anti Toxin
NVP	Niverapine	TB	Tuberculosis
OA	Occipito Anterior	TT	Tetanus Toxoid
OGTT	Oral Glucose Tolerance Test	TTTS	Twin to Twin Transfusion Syndrome
OIs	Opportunistic Infections	US	Ultrasound
OL	Obstructed Labor	UTI	Urinary Tract Infection
OP	Occipito Posterior	VDRL	Venereal Disease Research Laboratory
OPD	Out Patient Department	WBC	White Blood Cell
OPV	Oral Polio Vaccine	WHO	World Health Organization
PCP	Pneumocystis Carinii	ZDV	Zidovudine
PCWP	Pulmonary Capillary Wedge Pressure		
PID	Pelvic Inflammatory Disease		
PIH	Pregnancy Induced Hypertension		



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## RESPECTFUL MATERNITY CARE

### INTRODUCTION

Respectful Maternity Care (RMC) refers to care organized for and provided to all women in a manner that maintains their dignity, privacy and confidentiality, ensures freedom from harm and mistreatment, and enables informed choice and continuous support during pregnancy, labour and childbirth, and postnatal period.

RMC is an attitude that permeates each word, action, thought, and non-verbal communication involved in the care of women during pregnancy, childbirth, and the postnatal period. Provision of RMC is in accordance with a human rights-based approach to reduce maternal and neonatal mortality and morbidity. See [table 1](#) below for categories of disrespect and abuse with corresponding rights.

**Table 1.** *Categories of disrespect and abuse with corresponding rights.*

Category of disrespectful and abusive care	Example	Corresponding rights
Physical abuse	<ul style="list-style-type: none"> <li>Slapping, pinching, pushing, beating</li> </ul>	<ul style="list-style-type: none"> <li>Freedom from harm and ill treatment</li> </ul>
Non-consented care	<ul style="list-style-type: none"> <li>Doing procedure and/or providing medication without verbal or oral consent</li> </ul>	<ul style="list-style-type: none"> <li>Right to information</li> <li>Informed consent and refusal</li> <li>Respect for choices and preferences, including companionship during maternity care</li> </ul>
Non-confidential care	<ul style="list-style-type: none"> <li>Lack of privacy (laboring in public or disclosure of patient information)</li> </ul>	<ul style="list-style-type: none"> <li>Confidentiality, privacy</li> </ul>
Non-dignified care (including verbal abuse)	<ul style="list-style-type: none"> <li>Intentional humiliation, rough treatment, shouting, blaming, laughing at patient</li> <li>Not introducing self</li> <li>Not calling patient by name</li> </ul>	<ul style="list-style-type: none"> <li>Dignity, respect</li> </ul>

Category of disrespectful and abusive care	Example	Corresponding rights
Discrimination based on specific attributes	<ul style="list-style-type: none"> <li>• Discrimination based on age ethnic, religion and finance</li> </ul>	<ul style="list-style-type: none"> <li>• Equality, freedom from discrimination</li> <li>• Equitable care</li> </ul>
Abandonment or denial of care	<ul style="list-style-type: none"> <li>• Women left alone during labor and birth</li> <li>• Failure to provide monitoring and interven when needed</li> </ul>	<ul style="list-style-type: none"> <li>• Right to timely health care</li> <li>• Right to the highest attainable level of health</li> </ul>
Detention in facilities	<ul style="list-style-type: none"> <li>• Detention of patient/family in health facility after delivery usually due to failure to pay</li> </ul>	<ul style="list-style-type: none"> <li>• Liberty</li> <li>• Autonomy</li> <li>• Self-determination</li> <li>• Freedom from coercion</li> </ul>

## POTENTIAL CONTRIBUTORS TO DISRESPECT AND ABUSE

- Service delivery related:-
  - Lack of standards, leadership and supervision.
  - Lack of accountability mechanisms at health facility.
  - Lack of appropriate drugs, supply and equipment.
- Provider related:-
  - Discriminatory behaviour against certain sub-groups of women based on ethnicity, age, infectious disease status (e.g. HIV), financial and educational status of woman.
  - Provider demotivation related to weak health systems (shortages of human resources & professional development opportunities).
  - Provider status (e.g. behavioral, physical and emotional status).

## PRINCIPLES OF RESPECTFUL CARE:

Respectful care has the following seven core principles:-

1. Identify factors affecting individual's dignity.
2. Recognize diversity and the uniqueness of individual.
3. Communicating with individuals in ways that are meaningful to them.
4. Identify and challenge care that may reduce the respect of the individual.
5. Uphold the responsibility to shape care and support services around each individual (understand the implications of the individual's mental capacity, knowledge and

experience, client's involvement and level of participation in care planning and treatment).

6. Recognize that an individual's surroundings and environments are important to their sense of respect (welcoming atmosphere, respect for personal space and privacy).
7. Value work place cultures that actively promote respect for everybody (a positive enabling environment for health care providers to provide respectful maternity care).

## **PROVIDING RESPECTFUL MATERNITY CARE**

It should be emphasized that provision of respectful maternity care involves holistic approach (policy makers, hospital leaders/ managers, health care providers and community).

## **PROVIDER CONSIDERATIONS**

### **Maintain privacy**

- During provision of all maternal health care services, use curtains, doors, screens and separate rooms to maintain environmental privacy and confidentiality.
- Ensure bodily privacy by covering body and minimizing time exposed during undressing and clothing.

### **Maintain confidentiality**

All identifiable information about a patient's health status, medical condition, diagnosis, prognosis and treatment and all other information of a client must be kept confidential.

### **Have an informed consent**

Provide complete information for the woman (or her family) about the purpose, benefits, risks and other alternatives before she receives the care intended. A woman (or her family) has a right to decline any treatment or procedure offered.

### **Have effective communication**

- Speak in a calm quiet manner and assure the woman that the conversation is confidential.
- Be sensitive to any cultural or religious considerations and respect her views.
- Ask the woman whom she would like to be present. Facilitate the presence of only those she chooses to be present.
- Encourage the woman and her family to speak honestly and completely about her condition.
- Listen to what the woman and her family have to say and encourage them to express their concerns; try not to interrupt.
- Let the woman know that she is being listened to and understood.
- Use supportive nonverbal communication such as nodding and smiling.
- Answer the woman's questions directly in a calm and reassuring manner.

- If a woman must undergo a surgical procedure, explain to her the nature of the procedure and its risks and help to reduce her anxiety.
- Ask the woman to repeat back to you the key points to ensure her understanding.

### **Provide supportive care:**

- A woman should be made to feel as comfortable as possible when receiving care.
- Respect the woman's choices and preferences including birthing position options, companionship during maternity care, procedures and treatment.
- Emotional and psychological support for patients (or family members) with poor obstetric outcome (e.g. still birth, hysterectomy, etc).
- Facilitate on site clinical mentorship.
- Provide adequate pain management.

## **ORGANIZATIONAL CONSIDERATIONS**

### **Staffing**

- There should be adequate numbers of competent and trained staff with appropriate skills mix (health work force), working in multidisciplinary teams that are able to provide respectful and continuous care to all women.
- There should be regular practice-based training on RMC provision to enable effective delivery of RMC services that meet the social, cultural and linguistic needs of women and orientation of new staff.

### **Supply:**

- Provisions for staff in labor ward e.g. refreshments (snacks, drinks).
- Health education materials in written or pictorial format, accessible and available in the languages of the communities served by the health care facility.
- A standard informed consent form.
- Information (written or pictorial such as leaflets) for the woman and her companion.
- Essential medicines for maternal and new-born health care that is available in sufficient quantities at all times.

### **Equipment:**

Basic and adequate equipment for maternal and new-born health care that is available in sufficient quantities at all times in the health facility.

### **Infrastructure:**

The facility should ensure the presence of enhanced physical environment including:-

- Rooming-in to allow women and their babies to remain together.

- Clean, appropriately illuminated and well ventilated maternity service area that maintains privacy, and are adequately equipped and maintained.
- Continuous energy supply in the labor, childbirth and neonatal areas.
- Clean and accessible bathrooms for use by pregnant women, laboring and postnatal mothers.
- Safe drinking water and a hand hygiene station with soap or alcohol-based hand rubs.
- Curtains, screens, partitions and sufficient bed capacity.
- Facilities for labor companions, including physical private space for the woman and her companion.
- On-site pharmacy (labor ward) and a medicine and supplies stock management system that is managed by a trained pharmacist or dispenser.

#### **Supervision and monitoring:**

- Regular supportive supervision by labor ward / facility leaders.
- Staff meetings to review RMC practices.
- Easily accessible mechanism (e.g. a suggestion box) for service users and providers to submit complaints to management.
- Establishment of accountability mechanisms to prevent mistreatment or violations.
- Establishment of informed consent procedures.

#### **Strengthening referral linkage:**

Good-quality supervision, communication and transport links between facilities needs to be established to ensure that referral pathways are efficient.



## RAPID INITIAL ASSESSMENT AND EMERGENCY MANAGEMENT

### DEFINITION:

*Rapid initial assessment and emergency management* means immediate identification and recognition of specific problems for taking quick action to save the life of the patient during arrival to the facility.

All staff at the health facility should perform a Quick Check of a woman who presents with an emergency condition.

### QUICK CHECK

- Observe the woman:
  - Did someone carry her into the health institution? How was she transported?
  - Is there blood on her clothing or on the floor beneath her?
  - Is she grunting, moaning or bearing down?
  - Is she conscious and alert?
- Ask the woman or her companion whether she has or has recently had:
  - Vaginal bleeding
  - Severe headache / blurred vision
  - Convulsion or loss of consciousness
  - Difficulty of breathing
  - Fever
  - Severe abdominal pain
  - Pushing down pain
- If the woman has or recently had ANY of the above danger signs, immediately:-
  - Call for help.
  - Don't panic; focus on the needs of the woman.
  - Do not leave the woman unattended.
  - Ask and check relevant information from referral.
  - Avoid confusion by having one person in charge.

### RAPID INITIAL ASSESSMENT AND MANAGEMENT PRINCIPLES

See [table 2](#) below for principles to be followed for selected danger signs during rapid initial assessment and management.

**Table 2. Rapid initial assessment and management principles for selected danger signs.**

Danger sign	Ask and check	Perform	Consider
Breathing difficulty	<ul style="list-style-type: none"> <li>• Cyanosis (blueness)</li> <li>• Skin: pallor</li> <li>• V/S</li> <li>• Oxygen saturation</li> <li>• Signs of respiratory distress</li> <li>• Lungs: wheezing or rales</li> </ul>	<ul style="list-style-type: none"> <li>• Prop up the woman on her left side</li> <li>• Maintain airway</li> <li>• Give oxygen at 4–6 L/min. by mask or nasal cannulae</li> <li>• Investigations to determine the cause and initiate specific management</li> </ul>	<ul style="list-style-type: none"> <li>• Severe anemia</li> <li>• Heart failure</li> <li>• Pneumonia</li> <li>• Pulmonary edema</li> <li>• Asthma</li> </ul>
Convulsion or loss of consciousness	<ul style="list-style-type: none"> <li>• Airway patency</li> <li>• V/S- focus on BP, temp</li> <li>• If pregnant, length of gestation</li> <li>• Neck stiffness</li> </ul>	<p><b><i>If the woman is unconscious:</i></b></p> <ul style="list-style-type: none"> <li>• Position her on her left side</li> </ul> <p><b><i>If the woman is convulsing:</i></b></p> <ul style="list-style-type: none"> <li>• Position her on her left side</li> <li>• Never leave the woman unattended</li> <li>• Protect her from injuries (e.g. fall from bed)</li> <li>• If the cause of convulsion has not been determined, manage as eclampsia and continue to investigate other causes.</li> </ul>	<ul style="list-style-type: none"> <li>• Eclampsia</li> <li>• Hypoglycemia</li> <li>• malaria</li> <li>• Epilepsy</li> <li>• Tetanus ...</li> </ul>
High grade fever	<ul style="list-style-type: none"> <li>• Weakness, lethargy</li> <li>• Frequent, painful urination</li> <li>• V/S</li> <li>• Consciousness</li> <li>• Neck stiffness</li> <li>• Lungs: shallow breathing,</li> </ul>	<ul style="list-style-type: none"> <li>• Increased fluid intake by mouth/IV</li> <li>• Use a fan or tepid sponge, and if necessary, open a window to help decrease temperature</li> <li>• Antipyretics - paracetamol 500–1000 mg every six to eight</li> </ul>	<ul style="list-style-type: none"> <li>• UTI</li> <li>• Malaria</li> <li>• Endometritis</li> <li>• Pelvic abscess</li> <li>• Peritonitis</li> <li>• Breast infection</li> <li>• Complications of abortion</li> <li>• Pneumonia</li> </ul>

Danger sign		Ask and check	Perform	Consider
		<ul style="list-style-type: none"> <li>consolidation</li> <li>• Abdomen: tenderness</li> <li>• Vulva: purulent discharge</li> <li>• Breasts: tender</li> </ul>	<ul style="list-style-type: none"> <li>hours, diclofenac 75mg IM if unconscious</li> <li>• Determine the exact cause and start specific management</li> </ul>	
Abdominal pain		<ul style="list-style-type: none"> <li>• If pregnant, gestational age</li> <li>• V/S</li> <li>• Abdominal wall movement with respiration</li> <li>• Abdominal tenderness</li> <li>• Peritoneal fluid collection,</li> <li>• Uterine size and tenderness,</li> <li>• Cervical motion tenderness</li> </ul>	<ul style="list-style-type: none"> <li>• Determine the specific cause</li> <li>• Initiate targeted management</li> </ul>	<ul style="list-style-type: none"> <li>• Ovarian cyst torsion/rupture</li> <li>• Appendicitis</li> <li>• Ectopic pregnancy</li> <li>• Possible term or preterm labor</li> <li>• Amnionitis</li> <li>• Abruptio placentae</li> <li>• Ruptured uterus</li> </ul>
Vaginal bleeding	Early pregnancy	<ul style="list-style-type: none"> <li>• Gestational age, pain, passage of vesicles</li> <li>• V/S, uterine size, abdominal tenderness</li> </ul>	<ul style="list-style-type: none"> <li>• Call for help,</li> <li>• Monitor vital signs.</li> <li>• Turn the woman onto her side to minimize the risk of aspiration</li> <li>• Keep the woman warm but do not overheat her Elevate the legs if in shock</li> <li>• Start IV infusion (2 lines)</li> <li>• Blood typing and cross match</li> <li>• Determine specific cause and start targeted management</li> </ul>	<ul style="list-style-type: none"> <li>• Abortion</li> <li>• Ectopic or</li> <li>• Molar pregnancy</li> </ul>
	Late pregnancy	<ul style="list-style-type: none"> <li>• Gestational age</li> <li>• Color and amount of bleeding, abdominal pain, fetal kick</li> </ul>		<ul style="list-style-type: none"> <li>• Placenta previa</li> <li>• Abruptio placentae</li> <li>• Ruptured uterus</li> </ul>
	Post-delivery	<ul style="list-style-type: none"> <li>• Duration of delivery</li> <li>• Color and amount of bleeding</li> <li>• Uterine size and consistency</li> <li>• Vulvar</li> </ul>		<ul style="list-style-type: none"> <li>• Ruptured uterus</li> <li>• Uterine atony</li> <li>• Tears of genital tract</li> <li>• Retained placenta or placental fragments</li> </ul>

Danger sign	Ask and check	Perform	Consider
	evaluation		

**NOTE:**

- *The woman also needs prompt attention if she has any of the following signs: gush of fluid per vaginum, pallor, weakness, fainting, severe headache, blurred vision and vomiting.*
- *The woman should be sent to the front of the queue and promptly treated.*

## REFERRAL

- After emergency management, discuss about the need to refer the woman with the patient and her family.
- Quickly organize transport and possible financial aid.
- Inform the referral center through radio or telephone.
- Give the woman a referral slip containing all the necessary identification and clinical information.
- Send with the woman:
  - A health worker trained in child birth care.
  - Essential emergency drugs and supplies.
  - A family member who can support and attend her.
  - If there is a newborn, send a family member who can go with the mother to care for the neonate.
- During journey:
  - Maintain IV infusion.
  - Keep the woman (and newborn, if born) warm but do not overheat.
  - Give appropriate treatment on the way.
  - Keep record of all IV fluids, medications given, time of administration, and woman's condition.

**NOTE:** Most emergencies that occur in a hospital can be prevented by:

- Careful planning
- Following clinical guidelines
- Close monitoring of the woman

***Remark:*** For specific management of each emergency condition refer to appropriate sections in this document and other relevant national protocols.

# 3

## TRIAGE

### DEFINITION:

Obstetric triage is sorting of obstetric patients at the triage unit into priority groups according to their need or level of acuity.

### OBSTETRIC TRIAGE UNIT

It is an assessment area adjacent to labor and delivery ward staffed with competent health care provider/s and functional 24 hrs a day and 7 days a week for any condition that requires further assessment and care. The triage area is the first contact point for patients with the emergency department (ED) / emergency unit (EU) staff and should be situated at the entrance of the ED/EU with easily recognizable signage for patients and the general public.

The emergency-waiting area should be located near to the triage area with easy access and suitable for observation and follow up of patients by the triage nurse. Patients with stable conditions should remain in the waiting area until the physician is ready to evaluate their conditions.

**NOTE:** *In hospitals where there is a central triage pregnant and laboring mothers are not supposed to visit the central triage. They rather are directly seen at the obstetric triage unit.*

### OBJECTIVES:

- To identify emergency or life-threatening problems of the pregnant woman and/or fetus.
- To provide timely emergency or life-saving treatment and prevent further complications.
- To determine further assessment and plan further management.
- To utilize resources efficiently and prevent unnecessary admissions.
- To improve client/patient flow and decrease waiting time.

**NOTE:** *The specific health institution should have clear admission criteria at the triage unit.*

### ACTIVITIES IN THE TRIAGE UNIT:

Women should get care according to their triage acuity level rather than by time of arrival. Emergency patients should access the triage area without hindrance of their financial capacity

and/or other issues. All emergency cases should be seen at the triage unit; and rapid initial assessment and immediate initial management (see chapter on rapid initial assessment and emergency management above) should be provided by competent health care providers. All women presenting for care to the triage unit should be assessed using the triage assessment sheet ([Annex –1](#)) and be registered on the triage log book.

### Main activities:

- Initiate appropriate triage assessment and emergency care.
- Classify acuity level based on the five-level color coded emergency triage system using the triage assessment and acuity scale classification tool shown below ([Annex 2](#)).
- Request very important investigations
- Initiate appropriate interventions based on their level of acuity ([Annex 3](#)).
- Reassess and re-triage as necessary
- Transfer patients according to their level of acuity to labor & delivery or maternity ward, medical side, procedure room, or waiting area.

**NB:** If admission is not possible refer to other health institutions following the standard referral procedures.

## EMERGENCY TRIAGE EQUIPMENT AND SUPPLY REQUIREMENTS

The obstetrics triage should be equipped with the following items as a minimum. Each hospital should conduct its own assessment to determine the quantity of each item and any other necessary items in addition to the following:

- |  |  |
|--|--|
| • Examination coach/stretchers           | • Emergency management flow chart  |
| • Thermometer                            | • Catheter   |
| • Stethoscope                            | • NG-tube  |
| • Adult sphygmomanometer/BP Cuff         | • Delivery set   |
| • Pulse-oximeter                         | • MVA set  |
| • Oxygen and O2 administration face mask | • Light source   |
| • Glucometer                             | • Weight scale- adult / pediatric-hanging, tape measures   |
| • 40% glucose                            | • Screens or partitions  |
| • Tourniquet                             | • Wheelchairs, stretchers  |
| • Ambu-bags (adult & neonatal)           | • Personal protective equipment  |
| • Suction machines and tubes             | • Emergency drugs (oxytocin, ergometrine, hydralazine, adrenalin, hydrocortisone, MgSO <sub>4</sub> , calcium gluconate, etc.) |
| • Air-way                                |  |
| • IV fluids and canula                   |  |
| • Syringes and needles                   | • Triage assessment sheet  |

- Triage Acuity Scale.

## LIAISON

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### DEFINITION

Liaison is a means of good communication on specific case management readiness from sending and receiving referrals with facilitation beyond checking availability of beds.

There is no need for separate liaison office or officer for obstetrics and neonatology departments.

### PROCEDURE

- Referring facility health care provider should call/contact the receiving hospital's specific obstetrics department or neonatology department.
- Receiving facility takes highlight about the specific referral case and reason for referral from the referring health professional.
- Receiving facility's responding health care provider should inform the senior in charge and the team about the specific case and has to get ready.
- Pre-informed receiving facilities should rapidly initiate assessment and decide management after triaging specific obstetrics or neonatal cases.

**NOTE:** *Liaison referring physician communication with accepting physician*

- Creates strong referral linkage.
- Minimizes wasted time and investigation repeatedly done.
- Minimizes repeated medication provision.
- Saves lives of mothers and neonates.

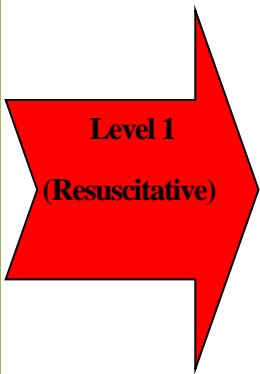



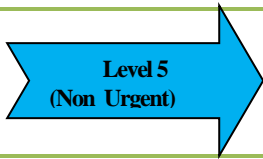


## Annex 1. Triage assessment sheet.

Triage Assessment Sheet		Arrival Date: _____
1. Name _____	Age _____ Sex _____	Card No. _____ Address _____
2. Time of Illness _____	Time at arrival to triage unit _____	Triage time _____
3. Mode of arrival to the Hospital: <input type="checkbox"/> Ambulance <input type="checkbox"/> Private car <input type="checkbox"/> Taxi <input type="checkbox"/> Carried <input type="checkbox"/> Walking		
4. Origin of Referral – <input type="checkbox"/> Government Hosp <input type="checkbox"/> Private Hosp <input type="checkbox"/> Health center <input type="checkbox"/> Self <input type="checkbox"/> Other		
5. Pre-Hospital care/First aid given: <input type="checkbox"/> Yes <input type="checkbox"/> No		
6. Gravidity _____ Parity _____ Abortion _____ LNMP _____ GA by Date _____		
7. Presenting complaints		
<input type="checkbox"/> Pushing down pain	<input type="checkbox"/> Convulsion	<input type="checkbox"/> Epigastric pain <input type="checkbox"/> Fever
<input type="checkbox"/> Leakage of Fluid	<input type="checkbox"/> Sudden collapse	<input type="checkbox"/> Shortness of breath <input type="checkbox"/> Chest pain
<input type="checkbox"/> Decreased fetal movement	<input type="checkbox"/> Headache	<input type="checkbox"/> Constant abd. pain <input type="checkbox"/> Flank pain
<input type="checkbox"/> Vaginal Bleeding	<input type="checkbox"/> Blurred Vision	<input type="checkbox"/> Diarrhea /Vomiting <input type="checkbox"/> Trauma
<input type="checkbox"/> Other (Specify) _____		
8. <u>Physical Examination</u>		
○ General Appearance: _____		
○ Vital Signs: BP _____ PR _____ RR _____ T _____ O2 Saturation _____		
○ HEENT _____		
○ Chest Finding _____		
○ CVS _____		
○ <u>Abdominal Examination Findings:</u>		
▪ Fundal height _____ Lie _____ Presentation _____		
▪ Uterine contraction ____/____/____		
▪ FHB ____/min		
○ Pelvic Examination (if done):		
▪ Active vaginal bleeding: <input type="checkbox"/> Yes <input type="checkbox"/> No		
▪ Cervical Status (Dilatation, effacement, position, station) _____		
▪ Other findings: Caput: _____ Moulding: _____		
▪ Membrane status: <input type="checkbox"/> Intact <input type="checkbox"/> Ruptured ( status of the liquor _____ )		
○ CNS _____		
9. <u>Investigation results</u>		
○ BG & RH _____ HGB/HCT _____ HBsAg _____ Urine hCG _____ HIV testing _____		
○ Others _____		
10. Assessment _____		
11. <b>Color code:</b> <input type="checkbox"/> RED <input type="checkbox"/> ORANGE <input type="checkbox"/> YELLOW <input type="checkbox"/> GREEN <input type="checkbox"/> BLUE		
12. Action taken: _____		
13. Transfer to: <input type="checkbox"/> Resuscitation room <input type="checkbox"/> Labor ward <input type="checkbox"/> OR <input type="checkbox"/> Regular OPD <input type="checkbox"/> Home		
<input type="checkbox"/> Procedure room <input type="checkbox"/> Regular ward <input type="checkbox"/> Waiting room <input type="checkbox"/> Referred out <input type="checkbox"/> Other		
14. Revaluation time (If applicable) _____		
15. Remarks: _____		
16. <b>Name &amp; Signature:</b> _____		

## Annex 2. Triage assessment and acuity scale classification tool.

Triage Acuity Scale	Level 1 (Resuscitative)	Level 2 (Emergent)	Level 3 ( Urgent)	Level 4 (Less Urgent)	Level 5 ( Non-Urgent)
Time for initial contact with care providers	Immediate	≤15 minutes	≤30 minutes	≤60 minutes	Within 120 minutes or less
Re-assessment time	Continuous care	Every 15 minutes	Every 15 minutes	Every 30 minutes	Every 60 minutes
Labor/ Fluid leakage	<ul style="list-style-type: none"> <li>Imminent birth</li> </ul>	<ul style="list-style-type: none"> <li>Suspected Preterm labor or Preterm PROM</li> </ul>	<ul style="list-style-type: none"> <li>Signs of active labor in GA ≥ 37weeks</li> </ul>	<ul style="list-style-type: none"> <li>Signs of early labor</li> <li>Term PROM</li> </ul>	
Vaginal bleeding	<ul style="list-style-type: none"> <li>Active vaginal bleeding with or without abdominal cramp</li> <li>Hemodynamically unstable</li> </ul>	<ul style="list-style-type: none"> <li>Bleeding associated with cramping and moderate in amount and GA&lt;37 weeks but no vital signs derangement</li> </ul>	<ul style="list-style-type: none"> <li>Bleeding associated with cramping (mild to moderate in amount and GA ≥37weeks)</li> </ul>	<ul style="list-style-type: none"> <li>Spotting type of bleeding</li> </ul>	
Hypertension	<ul style="list-style-type: none"> <li>Seizures</li> <li>Coma</li> </ul>	<ul style="list-style-type: none"> <li>Hypertension:SBP≥160 OR/&amp; DBP ≥ 110mmHg</li> <li>HTN with cerebral or visual symptoms</li> <li>Epigastric or right upper quadrant pain</li> </ul>	<ul style="list-style-type: none"> <li>Mild HTN: BP &lt;160/110 mmHg with or without associated signs and symptoms</li> </ul>		
Fetal Assessment	<ul style="list-style-type: none"> <li>Abnormal FHB tracing/ NRFHRP/</li> <li>Absent fetal movement</li> </ul>	<ul style="list-style-type: none"> <li>Non-Reassuring BPP</li> <li>Abnormal Doppler study</li> <li>Decreased fetal movement</li> </ul>			
Other	<ul style="list-style-type: none"> <li>Cord prolapse</li> <li>Acute severe abdominal pain</li> <li>Severe cardio-respiratory distress</li> <li>Suspected sepsis</li> <li>Altered level of consciousness</li> </ul>	<ul style="list-style-type: none"> <li>Major trauma</li> <li>Shortness of breath</li> <li>Unattended delivery</li> </ul>	<ul style="list-style-type: none"> <li>Abdominal or back pain which is more severe than expected in normal pregnancy</li> <li>Flank pain,</li> <li>Hematuria</li> <li>Nausea &amp; vomiting &amp;/or diarrhea with suspected dehydration</li> </ul>	<ul style="list-style-type: none"> <li>Minor trauma( Motor vehicle accident, or fall down injury)</li> <li>Nausea/Vomiting &amp;/or diarrhea with no dehydration</li> <li>Signs of infection (i.e. fever, chills)</li> </ul>	<ul style="list-style-type: none"> <li>Anything that does not seem to pose threat to mother or fetus</li> </ul>

Complaint / clinical condition	Level of acuity	Intervention
<ul style="list-style-type: none"> <li>Imminent birth</li> <li>Active vaginal bleeding</li> <li>Hemodynamically unstable</li> <li>Seizures</li> <li>Coma</li> <li>Altered level of consciousness</li> <li>Abnormal FHB tracing /NRFHRP/</li> <li>Absent fetal movement</li> <li>Cord prolapse</li> <li>Acute severe abdominal pain</li> <li>Severe cardio-respiratory distress</li> <li>Suspected sepsis</li> </ul>		<ul style="list-style-type: none"> <li>Immediate intervention</li> <li>Continuous care</li> <li>Initiate emergency care</li> <li>Transfer immediately to labor &amp; delivery ward, HDU or OR.</li> <li>Inform and mobilize the labor ward &amp;/or OR teams, call the most senior persons preferably Obstetrician and Anesthesiologist (if available). Or</li> <li>Refer to next level of Health Institution with all pre-referral care and accompanying medical personnel.</li> </ul>
<ul style="list-style-type: none"> <li>Suspected Preterm labour or Preterm PROM</li> <li>Bleeding associated with cramping and moderate in amount and GA&lt;37 weeks but no vital signs derangement</li> <li>Hypertension: SBP≥160 OR/&amp; DBP ≥ 110mmHg</li> <li>HTN with cerebral or visual symptoms</li> <li>Epigastric or right upper quadrant pain</li> <li>Non-Reassuring BPP</li> <li>Abnormal Doppler study</li> <li>Decreased fetal movement</li> <li>Major trauma</li> <li>Shortness of breath</li> <li>Unattended delivery</li> </ul>		<ul style="list-style-type: none"> <li>Intervention in ≤15 minutes</li> <li>Keep in the triage room until medical assessment or room on L&amp;D ward available.</li> <li>Open IV line access &amp; obtain blood for basic lab tests( BG&amp; Rh, CBC/Hgb, X-match, RBS &amp; other important tests)</li> <li>Keep NPO,</li> <li>Inform Senior health provider (Obstetrician or IESO/GP/HO)</li> <li>Obtain urine sample for PT, U/A</li> <li>Monitor Fetal Condition</li> <li>Bed side Ultrasound for BPP</li> <li>Re-assessment every 15 minutes</li> </ul>
<ul style="list-style-type: none"> <li>Signs of active labour in GA ≥ 37weeks</li> <li>Bleeding associated with cramping (mild to moderate in amount and GA ≥ 37weeks)</li> <li>Mild HTN: BP &lt;160/110 mmHg with or without associated signs and symptoms</li> <li>Abdominal or back pain which is more severe than expected in normal pregnancy</li> <li>Flank pain,</li> <li>Hematuria</li> <li>Nausea &amp; vomiting &amp;/or diarrhea with suspected dehydration</li> </ul>		<ul style="list-style-type: none"> <li>Intervention in ≤30 minutes</li> <li>Keep in the triage room until medical assessment or room on L&amp;D ward available.</li> <li>Open IV line access &amp; obtain blood for basic lab tests as required</li> <li>Keep NPO, Inform Senior staffs (Obstetrician or IESO/GP/HO)</li> <li>Obtain urine sample for PT, U/A</li> <li>Monitor Fetal Condition</li> <li>Bed side Ultrasound for BPP</li> <li>Re-assessment every 15 mins</li> </ul>
<ul style="list-style-type: none"> <li>Signs of early labour</li> <li>Term PROM</li> <li>Spotting type of bleeding</li> <li>Minor trauma( Motor vehicle accident, or fall down injury)</li> <li>Nausea/Vomiting &amp;/or diarrhea with no dehydration</li> <li>Signs of infection (i.e. fever, chills)</li> </ul>		<ul style="list-style-type: none"> <li>Intervention in ≤60 minutes</li> <li>Keep in the triage room until medical assessment or room on L&amp;D ward available.</li> <li>Monitor Fetal Condition</li> <li>Bed side Ultrasound</li> <li>Re-assessment every 30 mins</li> </ul>
<ul style="list-style-type: none"> <li>Anything that does not seem to pose threat to the woman or fetus</li> </ul>		<ul style="list-style-type: none"> <li>Intervention in ≤120 minutes</li> <li>Link to ANC, regular OPD or other RH services as required</li> </ul>

### Annex 3. Acuity level assessment and intervention guide.

## PRECONCEPTION CARE

### DEFINITION

Preconception care is the provision of biomedical, behavioral and social health interventions to women and couples before conception occurs to increase the chance of having good obstetric outcome.

### OBJECTIVE

- Management of long-term health conditions that affect pregnancy and fetal outcomes.
- Assistance in ceasing risky behaviors that affect pregnancy and fetal outcomes.
- Promoting healthy behaviors.

### INTERVENTIONS

Pre-conception care comprises a range of interventions aimed at identifying and modifying medical, behavioral and social risks during reproductive years.

#### Reproductive planning

- Reproductive planning helps to prevent unintended pregnancy, age-related infertility and fetal teratogen exposure. It may also improve health and pregnancy outcomes.
- Offer appropriate contraception advice for those not desiring pregnancy or until chronic medical conditions are stabilized.

#### Screening for modifiable risk factors

- Take a thorough history, assessing historical and ongoing risks that may affect future pregnancies.
- Reproductive history may provide important clues about future pregnancy risks.
  - Poor obstetric outcome (early neonatal death, still birth and birth defects, particularly neural tube defects)
  - History of previous gestational diabetes mellitus
  - Previous history of preterm birth
  - Previous history of small for gestational age baby
- Assessment of pre-existing medical conditions (hypertension, diabetes, epilepsy, renal disease, autoimmune conditions, cardiac and other conditions).

#### Management of medical conditions and medications

There are specific medical conditions associated with adverse pregnancy outcomes if untreated or treated poorly.

### **A. Stabilization of chronic medical conditions prior to conception**

- *Hypertension* should be controlled.
- *Diabetes mellitus*: For women with type 1 or type 2 diabetes, good glycemic control should be achieved before conception (see *chapter on diabetes mellitus*).
- *Asthma*: Poorly controlled asthma tends to worsen during pregnancy.
- *Thromboembolism*: Women with a history of thromboembolism have an increased risk of recurrence during pregnancy.
- *Hypothyroidism*: Women with hypothyroidism require increased doses of thyroxine early and throughout pregnancy; this is especially important during the first trimester.
- *Autoimmune disease*: Patients should be counseled that the best time to attempt conception is during periods of inactive disease.
- Medical conditions which are contraindications to pregnancy (e.g. *primary pulmonary hypertension*).

### **B. Review medications, over-the-counter preparations and vitamins**

Any medication with teratogenic potential should be stopped and replaced as appropriate. Some of the known teratogenic medications include:-

- Angiotensin-converting enzyme inhibitors and angiotensin II receptor antagonists.
- *Isotretinoin (Accutane)*: used for therapy of a variety of skin conditions.
- Anticonvulsant therapy particularly *hydantoin* or *valproic acid*.
- Vitamin A supplements.

### **Immunizations and infectious diseases**

- Screening for sexually transmissible infections (STIs) where indicated.
- Discuss with the patient about TORCH infections *e.g. syphilis*, including methods to reduce exposure and transmission.
- Screen for *hepatitis B* and *C* and advice on vaccination if *hepatitis B* test is negative.
- Vaccination for diphtheria and tetanus.
- Avoid conceiving for at least 28 days after receiving any live attenuated vaccinations such as the *measles, mumps* and *rubella* (MMR) vaccine.

### **Supplementations**

#### ***Folic Acid:***

- All women, from the moment they begin trying to conceive until 12 weeks of gestation, are recommended to take a folic acid supplement (400 µg folic acid daily).
- Women who have had a foetus diagnosed as affected by a neural tube defect or have given birth to a baby with a neural tube defect should take high-dose supplementation (5 mg folic acid daily); and be advised to increase their food intake of folate.

#### ***Iron:***

- Women with iron deficiency identified by blood tests should take oral supplement with at least 60 mg of elemental iron daily.

### **Lifestyle and Behaviors:**

- **Caffeine:** limit coffee intake
- **Smoking, alcohol and illicit drugs:** abstinence is advised in the preconception period and during pregnancy.
- **Weight control:**
  - Overweight (BMI 25–29.9 kg/m<sup>2</sup>) and obese (BMI >30 kg/m<sup>2</sup>) women should be advised to lose 5–10 % of their body weight prior to conception.
  - Underweight women should be provided dietary advice and advice on behavior techniques to help them achieve a target weight range.
- **Exercise:** Moderate-intensity physical activity is recommended (for 150 minutes per week or 30 minutes per day on most days).

### **Psychosocial aspects:**

- Screen for domestic violence
- Screen for mental health conditions

**NOTE: Women should also receive cervical cancer screening and breast examination during preconception care.**

## ANTENATAL CARE

### DEFINITION

Antenatal care (ANC) is defined as the complex of interventions that a pregnant woman and adolescent girl receives from skilled health care professionals in order to ensure the best health conditions for both mother and baby during pregnancy.

### PURPOSE

ANC reduces maternal and perinatal morbidity and mortality through:

- Screening, diagnosis and management of the risk factors and pregnancy-related complications.
- Identification of women and girls at increased risk of developing complications.
- Provides an important opportunity to prevent and manage concurrent diseases through integrated service delivery.
- Ensuring referral to an appropriate level of care.

### COMPONENTS

- Health promotion and disease prevention;
- Screening, diagnosis and management or referral for disease;
- Birth planning and complication readiness.

### ANC CONTACTS

Antenatal care models with a minimum of eight contacts are recommended. The first contact is scheduled to take place in the first trimester (up to 12 weeks of gestation), two contacts scheduled in the second trimester (at 20 and 26 weeks of gestation) and five contacts scheduled in the third trimester (at 30, 34, 36, 38 and 40 weeks). The details are described in [annex 4](#) below.

During each ANC contact, gather and interpret information (History, P/E, Investigations), classify the type of care (basic versus specialized), develop care plan, implement care plan (take action) and evaluate care plan.

### THE FIRST ANTENATAL CONTACT

#### Confirmation of pregnancy and gestational age

Confirmation of pregnancy and complete assessment of gestational age (LNMP, EDD and GA) are made at the first antenatal visit.

- Last menstrual period is valid if the woman is sure of her dates and reliable.

### History taking:

Take a full and relevant history including current pregnancy, previous pregnancies (any complications and outcomes), medical conditions (including psychiatric problems, and previous operations), intimate partner violence, familial and genetic disorders, allergies, use of medications, use of substances (alcohol, tobacco and other substances), and family and social circumstances.

### Physical examination:

Do general examination including blood pressure, heart rate, weight, height, colour of mucous membranes/conjunctivae, check for oedema, and palpation for lymph nodes. Do a systemic examination including teeth and gums, breasts, thyroid, heart and lung.

Examine the abdomen including inspection and palpation of the uterus; measurement of the SFH, presentation of the fetus (third trimester) and auscultation of the fetal heart beat (after 20 weeks).

### Investigations:

- *Blood tests:*
  - Hemoglobin, HIV test, blood group and Rh, VDRL, HBsAg. Hemoglobin is preferably determined with hemoglobinometer or complete blood count (when available).
  - Indirect Coomb's test for RH negative women.
- *Urine tests:*
  - Urine strip test and microscopy (Albumin, Sugar, ketone, WBC etc.)
  - Urine (midstream) gram stain or culture to diagnose asymptomatic bacteriuria (ASB). ASB is defined as true bacteriuria in the absence of specific symptoms of acute urinary tract infection. ASB is common in pregnancy.
- Ultrasound scan before 24 weeks of gestation.

### Advice and counseling:

Certain essential information should be provided to all pregnant women. This includes:

- ***Danger signs and symptoms of pregnancy:*** Severe headache, blurring of vision, abdominal pain (not discomfort), leakage of liquor from the vagina, vaginal bleeding and decreased fetal movements. A woman that experiences any of these symptoms should come to health facility immediately.
- ***Self-care in pregnancy:*** Diet and exercise, personal hygiene and breast care, avoid unnecessary use of medications, limit use of caffeine, avoid substance use (alcohol, tobacco and recreational drugs).



- **Birth preparedness and complication readiness (delivery plan):** At the end of her ANC contact, all pregnant women should be given a provisional delivery plan: the expected date of delivery, the place of delivery, the expected mode of delivery and a transport plan for emergency or delivery (including important contact numbers). The practice of home delivery should be discouraged.
- **Health facility delivery:** Advise the patient about the importance of facility delivery.
- **Maternity waiting home:** If mothers are living far from the delivery center, they shall be admitted to a maternity waiting home (residential facility) which is located near or within hospitals in their final weeks of pregnancy to bridge the geographical gap in obstetric care.
- **Newborn/infant care:** Plans for infant feeding and techniques, details of follow up care, immunization and where this can be obtained.
- **Family planning:** Counsel on family planning and use of postpartum contraception.

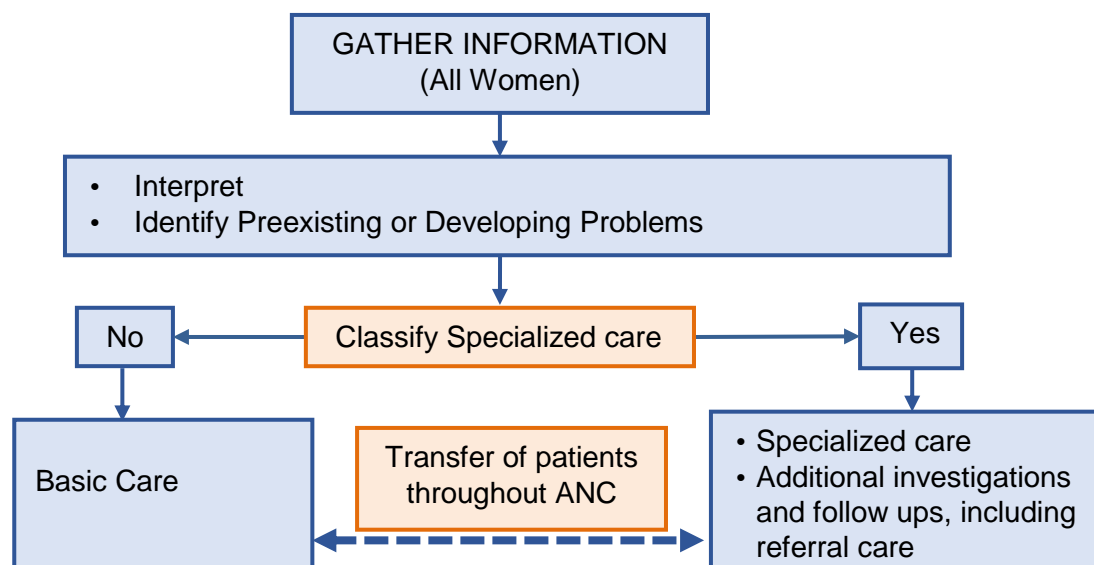
### Assessment and planning

The final assessment is made by interpreting the gathered information. It involves making diagnosis and evaluating for presence of any risk factors and classifying the type of care. This also includes documenting the risk factor identified, the best estimate of gestational age and making plan for management or appropriate referral for any problems identified.

Use the ANC classifying form in the FMOH integrated pregnancy, labor, delivery, newborn and postnatal care card for more detailed information to gather information during first visit ([annex 5](#) and [annex 6](#)).

If any ONE or more of the risk factors on the “information gathering and classifying form” are identified, the woman is eligible for specialized antenatal care (require closer follow up or referral to higher facility). Refer to the diagram for the classification algorithm ([figure 1](#)).

Those classified under basic care need a minimum of eight contacts ([annex 4](#)) while those having pre-existing or newly developed problems will be followed in a specialized care setting.



**Figure 1. ANC classification diagram.**

## SUBSEQUENT ANTENATAL VISITS

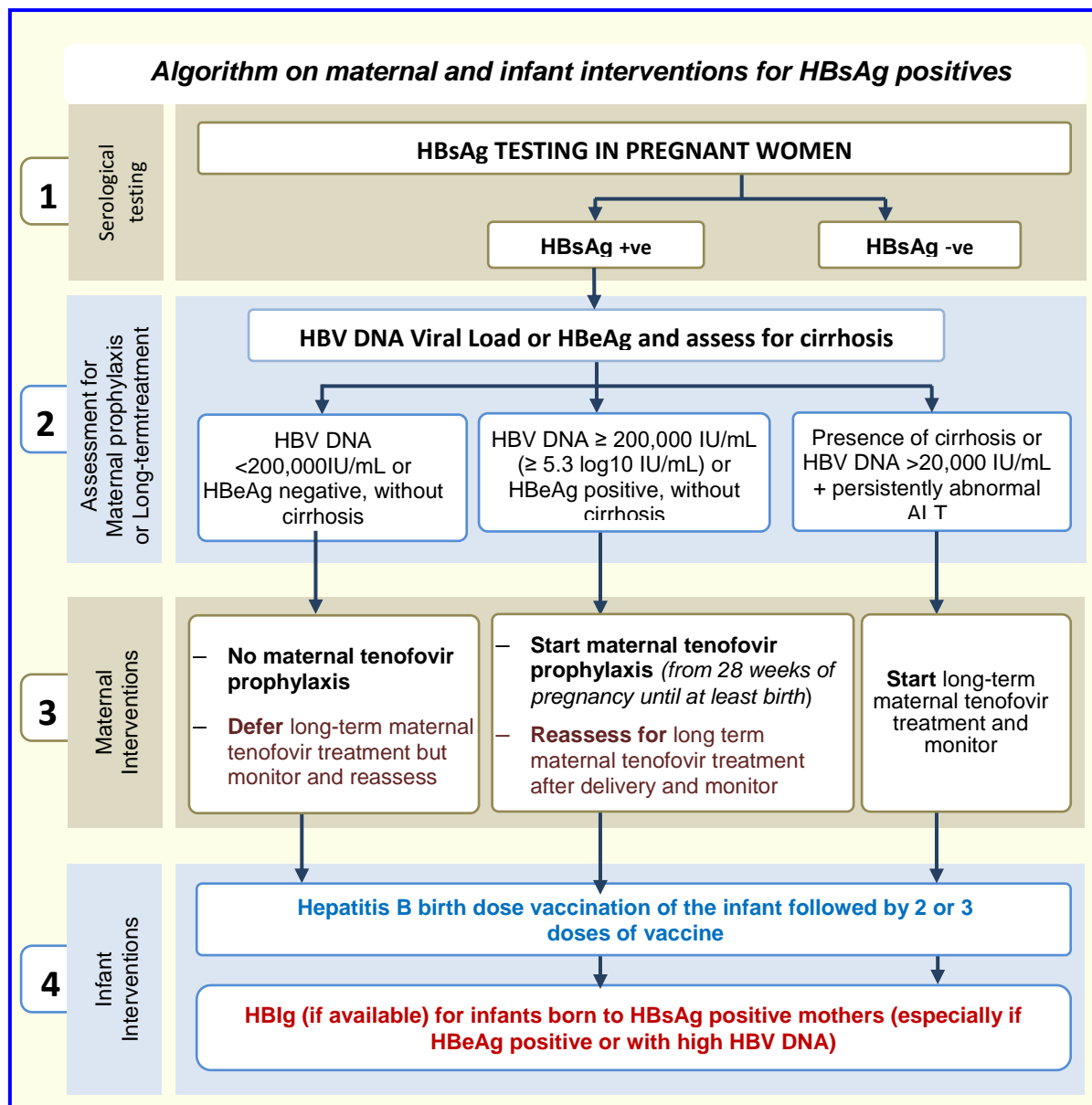
Content of subsequent antenatal care visits are:-

- Ask about general well-being, fetal movements, danger symptoms and any problems.
- Check BP, PR, weight, and color of the mucous membranes and conjunctivae.
- Measure the SFH and compare with previous measurements.
- Palpate the presenting part after 34 weeks of gestation.
- One step screening using 75 gm glucose at 24 to 28 wks, if the woman is high risk for diabetes. (If test result is abnormal, see chapter on management of DM in pregnancy)
- Repeat investigations
  - Repeat HIV counseling and testing in the third trimester preferably between 28 to 36 weeks for those tested negative at initial testing.
  - Repeat blood tests: Hgb at 26 and 36 weeks.
  - Repeat urine test at 26 and 34 weeks.
- Repeat information for danger signs of pregnancy, and review delivery and transport plans as well as feeding and contraception choices.
- Document the detail contact schedule, risk identification and list of interventions at each contact ([annex 4](#)).

## MEDICATIONS AND VACCINES

- Td vaccination - two doses, on the first visit and four weeks after the initial dose (regardless of the gestational age of her first contact)

- *Iron and folic acid supplements:* daily oral iron and folic acid supplementation with 30 mg to 60 mg of elemental iron and 400 µg (0.4 mg) of folic acid
- *Daily calcium supplementation:* 1.5–2.0 g oral elemental calcium starting from 14 weeks of gestation
- *Treatment of asymptomatic bacteriuria:* If there is asymptomatic bacteriuria give amoxicillin 500 mg PO TID for seven days.
- *Preventive antihelminthic treatment-* Preventive antihelminthic treatment (deworming), using single-dose albendazole (400 mg) or mebendazole (500 mg) is recommended after the first trimester in endemic areas (areas with greater than 20% prevalence of infection with any soil-transmitted helminthes).
- If *indirect coomb's test is negative*, administer anti-D immunoglobulin at 28 weeks and immediately after delivery after checking the blood group of the newborn from the cord blood.
- For those women with positive HBsAg, determine HBV DNA viral load. HBV viral load greater than 200,000 international units per milliliter (IU/mL) of blood indicates that the virus is active and is an indication to give tenofovir for the mother starting from 28 wks of gestation until delivery. If laboratory test for HBV viral load is not available, determine HBeAg. For mothers with detectable HBeAg, give tenofovir starting from 28 wks of GA until delivery. Linkage/ referral for medical evaluation is also important (assessment of eligibility for lifelong treatment and follow up). See [figure 2](#) below for detailed algorithm of prevention of mother-to-child transmission of hepatitis B virus, and assessment of eligibility of mother for treatment for her own health.



**Figure 2.** Algorithm for prevention of mother-to-child transmission of hepatitis B virus, and assessment of eligibility of mother for treatment for her own health.

## PHYSIOLOGICAL SYMPTOMS IN PREGNANCY

Nausea and vomiting, heartburn, leg cramps, low back and pelvic pain, constipation, varicose veins and edema are common during pregnancy. Refer to the following box below for options of available interventions.

### **Intervention for common physiological symptoms based on a woman's preferences and available options.**

**Nausea and vomiting** – Ginger, chamomile, vitamin B6 are recommended for the relief of nausea in early pregnancy.

**Heartburn**– Advise on diet and lifestyle changes (avoidance of large, fatty meals and alcohol, cessation of smoking, and raising the head of the bed to sleep) are recommended to prevent and relieve heartburn in pregnancy. Antacid preparations can be used depending on the woman's symptoms.

**Leg cramps** – Magnesium, calcium or non-pharmacological treatment options can be used for the relief of leg cramps in pregnancy.

**Low back and pelvic pain** – Regular exercise throughout pregnancy, treatment options such as physiotherapy, support belts can be used.

**Constipation**– Dietary modification, high fiber diet, regular bowel habit and adequate fluid intake.

**Varicose veins and oedema**– Non-pharmacological options, such as compression stockings, leg elevation and water immersion.

### **WOMAN-HELD CASE NOTES**

- It is recommended that each pregnant woman carries her own case notes during pregnancy to improve continuity, quality of care and her pregnancy experience.
- This standardized document is the principal record of the pregnancy and it must be completed at each antenatal clinic visit and retained by the mother until delivery, after which it will be kept at the place of confinement or final referral.
- Record of attendance, risk factors/ results of special investigations, appointment date and information on danger signs of pregnancy are components of woman-held case notes.

**Annex 4. Contact schedule, risk identification, list of interventions at each contact.**

Contents of Care		Eight schedule of ANC contacts (weeks of gestation)							
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
		12	20	26	30	34	36	38	40
History	Date of contact								
	Gestational age								
	Present Pregnancy History (complaint)								
	Past Pregnancy History								
	Medical History and Surgical History								
	Mental Health								
	Family/Social History								
Physical Examination	General Appearance								
	Blood pressure								
	Weight								
	Pallor								
	Breast								
	Chest								
	Abdominal examination	Fundal height (wks)							
		Fetal heart beat							
		Presentation							
	Pelvic assessment (as required/indicated)								
Investigations	Ultrasound (up to 24 weeks of gestation)								
	Haemoglobin								
	Blood group, RH								
	RPR/VDRL								
	HIV (PITC)								
	HBsAg								
	Urine test								
	Screening for active TB								
	Indirect coomb's test <i>for RH negatives</i>								
	75 gm oral glucose test ( <i>for those at risk</i> )								

Contents of Care		Eight schedule of ANC contacts (weeks of gestation)							
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>
		12	20	26	30	34	36	38	40
Date of contact									
Medications & vaccines	Preventive anti-helminthic treatment								
	Malaria prevention with ITN, and early diagnosis and treatment								
	Td vaccination								
	Anti-D immunoglobulin at 28 weeks ( <i>for those unsensitised RH negatives</i> )								
	Iron and folic acid supplements								
	Daily calcium supplementation								
Advice and counselling	Nutrition/healthy eating								
	PMTCT counselling and testing								
	Family planning counselling								
	Breast feeding counselling								
	Hygiene								
	Avoidance of harmful traditional practices								
	Reduce caffeine intake								
	Gender based violence specially IPV								
	Birth Preparedness and Complication Readiness plan								
Assessment ( <i>diagnosis, danger signs identified</i> )									
Action taken									
Next Appointment									
Name and Signature									

# Annex 5. ANC INFORMATION GATHERING AND CLASSIFYING FORM.

Date: _____ ANC Reg. No: _____ Medical Record Number (MRN): _____		
Name of Client: _____ Name of Facility: _____		
Woreda: _____ Kebele: _____ House No: _____ Age (Years): _____		
LMP: _____ / _____ / _____ EDD: _____ / _____ / _____		
Gravida: _____ Para: _____ Number of children alive: _____ Marital Status: _____		
<b>INSTRUCTIONS</b> to Fill Classifying form: Answer all of the following questions by placing a cross mark in the corresponding box.		
<b>OBSTETRIC HISTORY</b>	<b>No</b>	<b>Yes</b>
1. Previous stillbirth or neonatal death?		
2. History of 3 or more consecutive spontaneous abortions?		
3. Birth weight of the last baby <2500gm		
4. Birth weight of last baby > 4000gm		
5. Last pregnancy: hospital admission for hypertension or pre-eclampsia/eclampsia?		
6. Previous surgery on reproductive tract? (Myomectomy, removal of septum, fistula repair, cone biopsy, CS, repaired uterine rupture, cervical cerclage)		
<b>CURRENT PREGNANCY</b>	<b>No</b>	<b>Yes</b>
7. Diagnosed or suspected multiple pregnancy?		
8. Age less than 18 years?		
9. Age more than 35 years?		
10. Isoimmunization (Rh -ve) in current or in previous pregnancy?		
11. Vaginal bleeding?		
12. Pelvic mass?		
13. Systolic blood pressure $\geq$ 140 mmHg and/or diastolic pressure $\geq$ 90 mmHg?		
<b>GENERAL MEDICAL</b>	<b>No</b>	<b>Yes</b>
14. Diabetes mellitus?		
15. Renal disease?		
16. Cardiac disease?		
17. Chronic Hypertension?		
18. Known 'substance' abuse (including heavy alcohol drinking, Smoking)		
19. Any other severe medical disease or condition TB, HIV, Ca, DVT...		
A "Yes" to any ONE of the above questions (i.e., ONE shaded box marked with a cross) means that the woman is not eligible for the basic component of the new antenatal care model and require closer follow up or referral to specialized care. If she needs more frequent ANC visits use and attach additional recording sheets.		



Annex 6. Initial physical evaluation plus promotive and preventive care				
General examination		Gynecologic examination		Counseling / testing, HIV + care and follow up
General Appearance _____				Danger symptom/ signs in pregnancy and delivery <input type="checkbox"/> Y <input type="checkbox"/> N
Pallor	<input type="checkbox"/> Y <input type="checkbox"/> N	Vulvar ulcer	<input type="checkbox"/> Y <input type="checkbox"/> N	Birth preparedness advised <input type="checkbox"/> Y <input type="checkbox"/> N
Jaundice	<input type="checkbox"/> Y <input type="checkbox"/> N	Pelvic mass	<input type="checkbox"/> Y <input type="checkbox"/> N	<b>MOTHER</b> HIV test accepted <input type="checkbox"/> Y <input type="checkbox"/> N
				HIV test result _____
Chest abnormality	<input type="checkbox"/> Y <input type="checkbox"/> N	Uterine size wks. _____		HIV test result received with post-test counseling <input type="checkbox"/> Y <input type="checkbox"/> N
		FGM	<input type="checkbox"/> Y <input type="checkbox"/> N	Counseled on Infant <input type="checkbox"/> Y <input type="checkbox"/> N
Cardiac abnormality	<input type="checkbox"/> Y <input type="checkbox"/> N			Referred for care, treatment and support <input type="checkbox"/> Y <input type="checkbox"/> N
				<b>PARTNER</b> HIV test <input type="checkbox"/> Y <input type="checkbox"/> N
				Partner test result _____

## ECTOPIC PREGNANCY

### DEFINITION

An ectopic pregnancy is implantation of a fertilized ovum outside the uterine cavity.

### CLASSIFICATION

- Tubal - the fallopian tube is the most common site of implantation.
- Extra-tubal.

### RISK FACTORS

- History of PID (e.g. secondary to STI), ectopic pregnancy or tubal surgery.
- History of infertility, contraceptive failure.

### DIAGNOSIS

**History:** The *common* symptoms ascribed to ectopic pregnancy are:

- Amenorrhea
- Vaginal bleeding
- Abdominal / pelvic pain
- Other symptoms: - early pregnancy symptoms, fainting or syncope, features of anemia (e.g. dizziness), pain on defecation and shoulder tip pain.

**Physical examination:** Clinical presentations are extremely variable depending on whether the tube has ruptured or not. See [table 3](#) below

**Table 3. Signs of unruptured and ruptured ectopic pregnancies.**

Sign	Unruptured	Ruptured
Vital Signs	<ul style="list-style-type: none"> <li>• Vital signs can be normal or slightly deranged</li> </ul>	<ul style="list-style-type: none"> <li>• Fast, weak pulse</li> <li>• Hypotension</li> <li>• Pallor</li> </ul>
Abdominal examination	<ul style="list-style-type: none"> <li>• Non-tender abdomen</li> </ul>	<ul style="list-style-type: none"> <li>• Direct abdominal tenderness</li> <li>• Rebound tenderness</li> <li>• Abdominal distension</li> <li>• Bowel sounds are decreased</li> </ul>
Pelvic examination	<ul style="list-style-type: none"> <li>• Minimal vaginal bleeding</li> <li>• Adnexal mass</li> </ul>	<ul style="list-style-type: none"> <li>• Minimal vaginal bleeding</li> <li>• Cervical motion tenderness</li> <li>• Adnexal tenderness</li> </ul>

## DIFFERENTIAL DIAGNOSIS:

- Abortion
- PID
- Ovarian torsion
- Ruptured ovarian cyst
- Acute appendicitis

## DIAGNOSTIC TESTS AND PROCEDURES

### Diagnostic tests:

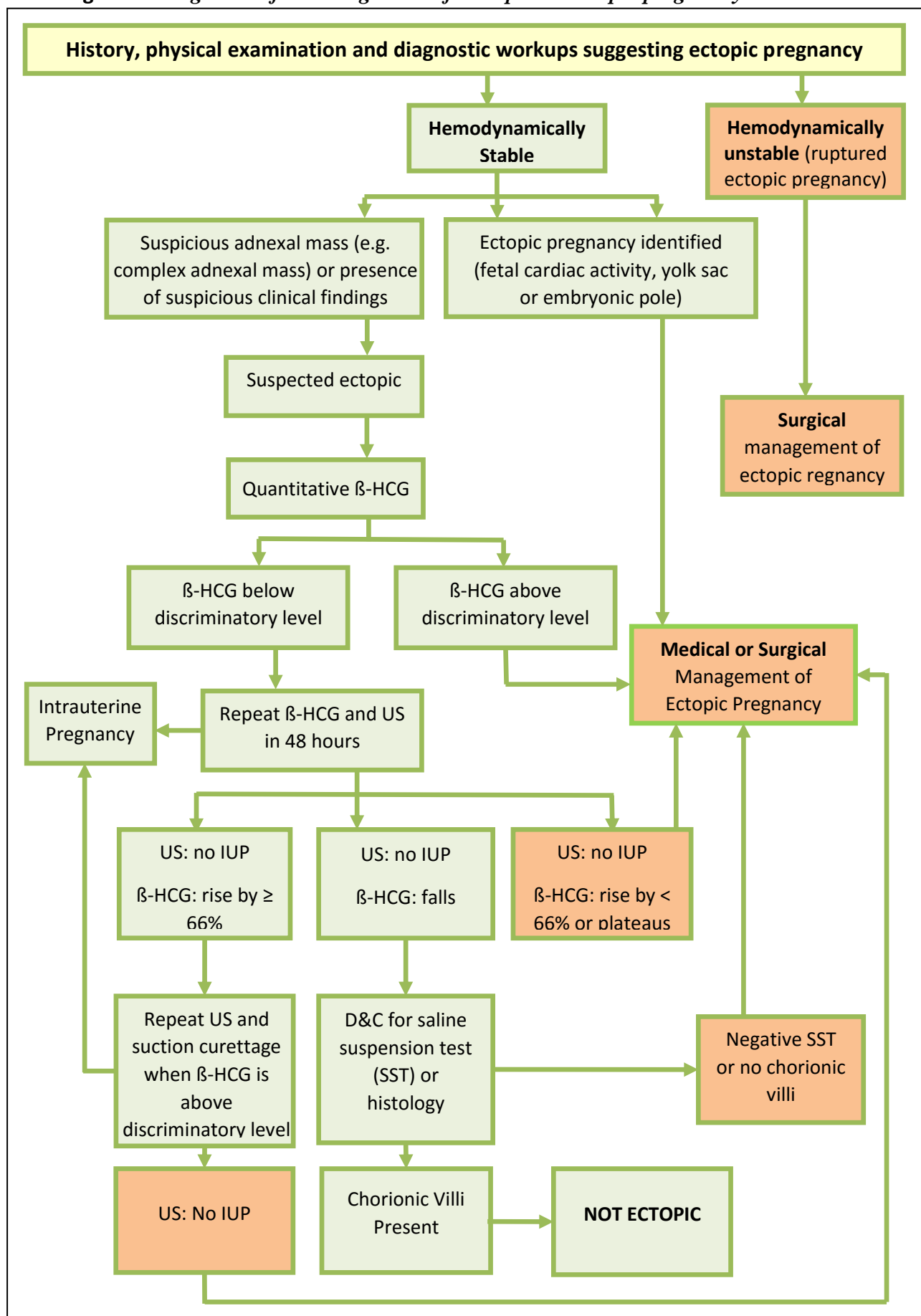
- CBC, Blood group and RH
- Urine hCG
- Serum  $\beta$ -HCG
- Ultrasound (abdominal/ transvaginal)
  - The ultrasound exam should be performed both transabdominal and transvaginal (if available). The transabdominal component provides a wider overview of the abdomen, while a transvaginal scan is important for diagnostic sensitivity.
  - Positive pregnancy test and intrauterine pregnancy finding by US almost always excludes ectopic pregnancy. These US findings are presence of double decidual sac, embryonic pole, yolk sac or embryonic cardiac activity in the uterine cavity.
  - The most reliable and specific sign of ectopic pregnancy is the visualization of an extra-uterine gestation (i.e. fetal cardiac activity, yolk sac or embryonic pole) with an empty uterine cavity. These features, however, are seen only in a minority of cases.
  - The presence of free intraperitoneal fluid collection (hemoperitoneum) in the context of a positive pregnancy test and empty uterus suggests ruptured ectopic pregnancy.
  - A complex or solid adnexal mass with a positive pregnancy test and empty uterus is highly suggestive of an extra uterine gestation and is the most common sonographic abnormality. However, such adnexal masses can also be corpus luteum, endometrioma, hydrosalpinx, ovarian neoplasm or dermoid cyst.
  - Sometimes the extrauterine pregnancy is too small to be visualized during the initial ultrasound examination in the early process of ectopic pregnancy.
- Ultrasound and serum  $\beta$ -hCG (the discriminatory zone)
  - The discriminatory zone is the serum hCG level above which a gestational sac should be visualized by ultrasound examination if an intrauterine pregnancy is present.
  - The ‘discriminatory zone’ of  $\beta$ -hCG level for abdominal US is 6,000 to 6,500 mIU/mL while for transvaginal US it is 1,500 to 2,000 mIU/mL.

- The absence of an intrauterine GS at hCG level above the discriminatory zone strongly suggests an ectopic or nonviable intrauterine pregnancy.
- Serum  $\beta$ -hCG level below the ‘discriminatory zone’ with no intrauterine pregnancy by US is not conclusive and is consistent with an early viable intrauterine pregnancy, an ectopic pregnancy or non-viable intrauterine pregnancy. This needs serial  $\beta$ -hCG level determination to determine its doubling time (see [figure 3](#) below for management algorithm).

## Diagnostic Procedures

- Culdocentesis
  - Culdocentesis should be considered only in resource limited settings i.e. in the absence of transvaginal ultrasound.
  - *Culdocentesis procedure:* Let the woman sit at 30° to 45° for few minutes just before the procedure; insert speculum and pull the posterior lip of the cervix with a tenaculum; and aspirate cul-de-sac using a 16-18-gauge spinal needle with 5 or 10 cc syringe.
    - **Positive culdocentesis** is aspiration of at least 5cc non-clotting blood. Besides ruptured and other causes of hemoperitoneum, 50-60% of unruptured ectopic pregnancies may have positive results. If non-clotting blood is obtained, begin immediate management.
    - **Negative culdocentesis** is aspiration of at least 5 cc clear-serous fluid. It indicates the absence hemoperitoneum.
    - **Equivocal culdocentesis** is a difficult aspiration of less than 5 cc blood-tinged fluid. It may represent the incomplete aspiration of a hemoperitoneum or the aspiration of blood from a vessel in the uterus, ovary or vaginal wall.
- Uterine Suction Curettage
  - Uterine suction curettage is performed when the pregnancy has been confirmed to be nonviable and the location of the pregnancy cannot be determined by ultrasonography.
  - Once tissue is obtained by curettage it can be added to saline, in which it will float. Decidual tissue does not float. Chorionic villi are also usually identified by their characteristic lacy frond appearance.
  - The tissue can also be sent for histopathologic examination. Presence of chorionic villi indicates intrauterine pregnancy.

**Figure 3. Algorithm for management of a suspected ectopic pregnancy.**



## MANAGEMENT

### A. Ruptured ectopic pregnancy

- Secure IV line with large bore canula.
- Cross-match blood and prepare for immediate laparotomy.
- Do not wait for blood before performing surgery. During surgery inspect both ovaries and fallopian tubes:
  - If there is extensive damage to the tube, perform salpingectomy.
  - Perform salpingostomy or salpingotomy if the contralateral tube is damaged or when the conservation of fertility is important.
  - Note that conservative surgeries are associated with persistent ectopic pregnancy and higher risk of recurrence.

### B. Un-ruptured ectopic pregnancy

For unruptured ectopic pregnancy, both surgical and medical management options can be used.

- *Candidates for medical management of ectopic pregnancy:*
  - Hemodynamically stable
  - Low initial serum  $\beta$ -hCG level (less than 5000 mIU/ml)
  - Small ectopic pregnancy size (less than 3.5 cm mass)
  - Absent fetal cardiac activity
  - Willing and able to comply to post treatment follow-up
- *Contraindications for medical management of ectopic pregnancy:*
  - Sensitivity to methotrexate
  - Tubal rupture
  - Breast feeding
  - Presence of intrauterine pregnancy (heterotopic pregnancy)
  - Hepatic, renal or hematologic dysfunction
  - Active pulmonary disease
  - Peptic ulcer disease
  - Immunodeficiency
- *Methotrexate is the drug of choice for medical management. See **box below** for a single-dose methotrexate protocol for ectopic of pregnancy.*

### ***Single-dose methotrexate protocol for ectopic pregnancy***

- Methotrexate 50 mg/m<sup>2</sup> IM on day 1.
- Determine serum B-hCG level on day 1, day 4 and day 7
- Once 15% decline in  $\beta$ -hCG level is achieved between day 4 and day 7, serum  $\beta$ -hCG level weekly until undetectable (average time for resolution is 36 days)
- If decline of 15% is not achieved repeat Methotrexate 50 mg/m<sup>2</sup> IM on day 7 or resort to surgical management.

### **Subsequent Management**

- Correct anemia
- Rh-immunoglobulin (Anti-D) should be administered to all Rh-negatives
- Provide family planning counseling and service.
- Provide counseling and advice on prognosis of fertility before discharge.
- Given the increased risk of a future ectopic pregnancy, patients should also be counseled to come as soon as she misses her menses.
- Schedule a follow-up visit.

## MOLAR PREGNANCY

### DEFINITION

Also known as hydatidiform mole — is pregnancy characterized by abnormal proliferation of trophoblasts.

### RISK FACTORS

- Age less than 20 and above 35
- History of previous Gestational Trophoblastic Disease (GTD)

### CLINICAL FEATURES

- |  |                                    |
|--|------------------------------------|
| • Nausea/vomiting  | • Uterus softer than normal        |
| • Vaginal bleeding   | • Absence of fetal movement        |
| • Partial expulsion of grapes like tissue (vesicles) in cases of complete mole | • No palpable fetal part or no FHB |
| • Cramping/lower abdominal pain  | • Hyperthyroidism                  |
| • Uterus larger than the gestational age ( in cases of complete mole)          | • Preeclampsia                     |

### INVESTIGATIONS

- CBC
- Blood group and RH
- Serum B-hCG (preferably) otherwise Urine hCG
- LFT and RFT
- Chest X-ray
- Ultrasound: typical sonographic features suggestive of complete molar pregnancy may include:
  - Absence of an embryo or fetus.
  - No amniotic fluid.
  - Central heterogeneous mass in the uterine cavity with numerous discrete anechoic spaces.
  - Bilateral theca lutein cysts.

**NOTE:** In cases of partial mole, there may be fetus with or without placental abnormality, there may be no amniotic fluid and absent theca lutein cysts.



## MANAGEMENT (for both partial and complete mole)

### Immediate management

- Open an IV line and resuscitate as required.
- Cross-match at least 2 units of blood
- Arrange for evacuation of the uterus.
- Get prepared for possible hemorrhagic shock.

**NOTE:** *Evacuate uterus by suction curettage in major OR.*

- Infuse oxytocin 20 units in 1 L normal saline or ringer's lactate at 60 drops / minute to prevent hemorrhage once evacuation is under way.
- Provide prophylactic antibiotic
- Administer Anti-D for RH negative patients
- Submit the evacuated specimen for histo-pathologic examination

### Subsequent management and follow up

- Advice for use of combined oral contraceptive pill, implant or injectable for one year or tubal ligation if the woman has completed her family.
- Get baseline  $\beta$ -hCG within 48 hours of evacuation.
- Follow-up:
  - Advise to come if she develops any or the combination of the following danger signs: cough, SoB, excessive vaginal bleeding, etc
  - Determine serum  $\beta$ -hCG every 1-2 weeks until it falls to a normal level.
  - After three consecutive normal  $\beta$ -hCG level is achieved, monitor monthly for six additional consecutive months, at which time surveillance can be discontinued safely.

**NOTE:** *In places where there is no capacity to determine serum  $\beta$ -hCG for surveillance, use urine hCG.*

- Patients can develop Gestational Trophoblastic Neoplasia (either invasive mole or choriocarcinoma subsequently) as a complication or sequelae of molar pregnancy while on follow up.

### Diagnostic criteria for Gestational Trophoblastic Neoplasia (GTN)

- Plateau of serum  $\beta$ -hCG level ( $<10\%$  drop) for four measurements during a period of 3 weeks or longer.
- Rise of serum  $\beta$ -hCG  $\geq 10\%$  during three weekly consecutive measurements or longer, during a period of 2 weeks or more.
- The serum / urine hCG level remains detectable for 6 months or more.
- Histological diagnosis of invasive mole, PSTT or choriocarcinoma.

**NOTE:** → If the patient is diagnosed with GTN, please refer to the standard management guideline for the management of cases of GTN.

→ If there are resource limitations to treat GTN, please refer patient to the next higher facility.

### **Early follow-up during subsequent pregnancies**

During any subsequent pregnancy, a woman with previous history of molar pregnancy needs to have early ultrasound to either detect recurrence early, or offer reassurance of normal development if the pregnancy is normal.

## HYPEREMESIS GRAVIDARUM

### DEFINITION

Hyperemesis Gravidarum (HG) is the severe form of nausea and vomiting during pregnancy resulting in dehydration and weight loss.

### RISK FACTORS:

- Multiple pregnancy
- Previous History
- Family History
- Overweight
- Young age
- Primigravidity
- Molar pregnancy / trophoblastic disease

### DIAGNOSIS:

#### Sign/symptoms

- Severe nausea and vomiting
- Dehydration: loss of skin elasticity, sunken eyeballs, dry mucus membranes and lips
- Head ache /confusion/
- Fainting
- Symptom and signs of complications

**NOTE:** *The diagnosis of hyperemesis is considered in the presence of severe nausea and vomiting after exclusion of other causes of nausea and vomiting during pregnancy.*

### Investigations

- |   |  |
|---|--|
| • Urinalysis                                      | • RFT  |
| • Stool Exam                                      | • Liver enzymes  |
| • CBC   | • Pelvic ultrasound  |
| • RBS   | • Other investigations- guided by history and physical examination finding |
| • Electrolytes- serum potassium, sodium, chloride |  |

## DIFFERENTIAL DIAGNOSIS (DDX)

- Peptic ulcer disease
- Pyelonephritis
- Gastroenteritis
- Hepato-biliary diseases (hepatitis, cholecystitis)
- Diabetic ketoacidosis

## MANAGEMENT

### Principles

- Correction of fluid and electrolyte deficits
- Identification and treatment of any co-morbidities
- Identification and management of complications.

### Outpatient management

#### *IV fluids:*

- Infuse one liter over 1-2 hours and then 1000 mL over 4 hours (i.e. 2 litres over 5 to 6 hrs), followed by further assessment, including urine ketone testing.
- Discharge the patient from outpatient care with PO medications and dietary advice.
- Or, admit for inpatient care.

#### *Medications:*

- Vitamin B6 (pyridoxine):- 10–25mg PO BID-QID and Meclizine 25 mg PO TID, **or**
- Metoclopramide:- 5-10 mg PO TID, **or**
- Promethazine:- 12.5-25 mg PO TID to QID, **or**
- Ondansetron 4-8 mg PO TID, **or**
- Chlorpromazine 12.5 mg IM BID

#### *Dietary advice:*

- Avoiding of empty stomach,
- Advise intake of small and frequent diet,
- Restriction of coffee, and spicy, odorous, high fat, acidic and very sweet foods,
- Counsel on preferably taking protein rich, salty (e.g. nuts), low fat, tasteless and dry snacks/meals.
- Encourage on fluid intake (better tolerated if cold, clear, and carbonated or sour).
- Advise on taking peppermint containing products (e.g. chewing gum, candy) to reduce postprandial nausea.
- Advise not to take drugs that may cause nausea and vomiting, e.g. iron supplement should be temporarily discontinued.

- Advise on taking ginger or ginger containing preparations.
- Counsel on avoiding of environmental triggers: - stuffy rooms, strong odors (e.g. perfume, chemicals, food, smoke), heat, humidity, noise, and visual or physical motion (e.g. flickering lights, driving).

## **Inpatient management**

### ***Indications for admission:***

- Weight loss > 5% from pre-pregnancy
- Ketonuria above +2
- Electrolyte imbalance
- Deranged renal and liver function tests
- Persistent vomiting / failed OPD management

### ***Fluid management:***

- Oral feeding withheld for 24 to 48 hrs.
- Give 1 to 2 liters of isotonic saline or ringer lactate within 1 - 2 hrs.
- Continue fluid repletion at a rapid rate (1-2 L over the next 2-3 hrs) until the clinical signs of hypovolemia improves (e.g. low blood pressure, low urine output, and / or impaired mental status,).
- Avoid dextrose containing fluid until thiamine is supplemented with the initial rehydration fluid.
- Give maintenance fluid after deficit is corrected:-
  - 4 ml / kg / hr- for the first 10 hrs
  - 2 ml / kg / hr for the next 10 hrs
  - 1 ml / kg / hr for the rest
- In addition replace ongoing loss

### ***Vitamins:***

- Thiamine (vitamin B1):
  - Give 100 mg IV with the initial rehydration fluids before administration of dextrose containing fluids and another 100 mg daily for the next two or three days i.e. 10 ampoules of Vita. B complex containing 10 mg of thiamine per 24 hrs (3 ampoules / liter).
- Vitamin B6:
  - Give 10-25 mg in every liter (i.e. at least 5 ampoules of vitamin B complex containing 2 mg of vitamin B-6 in each bag of fluid).

### ***Electrolyte management:***

Depends on the electrolyte abnormality detected on lab tests.

*Potassium supplementation:*

- For mild to moderate hypokalemia (serum potassium 2.5-3.5 meq)
  - Give potassium - 20-80 meq / 24 hrs.
  - Add 1 vial of KCL in each bag of maintenance fluid
- For severe hypokalemia (serum potassium <2.5 meq/l) or symptomatic hypokalemia.
  - Give potassium – 20 meq/2-3 hrs with careful monitoring every 2-4 hrs,
  - Add 2-3 vials of KCL (40-60 meq) in each bag of maintenance fluid.
  - Adjust the amount based on the serum potassium level.

*Antiemetics:*

- **First line**
  - Meclizine 25mg IV TID, or
  - Metoclopramide- 5–10 mg IV TID, or
  - Promethazine 5-10 mg IM every 6-8 hrs
- **Second line:** Serotonin antagonists - Ondansetron 4-8 mg IV or PO, TID
- **Third line:** Chlorpromazine 25mg IV or IM QID.

**NOTE:** \* Combinations of different drugs should be considered in women who do not respond to a single antiemetic.

\* Shift to the next line of antiemetic drugs if emesis continues without improvement after 24 hrs of therapy.

*Diet:*

- PO diet can be resumed after a short period of gut rest.
- Dietary recommendations stated above for outpatient management similarly applies for in patient cases.

*Adjunctive treatment:*

- If the patient has acid reflux or PUD administer anti-acid suspensions or H2 receptor blockers as needed.

*Follow up:*

- Vital signs (twice daily)
- Weight (at presentation, then daily)
- Features of dehydration
- In put & out put
- Urine ketone (daily)
- Appetite

### ***Refractory patients:***

- Corticosteroids:-
  - Give methyl prednisolone IV 16 mg TID for 48 to 72 hrs. Then oral prednisone with tapering dose regimen of 40 mg per day for one day, followed by 20 mg per day for three days, followed by 10 mg per day for three days, and then 5 mg per day for seven days.
  - Hydrocortisone 100 mg IV bid (or 300 mg a single daily dose) until clinical improvement. Then oral prednisolone 40–50 mg daily, with the dose gradually tapered until the lowest maintenance dose that controls the symptoms is reached.
  - Dexamethasone (if the above drugs are not available).
- Initiate naso-gastric tube feeding.
- Discuss on individualized decision on pregnancy termination if a patient doesn't show improvement and deteriorating despite taking all available therapeutic measures (in cases of life-threatening conditions such as Wernicke's encephalopathy, liver and renal failure).

### **Criteria for Discharge**

- Improvement of ketone level in the urine
- Tolerating oral fluids and possibly food for at least 24 hrs hours after urine is free for ketone and with PO antiemetic. Appropriate anti-emetic to be taken at home:-
  - Vitamin B6 (pyridoxine):- 10–25 mg PO BID-QID PLUS  
Meclizine 25 mg PO TID **or**
  - Promethazine 12.5-25 mg every 6 hours **OR**
  - Metoclopramide 10 mg every 6-8 hours, **OR**
  - Ondansetron 4-8 mg PO TID.

***NOTE: Antiemetic should be taken for at least one week and with proper advice.***

### **COMPLICATIONS**

#### ***Maternal***

- Esophageal tear or rupture
- Peripheral neuropathy due to B6 and B12 deficiency
- Wernicke's encephalopathy
- Liver and renal failure

#### ***Fetal***

- Preterm deliveries
- Stillbirths
- Miscarriages
- Fetal growth retardation
- Fetal death

## ANTEPARTUM HEMORRHAGE

### DEFINITION

Ante-partum hemorrhage (APH) is vaginal bleeding from the 28th week of gestation till the fetus (last fetus in case of multiple pregnancies) is delivered.

### CAUSES

#### *Placental causes*

- Abruptio placentae
- Placenta previa
- Rare causes: vasa previa and other placental abnormalities

#### *Non-Placental causes*

- Heavy show
- Uterine rupture / dehiscence
- Local lesions of the cervix, vagina and vulva
- Systemic bleeding disorders
- Indeterminate: causes of bleeding not identified even after delivery and examining the placenta.

## PLACENTAL ABRUPTION

### DEFINITION

Placental abruption (abruptio placentae) is a separation of the normally implanted placenta before delivery of the fetus.

### RISK FACTORS

- |  |                             |
|--|-----------------------------|
| • Previous history of abruptio placentae | • Abnormal placenta         |
| • Hypertension                           | • Low socio-economic status |
| • Multiparity                            | • Smoking                   |
| • Maternal age $\geq 35$ years           | • Trauma (e.g., ECV)        |
| • Multiple pregnancy                     | • Polyhydramnios            |
| • PROM                                   | • Short cord                |
| • Distorted uterine cavity               | • Amniocentesis             |
|  | • Others.                   |



## CLASSIFICATION

**Table 4.** *Classification of abruptio placenta.*

<b>Clinical presentation</b>	<b>Mild (Grade1)</b>	<b>Moderate (Grade 2)</b>	<b>Severe (Grade 3)</b>
• Amount of blood	<400 mL	400-1000mL	>1000mL
• Uterine irritability (pain/tenderness)	Normal / slightly increased	Increased	Tetanic, reactive, board like, tender on palpation
• Fetal condition	Normal fetal heart beat	Abnormal / rarely death	Fetal distress or death common
• Shock	Absent	Mild, postural hypotension	Severe and always present
• Fibrinogen level	Normal	Slightly decreased	Decreased

## DIAGNOSIS

The clinical presentation of abruptio placenta mainly depends on the extent of placental separation, rate of separation and flow of blood through the cervix (concealed/ revealed).

- *Vaginal bleeding:* menstrual-like (dark), totally concealed or the amount is less than the degree of the shock.
- Abdominal pain/ (uterine) tenderness.
- NRFHRP or absent fetal heart beat.
- *Coagulation defect:* frank bleeding (epistaxis, ecchymosis, petechiae).

## INVESTIGATIONS:

- HCT
- Blood group and Rh
- *Coagulation profile:* Platelet count, PT, PTT, fibrinogen or bedside clotting and bleeding tests
- Ultrasound: Fetal assessment, retroplacental clot and for exclusion of placenta previa

## TREATMENT:

- Resuscitate and stabilize on arrival, and admit the patient.
- Assess maternal and fetal wellbeing.
- Prepare cross matched blood (at least 2 units).

**Expectant management:** <37 weeks, patient in stable condition and reassuring fetal condition

- Dexamethasone 6 mg IM BID or Betamethasone 12 mg IM every 24 hrs for 48 hours.
- Anti D 300µg IM if Rh negative and not sensitized.
- Closely monitor maternal and fetal conditions.
- Prevent and treat anemia.

**Immediate delivery:** Gestational age is  $\geq 37$  weeks or estimated fetal weight is  $\geq 2.5$  Kg, deranged vital signs, heavy bleeding, NRFHRP, IUFD, malformed fetus, established labor.

- *Mode of delivery:* Vaginal delivery is preferred.
- Cervical ripening and induction of labor, amniotomy.
- *Emergency cesarean section:* For severe bleeding endangering maternal life, NRFHR or other obstetric indications.

## COMPLICATIONS

- Hemorrhagic shock (acute kidney injury, congestive heart failure).
- DIC
- Utero-placental insufficiency that may lead to IUGR, fetal distress or IUFD
- PPH

## PLACENTA PREVIA

---

### DEFINITION

Placenta previa is defined as the presence of placental tissue over or adjacent to the cervical os.

### CLASSIFICATIONS

- **Placenta previa:** Internal cervical os is covered partially or completely by placenta (synonyms: central PP, major PP).
- **Low lying:** Placenta lies within 2 cm of the cervical os but doesn't cover it (synonyms: marginal PP, minor PP).

### RISK FACTORS

- Scarred uterus: previous uterine surgery (CS, myomectomy), uterine curettage.
- Previous history of placenta previa
- *Large placenta:* multiple pregnancy, diabetes, smoking, syphilis, Rh incompatibility
- High parity and advanced maternal age

### DIAGNOSIS

- **Vaginal bleeding:** Bright red, painless and recurrent.
- **Ultrasound (trans abdominal/ trans vaginal):** For placental location and fetal wellbeing assessment.
- **Double setup examination:**
  - Used only in areas where U/S is not available/or the U/S is not done by experienced person.
  - The procedure is done only after termination is decided to diagnose the cause of bleeding and decide the mode of delivery.

## TREATMENT

- Resuscitate and stabilize on arrival and admit the patient.
- Assess maternal and fetal wellbeing.
- Prepare cross matched blood (at least 2 units).

**Expectant management:** <37 weeks, patient in stable condition and reassuring fetal condition.

- Give dexamethasone 6 mg IM BID or betamethasone 12 mg IM every 24 hours for 48 hours if GA < 37 weeks.
- Anti D 300µg IM if Rh negative and not sensitized.
- Closely monitor maternal and fetal conditions with APH chart.
- Prevent and treat anemia.

**Immediate delivery:** Gestational age is  $\geq 37$  weeks deranged vital signs, heavy bleeding, NRFHRP, IUFD, lethal congenital anomaly of the fetus, established labor.

**Mode of delivery:**

- *Vaginal delivery* can be allowed cautiously for marginal placenta.
- *Cesarean delivery:* Placenta previa, excessive bleeding, NRFHR or other obstetric indications in low-lying placenta

## COMPLICATIONS

- PPH
- Hemorrhagic shock
- Adherent placenta
- Fetal distress or IUFD

## ADHERENT PLACENTA

---

### DEFINITION

Morbidly adherent placenta occurs when the placenta fails to detach from the uterine wall due to abnormal implantation at the basal plate.

### CLASSIFICATION

- Placenta accreta
- Placenta increta
- Placenta percreta

### RISK FACTORS

- Previous caesarean section
- Placenta previa

- Previous uterine surgeries

## DIAGNOSIS

- Ultrasound
- MRI (if available and U/S findings are inconclusive)

## MANAGEMENT

The optimum time for planned delivery for a woman with suspected adherent placenta and placenta previa is at 36 weeks.

- Plan the type of skin incision:-
  - A low transverse skin incision allows access to the lower half of the uterus.
  - If, the placenta is anterior and extending towards the level of the umbilicus, a midline vertical skin incision may be needed to allow for a high upper-segment uterine incision.
- Open the uterus at a site distant from the placenta, and deliver the baby without disturbing the placenta to enable conservative management of the placenta or elective hysterectomy if the accreta is confirmed.
  - Going through placenta is associated with more bleeding and chance of hysterectomy.
  - Conservative management of placenta accreta in a bleeding woman should be avoided.
- If the placenta fails to separate with the usual measures proceed to hysterectomy.
- If the placenta separates, it needs to be delivered and any hemorrhage that occurs needs to be managed.

## MULTIPLE PREGNANCY

### DEFINITION

Multiple pregnancy is defined as development of more than one fetus in a pregnant uterus. It includes twins (two fetuses), triplets (three fetuses) and higher order multiples (more than three fetuses).

### VARIETIES OF MULTIPLE PREGNANCY

Twin pregnancy can be *dizygotic* or *monozygotic*:

- **Dizygotic twins:** results from fertilization of two separate ova by two spermatozoa.
- **Monozygotic twin:** results from the division of a single zygote.

For higher order multiples, either of the two mechanisms mentioned above can operate. For example, triplets can be monozygotic (from one ovum), dizygotic (from two ova) or trizygotic (from three ova).

### RISK FACTORS

- Family history of twins particularly on the maternal side;
- Previous history of multiple pregnancy
- History of ovulation induction or in vitro fertilization
- Age greater than 35.

### DIAGNOSIS

Diagnosis requires a high index of suspicion if obstetric ultrasound is not being done routinely. The following symptoms and sign should trigger the suspicion of multiple pregnancy:

#### **History:**

- Excessive nausea and vomiting.
- Abdomen bigger than the previous pregnancy in a parous woman.
- Excess maternal weight gain.
- Breathlessness, palpitation during later months of pregnancy.
- Exaggerated fetal movements (kicks).

#### **Physical examination:**

- Fundal height is large for date.
- Palpation of multiple fetal poles.
- Fetal head small in relation to the uterus.
- Two fetal heart beats heard at the same time by two observers & differing in rate by at least 10 beats per minute.

#### Ultrasound:

Prenatal ultrasound is important to diagnose multiple gestation, determine placentation (chorionicity), ascertain gestational age and to identify fetal anomalies.

- **Diagnosis of multiple pregnancy:** separate gestational sacs, more than one yolk sac, embryo or fetus.
- **Diagnosis of chorionicity and amnionicity:**
  - *Dichorionic (DC):* The presence of two separate placentas, thick ( $\geq 2$  mm) dividing membrane and lambda sign (twin-peak sign) are the hallmark features of DC twins. Discordant fetal sex may assist in the late identification of DC pregnancies.
  - *Monochorionic (MC):* T-sign and thin ( $< 2$  mm thick) wispy dividing membrane are features for MC twins. *Monoamniotic Monochorionic (MA-MC)* twinning is diagnosed in the presence of two separate fetuses with single placenta and absent inter-twin membrane.
  - *Undetermined Chorionicity:* After 2<sup>nd</sup> trimester, the sensitivity and specificity of ultrasound to diagnose chorionicity decreases. Pregnancies are described as “undetermined chorionicity” in cases of concordant fetal sex and difficult/delayed assignment of chorionicity”. In such cases monochorionicity is assumed unless proven otherwise.
- **Gestational age:** Use the measurement of the largest fetus to date twin pregnancy.
- **Fetal anomalies:** Fetuses of multiple pregnancies are at increased risk for structural malformation and genetic abnormalities.

## ANTEPARTUM MANAGEMENT

#### Supportive care:

- *Supplementation of iron & folic acid:* Iron 60 to 120 mg per day, Folic acid 1mg/day.
- *Nutrition:* Increased caloric intake by 300 kcal/day (equivalent to an extra snack) above that of singleton pregnancy.
- *Rest:* Limited physical activities, early work leave.
- *Frequent ANC follow up:* For uncomplicated twin pregnancy-
  - Up to 24 weeks: a prenatal visit once a month.
  - Weeks 24 to 32: a prenatal visit every two weeks.
  - Weeks 32 to 38: a prenatal visit every week.

- For higher order multiples and complicated multiple pregnancies, more frequent follow up is required.
- At each visit perform thorough evaluation for signs and symptoms suggestive of complications (like pregnancy induced hypertension (PIH), preterm labor, PROM).
- Give advice on danger symptoms/signs of preeclampsia, abruptio placentae, preterm labor and PROM
- Birth preparedness and on the need for health facility delivery with cesarean section facility and in the presence of skilled birth attendant and neonatal resuscitation.

### **Test of fetal well being**

- Serial growth monitoring (ultrasound every 3-4 wks) especially in monochorionic twins.
- Antepartum fetal surveillance starting from 28wks for monochorionic, undetermined chorionicity and other complicated twins, from 32 weeks of gestation for uncomplicated twins, *every week* is indicated.
- Non-stress testing (if there is CTG in the facility)
- Biophysical profile/modified biophysical profile
- Assessing amniotic fluid (deepest vertical pool)

### **Timing of delivery**

- MA twins should be delivered at 32-34wks of GA after a course of steroids by *cesarean section*.
- Monochorionic twins should be delivered between 36-38 wks of gestation
- For complicated MC twins, the timing depends on the underlying pathology.
- Dichorionic twins should be delivered by 40 weeks of gestation.
- Elective cesarean sections for twin pregnancy should be done at 38 wks of gestation.

**Note:** *Induction & augmentation of labor are contraindicated in twins.*

- For term single intrauterine death (co-twin death), deliver without delay but if it is preterm, prolonging the pregnancy for the benefit of increased maturity of the surviving twin is recommended.
- In triplet pregnancies, delivery is recommended if pulmonary maturity is assured or at gestational age of not more than 36 wks.

### **Mode of delivery**

The route of delivery of a multiple gestation depends on the number of fetuses, presentation of the fetuses and whether spontaneous onset of labor is present.

- *Vaginal delivery:* For all twins with 1st vertex, allow delivery by vaginal route and manage the delivery of the second as for singleton - depending on the presentation.
- *Cesarean section:*
  - The route of delivery for higher order gestations.

- For all twins with 1st non-vertex, irrespective of the presentation of the 2nd

## INTRA-PARTUM MANAGEMENT

### General:

- Follow labor using partograph.
- Secure IV line and anticipate PPH.
- Make all preparations for delivery.
- Prepare delivery room and equipment for the birth of multiple babies.
- Arrange for a helper to assist you with the births and care of the babies.

### First stage of labor:

- Admit in early labor.
- Open IV line and hydrate as needed.
- Ascertain fetal number, presentations, estimated fetal weight and placental location.
- Close monitoring of fetal heart rate (FHR) in both fetuses.
- Augmentation is contraindicated before delivery of the 1<sup>st</sup> twin.

### Second stage of labor:

- Deliver the first baby following the usual procedure. Label - Twin-A.
- Ask helper to attend to the first baby.
- Leave the other clamp on the maternal end of the umbilical cord and do not attempt to deliver the placenta until the last baby is delivered.
- Do not give the mother bolus IM/ IV oxytocin until after the birth of all the babies.
- Immediately after the first baby is delivered, palpate the abdomen to determine the lie and presentation of the second twin.
- Check fetal heart rate.
- Perform a vaginal examination to determine the presentation of the second twin, presence or absence of prolapsed cord and whether membranes are intact or ruptured. Bedside ultrasound can be used to confirm the presentation and lie of the fetus.
- After spontaneous or artificial rupture of the membranes, perform vaginal examination to check for prolapsed cord. If the cord has prolapsed, manage as a case of cord prolapse.
- If the membranes are intact and if there is no contraindication (e.g., high station), artificial rupture of membranes (ARM) of the second sac facilitates the labor.
- Birth interval of about 30 minutes is considered a reasonable time, after which delivery should be expedited. This may require:
  - Augmentation of labor with oxytocin, if contractions are inadequate after birth of first baby, in vertex presentation using rapid escalation.
  - Operative vaginal or abdominal delivery depending on the case.
- Stay with the woman and continue monitoring her and the fetal heart rate closely.



- When strong contractions restart, ask the mother to bear down when she feels ready.
- If spontaneous delivery does not occur within 2 hours of good contractions, do operative vaginal delivery or CS depending on the case.
- After delivery of the second baby, resuscitate if necessary. Label - Twin B.
- Make sure there is no more baby and proceed to 3<sup>rd</sup> stage management.

### ***Third stage of labor:***

- Manage third stage of labor actively after the delivery of the last fetus following the steps in active management of the third stage of labor (AMTSL).
- Before and after delivery of the placenta and membranes, observe closely for vaginal bleeding because this woman is at greater risk of postpartum hemorrhage.
- Examine the placenta for completeness, vascular anomalies and communications, and zygosity (mono or dizygotic twin).

### ***Immediate postpartum care:***

- Monitor closely as risk of postpartum bleeding is increased.
- Provide immediate postpartum care.
- Plan to measure hemoglobin postpartum.
- Special support and follow up for feeding and care of preterm/low birth weight babies.

## **COMPLICATIONS**

Multiple pregnancy is associated with all obstetric complications with the possible exception of macrosomia and post term pregnancy:

### ***Maternal complications:***

- Hyperemesis
- Anemia
- Miscarriage
- Pregnancy-induced hypertension and pre-eclampsia
- Polyhydramnios
- Uterine inertia (poor contractions during labor)
- Post-partum hemorrhage (uterine atony, retained placenta).

### ***Placental/fetal complications:***

- Placenta previa
- Abruptio placentae
- Placental insufficiency
- Preterm delivery
- Low birth weight
- Malpresentations

- Cord prolapse
- Congenital anomalies (especially in monozygotic).

***Complications unique to multiple pregnancies:***

- Conjoined twins
- Monoamniotic twins
- Interlocking of twins
- *TAPS*: Twin anemia-polycythemia sequence
- *TRAP sequence*: Twin reversed arterial perfusion
- *Co-twin death*: Single intrauterine fetal death
- *Discordant Twins*: A difference in EFW of greater than 20% between twin A & Twin B expressed as (EFW larger fetus – EFW smaller fetus) / EFW larger fetus.
- *Twin-Twin Transfusion*: MC twins with an oligohydramnios/polyhydramnios sequence and the presence of a large fetal bladder in the polyhydramnios twin and a small or absent fetal bladder in the oligohydramnios twin are consistent with TTTS.

***Conditions requiring referral to a tertiary/ regional center***

- Triplets and higher order pregnancies
- Monoamniotic twins
- Discordant twins or suspected twin-twin transfusion cases
- Selective IUGR

## PREMATURE / PRELABOR RUPTURE OF MEMBRANE

### DEFINITIONS

Premature / pre-labor rupture of fetal membranes is rupture of membranes (ROM) before the onset of labor.

Prolonged PROM is rupture of membranes for > 12 hours.

### CLASSIFICATION

- **Term PROM:** is rupture of membranes at or after 37 completed weeks of gestation.
- **Preterm PROM:** is rupture of membranes before 37 completed weeks of gestation.

### RISK FACTORS

- *Mechanical factors:* Multifetal gestation, polyhydramnios, pulmonary diseases, cervical conization/ LEEP/ cerclage.
- *Urogenital infections:* UTI, cervicitis, GBS, bacterial vaginosis.
- Previous history of preterm PROM, preterm labor.
- Second and third trimester bleeding (e.g. abruptio placenta).
- *Other risk factors:* Low socioeconomic status, nutritional deficiencies, low BMI, smoking and connective tissue disorders.

### APPROACH TO MANAGEMENT OF PROM

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1. Confirm the diagnosis of ROM.
2. Evaluate for the presence of chorioamnionitis and labor.
3. Determine the gestational age and evaluate the fetal condition.
4. Subsequent management based on the above findings.

### CONFIRM THE DIAGNOSIS OF ROM

#### History:

- The classic clinical presentation of PROM is a sudden "gush" of clear or pale-yellow fluid from the vagina.
- Patients can present with intermittent or constant leaking of small amounts of fluid or just a sensation of wetness within the vagina or on the perineum.

## Diagnostic evaluation:

### *Sterile speculum examination:*

- Observation of amniotic fluid coming out of the cervical canal.
- If amniotic fluid is not immediately visible, the woman can be asked to push on her fundus, valsalva, or cough to provoke leakage of amniotic fluid from the cervix.
- Pooling in the vaginal fornix needs further evaluation as the collection may be due to excessive vaginal discharge or urine.
- Presence of meconium, vernix caseosa or lanugo hair in the fluid pooling indicates PROM while presence of uriniferous smell suggests urinary incontinence.
- Note that sterile speculum examination can also help to check for the presence of cord prolapse and to assess cervical status. Amniotic fluid can also be sent for maturity tests (if available).
- **Digital examination should be avoided** because it may decrease the latency period (i.e. time from rupture of membranes to delivery) and increase the risk of chorioamnionitis.
- If PROM is not obvious after visual inspection, examine the fluid for ferning or PH.

### *Ferning test:*

- Obtain fluid by swabbing the posterior fornix (avoid cervical mucus to decrease chance of false positive result).
- Spread some fluid on a slide & let it dry for at least 10 minutes. Examine it with a microscope and look for a fern-leaf pattern (arborization).
- The test is not affected by meconium, vaginal PH & blood.

### *Nitrazine paper test:*

- Hold a piece of nitrazine paper in a hemostat (artery forceps) & touch it against the fluid pooled on the speculum blade. A change from yellow to blue indicates presence of amniotic fluid (a PH >6 - 6.5).
- False negative tests results can occur when leaking is intermittent or the amniotic fluid is diluted by other vaginal fluids.
- False positive results can be due to the presence of alkaline fluids in the vagina, such as blood, seminal fluid, or soap. In addition, the pH of urine can be elevated to near 8.0 if infected with *Proteus* species.

### *Pad test:*

- Can be helpful when there is no pooling & no leakage from cervix.
- Place a vaginal pad over the vulva & examine it one hour later visually & by odor.
- Wetting with no urine and no vaginal discharge (vaginitis) may suggest PROM.
- If the diagnosis remains in question, repeat the test.

**Ultrasound examination:** Performed to look for reduction of amniotic fluid volume.

## EVALUATE FOR THE PRESENCE OF CHORIOAMNIONITIS AND LABOR

### *Clinical signs and symptoms of chorioamnionitis*

Once PROM is confirmed, a careful physical examination is necessary to search for other signs of infection. The criteria for the diagnosis of clinical chorioamnionitis include:

- Maternal fever
- Tachycardia
- Leukocytosis
- Uterine tenderness
- Offensive vaginal discharge and
- Fetal tachycardia

Because of the low specificity of clinical findings, a consideration of other potential sources of fever and other causes of clinical symptoms is essential for the diagnosis of chorioamnionitis. The combination of clinical criteria provides a highly accurate diagnosis of chorioamnionitis.

### *Laboratory tests*

- *Complete blood count:*
  - Maternal leukocytosis (WBC >12,000 /mm<sup>3</sup>) or the presence of a left shift (> 90%) often supports the diagnosis of chorioamnionitis.
  - Isolated leukocytosis in the absence of other signs or symptoms is of limited value as it may be induced by several conditions including labor and steroid use.
- *C-reactive protein (CRP): High level* is associated with a higher risk of chorioamnionitis in the setting of PPROM.
- *Amniotic fluid testing:* Tests on amniotic fluid, usually obtained by amniocentesis, can be used for the diagnosis of subclinical chorioamnionitis and to confirm lung maturity.

## DETERMINE THE GA AND EVALUATE THE FETAL CONDITION

- Confirm the gestational age of the fetus (using LMP, early U/S).
- Perform ultrasound to determine fetal presentation and lie.
- Electronic fetal monitoring to identify occult umbilical cord compression.
- Do biophysical profile or NST.

## SUBSEQUENT MANAGEMENT

### *Indications for expedite delivery:*

Indications for expedite delivery are onset of labor, gestation age  $\geq 37$  wks, evidence for non-reassuring fetal status, evidence for chorioamnionitis, lethal congenital anomalies, intrauterine fetal death, if there is high risk of cord prolapse (e.g., transverse lie) and abruptio placenta.

Note that if the gestational is below 34 weeks and both the fetal and maternal conditions are stable, expectant management can be considered for abruptio placenta in a setting where close follow up is possible.

### *Expectant management*

- Admit to the ward (Transfer patients with early preterm PROM to a higher health facility with newborn intensive care, if possible).
- Avoid digital cervical (pelvic) examination.
- Advise bed-rest, to potentially enhance amniotic fluid re-accumulation & possibly delay onset of labor.

#### Corticosteroids

- Administer antenatal corticosteroids (betamethasone 12 mg intramuscularly 24 hours apart for two doses or dexamethasone 6 mg IM 12 hours apart for four doses) for lung maturity.
- Note that if preterm birth is considered imminent, treatment for short duration still improves fetal lung maturity and chances of neonatal survival. Therefore, the first dose of corticosteroids should be administered even if the ability to give the second dose is thought to be unlikely.
- Antenatal corticosteroid therapy should not be administered in women with chorioamnionitis.

#### Antibiotics

- Ampicillin 2gm IV QID and Erythromycin 250 mg P.O QID for 48 hours followed by Amoxicillin 500 mg P.O TID & Erythromycin 250 mg. P.O QID for 5 days.
- Azithromycin may be substituted for Erythromycin with regimen of 500mg PO on day 1 followed by 250mg PO daily for 6 days.
- If there is onset of labor and in the absence of signs of uterine infection, discontinue antibiotics after delivery.

#### Neuroprotection

- If gestational age is less than 32 weeks and preterm birth is likely within the next 24 hours, consider magnesium sulfate for neuroprotection

#### Monitoring and Follow up

Monitor the following clinical features during expectant management of PROM:

- Maternal pulse & temperature - every 4-6 hours
- FHR - every 4-6hrs (& if possible CTG 2x daily)
- Uterine tenderness or irritability (or pain) - daily
- WBC count & differential - changes, every 2-3 days
- Amniotic fluid appearance & odor - daily
- If possible, examine for presence of subclinical intraamniotic infection with amniocentesis.
- If there is a need for termination of expectant management, deliver the baby. If there is no contraindication for priming, induction or vaginal delivery, ripen the cervix and induce labor.

### ***Treatment of chorioamnionitis:***

- Give a combination of antibiotics until the woman gives birth. **Note** that metronidazole should be added if the route of delivery is CS to cover anaerobic organisms.
- **Option 1:** Ampicillin 2 g IV every six hours PLUS gentamycin 5 mg/kg body weight IV every 24 hours ± metronidazole 500 mg IV TID
- **Option 2:** Ceftriaxone 1 gm IV BID for 10 days ± metronidazole 500 mg IV TID
- After delivery, shift the antibiotics to PO medication after the symptoms and signs of infection have subsided for 48 hours.
- Emergency priming and induction of labor if there is no contraindication for vaginal delivery.
- If conditions for vaginal delivery are not met, perform C/S. (Before procedure, cleanse the vagina with povidone-iodine)
- Newborn requires evaluation and management in NICU.

### ***Labor and delivery for term PROM without infection:***

- If cervix is favorable, labor is induced, unless there are contraindications to labor or vaginal delivery, in which case cesarean delivery is performed.
- If cervix is unfavorable, ripen the cervix (preferably with PO misoprostol).
- Institute antibiotic (Ampicillin 2gm IV QID) when the duration of ROM >12hrs.
- Follow for features of chorioamnionitis (maternal fever, tachycardia, leukocytosis, uterine tenderness, offensive vaginal discharge and fetal tachycardia).
- The antibiotic should continue throughout labor and for at least one dose after delivery.

### ***Management of near-term PROM (34-37 weeks)***

- Induction or expectant management is acceptable management options depending on local resources.

## **COMPLICATIONS**

**Maternal:** Abruption placentae, chorioamnionitis, sepsis, higher risk for cesarean delivery retained placenta and hemorrhage.

**Fetal and Neonatal:** Infection, umbilical cord compression as a result of oligohydramnios, cord prolapse, fetal death, preterm birth and associated complications (RDS, NEC, IVH, etc), neonatal infections, long-term sequelae such as cerebral palsy, pulmonary hypoplasia and restriction deformities.

## LABOR AND DELIVERY

### DEFINITION

Labor is a process where regular uterine contraction results in progressive dilatation and effacement which ends in the delivery of the fetus, placenta and membranes.

### NORMAL LABOR AND DELIVERY

Labor is considered normal when the following conditions are fulfilled:

- Parturient without any apparent risk (e.g., pre-eclampsia, previous scar, etc.)
- Labor should start spontaneously
- Labor should start at term
- Vertex presentation
- Spontaneous vertex delivery, with minimal assistance
- Normal duration for all stages of labor
- Good neonatal and maternal outcome

**NOTE:** The diagnosis of normal labor is established after the evolution of all the stages & 1-2 hours after delivery.

### False Labor

False labor is irregular contractions of the uterus prior to actual labor pains resembling those of normal labor. Signs of false labour are

- Mild pain and irregular contractions.
- There is no mucous blood-stained discharge (show).
- No progressive cervical dilatation observed on follow up.

### CLASSIFICATION OF LABOR

Normal labor is classified / staged as:

- **First stage of labor:** The period between onset of regular uterine contractions to full cervical dilatation. It is subdivided into two phases: -
  - *Latent phase:* The phase of labor between the onset of regular uterine contraction to 5 cm of cervical dilatation (often slow & unpredictable rate of cervical dilatation).



- *Active phase:* The phase of labor after 5 cm of cervical dilatation to full cervical dilatation (more rapid rate of cervical dilatation).
- **Second stage of labor:** The stage of labor between full cervical dilatation and delivery of the last fetus (often associated with involuntary bearing down urge because of expulsive uterine contraction).
- **Third stage of labor:** The stage of labor between delivery of the last fetus and delivery of the placenta & membranes.

## DIAGNOSTIC CRITERIA OF TRUE LABOR

Regular, rhythmic uterine contractions ( $\geq 2$  contractions in 10 minutes) with one or more of the following:

- Rupture of the membranes.
- Cervical dilatation of 4 centimeters.
- Cervical effacement of  $\geq 80\%$ .
- Bloody show (If fetal membranes are ruptured or if digital vaginal examination was done within the past 48 hours, show shouldn't be used as diagnostic criteria.)

**NOTE:** Always rule out false labor to avoid unnecessary interventions.

## ADMISSION CRITERIA

- For a woman without known risk and intact membrane if cervical dilation is  $\geq 4$  cm.
- Those women with ruptured membranes & known risk factor can be admitted at any cervical dilatation.

## ADMISSION PROCEDURE

- Warm and friendly acceptance.
- Immediate assessment of maternal and fetal condition to check for signs of imminent delivery.
- Review ANC record and revise her birth preparedness plan.
- Appropriate history, physical examination (including vaginal examination).
- Perform laboratory investigations which are not determined during ANC (e.g., Blood group and Rh, urine analysis, VDRL, HBsAg and HIV test).
- If urine analysis and hemoglobin/ hematocrit are not determined within the past two weeks, repeat the test.
- If serology for HIV is positive refer to section on PMTCT guide (HIV).
- Inform and regularly update client and attendants about her condition and the status of labor.
- Provide loose fitting gown (if possible).
- Revise her postpartum contraception plan, counsel and prepare accordingly. (If the client is in active labor, postpone the counselling to the immediate postpartum period).

**NOTE.** Team approach is important, and all abnormal clinical/ laboratory findings should be informed to the most senior personnel in charge of the labor ward activity.

## MANAGEMENT DURING 1<sup>st</sup> STAGE

### LATENT PHASE OF FIRST STAGE OF LABOR

If the client is in LFSOL and fulfils admission criteria, admit the mother and follow her using the “latent phase follow-up chart”. ([Table 5](#))

**Table 5. Latent phase of first stage of labor follow up chart.**

Name _____ Age _____ MRN _____												
Admission _____ diagnosis _____ Status _____ of												
membranes _____ If Ruptured duration in hours _____ Admission date _____												
Time _____												
Date	Time	BP	PR	R R	T <sup>0</sup>	FHR	Uterine contrac tion	Cervical dilatation & effacement	Colou r of liquor	Remar k	Sign	

- Uterine contraction, FHR & PR every 1 hour.
- BP every 4 hours if not indicated more frequently.
- Cervical condition every 4 hours but should be done after spontaneous rupture of membranes, in the presence of abnormal FHR or before giving analgesia.

### ACTIVE PHASE OF FIRST STAGE OF LABOR

All observations and findings should be recorded on the partograph ([figure 4](#)) if the client presents with cervical dilatation of >5 cm (or when she enters this phase after admission)

Parts of the partograph

- Identification
- Fetal status
- Labor progress
- Medication
- Maternal condition

**NOTE:**

- Start partograph by plotting the cervical dilatation on the alert line.

- Labor ward personnel should be proficient in the filling & interpretation of the partograph.

Name	Gravida	Para	Hospital number
Date of admission	Time of admission	Ruptured membranes	hours

Fetal heart rate

200  
190  
180  
170  
160  
150  
140  
130  
120  
110  
100  
90  
80

Amniotic fluid Moulding

10  
9  
8  
7  
6  
5  
4  
3  
2  
1  
0

Cervix (cm) [Plot X]

Descent of head [Plot O]

Hours

Time

Alert

Action

Contractions per 10 mins

5  
4  
3  
2  
1

Oxytocin U/L drops/min

Drugs given and IV fluids

Pulse ● and BP ▲▼

180  
170  
160  
150  
140  
130  
120  
110  
100  
90  
80  
70  
60

Temp °C

Urine { protein  
acetone  
volume

**Figure 4.** Partograph

## Vaginal examination during labor follow up

Vaginal examination is done to evaluate cervical dilatation, station, fetal position, fetal presentation, pelvic adequacy, status of liquor, molding and caput. The frequency of vaginal examination is every 4 hours but can be repeated:

- After spontaneous rupture of membranes
- When there is abnormal FHR (NRFHR), and
- If symptoms are suggesting for second stage of labor (to confirm the diagnosis).

## Fetal well-being monitoring

### *FHR*

- Use Pinnard stethoscope or doppler device for women with no known problem
- Count the FHR immediately after a contraction for 1 min, every 30 min for low-risk pregnancy and every 15 min for high risk pregnancy.
- Continuous electronic FHR monitoring is preferred to monitor high-risk pregnancies.
- FHR 100-180 BPM is normal for term normal fetus. If FHR is less than 100 or higher than 180 manage as Non reassuring fetal heart rate (NRFHR).

### *Status of liquor (Grading of meconium)*

- Clear liquor.
- Grade I - Good volume of liquor, lightly meconium stained.
- Grade II - Reasonable volume with a heavy suspension of meconium.
- Grade III - Thick meconium/particulate matter which is undiluted.

**NOTE:** A newly appearing meconium is alarming sign.

### *Grading of Molding*

- No molding: The cranial bones are separate along the suture lines.
- Grade I: Fetal cranial bones are touching each other along the suture lines.
- Grade II: Fetal cranial bones are overlapping but can be separated.
- Grade III: Fetal cranial bones are overlapping & are not separable.

## Monitoring of progress of labor

### *Uterine contraction:*

- Frequency (uterine contraction per 10 min), duration and intensity of each contraction is determined by palpation or toco-dynamometer every 30 minutes.

### *Descent of fetal head:*

- Assess descent of the fetal head during abdominal palpation before vaginal examination.

***Cervical Dilatation:***

- The dilatation of the cervix is plotted with “X” on the alert line when starting partograph. Start the partograph at 5 cm of dilation.
- Crossing of the alert line mandates re-evaluation for maternal & fetal conditions thoroughly. When maternal & fetal conditions are reassuring there can be a place for observation without intervention for 2 hours.

**Maternal wellbeing monitoring**

***Vital signs:***

- Pulse rate - half hourly (30’).
- Temperature and BP - every 4 hourly or more frequently if indicated.

***Urine***

- Monitor urine output.
- Test urine for ketone and protein.

***Maternal position:***

- Avoid supine position.
- Note that the mother should not be confined to bed unless contraindicated (e.g. sedated patient, for frequent monitoring, high head and ruptured membranes).
- She can assume any position comfortable to her (left lateral position, right lateral position, sitting).

***Nutrition- oral intake:***

- In general, encourage oral intake of liquid diet (tea, juice) but not hard foods.
- Consider fluid diet as a source of water and energy for those mothers staying longer before delivery (e.g., small sips of sweetened tea or water).

***Companionship in labor:***

- Encourage partner to accompany the spouse who is in labor. Partner support and education should start during ante-natal care and continue throughout child birth.

***Pain management:***

- All available pain management options should be informed for the client. Provision of pain relief should be individualized based on preference and request.
- Options of pain relief in labor can be non-pharmacologic or pharmacologic.
- *Non pharmacologic:*
  - Provide continuous emotional support.
  - Inform laboring mothers about the procedures to which they will be subjected during labor and delivery.

- Relaxation & Massaging (back rubbing).
- Hot compress (back).
- *Pharmacological:*
  - The selected analgesia should be available and safe to the mother and fetus.
  - Timing, route, dosage and frequency of administration should be based on the anticipated time of delivery.
  - Avoid combination of opioids.
  - A small dose given more frequently is preferable to a large dose administered less frequently.
  - Whenever opioids are used during labor (>4 cm), all preparations should be made to treat neonatal respiratory depression. This includes preparation of ventilation, oxygenation, gentle stimulation and judicious use of the opioid antagonist Naloxone. See box below for pharmacologic pain management.

#### PHARMACOLOGICAL PAIN MANAGEMENT

##### 1. *Opioids alone (pethidine, diamorphine and fentanyl are options)*

- *Pethidine injection:* 50 mg IM initially. Assess after ½ hr and if not adequate and side effects not troublesome, repeat 50mg. Onset of action 10-20 mins and lasts for 2-4 hrs.
- *Pethidine injection:* 25- 50 mg IV, onset of action immediately and effect lasts for 1.5-2 hrs. Repeat doses every 1-2 hours depending on the level of sedation. Always check respiratory depressant effect of pethidine on the mother as well as the neonate.

##### 2. *Lumbar Epidural Analgesia (if available).*

## MANAGEMENT DURING 2<sup>nd</sup> STAGE

### DEFINITION:

The second stage is the time from full dilation of the cervix to delivery of the last fetus.

### MATERNAL CARE AND WELLBEING EVALUATION

- BP monitoring: every 1hour (if indicated more frequently).
- PR, temp., and RR: every 30 minutes.
- Evaluate general condition: fatigue, pain, physical depletion and state of hydration.
- Evaluate for the presence of the urge to push and /or effort.
- Avoid early push.
- She can attain any position until the presenting part is visible or delivery is imminent.

- The woman should be encouraged to empty her bladder before delivery.

## **BIRTHING POSITIONS**

- Women can assume any position (e.g. semi sitting, squatting, kneeling or left lateral position) unless delivery is imminent or there is a need for operative vaginal delivery or episiotomy.
- Prolonged recumbent position should be avoided.

## **FHR / FETAL STATUS MONITORING**

- Every 15 min for low-risk pregnancy.
- Every 5 min for high-risk pregnancy (continuous electronic monitoring is preferred for fetal monitoring of high-risk pregnancies).
- Evaluate the status of liquor (progress of meconium staining) during pelvic examination.

## **LABOR PROGRESS EVALUATION**

- Evaluate the degree of descent and / or station every 1 hour.
- Look for extent of caput and degree of molding.

## **PREPARATION FOR DELIVERY**

- Notify the labor ward staff that delivery is imminent.
- Take the woman to the delivery room (if it is a separate room).
- Make sure all the equipment for delivery and newborn care are available at the delivery room.
- There should be a pre-warmed neonatal corner for neonatal care.
- The birth attendant should wash hands and wear complete personal protection equipment (gloves, gown, apron, mask, cap and eye protection).
- Sterile draping in such a way that only the immediate area around the vulva is exposed.
- Perineal care: clean the vulva and perineum with antiseptics / tap water (downward and away from the introitus). Wipe feces downwards. Avoid routine vaginal cleansing.

## **ASSISTANCE OF SPONTANEOUS DELIVERY**

### **Goal**

- Reduction of maternal trauma, prevention of fetal injury and initial support of the newborn.

### **Perineal protection (hands on birth)**

- Perineal guard to support perineum is recommended during childbirth for reduction of perineal trauma & facilitation of birth.

### **Episiotomy:**

- Routine episiotomy should be avoided and individualization is important.



- *Indications for episiotomy:*
  - Imminent perineal tear,
  - Perineal resistance for fetal head descent, or
  - Presence of fetal/maternal indication for expedited delivery.
- *Timing of episiotomy:* When the presenting part distends the vulva 2-3 cm (unless early delivery is indicated).
- *Type:* Medio-lateral episiotomy is recommended.
- Give analgesia / anesthesia before episiotomy is performed and during repair.

### **Delivery of the Head:**

- Perform perineal support to reduce risk of perineal trauma and to facilitate birth.
- Prevent rapid delivery and assist extension of the head.
- Check for cord around the neck and if present disentangle it from around the head or if tight clamp at two sites and cut the cord.
- After delivery of the head, wipe the mouth and nose (routine suctioning of oropharynx is not recommended).

### **Delivery of the rest of the body**

- After delivery of the head, allow restitution (turning of the head towards one maternal thigh with internal rotation of the shoulders).
- Hold on both sides of the head and deliver the anterior shoulder by gently pulling the head downwards.
- Deliver the posterior shoulder by pulling upwards after delivery of anterior shoulder.
- The rest of the body usually follows easily. Support the baby's body with both hands and place the baby on maternal abdomen.
- Dry the newborn's body with clean dry towel. Remove the wet towel and wrap the newborn with dry towel.
- Record the time, APGAR score and sex of the baby. Inform the mother.

### **Cord clamping**

- Delay cord clamping for 1-3 minutes after delivery or until cord pulsation is absent (either of the two which comes first).
- Clamp the cord immediately in the following conditions: preterm baby, low birth weight, neonatal asphyxia, Rh isoimmunized pregnancy or HIV.
- Clamp the cord 4-5 cm away from the umbilicus.
- Take cord blood if indicated.

## THIRD STAGE OF LABOR

### DEFINITION:

Third stage of labor is the time interval between the delivery of the last fetus up to the expulsion of the placenta.

During this stage, there is a significant risk of hemorrhage. Therefore, all mothers require close monitoring and routine prevention of postpartum hemorrhage (PPH) through active management of third stage of labor (AMTSL).

### ACTIVE MANAGEMENT OF THIRD STAGE OF LABOR (AMTSL)

AMTSL refers to a sequence of clinical actions taken by a skilled birth attendant to facilitate the delivery of the placenta, by promoting uterine contraction and placental expulsion. Every woman who deliver vaginally in the health facility should be managed with AMTSL.

### COMPONENTS OF AMTSL

1. Administer uterotonic medication within one minute of the birth of the last baby.
2. Controlled cord traction.
3. Verification of uterine tone and if the uterus is not well contracted, uterine massage.

### DRUGS USED FOR AMTSL

**Oxytocin:** the preferred drug for AMTSL and 1<sup>st</sup> line drug for PPH caused by uterine atony.

**Ergometrine:** the 2nd line drug for PPH though associated with more serious adverse events.

Ergometrine is contraindicated in hypertensive women and in those with cardiac problems.

**Misoprostol:** is cheap and stable at room temperature.

**NOTE:** Uterotonics require proper storage:

- *Oxytocin:* 2-8°C, protect from freezing
- *Ergometrine:* 2-8°C and protect from light and from freezing.
- *Misoprostol:* room temperature, in a closed container.

## STEPS OF AMTSL

### 1. Use of uterotonic agents

- Within one minute of the delivery of the baby, palpate the abdomen to rule out the presence of an additional fetus(s).
- Within one minute of the delivery of the baby, give uterotonic medication.
- Give oxytocin 10 IU injected deep into the woman's thigh muscles IM. It is effective 2-3 minutes after injection. It has minimal side effects and can be used in all mothers.
- If oxytocin is not available, administer other uterotonic agents (within one minute of delivery):
  - Carbetocin 100 micrograms IV or IM, or
  - Ergometrine 0.2 mg IM within 1 minute of the delivery or
  - Misoprostol 600 mcg oral

### 2. Controlled cord traction

- Clamp the cord close to the perineum within 1-3 minutes after delivery or after cord pulsation stops (either of the two which comes first). Early cord clamping (< 1 min) is recommended if the neonate is asphyxiated and needs resuscitation.
- Place the other hand just above the woman's pubic bone and stabilize the uterus by applying counter-pressure during controlled cord traction.
- Keep slight tension on the cord and wait for strong uterine contraction.
- With strong uterine contraction, gently pull the cord downwards to deliver the placenta. Continue to apply counter-pressure on the uterus.
- If the placenta does not descend, wait until the uterus contracts and repeat the controlled cord traction with the next contraction.
- As the placenta delivers, hold the placenta in two hands and gently turn it until the membranes are twisted. Gently pull the placenta to complete the delivery.
- If the placenta fails to be delivered within 30 minutes after delivery, manage as retained placenta (see section on PPH)
- Inspect both the placenta and fetal membranes for completeness.

### 3. Verification / checking of uterine tone

- Immediately check for contraction. If the uterus is soft, massage the fundus of the uterus until the uterus is well contracted.
- Assess uterine tone every 15 minutes for the first 2 hours after delivery. If the uterus is atonic, massage the uterus.
- Teach the woman how to assess uterine tone and massage her own uterus.
- Estimate and record blood loss.

- Note that sustained uterine massage is not recommended as an intervention to prevent postpartum hemorrhage in women who have received a prophylactic uterotonic.

**NOTE:** Provide post-natal family planning counselling for informed choice & decisions.  
(Implement when applicable)

## NEWBORN CARE AT THE TIME OF BIRTH

### ESSENTIAL NEWBORN CARE (ENC)

---

#### DEFINITION

Essential newborn care (ENC) is care given to all newborn infants at birth to optimize their chances of survival and wellbeing.

ENC starts before birth (teaching of parents about the unborn child during ANC) and extends to postnatal period.

#### COMPONENTS OF ENC AT BIRTH FOR ALL BABIES

- Prevent hypothermia.
- Observe for the first breath (spontaneous breathing).
- If any difficulties to establish spontaneous breathing immediately start bag and mask ventilation.
- Cord and eye care.
- Provide vitamin k.
- Put the baby in skin to skin contact with the mother.
- Start exclusive breast feeding within one hour of life.
- Measure newborn's weight.
- Vaccination of BCG, HBV and polio -0.

#### PREPARATION FOR ENC DURING BIRTH

- Every delivery should be attended with the anticipation of need for newborn resuscitation.
- Personnel should always wash hands with soap and water and use PPE.
- Keep the delivery room warm.
- Prepare the newborn corner/ resuscitation area.
  - Turn on the radiant warmer until the baby is delivered.
  - Prepare functional self-inflating bag.
  - Prepare functional bulb suction or suction device with catheter.
  - Prepare stethoscope, clock and thermometer.

## STANDARDIZED PROCEDURES IN ESSENTIAL NEWBORN CARE (ENC)

### Step 1: Dry and stimulate

- Deliver the baby on clean, dry towel draped over the mother's abdomen.
- Immediately dry the whole body (including the head and limbs).
- Stimulate by rubbing the back or flicking the soles of the feet.
- Remove the wet towel and wrap with dry towel to keep the baby warm.
- Let the baby stay in skin to skin contact on the mother's abdomen.

### Step 2: Evaluate Breathing

- While drying and stimulating, check if the baby is breathing.
- Always keep the head in a slightly extended position.
- If the baby is not crying or breathing immediately cut the cord, call for help and shift to the resuscitation corner.
- If the baby cries or breathes well (see box below), continue routine essential newborn care.
- Do not do suction of the mouth and nose as a routine. Do it only if there is thick meconium, mucus or blood obstructing the airway.

#### NORMAL BREATHING

Normal breathing rate in a newborn baby is 30 to 60 breaths per minute. The baby should not have any chest in-drawing or grunting. Small babies (less than 2.5 kg at birth or born before 37 weeks gestation) may have some mild chest in-drawing and may periodically stop breathing for a few seconds.

### Step 3: Cord care

Optimal cord care consists of the following:

#### *Clamping / tying the cord:*

- If the baby does not need resuscitation, wait for approximately 1-3 minutes after birth or until cord pulsations are absent, whichever comes first, and then place one metal clamp / cord tie 2 cm from the baby's abdomen and the second clamp / tie another 2 cm from the first clamp/tie.
- The cord may be tied by using sterile cotton ties, elastic bands, or pre-sterilized disposable cord tie.

#### *Cutting the cord:*

- Cut the cord with sterile scissors or surgical blade, under a piece of gauze in order to avoid splashing of blood. At every delivery, a clean separate pair of scissors or blade should be designated for this purpose.
- Check for bleeding / oozing and retie if necessary.

***Counseling on cord care:***

- Advise the mother not to cover the cord with the diaper
- Do not use bandages as it may delay healing and introduce infection.
- Do not use alcohol for cleansing as it may delay healing.
- Do not apply traditional remedies to the cord as it may cause tetanus and other infections.
- Apply 4% chlorhexidine immediately after cutting the cord and continue daily for 7 days.

***Watch out for:***

- Pus discharge from the cord stump.
- Redness around the cord especially if there is swelling.
- Fever (temperature more than 38°C) or other signs of infection.

***Step 4: Keep the newborn warm (Prevent Hypothermia)***

- Support the mother to keep the baby warm by placing skin-to-skin contact on her chest.
- Cover the baby's body and head with pre-warmed clean cloth including hat and socks.
- Use a blanket to cover the baby and the mother
- Keep the newborn with the mother
- Delay bathing for at least 24 hours

***Step 5: Initiate breastfeeding in the first one hour***

***Early initiation of breastfeeding:*** Breastfeeding within the first hour, with counseling for correct positioning.

***Benefits of breast feeding:***

- Early breastfeeding reduces the risk of postpartum hemorrhage for the mother.
- Colostrum (the "first milk") has many benefits for the baby, especially anti-infective properties.
- Skin to skin contact while feeding helps the baby to stay warm.
- Breastfeeding delays the mother's return to fertility because of lactation.
- Breastfeeding provides the best possible nutrition for the baby.

***Breast feeding counseling:***

- Encourage mothers to breastfeed their babies 'on demand'.
- Frequency of feeding:-
  - Should not be less than 8 times in 24 hours.
  - If the baby is small (< 2,500 grams), wake the baby to feed every 3 hours.
- If the baby is not feeding well, seek help.

- Successful breastfeeding requires support for the mother from the family and health institutions.
- There is no need for extra bottle feeds or water for normal babies, even in hot climates
- Avoid the use of the bottles and pacifiers.

**Step 6: Administer eye drops / eye ointment**

- Wash your hands with soap and water
- Clean eyes immediately after birth with swab soaked in sterile water, using separate swab for each eye.
- Clean from medial to lateral side.
- Give tetracycline eye ointment/drops within 1 hour of birth usually after initiating BF.
- Do not put anything else in baby's eyes as it can cause infection.
- Watch out for discharge, especially with redness and swelling around the eyes.

**Step 7: Administer vitamin K Intramuscularly (IM)**

- 1 mg for babies with gestational age of 34 weeks and above.
- 0.5 mg for premature babies less than 34 weeks gestation.

**Step 8: Place the newborn's identification bands on the wrist and ankle**

- Put newborn identification band on the baby preferably on the wrist and/or ankle.

**Step 9: Weigh the newborn when it is stable and warm**

- Weigh the newborn when it is stable and warm.
- Place clean linen or other alternatives on the pan of the weighing scale.
- Remove clothes and place the baby on weighing scale.
- Never leave the baby unattended on the scale.
- Record the baby's weight and inform the mother.

**Step 10: Record all observations and treatment provided in the registers/appropriate chart/cards**

- Record all findings and care provided for the newborn on the client chart and the registration book.

See [figure 5](#) below for diagrammatic demonstration of the steps in ENC.



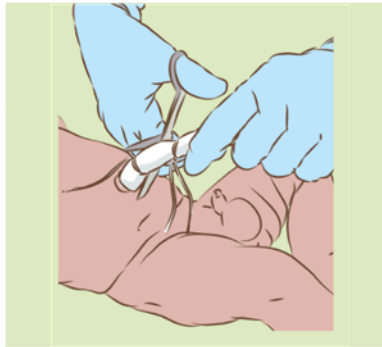
**Step 1:** Deliver baby on to mother's abdomen or into her arms



**Step 2:** Dry baby's body with dry towel. Wipe eyes. Wrap with another dry one and cover head



**Step 3:** Assess breathing and color. If <30 breaths per minute, blue tongue, lips or trunk or if gasping then start resuscitating



**Step 4:** Tie the cord two fingers from abdomen and another tie two fingers from the 1<sup>st</sup> one (if no clamp). Cut the cord between the 1<sup>st</sup> and 2<sup>nd</sup> tie (clamp)



**Step 5:** Place the baby in skin-to-skin contact and, on the breast, to initiate breastfeeding.

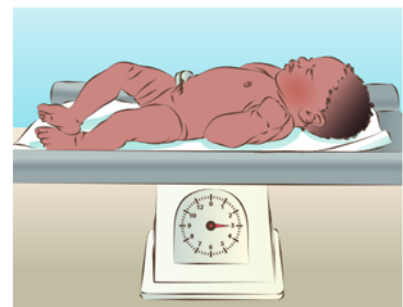
**Step 6:** Apply Tetracycline eye ointment



**Step 7:** Give Vitamin K, 1mg IM on anterior mid-thigh



**Step 8:** Place the newborn's identification bands on the wrist and ankle



**Step 9:** Weigh baby (if <1500 gm, refer urgently)

**Note:** Delay bathing of the baby for 24 hours after birth

Do not remove vernix

Provide postnatal visits during at 6-24 hours, 3 days and 6 weeks

Place the baby in skin-to-skin contact and, on the breast, to initiate breastfeeding.

**Figure 5.** Figure showing steps of Essential Newborn Care.

## NEONATAL RESUSCITATION

Neonatal resuscitation means to revive or restore life to a baby. It is a lifesaving intervention for newborns who fail to initiate and maintain spontaneous and adequate breathing at birth.

While providing essential care; identify babies in need of resuscitation according to the table below ([table x](#)).

**Table 6. Neonatal resuscitation.**

Assessment	Decision
Baby is crying	No need for resuscitation or suctioning. Start skin-to-skin contact and breastfeeding.
Baby is not crying but his chest is rising regularly between 30 to 60 times in a minute	No need for resuscitation or suctioning. Start skin-to-skin contact and breastfeeding.
Respiratory rate below 30	Start resuscitation immediately.
Baby is gasping	Start resuscitation immediately.
Baby is not breathing	Start resuscitation immediately.

### THE 3A'S: GOLDEN RULES OF RESUSCITATION

- 1. Anticipation:** Identify those newborns that are at high risk for birth asphyxia (Intrauterine growth restriction, preterm birth, breech delivery, post term pregnancy, prolonged labor) ([table 7](#)).
- 2. Adequate preparation:** Skilled manpower can undertake the steps of resuscitation (warm well organized new born corner with resuscitation equipment, observation of infection prevention practice)
- 3. Act on time:** There should not be any delay in identifying newborns that need resuscitation and action should be taken immediately.

### PREPARATION FOR RESUSCITATION

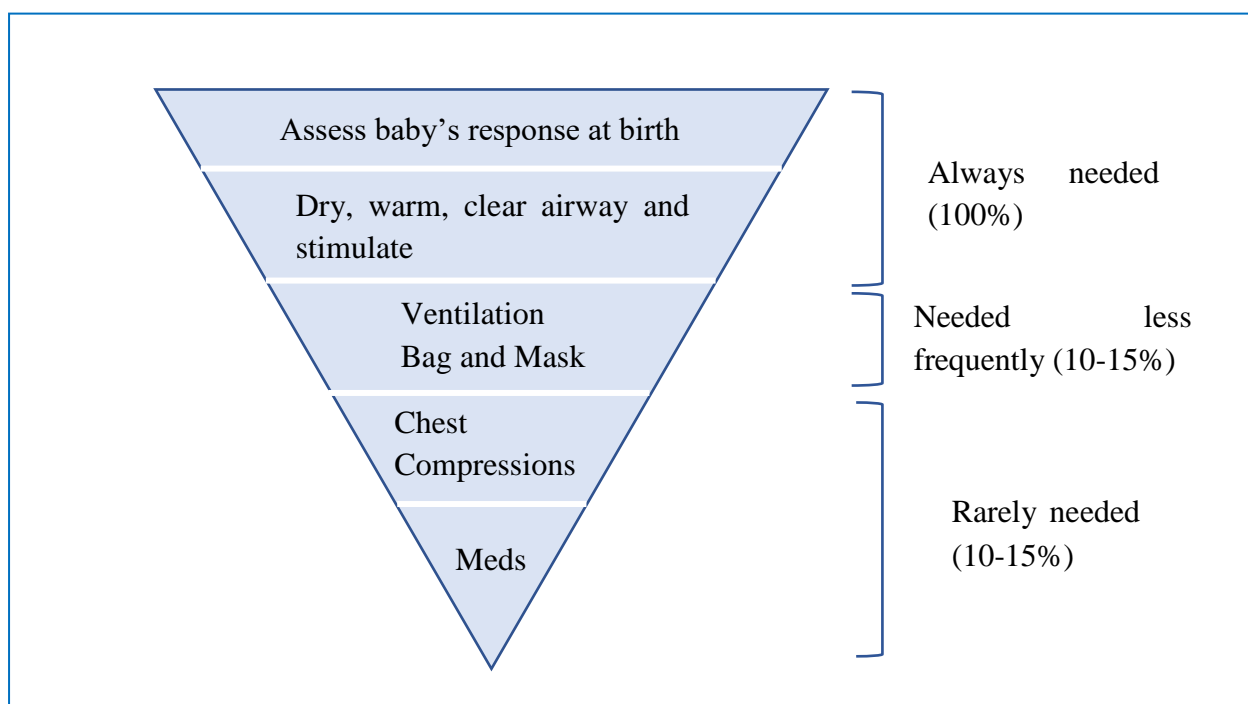
- Change your gloves.
- Tie and cut the cord first.
- Tell the mother that her baby is having difficulty to breath and that you are going to help the newborn. Tell her quickly but calmly.
- Lightly wrap the baby in a warm dry towel or cloth.
- Leave the face and upper chest free for observation.
- Immediately transfer the baby to a newborn corner which is warm, clean and dry surface, under an overhead heat source.

**Table 7. Risk factors associated with need for resuscitation.**

Maternal Risk Factors before Labor	Risk Factors during Labor
• Pre-eclampsia and eclampsia	• Foul smelling amniotic fluid
• Previous fetal or neonatal death	• Unusual vaginal bleeding before delivery
• Maternal infection (HIV, STD, Malaria)	• Prolonged rupture of membranes >18 hrs
• Multiple gestation	• Precipitate labor
• Premature rupture of membranes	• Shoulder dystocia
• Diminished fetal activity	• Prolonged labor (>24 hours)
• Post-term gestation	• Prolapsed cord
• Bleeding in second or third trimester	• Fetal bradycardia
• Maternal diabetes	• Meconium
• Age <16 or >35 years	• Narcotics administered to mother
• Anemia	• Instrumental delivery
• No prenatal care	

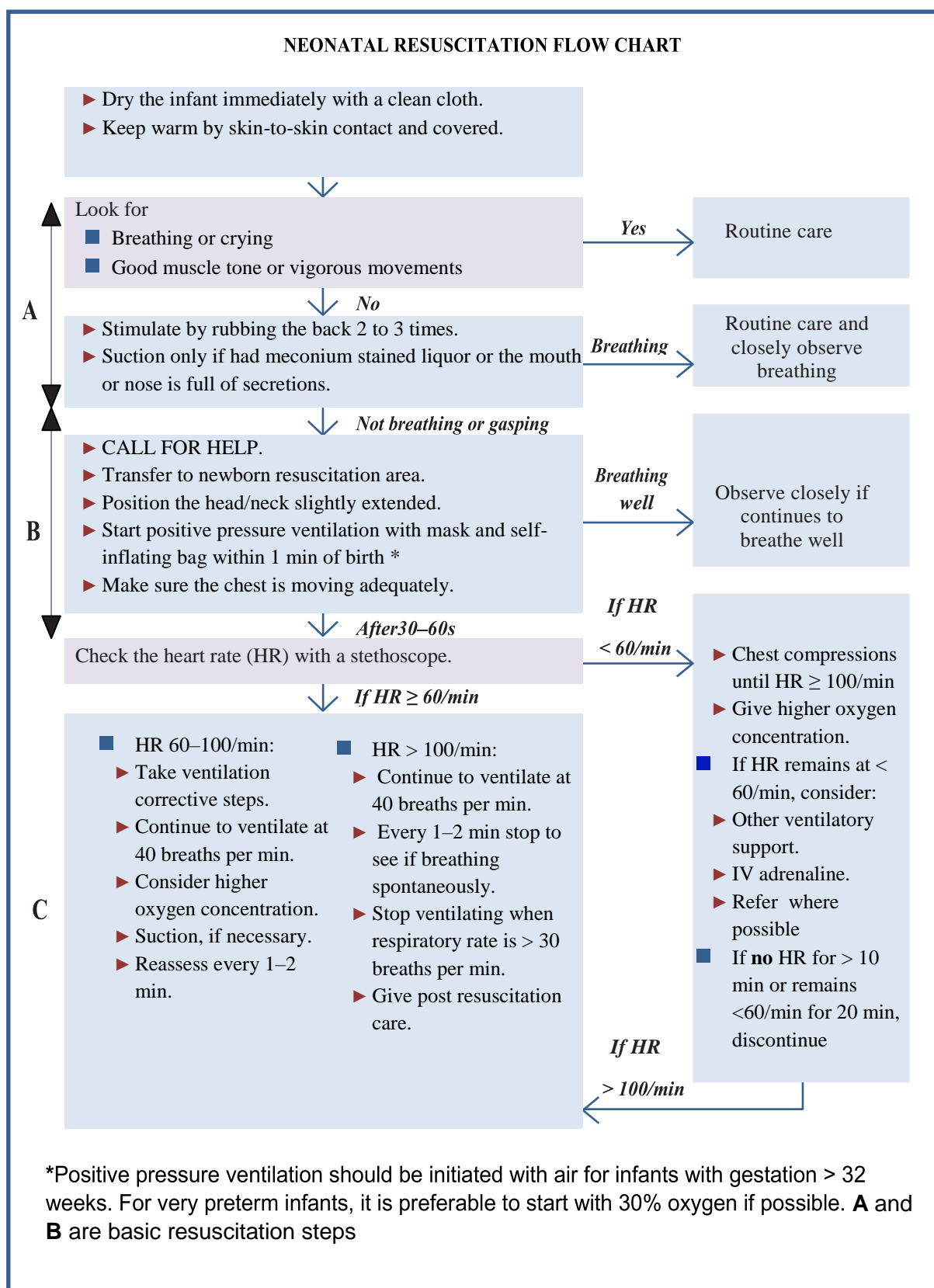
## BASIC STEPS IN RESUSCITATION

The diagram below ([figure 6](#)) illustrates the relationship between resuscitation procedures and the number of newly born babies who need them. At the top are the procedures needed by all newborns. At the bottom are procedures needed by very few.



**Figure 6. Steps in resuscitation.**

## NEONATAL RESUSCITATION ACTION PLAN



Neonatal resuscitation can be done using the action plan developed by WHO. The action plan is shown in the “neonatal resuscitation flow chart” above ([figure 7](#)).

**Figure 7. Neonatal resuscitation flow chart.**

## **POST RESUSCITATION CARE**

Infants who require resuscitation are at risk for deterioration after their vital signs have returned to normal. Once adequate ventilation and circulation has been established:

- Stop ventilation.
- Return to mother for skin-to-skin contact as soon as possible.
- Closely monitor breathing difficulties, signs of asphyxia and anticipate need for further care.

## **CESSATION OF RESUSCITATION**

It is appropriate to consider discontinuing after effective resuscitation efforts if:

- If the baby is breathing or crying.
- If breathing is >30/min and regular.
- Infant is not breathing and heart beat is not detectable beyond 10 min, stop resuscitation.
- If no spontaneous breathing and heart rate remains below 60/min after 20 min of effective resuscitation, discontinue active resuscitation.
- Record the event and explain to the mother or parents that the infant has died.
- Give them the infant to hold if they so wish.

## **DOCUMENTATION AND COUNSELING**

- Document the resuscitation process and its outcome.
- Explain to the mother and/or parents about what possibly has happened to the newborn and provide grief counseling
- Give them the dead newborn if they wish

## POSTPARTUM / POSTNATAL CARE

### DEFINITION

Post-natal care is care that is provided to a mother and newborn baby after delivery and within the first 42 days after child birth.

### CLASSIFICATION

#### A. Type of care

- i. *Postpartum care*: Care that is provided to a mother.
- ii. *Postnatal care*: Care that is provided to a newborn.

#### B. Timing of care:

- i. *Immediate PNC*: Care provided to the mother and/or newborn within the first 24 hours after delivery.
- ii. *Early PNC*: Care provided to the mother and/or newborn between 3rd to 7th day after delivery or birth.
- iii. *Late PNC*: At least three additional postnatal contacts are recommended on day 3 (48–72 hours), days 6–7 after birth, and six weeks after birth.

## ROUTINE POSTPARTUM / POSTNATAL CARE

The timing, content and key postpartum maternal and newborn health care interventions are addressed in the tables below ([table 8](#), [table 9](#) and [table 10](#)).

**Table 8. Immediate postpartum/ postnatal care (first 24 hours after birth).**

#### A. MOTHER: IMMEDIATE PPC

**Monitor mother every 15 min for the first hour; at 2, 3, and 4 hrs. then every 4 hrs**

- Measure and document BP, temperature and pulse every 30 min with in the first 2 hours.
- If the first BP measurement is normal, take the second measurement within six hours.
- Check uterine tone.
- Check for bleeding.

- Check for pallor.
- Check for any perineal problem, inspect episiotomy site if done.
- Monitor urine output for 6 hours after delivery.
- Encourage voiding of urine.
- Encourage for mobility / ambulation.

#### ***Give preventive measures***

- Counsel on breast feeding, encourage early initiation of breast feeding.
- Counsel on danger signs of the mother and newborn.
- Counsel on nutrition.
- Advise on postpartum care and hygiene.
- If screening for syphilis is positive, treat the woman, her partner and newborn.
- Provide tetanus toxoid (TT) according to her immunization status / schedule.
- Give mebendazole (depending on the previous dose - once in 6 months).
- Check woman's supply of iron/folate and give 3 month's supplies.
- Advise on use of insecticide treated bed net.
- Counsel on safe sex (including use of condoms).
- Counsel on continued abstinence from tobacco, alcohol and drugs.
- Counsel for return visit.
- Give appropriate supportive care for mothers with stillborn or dead baby.
- Provide PFP based on counseling during ANC. Options include implants, post placental insertion of IUCD; and for those who have completed their family numbers, BTL by mini-laparotomy or vasectomy can be done.

### **B. NEWBORN: IMMEDIATE PNC**

#### ***Monitor newborn every 15' until the first hr. then before discharge***

- Assess the newborn as per standards (check breathing; movement; swelling and bruises over the presenting part; abdomen (for pallor and distension); malformations; feel the tone; feel for warmth (if cold, or very warm, measure temperature); umbilical stump; passage of meconium; weigh the baby).
- Provide essential new born care.
- Warm baby by keeping mother and baby together, skin to skin contact.
- Initiate breast feeding with in the first one hour.
- Frequent observation of the baby by the mother for danger signs (failure to feed, convulsion, fast breathing, lethargy....).
- Check color, umbilical cord for oozing, sucking / feeding.
- Immunization with BCG, birth dose HBV and OPV0 (If not vaccinated, newborn should be appointed within one week after birth).

- Advise on cord care.
- Counsel to delay bathing until after 24 hours.
- Counsel on appropriate clothing of the newborn for ambient temperature (one to two layers of clothes more than adults and use of hats / caps).
- Encourage Communication and play with the newborn.
- Preterm and low-birth-weight babies should be identified immediately after birth and should be provided special care as per existing guidelines.
- Schedule return visit.

**Table 9. Early postpartum / postnatal care (at day 3 and 6 – 7 days).**

#### **A. MOTHER: EARLY PPC**

- Check blood pressure; passage of urine and urinary incontinence, bowel function, healing of any perineal wound, headache, fatigue, back pain, perineal pain and perineal hygiene, breast pain, engorgement, fever and uterine tenderness and status of lochia.
- Advise on mobility / ambulation, exercise and adequate rest.
- Check for leg swelling (DVT).
- Breastfeeding progress should be assessed at each postnatal contact.
- Counsel on post-partum nutrition.
- Counsel on hygiene.
- Counsel on safer sex (including use of condoms).
- Advise on insecticide treated bed net use (if required).
- Assess and support emotional and psychological wellbeing.
- Counsel on danger signs.
- Search for any risks, signs and symptoms of domestic abuse and inform whom to contact for advice and management.
- Counsel on PPFp if not done earlier and initiate based on the availability of methods, commodities, instruments and trained personnel. Options include mini-pills, implants and for those who have completed their family numbers BTL by mini-laparotomy or vasectomy can be done.

#### **B. NEWBORN: EARLY PNC**

- Assessment of the newborn as per standards (check breathing; movement; swelling and bruises over the presenting part; abdomen (for pallor and distension); malformations; feel the tone; feel for warmth (if cold, or very warm, measure temperature); umbilical stump; passage of meconium; weigh the baby).
- Respond to any abnormal findings. Observe how the baby is breast feeding.



- Advise exclusive breast feeding.
- Immunization with BCG (if not provided at birth).
- Immunization with OPV 0 (if not provided at birth).
- Advise on exposure to sunlight.
- Counsel on danger signs.
- Counsel on appropriate clothing of the newborn for ambient temperature (one to two layers of clothes more than adults and use of hats/caps).
- Encourage communication and play with the newborn.

**Table 10. Late postpartum/ postnatal care (care at 6 weeks).**

#### **A. MOTHER: LATE PPC**

- Routine postpartum assessment: ask for general well-being and assess the following: headache, fatigue, micturition and urinary incontinence, breast pain, bowel function, back pain, uterine tenderness, perineal pain, healing of perineal wound, perineal hygiene and lochia.
- Assess for signs of postpartum complications.
- Ask for resumption of sexual intercourse and possible dyspareunia.
- Counseling on appropriate nutrition, and micronutrient supplementation.
- Counseling on safe sex practices.
- Counseling on breastfeeding and support as needed.
- Counseling on personal hygiene and disposal of soiled pads.
- Encourage on continued use of ITN for women living in malaria endemic areas.
- Assess and support emotional and psychological wellbeing.
- Observe for any risks, signs and symptoms of domestic abuse and inform whom to contact for advice and management.
- Routine offering of HIV testing (if not tested earlier).
- Plan for revisit.
- Counsel and provide FP methods if not done earlier as needed.

**NOTE:** Counseling of FP should start during ANC or during early postpartum period.

#### **B. NEWBORN LATE PNC (CARE AT 6 WEEKS)**

- Identify warning signs of complications.
- Routine examination of the baby.
- Advise on exposure to sunlight.
- Immunization according to the national EPI program.

## PUERPERAL FEBRILE MORBIDITIES

### DEFINITION

Puerperal fever, also known as postpartum fever is defined as temperature of 38.0°C or higher during the first 10 days postpartum, exclusive of the first 24 hours.

Fever in the first 24 hours after delivery often resolves spontaneously and cannot be explained by an identifiable infection. A mother may have fever owing to prior illness or an illness unconnected to childbirth. However, any fever during 10 days postpartum should be aggressively investigated and timely managed.

Most persistent fevers after childbirth are caused by genital tract infection. Other causes of puerperal fever include breast engorgement, urinary infections, wound infections (episiotomy, abdominal incisions or perineal lacerations), respiratory complications after caesarean delivery and septic thrombophlebitis.

Endemic febrile illnesses like malaria may also be the cause of fever in mothers during this period.

### RISK FACTORS

- Prolonged and premature ROM
- Prolonged (> 24 hours) labor
- Frequent vaginal examination
- Retained placental fragments or membranes
- Anemia and poor nutrition during pregnancy
- Immunocompromised
- Genital or urinary tract infection prior to delivery
- Cesarean birth (20-fold increased risk)
- Obesity
- Diabetes
- Indwelling urinary catheter.

### DIAGNOSIS

For diagnosis of puerperal fever see [table 11](#) below.

**Table 11. Diagnosis of puerperal fever.**

CLINICAL PROBLEM	CLINICAL PRESENTATION	COMPLICATIONS
<b>UTERINE INFECTION</b> (Postpartum Endomyometrits, Metritis with pelvic cellulites)	Fever, lower abdominal pain, offensive lochia, subinvolved uterus, lower abdominal tenderness and uterine tenderness.  <b>Less common presentation:</b> <i>Abdominal distension, nausea and vomiting, diarrhoea, abdominal fluid collection, generalized abdominal tenderness and guarding, adnexal mass.</i>	<b>Sepsis, peritonitis and pelvic abscess</b>

<b>BREAST ENGORGEMENT</b>	<p>Fever, bilaterally and diffusely swollen painful breasts, tense, warm and tender breasts on palpation in the first three postpartum days.</p> <p><i>Less common presentation</i> <i>Inverted nipples</i></p>	<i>Mastitis, breast abscess and lactation failure</i>
<b>MASTITIS</b>	<p>Fever, unilateral breast swelling and/or pain, unilateral erythema, warmth, swelling and tenderness.</p> <p><i>Less common presentation</i> <i>Nipple excoriations/ cracking, shock</i></p>	<i>Breast abscess, sepsis, lactation failure</i>
<b>BREAST ABCESS</b>	<p>Fever, unilateral breast swelling and pain, localized and fluctuant mass with erythema of overlying skin.</p> <p><i>Less common presentation</i> <i>Draining pus, pus discharge per nipple</i></p>	<i>Sepsis</i>
<b>URINARY INFECTION/ PYELONEPHRITIS</b>	<p>Spiking fever/chills, dysuria, increased frequency and urgency of urination, flank pain.</p> <p><i>Less common presentation</i> <i>Retropubic / suprapubic pain, loin pain/tenderness, tenderness at costovertebral angle area, anorexia and nausea/vomiting</i></p>	<i>Sepsis</i>
<b>ATELECTASIS/ PNEUMONIA</b> (Atelectasis after intubation & ventilation after general anesthesia)	<p>Fever, tachypnea, tachycardia, difficulty in breathing, cough with expectoration and chest pain.</p> <p><i>Less common presentation:</i> <i>Rhonchi / rales, reduced oxygen saturation.</i></p>	<i>Respiratory failure, Sepsis</i>
<b>WOUND INFECTION</b> (Abdominal, episiotomy or perineal) ± cellulitis	<p>Fever, painful and tender wound, erythema and edema beyond edge of incision.</p> <p><i>Less common presentation:</i> <i>Hardened edges of wound, purulent discharge, and reddened area around wound.</i></p>	<i>Necrotizing fasciitis, Sepsis</i>

## INVESTIGATION

- Blood film
- CBC
- C reactive protein
- Urinalysis,
- Stool exam
- Abdominopelvic ultrasound

## PREVENTION

- Avoid risk factors.
- Keep the episiotomy site clean.
- Careful attention to antiseptic procedures during childbirth.
- Administration of prophylactic antibiotics (e.g. cesarean section, manual removal of placenta).

## MANAGEMENT

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### UTERINE INFECTION

Uterine infection is also referred to as *Endomyometritis* or *Metritis with Pelvic Cellulites*.

#### Supportive care

- Institute supportive measures if necessary. This includes transfusion of blood, correction of fluid & electrolyte imbalance.

#### Antibiotics

- Give the woman a combination of antibiotics starting from presentation up to 24–48 hours after complete resolution of clinical signs and symptoms (fever, uterine tenderness, purulent lochia, and leukocytosis).
- Clindamycin phosphate 600 mg IV every eight hours PLUS Gentamicin 5 mg/kg body weight IV every 24 hours.
- If Clindamycin is not available administer Ampicillin 2 g IV every 6 hours PLUS gentamicin 5 mg/kg body weight IV every 24 hours.
- When available, Clindamycin (in combination with Gentamicin) is more effective than Ampicillin or a penicillin antibiotic for the treatment of postpartum endometritis.

**NOTE:** *Oral antibiotics are not necessary after stopping IV antibiotics.*

#### Management of persistent fever

- If fever is still present 72 hours after starting antibiotics, re-evaluate and revise the diagnosis.
- Possible differential diagnosis for persistent fever includes peritonitis, pelvic abscess and septic thrombophlebitis.

- Do abdomino-pelvic ultrasound to assess for retained tissue and to check for other complications like abscess collection.
- If retained placental fragments are suspected, perform a digital exploration of the uterus to remove clots and large pieces. Use ovum forceps, aspiration with large cannula (12-14) or a wide curette if necessary (avoid sharp curette).
- If there are signs of general peritonitis (fever, rebound tenderness, general abdominal pain), perform laparotomy to drain the pus (Note that abdominal tenderness in the postpartum period may be subtle). If the uterus is necrotic and septic, perform subtotal hysterectomy.

## PELVIC ABSCESS

- Give a combination of antibiotics before draining the abscess; continue antibiotics until the woman is fever-free for 48 hours.
- Ampicillin 2 g IV every six hours PLUS Gentamicin 5 mg/kg body weight IV every 24 hours PLUS Metronidazole 500 mg IV every eight hours.
- If the abscess is fluctuant in the cul-de-sac, drain the pus through the cul-de-sac. If the spiking fever continues, perform laparotomy.

## PERITONITIS

- Provide nasogastric suction.
- Start an IV infusion and infuse IV fluids
- Give the woman a combination of antibiotics until she is fever-free for 48 hours
- Ampicillin 2 g IV every six hours PLUS Gentamicin 5 mg/kg body weight IV every 24 hours PLUS Metronidazole 500 mg IV every eight hours.
- Identify and treat the underlying cause of the peritonitis. The type of surgical intervention needed depends on the diagnosis of the cause of the peritonitis. For example, closure may need to be performed for an intestinal or uterine perforation, whereas an abscess may need to be drained.

## BREAST ENGORGEMENT

### **If the woman is breastfeeding and the baby is able to suckle: -**

- Encourage the woman to breastfeed more frequently, without restrictions, using both breasts at each feeding. Show the woman how to hold the baby and help the baby attach.
- If the woman is breastfeeding and the baby is not able to suckle, encourage the woman to express milk by hand or with a pump.
- Relief measures before feeding or expression may include:
  - Applying warm compresses to the breasts just before breastfeeding, or encouraging the woman to take a warm shower.

- Massaging the woman's neck and back.
- Having the woman express some milk manually before breastfeeding, and wetting the nipple area to soften the areola (helps the baby latch on properly and easily).
- Relief measures after feeding or expression may include:
  - Supporting breasts with a binder or bra.
  - Applying cold compresses to the breasts.
- Paracetamol 500–1000 mg every six to eight hours orally as analgesic (maximum 4000 mg in 24 hours).
- Follow up in three days to ensure response.

#### **If the woman is not breastfeeding:**

- Encourage her to support breasts with a binder or bra.
- Apply cold compresses to the breasts to reduce swelling and pain.
- Avoid massaging or applying heat to the breasts.
- Avoid stimulating the nipples.
- Give Ibuprofen 200–400 mg every six to eight hours (maximum dose 1200 mg in 24 hours) OR Paracetamol 500–1000 mg every six to eight hours orally as an appropriate alternative (maximum dose 4000 mg in 24 hours).
- Follow up in three days to ensure response

#### **BREAST INFECTION (MASTITIS)**

- Treat with antibiotics.
- Cloxacillin 500 mg by mouth every six hours for 10 days OR Erythromycin 250 mg every eight hours for 10 days.
- Encourage the woman to continue breastfeeding,
- Support the breasts with a binder or bra, and
- Apply cold compresses to the breasts between feedings to reduce swelling and pain.
- Paracetamol 500–1000 mg every six to eight hours as an appropriate alternative (maximum dose 4000 mg in 24 hours).
- Follow up in three days to ensure response.

#### **BREAST ABSCESS**

##### **Antibiotic Treatment:**

- Treat with antibiotics: Cloxacillin 500 mg PO every six hours for 10 days OR Erythromycin 250 mg every eight hours for 10 days.

##### **Surgical Treatment:**

- Pus must be drained either by incision (see box below) and drainage or ultrasound-guided needle aspiration (aspiration may need to be repeated).

- Supportive Treatment:
  - Encourage her to continue breastfeeding even when there is collection of pus.
  - Support breasts with a binder or bra.
  - Apply cold compresses breasts between feedings to reduce swelling and pain.
- Give Ibuprofen.
- Mid-stream milk culture and sensitivity studies when there is poor response is needed to tailor the antibiotic of choice.
- Breast ultrasound should be employed when there is poor response to rule out recollection of abscess or other mass lesion.
- There may be a need to hospitalize and manage patients with parenteral antibiotics in severe infections.

#### **BREAST ABSCESS DRAINAGE:**

General anesthesia (e.g. ketamine) is usually required. Make the incision radially, extending from near the areolar margin toward the periphery of the breast to avoid injury to the milk ducts. Wearing sterile gloves use a finger or tissue forceps to break up the pockets of pus. Loosely pack the cavity with gauze. Remove the gauze pack after 24 hours and replace with a smaller gauze pack.

*If there is still pus in the cavity:* Place a gauze pack in the cavity and bring the edge out through the wound as a wick to facilitate drainage of any remaining pus, or perform ultrasound-guided aspiration for abscesses in which overlying skin is intact and the abscess is less than 5 cm in diameter. Local anesthesia is generally sufficient for ultrasound-guided aspiration. This can often be done as an outpatient procedure.

*If laboratory capacity is available,* send drained or aspirated pus for culture and sensitivity testing.

**Note:** A large surgical incision should be avoided because it could damage the areola and milk ducts and interfere with subsequent breastfeeding.

#### **INFECTION OF PERINEAL AND ABDOMINAL WOUNDS WITH CELLULITES**

- If there is superficial fluid or pus, open and drain the wound and debride dead tissue. Inspect carefully for fascial integrity for abdominal wounds. (Wound disruption or dehiscence refers to separation of the fascial layer. This is a serious complication and requires secondary closure of the incision in the operating room after exploration of abdomen).
- Remove infected skin or subcutaneous sutures and debride the wound. Do not remove fascial sutures.

- If infection is superficial and does not involve deep tissues, monitor for development of an abscess and give antibiotics: based on culture of the wound exudate whenever possible.
- Combination antibiotics should be given when culture and sensitivity is not available.
- Place a damp dressing in the wound and have the woman return to change the dressing every 24 hours.

## NECROTIZING FASCIITIS

- Necrotizing fasciitis may involve abdominal incisions, or it may complicate episiotomy or other perineal lacerations.
- The necrosis may involve the deep fascial layers and muscles.
- Early diagnosis, surgical debridement, antimicrobials, and intensive care are paramount to successfully treat this potentially lethal complication.
- Give a combination of antibiotics until necrotic tissue has been removed and the woman is fever-free for 48 hours.
  - Penicillin G 2 million units IV every six hours PLUS Gentamicin 5 mg/kg body weight IV every 24 hours PLUS Metronidazole 500 mg IV every eight hours.

## URINARY TRACT INFECTION AND RESPIRATORY TRACT INFECTION

- Management of urinary tract infection and respiratory tract infection should be according to the relevant guideline after thorough evaluation with possible interdisciplinary consultation.

## PSYCHOLOGICAL MORBIDITIES DURING PUERPERIUM

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Postpartum emotional distress is fairly common after pregnancy and ranges from mild blues, postpartum depression to psychosis. Postpartum psychosis can pose a threat to the life of the mother or baby.

### MATERNITY BLUES / POSTPARTUM BLUES

#### Diagnosis

- Mild and often rapid mood swings from elation to sadness
- Irritability, anxiety
- Decreased concentration
- Insomnia, tearfulness and crying spells

**NOTE:** 40-80% of postpartum women develop these changes within 2-3 days of delivery. Symptoms typically peak on the 5th postpartum day and resolve within 2 weeks.



## Management

Postpartum blues typically resolve over time and with conservative management. Supportive treatment is indicated, and sufferers can be reassured that the dysphoria is transient. Advise on:

- Adequate time for sleep and rest, and continuous family support.
- The newborn should be taken care of by someone else particularly during night time.
- Patients should be monitored for development of more severe psychiatric disturbances, including postpartum disorders.
- If symptoms do not resolve within 2 weeks, needs further evaluation and management.

## POSTPARTUM DEPRESSION

Postpartum depression affects up to 30% of women and typically occurs in the early postpartum weeks or months and may persist for a year or longer.

### Diagnosis

In nearly all respects, postpartum depression is similar to other major and minor depressions. Symptoms must be present for most of the day, every day, for at least 2 weeks.

Symptoms include:

- Depressed mood, loss of interest or pleasure in most or all activities
- Insomnia or hypersomnia
- Change in appetite, change in weight
- Psychomotor retardation and agitation
- Low energy, poor concentration
- Thoughts of worthlessness or guilt, recurrent thoughts about death or suicide.

The prognosis for postpartum depression is good with early diagnosis and treatment. More than two-thirds of women recover within a year.

## Management

Providing a companion during labor may prevent postpartum depression. Once established, it requires psychological counseling and practical assistance which includes:

- Providing psychological support and practical help (with the baby and through home care).
- Listening to the woman and providing encouragement and support.
- Link to a mental health unit for further psychiatric consultation and management.

## POSTPARTUM PSYCHOSIS

Postpartum psychosis is the most severe puerperal mental disorder and typically occurs around the time of delivery (within 2 weeks). It affects less than 1% of women. Cause is unknown, although about half of the women with pre-existing psychotic illness and those with prior episodes of postpartum depression are at highest risk.

## Diagnosis

Postpartum psychosis is characterized by:

- Abrupt onset of delusions or hallucination.
- Insomnia, a preoccupation with the baby.
- Severe depression, anxiety.
- Despair and suicidal or infanticidal impulses.
- Care of the baby can sometimes continue as usual.

Prognosis for recovery is excellent but about 50% of women will suffer a relapse with subsequent deliveries.

## Management

- The course of postpartum psychosis is variable and depends on the type of underlying illness. The clinical course of bipolar illness or schizoaffective disorder in puerperal women is comparable to that for non-pregnant women.
- They usually require hospitalization for pharmacological treatment and long-term psychiatric care is needed.
- In the presence of the above symptoms link to a mental health unit.

## ABNORMAL LABOR

### DEFINITION

Abnormal labor is labor that deviates from the course of normal labor and delivery.

### CLASIFICATION

**Table 12. Classification of Abnormal Labor.**

Labor Pattern	Diagnostic Criteria		Management
	Nulliparas	Multiparas	
FIRST STAGE PROLONGATION DISORDER			
Prolonged Latent (from onset of painful, regular contractions)	> 20 hrs	>14 hrs	<ul style="list-style-type: none"><li>• Bed rest</li><li>• Oxytocin,</li><li>• CS delivery for urgent problems</li></ul>
Prolonged latent (confirmed true labor)	> 8 hrs	> 8 hrs	
PROTRACTION DISORDERS			
Active phase dilatation	<1.2 cm/hr	<1.5 cm/hr	<ul style="list-style-type: none"><li>• Expectant / support</li><li>• ARM</li><li>• Augmentation</li><li>• CS for CPD or contraindication for oxytocin use</li></ul>
Descent	< 1 cm/hr	< 2 cm/hr	
ARREST DISORDERS			
Prolonged deceleration phase	> 3 hrs	> 1 hr	<ul style="list-style-type: none"><li>• No contraindication for augmentation - Oxytocin</li><li>• CPD- CS</li><li>• Contraindication for augmentation - CS</li></ul>
Secondary arrest of dilatation	> 2 hrs	> 2 hrs	
Arrest of descent	> 1 hrs	> 1 hr	
Failure of Descent	No descent in deceleration phase		
SECOND STAGE DISORDERS			
Prolonged second stage	Without epidural > 3 hrs	Without epidural > 2 hrs	<i>Depends on identified cause and presence of complications.</i>
	With epidural > 3.5 hrs	Without epidural > 2.5 hrs	
Failure of descent	No descent in second stage		

## RISK FACTORS (CAUSES)

Risk factors are generally denoted by the “**three Ps**”

- **Power:** Dysfunctional uterine contraction.
- **Passage:** Contracted pelvis
- **Passenger:** Macrosomia, malpresentation, malposition

**NOTE:** Labor abnormality can result from combination of the three Ps. For example, abnormality of passage and passenger can result in Cephalo-Pelvic-Disproportion (CPD) or Feto-Pelvic-Disproportion (FPD)

## SIGN AND SYMPTOM

Failure of or poor progress of labor is a sign of abnormal labor (see [table 12](#) above).

**NOTE:** Clinical pelvimetry should be done during labor to check for adequacy of the pelvis, particularly for a primigravid woman with prolonged second stage of labor.

## INVESTIGATIONS

Diagnosis of labor abnormality is mainly clinical by close observation of progress of labor and appropriate use of partograph.

## COMPLICATIONS

If not managed timely, abnormal labor will contribute to bad maternal, fetal and neonatal outcomes. Complications include:

- Obstructed labor, obstetric fistula, etc
- Uterine rupture, hemorrhage, sepsis and maternal death
- Fetal distress, asphyxia, and death

## MANAGEMENT OF FIRST STAGE ABNORMALITIES

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Management is directed towards the stage and cause of abnormal labor.

### RULING OUT FALSE LABOR

- False labor is characterized by no change in cervical effacement and dilatation after 4 to 8 hours of reevaluation.
- Once false labor is ascertained explain to the woman (and accompanying relatives) about false labor, true labor and danger symptoms of pregnancy and labor.
- Rehydrate if there is sign of dehydration.
- Give psychological support for the mother.
- Discharge the woman if she has no other problem requiring inpatient management.

## MANAGING LATENT PHASE ABNORMALITIES

- Dysfunctional uterine contraction is treated by augmentation of labor if there is no contraindication.
- Scarred cervix due to operations such as conization or cautery may lead to prolonged first stage of labor. In such scenario CS delivery should be considered.
- Management of latent phase abnormality in the presence of malpresentations and malposition depends on the specific abnormality.

## MANAGING ACTIVE PHASE ABNORMALITIES

### Crossing the alert line

If the alert line is crossed thorough assessment of the mother, fetus and progress of labor should be done to identify the cause.

- In the absence of adequate uterine contractions and good fetal and maternal condition:
  - Provide labor support: Rehydration, emptying the bladder and encouraging the woman to be more active and move around or adopt an upright position.
  - Consider ARM and augmentation if no contraindication.
  - Reevaluation 2-4 hours later.
- Presence of adequate labor progress with above interventions (cervicogram remains to the left of the action line): *expect vaginal delivery*.
- Inadequate labor progress despite intervention (cervicogram crosses the action line): *cesarean delivery*.

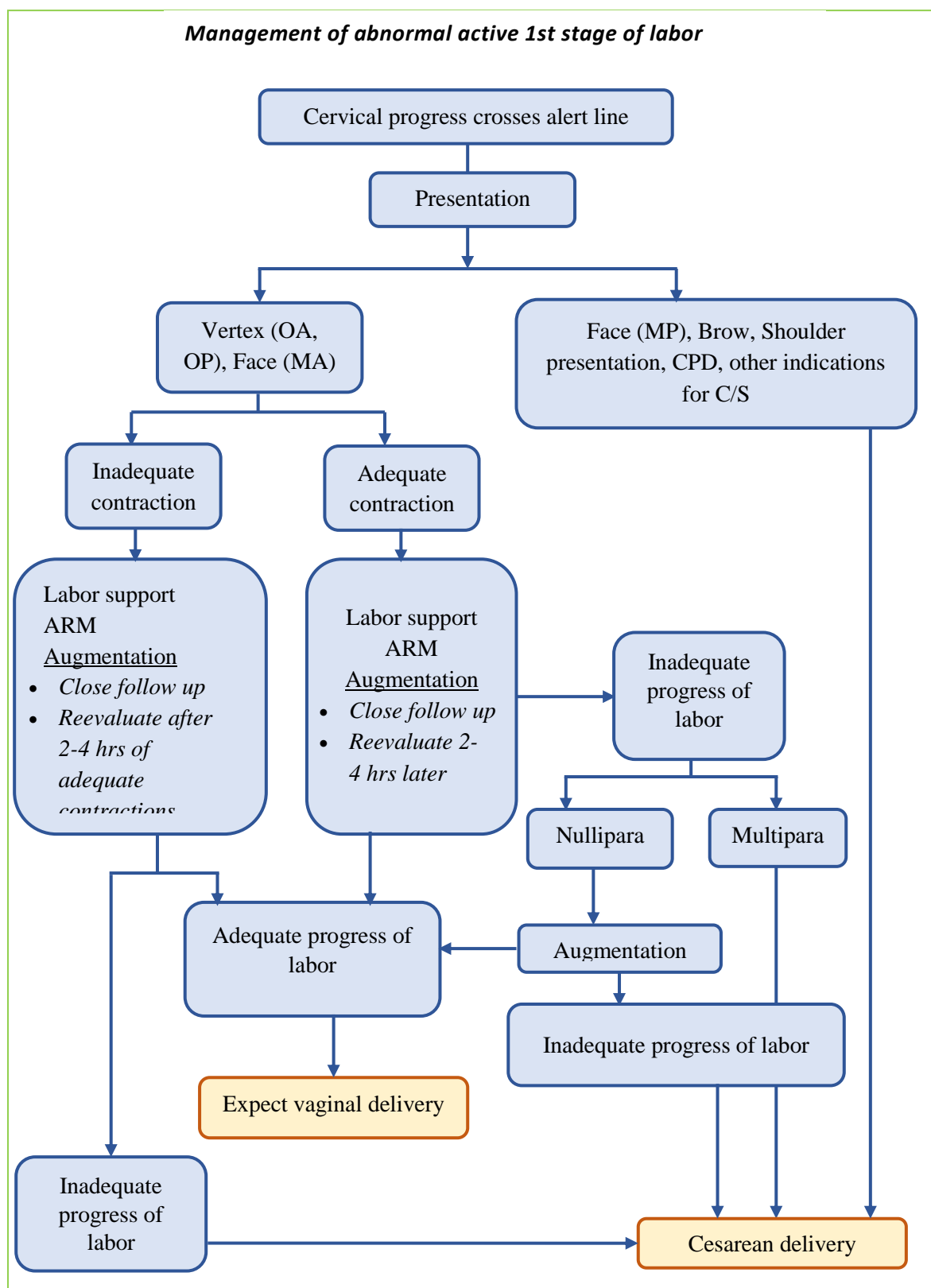
### Crossing the action line:

- When cervical dilatation crosses this line, action must be taken immediately depending on identified cause.
- Management options of dysfunctional uterine contraction include performing ARM, rehydration, augmentation of labor and caesarean delivery.
- Presence of contraindication for augmentation, features of CPD or non-reassuring fetal status (thick meconium, NRFHR) is indications for emergency CS delivery.

**NOTE:** For management of first stage abnormalities see algorithm in [figure 8](#) below.

## MANAGING SECOND STAGE ABNORMALITIES

- Abnormal progress in the second stage is entertained if there is not progressive descent (or head rotation to a favorable position) with uterine contraction.
- Management depends on identified cause and presence of complications. The management options are augmentation of labor (particularly in primigravid), caesarean delivery, instrumental vaginal delivery (in the absence of contraindications) or destructive vaginal delivery (if prerequisites are fulfilled).



**Figure 8. Management of abnormal active 1st stage of labor.**

## PRETERM LABOR

### DEFINITION

Preterm labor refers to the onset of labor before the 37 completed weeks of gestational age.

### CLASIFICATION

- **Early preterm:** 28–32 completed weeks.
- **Moderate preterm:** 32 plus 1 day to 33 weeks plus 6 days.
- **Late preterm:** 34 completed weeks –36 weeks plus 6 days.

### RISK FACTORS

**Socio-demographic conditions:** Low socioeconomic status, extremes of maternal age, unsupported/ unwanted pregnancy, smoking, alcohol consumption, excess physical work/ activity.

**Medical conditions:** UTI, malaria, HIV, syphilis, bacterial vaginosis, DM, hypertension, anemia, asthma, thyroid diseases, obesity, under nutrition.

**Gynaecologic conditions:** Congenital uterine anomalies, cervical insufficiency, intramural/ submucous myoma, uterine synechiae.

**Obstetric conditions:** Previous history, family history, multifetal gestation, short inter pregnancy interval (< 6 months), polyhydramnios, fetal macrosomia, fetal malformations, placental abruption and early vaginal bleeding during the index pregnancy, amniocentesis, ECV, cervical procedures during pregnancy.

### DIAGNOSIS

#### History:

- Abdominal cramps and back pain
- Pelvic or lower abdominal pressure
- Changes in type and amount of vaginal discharge (mucus, bloody or leakage of watery fluid).

#### Physical examination:

Four uterine contractions per 20 minutes or eight contractions per 60 minutes which are accompanied by one of the following:

- Rupture of membranes
- Cervical dilation greater than 2 cm
- Effacement exceeding 80%

- Change in cervical dilation or effacement detected by serial examinations.

## INVESTIGATIONS

- WBC with differential count
- Urine analysis/culture and sensitivity
- Ultrasound (biophysical profile, fetal weight estimation)

## TREATMENT

Treatment depends on gestational age, estimated fetal weight, presence or absence of contraindications for tocolytics.

Preterm labor should be managed in a setup where there is best possible neonatal care of the preterm newborn. Hence, in-utero transfer should be considered whenever possible.

*Management of preterm labour includes:*

### Corticosteroids

- Dexamethasone 6 mg IM BID for 48 hours or betamethasone 12 mg every 24 hours for 48 hours.
- A single repeat course of antenatal corticosteroid is recommended if preterm birth does not occur within 7 days after the initial dose, and a subsequent clinical assessment demonstrates a high risk of preterm birth in the next 7 days. This recommendation should only be applied if the gestational age is less than 34 weeks of gestation.

### Tocolytics:

- Provide window for administration of antenatal corticosteroids and/or in-utero fetal transfer to an appropriate neonatal health care setting:
- Tocolytic therapy is considered when cervical dilatation is less than 4cm; uterine contraction is fewer than 4-5 within an hour with no cervical change.
- Nifedipine is the preferred drug for tocolysis. Do not give a combination of tocolytic agents as there is no additional benefit. See box below for dosing of Nifedipine.
- *Tocolytic therapy is considered when:*
  - Contractions are resulting in a demonstrated cervical change and cervical dilatation is less than 4 cm.
  - Uterine contraction is more than 4-5 within an hour with no cervical change.
- *Contraindications for tocolytics include:-*
  - Preterm prelabor rupture of membranes (PPROM)
  - Cervical dilatation >4 cm and effacement >80%
  - Chorioamnionitis
  - Antepartum hemorrhage
  - Cardiac disease
  - Fetal death



- Fetal congenital abnormality not compatible with life

### NIFEDIPINE DOSE

- Loading oral dose of 20 mg followed by 10– 20 mg every 4–8 hours for up to 48 hours.
- Inform the woman to be aware of side effects of Nifedipine such as headache, flushing, dizziness, tiredness, palpitations and itching.
- Monitor maternal and fetal condition: pulse, blood pressure, signs of respiratory distress, uterine contractions, loss of amniotic fluid or blood, fetal heart rate, fluid balance.

### Neuroprotection:

Administer  $\text{MgSO}_4$  up to 32 weeks of gestation to prevent preterm birth-related neurologic complications (neuroprotection). See box below for dosing of  $\text{MgSO}_4$ .

### Antibiotics:

- Antibiotics should be administered for spontaneous preterm labour with unknown GBS status.
- Provide Ampicillin 2 gm IV as initial loading dose then 1gm IV every four hours until delivery for GBS prophylaxis.

## LABOR AND DELIVERY

### $\text{MgSO}_4$ FOR NEUROPROTECTION

- $\text{MgSO}_4$  IV 20% 4 gm over 10–15 minutes, followed by IM 5 gm every 4 hours for 24 hours.
- Assess urine output, respiratory rate and deep tendon reflexes when administering  $\text{MgSO}_4$ .
- *Contraindications to  $\text{MgSO}_4$ :* Myasthenia gravis, myocardial damage, impaired renal function.
- Avoid vacuum-assisted birth for pregnancies less than 34 weeks of gestation.
- Prepare for management of preterm or low birth weight baby and anticipate the need for resuscitation.

## PREVENTION

### Secondary prevention of preterm birth:

Identification and management of pregnant mothers who are at a risk of preterm labour

### **Cerclage:**

Women who have the following conditions can benefit from application of cerclage:

- Pregnant women who have history of recurrent mid trimester pregnancy losses and who are diagnosed with cervical insufficiency (*history indicated cerclage*).
- Pregnant women who are diagnosed to have short cervical length (< 25 mm) and have history of preterm birth (*ultrasound indicated cerclage*)
- Pregnant women who are accidentally found to have dilated cervix prior to 24 weeks of gestation can benefit from emergency/ rescue cerclage.

### **Progesterone compounds:**

- The criteria for progesterone are a history of prior preterm birth or no prior preterm birth but a sonographically identified short cervix.
- Progesterone vaginal tablet 100 mg to 200 mg vaginally each night or progesterone caproate 250 mg IM weekly starting from 16 weeks of gestation until 36 weeks of gestation can be considered.

## UMBILICAL CORD PROLAPSE

### DEFINITION

Umbilical cord (UC) descends alongside or beyond the fetal presenting part in the presence of ruptured membranes.

### CLASSIFICATION

- **Overt UC prolapse:** Protrusion of the UC in advance of the fetal presenting part with ruptured fetal membranes.
- **Occult UC prolapse:** Cord descends alongside, but not past, the presenting part with intact / ruptured fetal membranes.
- **Cord presentation:** Prolapse of UC below the level of the presenting part with intact fetal membranes.

### RISK FACTORS

- **General:**
  - Malpresentations
  - Unengaged presenting part
  - Prematurity
  - Multifetal gestation
  - PROM
  - Abnormal placentation
  - Multiparity
  - Polyhydramnios
  - Long UC
  - Pelvic deformities
  - Uterine tumors/malformations
  - Congenital anomalies
  - Low birth weight less than 2.5 kg.
- **Procedure related:**
  - ARM with unengaged fetal presenting part
  - Vaginal manipulation of the fetus with ruptured membranes
  - ECV
  - Stabilization induction.

### DIAGNOSIS

- **Occult UCP:** Presence of severe prolonged fetal bradycardia or moderate to severe variable decelerations after a previous normal tracing on CTG/ Pinnard stethoscope or fetal death.

- **Overt UCP:** Presence of palpable cord (pulsatile or non-pulsatile) on pelvic examination or visible cord outside the introitus.
- **Cord presentation:** Loops of cord are palpated through the fetal membranes on digital vaginal examination or seen in front of the presenting part on ultrasound examination.

## TREATMENT

### General measures

- Call for assistance.
- Secure IV fluid.
- Check for cord pulsation. If absent, confirm fetal heart beat with fetoscope or U/S
- Discontinue oxytocin if being given.
- Careful pelvic examination immediately after spontaneous rupture of fetal membranes.
- Prepare for resuscitation of the newborn.
- In cord presentation, do not rupture fetal membranes at any stage of labor; deliver the fetus by CS.
- Monitor FHB while preparing for delivery

### *If the woman is in the first stage of labor, perform the following in all cases:*

- 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 in the suprapubic region to keep the presenting part out of the pelvis.
- Once the presenting part is firmly held above the pelvic brim, remove the other hand from the vagina.
- Keep the hand on the abdomen until a caesarean section can be performed.
- If available, give tocolytics.
- Perform immediate caesarean delivery.
- Choice of anesthesia should be the quickest and safest for both the mother and the fetus preferably – GA.

### *Manuevers to reduce fetal presenting part pressure on the cord:*

- Examiner's hand is maintained in the vagina to elevate the presenting part off of the umbilical cord while preparations for an emergency C/S are being made.
- Client be placed in steep Trendelenberg or knee-chest position.
- Do not manipulate the cord.
- Avoid exposure of the cord to cold environment to avoid cord spasm (keep in vagina).
- Bladder filling: Insert Foley catheter into maternal bladder then fill bladder with 500-700 ml of normal saline with the patient in Trendelenberg position (used during referral).

***If the woman is in the second stage of labor:***

- Expedite vaginal birth if deemed quicker than cesarean section.
- Obstetric vacuum is preferable over forceps, if prerequisites are met.
- If there is malpresentation or if prerequisites for instrumental delivery are not fulfilled, deliver immediately by CS.

**NOTE:** Delivery should be accomplished within 30 minutes from the time of diagnosis.

**PREVENTION**

- Avoid ARM if the presenting part is not well applied/ engaged or perform ARM with simultaneous downward fundal pressure.
- Avoid disengaging fetal presenting part when performing procedures.
- Incidental finding of cord presentation on U/S should be followed to decide mode of delivery.

## MALPOSITIONS AND MALPRESENTATIONS

### DEFINITION

- Malpositions are abnormal positions of the vertex (other than occipito-anterior position) of the fetal head relative to the maternal pelvis.
- Malpresentations are all fetal presentations other than vertex.

### CLASSIFICATION / TYPES

#### Malpositions

- Occiput posterior
- Persistent occiput transverse position

#### Malpresentations

- Breech
- Face
- Brow
- Shoulder
- Compound

### PREDISPOSING FACTORS

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• <b>Maternal:</b> <ul style="list-style-type: none"> <li>○ Contracted pelvis</li> <li>○ Pelvic tumors: uterine myomas, ovarian tumors etc.</li> <li>○ Uterine anomalies: bicornuate uterus, uterine septum etc.</li> <li>○ High parity</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>Fetal and placental:</b> <ul style="list-style-type: none"> <li>○ Prematurity</li> <li>○ Fetal anomaly (e.g. hydrocephalus, anencephalus)</li> <li>○ Polyhydramnios / oligohydramnios</li> <li>○ Multiple pregnancy</li> <li>○ Placenta previa</li> </ul> </li> </ul> |
|---|---|

### DIAGNOSTIC APPROACH

- Clinical assessment (history, obstetric palpation and digital vaginal examination in labor).
- Ultrasound is mainly used to confirm clinical diagnosis and to investigate for predisposing factors.

## OCCIPUT POSTERIOR POSITION

---

### DEFINITION

Occiput posterior position is when the fetal occiput is posterior in relation to the maternal pelvis.

### DIAGNOSIS

- Suggestive abdominal findings:-
  - Flattened lower part of the abdomen.
  - Anteriorly palpable fetal limbs.
  - Fetal heart heard in the flank.
- On vaginal examination:-
  - Posterior fontanelle towards the sacrum.
  - Anterior fontanelle felt anteriorly if neck is flexed.

### MANAGEMENT

If the pelvis is grossly adequate follow labor closely with anticipation of spontaneous rotation to occipito-anterior position:-

- If there is **rotation** to occiput anterior, expect vaginal delivery as occiput anterior.
- If there is **incomplete rotation** leading to occipito-transverse position:
  - *Expect vaginal delivery* if there is stable fetal condition with adequate pelvis and good progress of labor with progressive fetal descent.
  - *Vacuum delivery* can be tried if there is arrest of fetal descent at low station (station at or below +2), especially in multiparous women with adequate pelvis.
  - *Deliver by cesarean section* if there is:-
    - Arrest of fetal descent in the presence of adequate uterine contraction especially in primigravids and in those with borderline pelvis.
    - Arrest of fetal descent at high station (station above +2),
- **If no rotation:**
  - *Expect vaginal delivery* as long as fetal condition is stable, maternal pelvis is adequate and there is progressive descent of the fetus.
  - *Augment with oxytocin* if there is no adequate uterine contraction.
  - *Vacuum delivery* can be tried if there is labor abnormality in second stage of labor and the prerequisites are met.
  - *Deliver by cesarean section* if there is arrest of fetal descent and the prerequisites for vacuum delivery are not met.

## PERSISTENT OCCIPUT TRANSVERSE POSITION

---

### DEFINITION

Persistent occiput transverse position is an occiput transverse position that is maintained for an hour or more in the second stage of labor.

Small fetuses can usually be delivered in occiput posterior position while others rotate anteriorly or posteriorly after the fetal head descends in to the pelvic floor.

### CLASSIFICATION

- High transverse arrest (arrest above station +2 on a -5 cm to + 5 cm scale)
- Deep transverse arrest (arrest below station +2 on a -5 cm to + 5 cm scale)

### CAUSES AND RISK FACTORS

- Inadequate power (contraction and poor pushing)
- Platypelloid and android pelvis.
- Fetal head in long occipito-frontal diameter.

### DIAGNOSIS

- Suspect persistent occipito-anterior position when fetal descent is protracted or arrested.
- On vaginal examination the fetal sagittal suture and fontanelles are palpable in the transverse diameter of the pelvis; the fetal ears can be palpated superiorly under the symphysis and inferiorly above the sacrum/coccyx.
- There may be anterior or posterior asynclitism.

### MANAGEMENT

- *Expectant management:*
  - If there is any progress in descent and the fetal heart rate is reassuring, expectant management is the preferred option.
  - Partial or complete rotation may still occur spontaneously.
- *Augmentation.*
- *Cesarean delivery* if there is high transverse arrest despite adequate uterine contraction and maternal expulsive effort.

## BROW PRESENTATION

---

### DEFINITION

Partial extension of the fetal head making the occiput higher than the sinciput and brow is the presenting part (the part of the head between orbital ridges and anterior fontanel). See [figure 9](#).

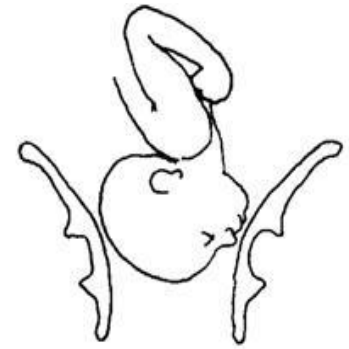


## DIAGNOSIS

- Suggestive abdominal finding:
  - Occiput felt above sinciput.
- On vaginal examination
  - Anterior fontanelle and orbits are felt

## NATURAL COURSE

- In brow presentation, engagement is usually impossible and arrested labor is common.
- Spontaneous conversion to either vertex or face presentation can occur when brow presentation is identified in early labor.



**Figure 9. Brow presentation**

## MANAGEMENT OF PERSISTENT BROW

- Persistent brow presentation is brow presentation in the later part of the first stage (after 6 cm of cervical dilatation) and second stages of labor.
- *If the fetus is alive* deliver by cesarean section.
- *If the fetus is dead:*
  - Perform craniotomy if the cervix is fully dilated and the head is accessible and other prerequisite for craniotomy are met:
  - Deliver by cesarean section if:-
    - The cervix is not fully dilated or station is high.
    - The operator is not proficient in craniotomy.

**NOTE:** → Do not use an obstetric vacuum or forceps with brow presentation.

→ Augmentation of labor is also not generally recommended in brow presentation

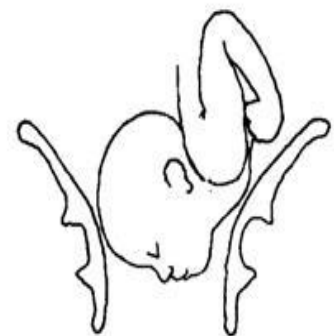
## FACE PRESENTATION

### DEFINITION

- Face presentation is hyperextension of the fetal head with the face being the leading part ([figure 10](#)).
- Fetal chin (mentum) is used as a reference point.

## DIAGNOSIS

- Suggestive abdominal finding:
  - Groove may be felt between the occiput and the back (Leopold III).



**Figure 10. Face presentation**

- On vaginal examination
  - Fetal chin, mouth and nose palpated.
  - The mouth with the two malar bone prominences make a triangle (unlike in breech where the anal orifice with two trochanteric eminences are in a line).
  - Mento-anterior: Chin anterior position.
  - Mento-posterior: Chin posterior position.

## MANAGEMENT

### Mento-anterior:

- Grossly adequate pelvis → follow the progress of labor but augmentation is not recommended.
- Forceps delivery can also be used when indicated and prerequisites for out let forceps are met. Vacuum delivery, however, is contraindicated.

### Mento-posterior:

- Early admissions with rotation to mento-anterior → follow labor progress with anticipation of vaginal delivery.
- Persistent mento-posterior presentation: Mento-posterior in the later part of the first stage (after 6 cm of cervical dilatation) and second stages of labor.
  - If fetus is alive → Cesarean delivery
  - If the fetus is dead → Craniotomy if all the prerequisites are met

## COMPOUND PRESENTATION

---

### DEFINITION

Compound presentation is when a fetal extremity prolapses alongside the main presenting part. It usually is the hand alongside the fetal head.

### DIAGNOSIS

- On vaginal examination: Irregular mobile fetal part adjacent to the larger presenting part.

### MANAGEMENT

- Closely monitor labor. The prolapsed extremity should not be manipulated as it may retract with the descent of the main presenting part.
- Spontaneous vaginal birth can occur only when the fetus is very small or dead and macerated.
- Cesarean delivery is indicated if there is protraction or arrest of labor.
- Augmentation of labor is not recommended.

## TRANSVERSE LIE (SHOULDER PRESENTATION)

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### DEFINITION:

**Transverse lie** is when the long axis of the fetus is perpendicular to the longitudinal axis of the mother/uterus. See [figure 10](#) below.

**Shoulder presentation** is when the shoulder is the presenting part in a transverse lie.

### DIAGNOSIS

- Abdominal findings:
  - Neither the fetal head nor the breech is felt in the upper and lower part of the uterus.
  - The abdomen is transversely elongated than longitudinally.
  - Fundal height is less than gestation age.
- Vaginal finding:
  - The shoulder or the prolapsed arm is felt.



**Figure 11.**  
**Transverse lie**

### MANAGEMENT:

- *CS delivery* if a transverse lie presents in labor in a term pregnancy.
- *Consider ECV* during pregnancy after 36 weeks of gestation until early in labor with intact fetal membranes, if operator is experienced. If ECV fails deliver by CS.

**Note:** *Neglected shoulder presentation leads to obstructed labor and associated complications.*

## BREECH PRESENTATION

### DEFINITION

Breech presentation is when the fetal buttock and/ or feet are the presenting part occupying the lower pole of the uterus.

### CLASSIFICATION

- Frank breech ([figure 12](#))
- Complete or flexed breech
- Footling breech /incomplete breech

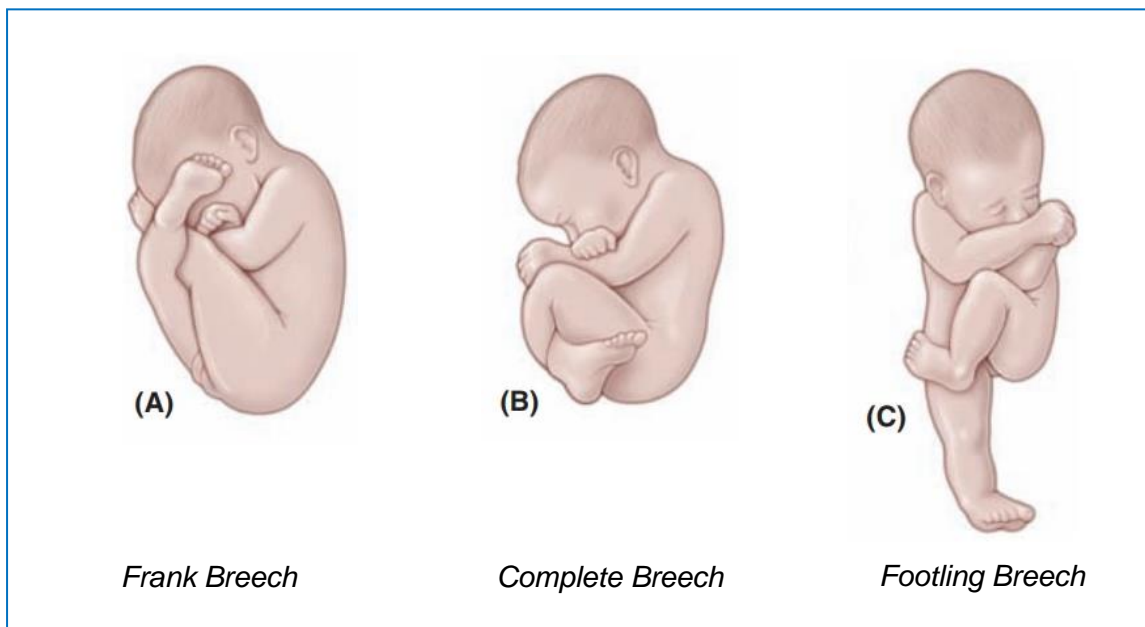


Figure 12. *Types of breech presentation.*

### DIAGNOSIS

#### Clinical assessment

- The mother may report subcoastal discomfort when the head occupies the fundus rather than the lower segment.
- Identify the following predisposing factors:-
  - Multiparty.
  - Previous history of breech presentation.
  - Preterm pregnancy.

- Contracted pelvis.
- Fetal congenital anomalies.
- Uterine malformation or presence of tumor previa.

#### **On abdominal palpation (Leopold's maneuvers):**

- The head is felt as hard, globular and ballotable mass at the fundus; and the breech will feel soft and bulky at the lower pole of the uterus.
- FHB loudest just above the umbilicus (may be lower with engagement). During vaginal examination in labor soft and irregular parts are felt through the cervical opening at early labor.
- Palpation of ischial tuberosities, sacrum and the feet by the sides of the buttock.
- In frank breech hard feel of the sacrum is felt and often mistaken for the head. Ischial tuberosities, anal opening and sacrum will be felt.
- To differentiate from face presentation ischial tuberosities and anal opening will be identified in a straight line. Perform clinical pelvimetry and look for cord presentation or prolapse.

#### **Ultrasound**

- To confirm clinical diagnosis,
- To assess fetal attitude,
- To assess amniotic fluid volume to consider ECV
- To estimate fetal weight, and to investigate for fetal anomalies and other predisposing factors.

#### **MANAGEMENT**

Ideally, every breech birth should take place in a hospital with the ability to perform an emergency caesarean section.

At 37 or more weeks of gestation (including early labor with intact fetal membranes) assess thoroughly and plan management accordingly:

- If there is no any contraindication for external cephalic version (ECV), consider ECV. If the ECV fails, consider vaginal breech delivery or CS.
- If there is absolute indication for CS (e.g. placenta previa, fetopelvic disproportion or compounding factors such as multiple pregnancy, post-term, elderly primigravida, Rh-immunization), plan for cesarean delivery.

#### **Attempt ECV if: -**

- By experienced Obstetrician.
- Gestational age is at or after 36weeks (before 36 weeks, a successful version is more likely to spontaneously revert back to breech presentation).

- Vaginal birth is possible.
- Facilities for emergency caesarean are available.
- Membranes are intact and amniotic fluid is adequate.
- There are no contraindications (e.g. fetal growth restriction, uterine bleeding, previous caesarean birth, fetal abnormalities, twin pregnancy, hypertension, fetal death).

## VAGINAL BREECH DELIVERY

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The most experienced provider in breech delivery should attend the delivery. The mother has to be counselled for the relative risk of perinatal mortality and morbidity compared with vertex presentation and ensuring availability of setup for emergency CS.

### FIRST STAGE OF LABOR

*First stage of labor* is monitored using partograph with close fetal monitoring as in cephalic presentation.

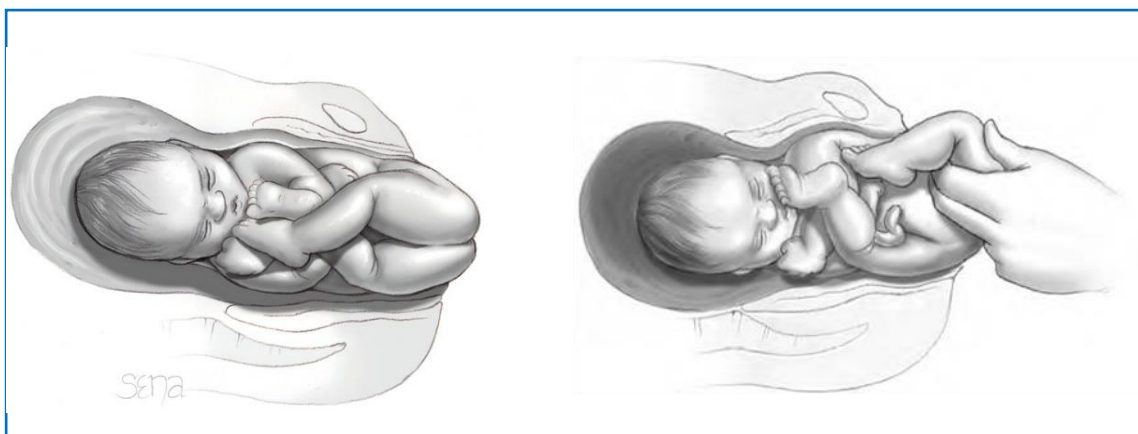
- Secure IV line.
- Consider analgesics as labor pain management.
- Immediate vaginal examination at rupture of membranes to rule out cord prolapse.
- Avoid ARM.
- Meconium is common with breech presentation and presence of meconium alone is not considered as a sign of fetal asphyxia.
- The mother should be instructed not to push until the cervix is fully dilated.
- Augmentation of labor is contraindicated in breech presentation.

### SECOND STAGE OF LABOR

Once the cervix is fully dilated and the buttocks have entered the vagina, tell the woman to bear down with the contractions.

#### Delivery of the buttocks and legs:

- If indicated (e.g., tight perineum), perform an episiotomy.
- As the buttocks get delivered, gently guide the sacrum anteriorly. Wait till body is born to the level of the umbilicus (no other manipulation at this stage).
- Sweep each leg away from the midline. If the legs do not deliver spontaneously, assist delivery of one leg at a time, by lateral rotation of thighs and flexion of knees.
- Splint the median thigh of the fetus with fingers positioned parallel to the femur and exert pressure laterally so as to sweep the legs away from the mid line or (Pinard's maneuver) ([figure 13](#)).
- Pushing behind the knee so that it bends; then grasp the ankle and deliver the foot and leg.



**Figure 13. Pinard's maneuver.**

- Wait until body is born to the level of the umbilicus.
- Put fingers on the anterior superior iliac crests and thumbs on the sacrum to apply downward rotational traction (Use a dry towel to wrap around the hips (not the abdomen) to help with gentle traction of the infant). Do not hold the baby by the flanks or abdomen as this may cause kidney or liver damage. See [figure 14](#) below.



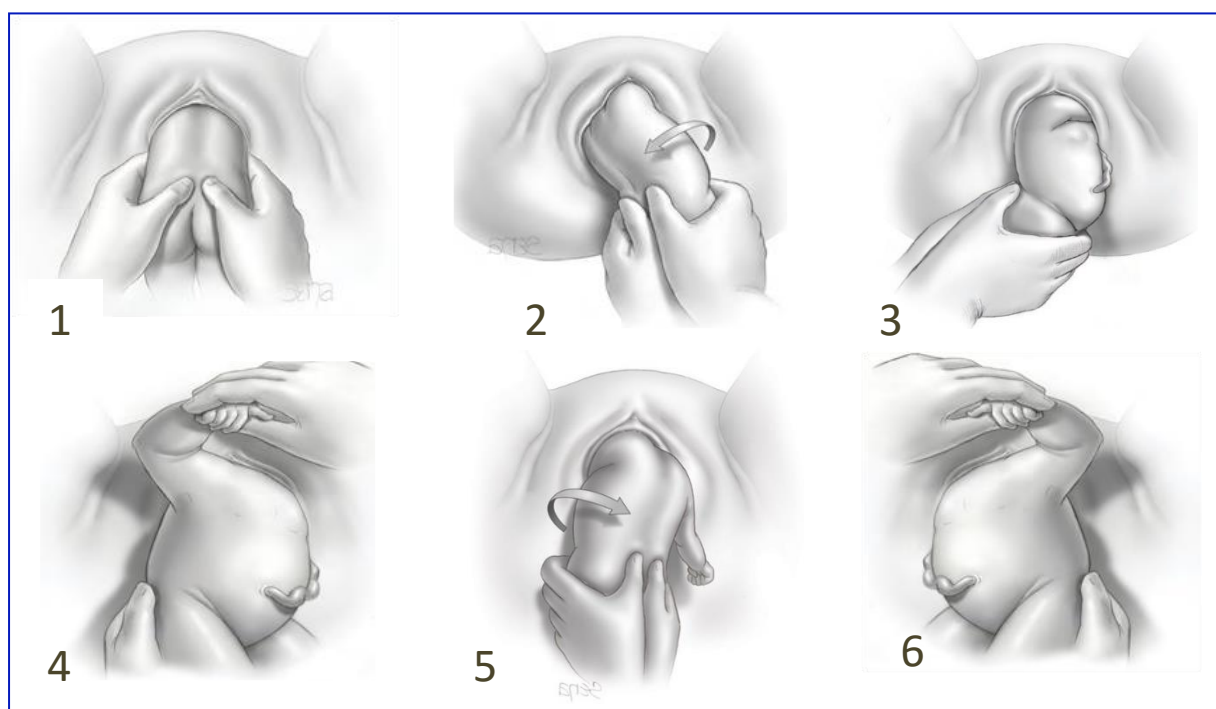
**Figure 14. Holding the baby.**

### **Delivery of the arms and shoulders**

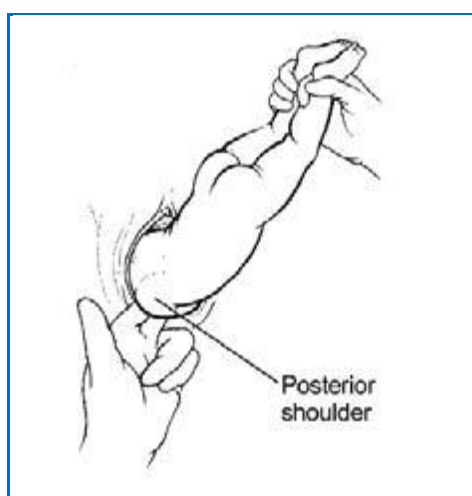
- When both scapulae are visible the body is rotated 90°. Allow the arms to disengage spontaneously one by one. Only assist if necessary ([figure 15](#)).
- If the arm does not spontaneously deliver, locate the humerus, place one or two fingers in the elbow and laterally sweep the arm across the chest.
- Rotate the body 180 degrees to deliver the other arm.
- If the arms are trapped in the birth canal, use classical method (delivering posterior shoulder) ([figure 16](#)) or Lovset's maneuver ([figure 17](#)).
- **Delivering posterior shoulder:** Hand is introduced along the curve of sacrum while the

baby is pulled slightly upwards. First post arm is delivered by applying firm pressure over the arm and pushing over the baby's face.

- **Lovset's maneuver:** Hold the fetus around the bony pelvis with thumbs across the sacrum. The fetus is turned through half a circle ( $180^0$ ) while downward traction is applied at the same time, so that the posterior arm emerges under pubic arch and then hooked. The position is restored and anterior arm is delivered in the same manner.

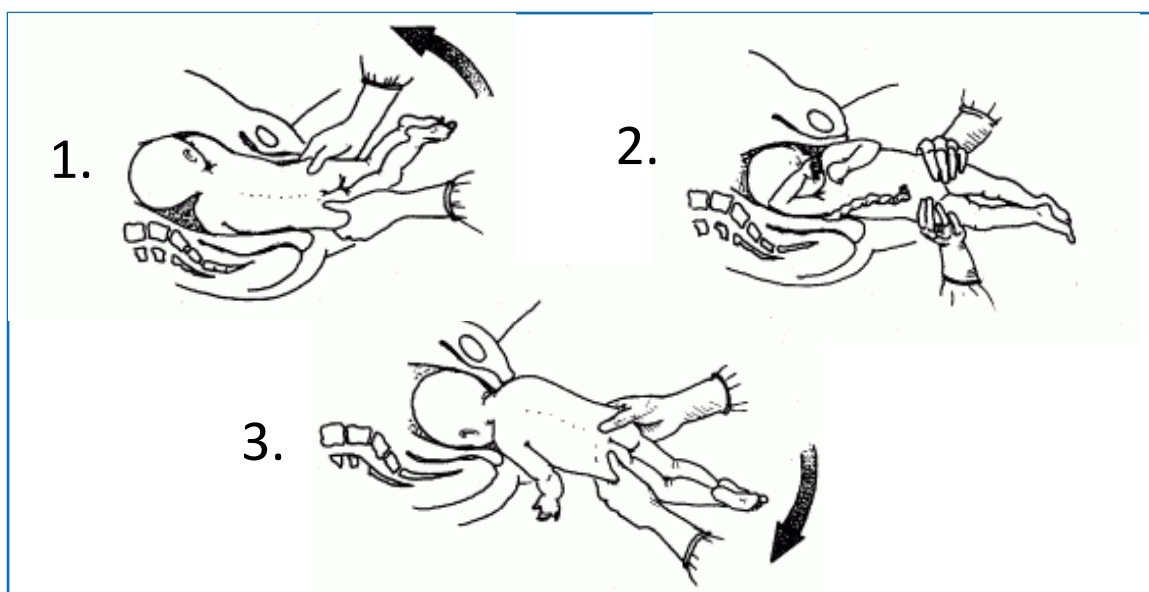


**Figure 15. Delivery of Arms and Shoulders.**



**Figure 16.** *Classical method (delivery of posterior shoulder).*



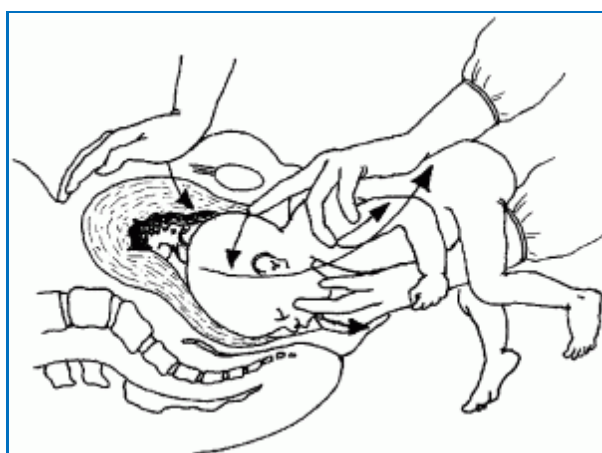


**Figure 17. Lovset's Maneuver.**

### **Delivery of the after coming Head**

When the nape of the neck is visible, apply fundal pressure to maintain flexion and deliver the upcoming head.

**Mauriceau Smellie Veit Maneuver (MSV):** Index and middle finger of one hand are applied over the maxilla, to flex the head, while the fetal body rests on the palm of the same hand and forearm. Fetal legs straddle the forearm. Two fingers of the other hand are hooked over the fetal neck and grasp the fetal shoulders. Apply gentle downward traction to deliver the head ([figure 18](#)).



**Figure 18. Mauriceau Smellie Veit Maneuver (MSV).**

**Forceps delivery:** Specialized type of obstetric forceps (Piper forceps) can be used to deliver after-coming head when the MSV cannot be accomplished easily.

## CESAREAN DELIVERY

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Some of the indications for cesarean delivery are:

- Presence of any indication for CS such as placenta previa and fetal distress.
- Specific breech-related indications:
  - Footling breech at first stage of labor or before initiation of labor.
  - Estimated fetal weight of  $\leq 1500$  gm and  $\geq 3500$  gm.
  - Extended or deflexed neck.
- Presence of compounding factor such as previous CS, elderly primigravida, history of infertility, bad obstetrics history, severe IUGR, Rh-immunization, any degree of CPD, uterine dysfunction, prolonged labor and failure to progress in labor during breech vaginal delivery.

## CEPHALOPELVIC DISPROPORTION

### DEFINITION

Cephalopelvic disproportion (CPD) is disparity between the fetal head and maternal pelvis which leads to inability of the fetal head to pass through the maternal pelvis for mechanical reasons.

### CAUSES OF CPD (clinical classification)

- **Absolute CPD:** true mechanical obstruction as a result of
  - **Permanent (maternal) factors:** contracted pelvis (commonest), pelvic exostoses, spondylolisthesis, anterior sacro-coccygeal tumors; or
  - **Temporary (fetal) factors:** Hydrocephalus, large fetus
- **Relative CPD:** where the fetus may be delivered vaginally if a favorable combination of other factors can be achieved. E.g. brow presentation, face presentation and occipito-posterior positions (rotation / flexion of the head may occur during labor progress).

### DIAGNOSIS OF CPD

Properly taken history, physical examination and completed labor graph allow easy and early identification and diagnosis of CPD.

### History

- Primigravid (especially teenage pregnancy)
- Prolonged labor
- Previous history of prolonged labor
- Previous history of perinatal death
- Previous history of obstetric trauma
- Properly documented obstetric record (e.g. intraoperative direct measurement of the obstetric conjugate)

### Antepartum evaluation

- Measurement of the mother and the fetus has been attempted as a means of detecting CPD before the onset of labor but is found to have poor prediction value. Therefore, antepartum examination, measurement and imaging cannot reliably diagnose CPD to preclude a trial of labor.

## Intrapartum evaluation

Generally CPD, with very few exceptions, is diagnosed after a properly conducted trial of labor. Abdominal and pelvic assessment should be done in all laboring mothers to rule out CPD. Findings that may indicate CPD are:-

- ***Abnormal progress of labor:***
  - Arrest and protraction disorders of cervical dilatation, or crossing an alert or action line on a partograph.
  - Failure of head descent especially in the presence of arrested or protracted cervical dilatation. Note that failure of head descent in the first stage of labor is not necessarily a cause for alarm, but may be suggestive of CPD.
  - High station of the head during late active first stage of labor or second stage of labor may suggest presence of CPD, particularly in primigravid woman.
  - Failure of progress of labor after correction of inadequate uterine activity (by amniotomy or oxytocin infusion or both)
- ***Abnormal clinical pelvimetry:***
  - If the true conjugate is less than 10 cm. A true conjugate or inter-tuberous diameter of less than 8 cm (a fist size) indicates a grossly contracted pelvis through which a fair-sized fetus (with BPD of 8.5 cm) cannot be delivered safely.
  - Abnormal measurements of clinical pelvimetry also include easily reachable sacral promontory, prominent ischial spines, convergent pelvic side walls, flat sacrum, narrow sub pubic angle and narrow sacrosciatic notch.
- ***Molding:***
  - An increasing degree of molding in the absence of descent of the head is the hallmark feature of CPD (the 'ultimate index' of CPD).
  - Severe moldings (+2/+3) at a higher station (3/5<sup>th</sup> or more above the pelvic rim).
  - Parieto-parietal molding (overlap) is highly associated with CPD.
- ***Caput Succedaneum:***
  - A severe degree of caput has been associated with prolonged labor and CPD.
  - Severe degree of caput is diagnosed when the scalp edema hampers identification and assessment of the suture lines.
- ***Abnormal degree of head flexion:***
  - Deflexion results in greater cephalic diameters presenting at the pelvic brim.
  - Extreme deflexion (as in brow presentation) can result in 'relative CPD'.
- ***Asynclitism***
  - It is lateral flexion of the fetal head as it negotiates the birth canal in the OT position.
  - Posterior asynclitism (Litzmann's obliquity) is frequently associated with CPD.

- **Fetal Macrosomia:**
  - Clinical, maternal or ultrasound estimation of fetal size have the potential for identifying macrosomic pregnancies at risk for CPD.
- **Fetal distress:**
  - In the presence of marked CPD, the fetus responds with fetal heart rate abnormalities, falling PH and passage of meconium.

### Imaging:

- Ultrasound examination may reveal macrosomia or congenital anomalies e.g. hydrocephalus.

## MANAGEMENT OF CPD

### Trial of labor:

- Trial of labor is conducted in a woman with suspected CPD to determine whether it is safe for the woman to deliver vaginally or not. It is done in an equipped and staffed hospital for operative procedures in case vaginal delivery fails.
- CPD is suspected if there is previous history of prolonged labor with bad obstetric history or operative delivery, if the parturient is teenage, in the presence of borderline pelvis or if the cervicogram is crossing the alert line without signs of CPD.
- Borderline pelvis is entertained if the obstetric conjugate is 8 to 10 cm or in the presence of other less specific clinical findings. If there is no other risk factor (such as previous CS), trial of labor is the best diagnostic approach.
- The trial continues as long as labor progresses well and as long as there is reassuring fetal and maternal status.

### Route of delivery:

- Generally, presence of CPD during labor is an indication for caesarean delivery.
- In permanent absolute disparities (e.g. severe pelvic contracture (OC of 6-8 cm) or extreme pelvic contracture (OC < 6 cm)), there is no possibility of vaginal delivery and elective cesarean section should be done.
- Induction and augmentation of labor is contraindicated in fetal macrosomia.
- Cesarean delivery is recommended for macrosomic fetus with estimated fetal weight of greater than 4.5 kg (4.0 kg if the mother is diabetic) regardless of the status of labor.
- Fetal hydrocephalus may be managed by cephalocentesis.
- Craniotomy is indicated if the fetus is dead and prerequisites for destructive delivery are fulfilled.

## DISCHARGE COUNSELING AND EDUCATION

- A woman who delivered by CS should be explained about the indication (CPD) and the need for repeat CS in future pregnancy.
- Besides verbal explanation, a written note should be given that could also serve as referral feedback to referring health centers.
- Previous CS for CPD can be followed at a nearby health center and referred after 36 - 37 weeks of gestation.

## COMPLICATIONS

### Maternal: -

- Prolonged / obstructed labor: If CPD is not diagnosed & properly managed the end result is obstructed labor and its associated complications.
- PPH
- Maternal sepsis

### Fetal / neonatal

- Fetal distress
- Perinatal asphyxia
- Neonatal infections
- Perinatal death

## OBSTRUCTED LABOR AND UTERINE RUPTURE

### OBSTRUCTED LABOR

---

#### DEFINITION:

Obstructed labor (OL) is failure of descent of the fetus in the birth canal for mechanical reasons in spite of good uterine contraction. It is an outcome of neglected and mismanaged labor.

#### CAUSES

##### Maternal:

- Contracted pelvis / cephalopelvic disproportion (commonest)
- Soft tissue abnormalities (e.g. tumor previa, vaginal septum, tight perineum, uterine congenital anomalies)

##### Fetal:

- Macrosomia
- Malpresentations- e.g. shoulder presentation
- Malposition – persistent occipito posterior or occipito transverse positions
- Locked twins, conjoined twins
- Fetal anomalies e.g. hydrocephalus
- Shoulder dystocia

#### CLINICAL FEATURES:

The clinical findings depend on the duration, complications, cause of the obstruction and gravidity.

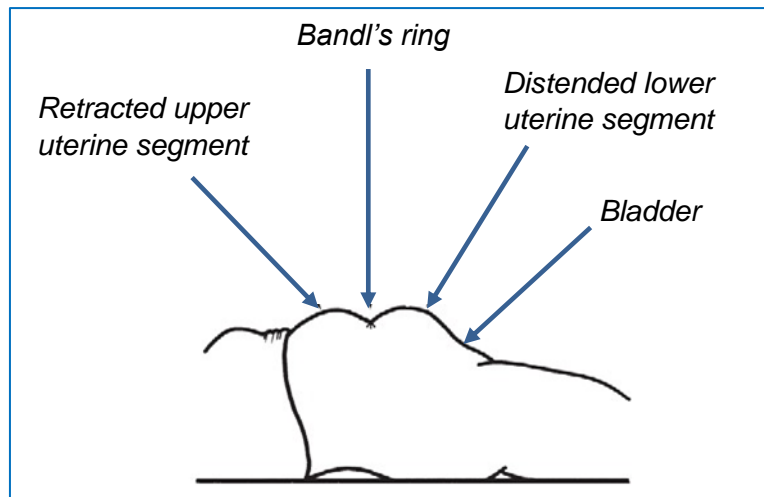
##### History:

- Abnormally prolonged labor
- Early ROM or prolonged rupture of the membranes
- Most do not have antenatal care
- Painful contractions
- Fever
- Previous pregnancy complicated by prolonged labor, stillbirth or early neonatal death
- Previous operative deliveries (instrumental deliveries, cesarean section)
- Medical history; particularly rickets, osteomalacia, or pelvic injury

## Clinical findings

- **General condition** of the patient:-
  - Exhausted due to severe pain and lack of sleep.
  - Anxious, terrified and uncontrollable.
  - Dehydration is nearly always present. Symptoms of dehydration include dry and furred tongue, and cracked lips; hot and dry skin with loss of tissue turgor.
  - Deep and rapid respiration as a result of ketoacidosis
- **Clinical signs of infection:-**
  - Pyrexia and tachycardia.
  - Purulent vaginal discharge.
  - In advanced cases, infections due to gas-forming organisms may produce a crackling sensation when the uterus is palpated.
  - Terminal severe intrapartum infection results in septic shock with circulatory collapse, hypotension, and a rapid thready pulse with subnormal temperature.
- **The uterus:**
  - Increasing uterine contractions in frequency and duration, that later becomes atonic (mainly in a primigravid).
  - In multiparous women, uterus responds by increasingly frequent and violent contractions resulting in tonic contractions.
- **The bladder:**
  - Edematous bladder, displaced out of pelvis.
  - Blood-stained urine because of prolonged compression traumatizing the bladder.
  - Decreased urine output
- **Abdominal findings:**
  - Distention of the bowel as a result of acidosis and hypokalemia.
  - *Two/ Three tumor abdomen:*
    - Occurs due to grossly thickened and retracted upper uterine segment above Bandl's ring; thinly distended lower uterine segment below the ring; and fully distended and/ or edematous bladder further distending the lower abdomen (see [figure 19](#) below).
    - Retraction ring of Bandl marks the junction between thickened and retracted upper segment and thinned lower uterine segment.
    - The 'two/three tumor abdomen' and retraction ring of Bandl are warning signs of an impending uterine rupture.





**Figure 19. The three tumors and ring of Bandl.**

- **Vaginal examination findings**
  - Edema of lower vagina and vulva (canula sign).
  - Meconium- stained and foul-smelling discharge.
  - Bleeding may be seen.
  - Edema of the cervix.
  - Cervix poorly applied to the head.
  - Full cervical dilatation usually occurs in cephalic presentation.
  - Little or no descent of the presenting part.
  - Increasing molding.
  - Depending on the type of fetal presentation, findings may include large caput succedaneum in cephalic presentation, shoulder with or without prolapsed arm in transverse lie, brow or face in deflected neck.
  - Caput formation makes identification of the presentation and position very difficult.
- **Fetal Status**
  - Abnormal fetal heart rate (tachycardia, bradycardia or deceleration).
  - No fetal heart tone if the fetus dies from anoxia;

#### **Partograph findings:**

- A prolonged first or second stage of labor with no descent, and
- Cervicogram crossing the alert line and then action line despite adequate uterine contractions.

## MANAGEMENT

Initial management of OL involves resuscitation and monitoring of the life endangering conditions such as shock and sepsis followed by identification and treatment of the cause of OL and its complications.

### Resuscitation and monitoring:

- Secure good venous access; preferably with two large-bore cannulae (No. 18).
- Give crystalloids (ringers lactate is the fluid of choice)
  - If the woman is in shock, give normal saline or Ringer's lactate. Run 1 litre as quickly as possible, then repeat 1 litre every 20 minutes until the pulse slows to less than 90 beats per minute or systolic blood pressure is 100 mm Hg or higher. However, if breathing problems develop, reduce to 1 litre in 4–6 hours.
  - If the woman is not in shock but is dehydrated and ketotic, give 1 litre rapidly and repeat if still dehydrated and ketotic. Then reduce to 1 litre in 4–6 hours.
- Give dextrose solution IV but never give orally.
- Monitor closely
  - Keep an accurate record of all intravenous fluids infused, vital signs and urinary output.
  - Lung bases should be examined at intervals.

### Send an urgent blood sample:

- Blood group and Rh, cross-match, complete blood count.

### Give broad spectrum antibiotics:

- Ampicillin 2 gm every 6 hours or Ceftriaxone 1-2g IV every 12 hours, PLUS Gentamicin 80 mg IV every 8 hours (should be adjusted with renal status), PLUS Metronidazole 500 mg IV every 8 hours.

### OR

- Gentamicin 80 mg IV every 8 hours PLUS Clindamycin 900 mg IV every 8 hours.

### Further management:

- Empty the bladder:
  - Note that catheterization may be difficult or impossible.
  - Metallic catheters should not be used to avoid injury to the urethra and bladder.
- Empty the stomach: insert NG tube, particularly in the presence of distended abdomen.
- Prophylactic dose of TAT: 1500 units, if not immunized for tetanus during ANC.
- Inhalation of oxygen by face mask

### Supportive care:

- Encourage family members to stay with her to provide comfort and support.
- Staff should explain all procedures to the woman, seek her permission, discuss results with her, listen and be sensitive to her feelings.

### Pain management:

- Give analgesics while resuscitating and preparing her for operative delivery.

### Delivery:

- *Alive fetus*: do emergency cesarean delivery.
- *Dead fetus with presence of imminent signs* of uterine rupture: perform cesarean delivery or destructive delivery under direct vision.
- *Dead fetus without imminent signs* of uterine rupture: perform destructive delivery if prerequisites are fulfilled.

### Postoperative care and follow up

- Intensive resuscitation and close monitoring should continue to identify complications (e.g. abscess) early until her condition improves.
- IV antibiotics should be continued until the patient is fever free for 48 hours and shift the medications to PO antibiotics to complete 7-10 days treatment.
- Give analgesics.
- Breast care for those with stillbirths or neonatal deaths.
- Explain the condition and counsel on future pregnancy.
- Severe postpartum infection: possibility of ectopic pregnancy in future pregnancy and need for early check-up if pregnant; infertility.
- After prolonged obstructed labor, keep the catheter for at least 10 days. Earlier removal predisposes to chronic retention.
- Fistula care and follow-up:
  - A leak of urine may indicate obstetric fistula.
  - If there is urinary leakage after removal of the catheter, reinsert it immediately.
  - Prolonged urethral catheterization (for total duration of 3 to 6 weeks) can be utilized to non-surgically manage “small” (< 2 cm) and “fresh” fistulas (i.e., cases diagnosed within four weeks of injury).
  - Women with fistula are kept in the hospital until infection is controlled. They should be explained about when and where they can have the fistula repair.
  - Usually, the fistula repair is undertaken after infection and edema has subsided.
- Follow up schedule: keep patients until infection and acute conditions are well controlled, especially in women coming from rural and distant areas.

- Besides the basic postpartum care, the follow up care should focus on the specific complication sustained after OL.

## COMPLICATIONS:

### Early complications:

- Atonic PPH, uterine rupture, peripartum infection (peritonitis, sepsis and septic shock leading to various organ failures (temporary or permanent)), tetanus, maternal death, fetal distress, fetal & neonatal infections, and fetal and neonatal death.

### Late complications:

- Fistula (e.g. vesico-vaginal, rectovaginal) and its aftermath, vaginal stenosis & stricture, foot drop (sciatic, common peroneal nerve), infertility following postpartum PID or hysterectomy, psychological trauma due to the painful labor experience, loss of the baby and social isolation.

## UTERINE RUPTURE

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### DEFINITIONS

- **Uterine rupture:** A tear through the uterine wall above the cervico-uterine junction during pregnancy and labor.
- **Silent uterine rupture:** Rupture of the uterus before the onset of labor. It usually occurs in patients with previous uterine scar involving the upper uterine segment (e.g. repaired uterine rupture, previous classical C/S).

### RISK FACTORS

- Obstructed labor and previous cesarean section scar are the most common risk factors for uterine rupture.

### CLASSIFICATION

- **Complete:** Where all the three layers of the uterus are involved and there is a direct communication between the uterine and abdominal cavities.
- **Incomplete:** In incomplete uterine rupture, the peritoneum covering the uterus remains intact

### CLINICAL FINDINGS

- The clinical findings may vary from mild and non-specific to an obvious clinical crisis and abdominal catastrophe.

- The *classic signs and symptoms of complete uterine rupture* are:
  - Sudden onset tearing abdominal pain (sudden feeling of something giving way)
  - Cessation of uterine contractions
  - Easily palpable fetal parts
  - Abnormal uterine contour
  - Signs of intra-abdominal hemorrhage
  - Tender abdomen
  - Absent fetal heart sounds
  - Vaginal bleeding
  - Recession of the presenting part
  - Hemorrhagic shock
  - Copious bright red blood through the catheter indicates involvement of the bladder.
- *Clinical finding of incomplete rupture* includes
  - The fetus remains in the uterus and signs of shock may be delayed until after delivery.
  - Rapid maternal pulse
  - Labor pain may continue
  - Fetal heart rate abnormalities: the most reliable warning sign
  - Vaginal bleeding

## MANAGEMENT

### Emergency management

- Secure IV lines bilaterally with large bore cannulae.
- Resuscitation with IV fluids and blood products.
- Prepare for operative interventions (e.g. determine hematocrit, blood group and RH, avail cross-matched blood and organize the OR).
- Laparotomy should not be delayed till patient is resuscitated out of shock.

### Surgical intervention

- Abdominal cavity should be entered through vertical skin incision.
- One of the following operative procedures is undertaken to manage the rupture:
  - Repair of uterine tear with preservation of fertility:
    - If preservation of fertility is desired.
    - Performed for recent tear, not too large, with accessible and clean (little or no infection) edges.
  - Repair of uterine tear with bilateral tubal ligation:

- For less experienced surgeon, or
- If the patient is in critical condition.
- Total hysterectomy
  - Extensive tear, necrotic edges, tears difficult to stitch (such as posterior tears and with extension into the vagina), grossly infected uterus, rupture after prolonged labor, future cervical cancer concern.
- Subtotal hysterectomy
  - Similar indications as total hysterectomy.
  - Relative ease of procedure than total hysterectomy.

## POSTPARTUM CARE

- Intensive resuscitation and monitoring should be continued till the patient's condition improves.
- Blood transfusion as required.
- If hysterectomy/ BTL done: counsel about future fertility and menstruation.
- Repaired uterus:
  - Requires extensive counseling about the increased risk of rupture with future pregnancies.
  - Written note should be given that could also serve as referral feedback to referring health facility.
  - In future pregnancy, women with prior rupture should be admitted early to hospital, monitored closely and offered cesarean delivery at 36 weeks of gestation.
  - For pregnancy with repaired uterus and with relatively higher risk of silent uterine rupture (e.g. multiple pregnancies, polyhydramnios, etc), delivery should be planned earlier.

## POST PARTUM HEMORRHAGE

### DEFINITION:

Post partum hemorrhage (PPH) is excessive bleeding following delivery (>500 ml in vaginal delivery or >1000 ml in Cesarean Delivery) or bleeding resulting in derangement of vital signs or a drop in Hct > 10% from the baseline.

### CLASSIFICATION:

- **Primary PPH:** PPH occurring within 24 hrs.
- **Secondary PPH:** PPH occurring from 24 hrs until 6 wks after delivery.

### PRIMARY PPH

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#### CAUSES

**The 4Ts plus 1:** Atonic uterus (Tone), genital trauma (Trauma), retained placenta (Tissue), coagulation failure (Thrombin) and acute inversion of the uterus (Traction)

#### Atonic Uterus (Tone)

**Definition:** A loss of tone in the uterine musculature.

**Risk factors:** Prolonged or precipitate labor, induction or augmentation, over distended uterus (multiple gestation, polyhydramnios, fetal macrosomia), use of drugs (e.g. halothane, MgSO<sub>4</sub>), chorioamnionitis, previous history of PPH (particularly following atony), high parity, uterine hypoxia (e.g. hypotension) and mismanagement of 3rd stage.

**Diagnosis:** Hypotonic (boggy) uterus with brisk bleeding and expression of clots when the uterus is massaged.

#### Genital tract trauma (Trauma)

**Definition:** Lacerations and hematoma of the genital tract in the process of delivery (uterus, cervix or vagina).

**Risk factors:** Mismanagement of 3<sup>rd</sup> stage of labor, fetopelvic disproportion, instrumental deliveries, precipitate labor, scarred uterus, large episiotomy, delivery through incompletely dilated cervix, tight perineum.

**Diagnosis:** Suspect when bright red (arterial) bleeding occurs in the presence of a contracted uterus. Diagnosis is made following exploration of the genital tract.

### **Retained placental tissue (Tissue)**

**Definition:** Failure to deliver the placenta and the membranes fully or partially following active management of labor.

*Retained placenta* is defined as placenta that has not undergone placental expulsion after 30 minutes of birth of the last baby.

**Risk factors:** Mismanagement of third stage of labor, abnormal placentation (morbidity adherent placenta, succenturiate lobe), constriction of the cervix or lower uterine segment and untimely use of uterotonics.

**Diagnosis:** Placental examination (incomplete cotyledons and/or membranes), failure to deliver the placenta by CCT, continuous bleeding, ultrasound (retained echogenic tissue in the uterine cavity).

### **Coagulation failure (Thrombosis)**

**Definition:** Any derangement of hemostasis resulting in excessive bleeding.

**Risk factors:** Platelet dysfunction (ITP, HELLP), inherited coagulopathy, use of anticoagulation, disseminated intravascular coagulation (from sepsis, placenta abruption, amniotic fluid embolism or IUFD), dilutional coagulopathy, systemic bleeding disorders.

**Diagnosis:** Presence of bleeding from other sites in addition to the genital tract including (but not limited to) mucosal bleeding. Assess for antenatal or intrapartum risk factors, perform bedside coagulation tests, determine platelet count, coagulation profile (PT, PTT, INR) and fibrinogen level.)

### **Acute inversion of the uterus (Traction)**

**Definition:** The uterus turns inside-out partially or completely during or after delivery of the placenta.

#### **Classification:**

*First degree:* Fundus is within the uterus not extending beyond the cervix.

*Second degree:* The inversion extends out of the cervix and is limited to within the vagina.

*Third degree:* Complete inversion to the perineum.

*Fourth degree:* Total inversion of the uterus with the vagina.

**Risk factors:** Mismanagement of third stage of labor, adherent placenta, short cord, fundal placenta, morbid placental adherence, precipitated labor and multiparity.

**Diagnosis:** Sudden maternal collapse with active vaginal bleeding and a fleshy “cherry red” mass in or out of the vagina with disproportionately small or absent uterus on abdominal palpation; placenta might or might not be attached.



## PREVENTION OF POSTPARTUM HEMORRHAGE

Prevention methods include prevention / treatment of anemia, skilled birth attendance and active management of third stage of labor. Active management of third stage of labor is the best strategy to prevent postpartum partum hemorrhage.

## INITIAL TREATMENT OF POSTPARTUM HEMORRAHGE

**Shout for help:** This involves alerting the ward team, calling the most senior, consulting anaesthesia team and alerting blood transfusion service.

### Initiate resuscitation and monitoring

- Establish two IV lines
- Take blood for hemoglobin / hematocrit, cross-matching and coagulation tests
- Position the patient flat
- Oxygen by face mask
- Commence crystalloids infusion
- Initiate monitoring vital signs: BP, PR, RR
- Catheterize the bladder and follow urine output
- Consider blood transfusion if there is indication

## TREATMENT OF ATONIC UTERUS:

### 1. Uterine massage

- To stimulate uterine contraction

### 1. Uterotonic drugs (*see Box x below*):

- Give uterotonic drugs while stimulating contraction by gentle massaging of the uterus.
- IV oxytocin is the recommended first line uterotonic drug for the treatment of PPH.

### 2. Tranexamic acid (TXA): (*see Box –x below*):

- All women diagnosed with PPH should be given intravenous (IV) tranexamic acid (TXA) (table) as soon as possible after the onset of bleeding and within 3 hours of birth, in addition to the standard care for women with PPH.

## UTEROTONIC AGENTS

### OXYTOCIN

Intravenous oxytocin is the recommended first line uterotonic drug for the treatment of PPH.

**Dose:** 20 – 40 units in 1-liter normal saline (NS) or lactated Ringer's (LR) solution infuse IV at fastest flow rate possible.

Give oxytocin 10 units IM in women without IV access.

**Maintenance dose:** IV infuse 20 units in 1 L IV fluids at 40 drops per minute.

**Maximum dose:** Not more than 3 L of IV fluids containing oxytocin.

**Precautions:** Do not give oxytocin as an IV bolus.

### ERGOMETRINE/ METHYLERGOMETRINE

**Dose:** 0.2 mg IM

**Maintenance dose:** repeat 0.2 mg IM after 15 minutes (if required, give 0.2 mg IM or IV every 4 hours).

**Maximum dose:** Five doses (1g).

**Precaution:** Should not be given in hypertensives, cardiac patients and in retained placenta.

### MISOPROSTOL (PGE1)

If the bleeding is intractable or in settings in which oxytocin use is not feasible: 800 mcg sublingual or rectal.

### CARBOPROST (15-METHYL PROSTAGLANDIN F2 ALPHA)

**Dose:** 0.25 mg IM

**Maintenance dose:** 0.25 mg every 15 minutes.

**Maximum dose:** Eight doses (total 2 mg).

**Precautions:** Do not give in asthmatic patients, do not give IV.

## TRANEXAMIC ACID (TXA)

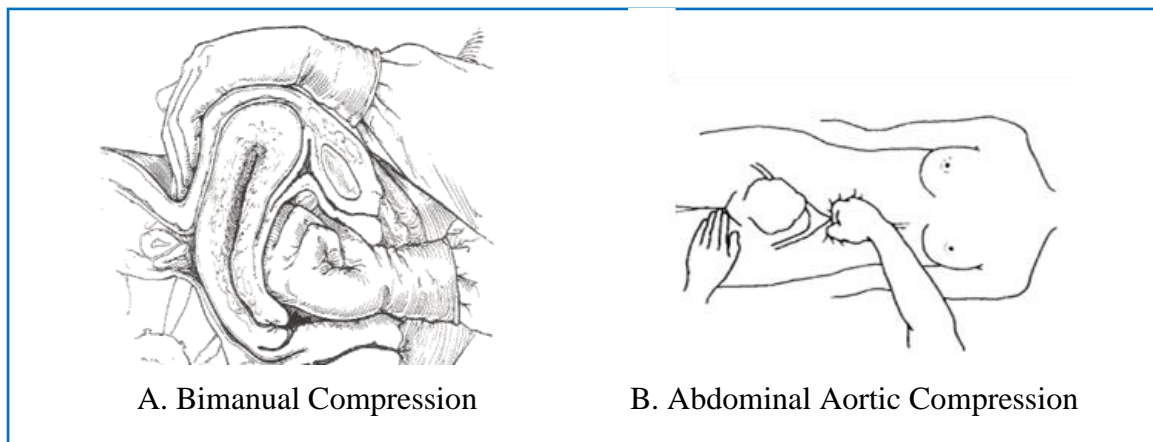
**Dose:** Administer a fixed dose of TXA 1 gm in 10 mL (100 mg/mL) IV at 1 mL per minute (i.e., administered over 10 minutes).

**Continuing dose:** If bleeding continues after 30 minutes or if bleeding restarts within 24 hours of completing the first dose, administer second dose of TXA 1gm IV.

## 4. Bimanual compression and aortic compression:

**Bimanual compression:** Perform bimanual compression of the uterus as a temporizing measure until appropriate care is available for the treatment of PPH after vaginal delivery. ([Figure 20-A](#))

**Aortic compression:** Maintain compression of the abdominal aorta until bleeding is controlled or alternative measures can be taken. ([Figure 20-B](#))



**Figure 20. Bimanual and abdominal aortic compressions.**

### 5. Uterine balloon tamponade (UBT)

If bleeding is not arrested by manual compression (bimanual uterine compression or aortic compression), subsequent management of atonic uterus involves the use of UBT.

#### *Steps to follow during UBT insertion:*

- Explain the procedure to the mother and get consent.
- Collect the already assembled UBT kit, a basin and clean water. (A complete kit consists of 2 condoms, 2 O-rings/cotton strings, 1 Foley catheter fitted with a one-way valve and a 60 ml syringe).
- Unroll the condom. Place the Foley catheter half-way into the condom leaving the condom hanging loosely at the end of the Foley catheter.
- Tie the condom onto the Foley catheter using the two O-rings/cotton strings.
- Locate the cervix using your two fingers and insert the uterine balloon into the uterus to the fundus. Be sure that it is not just in the vagina. If the balloon is inflated in the vagina, it may not address bleeding from within the uterus.
- Inflate the catheter with 15 ml of NS / water.
- Inflate the balloon using NS/clean water at room temperature. Fill the balloon with 300-500 ml of NS/water or more as maybe required until bleeding stops /meet resistance.
- Continue to check to see that the UBT has not slipped into the vagina as it is filled. If the bleeding does not stop, re-examine for other causes of PPH and then proceed to next steps of management.
- Secure the catheter on the thigh of the woman so it does not pull out with her movement.
- Place the woman in a recovery position.

A prophylactic dose of broad-spectrum antibiotics, Ampicillin 2gm IV or Cefazolin 1gm IV, is recommended when the uterine balloon is placed. The uterine balloon should stay in place for at least 6-24 hours. The mother's vital signs and fundal height should be examined every 15 minutes for the first hour (or longer if she is still showing signs of severe anemia) then at least every 4 hours.

***Steps to follow during UBT removal:***

- After 6-24hrs, while the woman is being observed, the balloon should then be deflated.
- Explain the procedure to the mother.
- Wash your hands and put on gloves.
- Remove 100 ml of water from the balloon and observe closely for one hour to see if bleeding resumes.
- If significant bleeding resumes refill the balloon and re-examine the patient. Other causes of bleeding (retained products, cervical tears, coagulopathy) can be the cause and should be treated.
- If there is no bleeding after one hour, withdraw all the NS / water from the balloon using the syringe.
- Withdraw the 15mls of NS/water from the smaller Foley balloon.
- Gently remove the UBT device and discard.

## **6. Non-pneumatic anti-shock garment (NASG)**

NASG applies pressure to the lower body and abdomen, thereby stabilizing vital signs and resolving hypovolemic shock. NASG can be used as a temporizing measure until appropriate care is available.

## **7. Uterine compression sutures**

If bleeding does not stop in spite of treatment with uterotonics, other available conservative interventions (e.g., uterine massage, balloon tamponade), and external or internal pressure on the uterus, conservative surgical interventions using uterine compression sutures should be initiated. This includes applying B-Lynch or modified compression suture.

## **8. Uterine or utero-ovarian artery ligation**

If bleeding is not resolved, uterine or utero-ovarian artery ligation is tried alone or together with compression sutures.

## **9. Hysterectomy**

- If bleeding does not stop, further surgical intervention (subtotal or total hysterectomy) is required.

## **TREATMENT OF GENITAL TRAUMA**

- *Repair* the laceration with adequate exposure.

- *Laparotomy* for cervical tear extending in to the uterus or if the apex is not visualized.
- *Evacuate* hematoma larger than 5 cm.
- If bleeding continues, assess clotting status using a bedside clotting test.
- Give tranexamic acid.

## TREATMENT OF RETAINED PLACENTA TISSUE

### Treatment of retained placenta (PPH with undelivered placenta)

- Give additional 10 units of oxytocin IM, check the tone of the uterus and attempt CCT.
- If placenta is delivered and uterus is well contracted, closely monitor vital signs and the tone of the uterus.
- If placenta delivery fails, perform manual removal of the placenta: give analgesia and prophylactic antibiotics (Ampicillin 2 gm IV or Cefazolin 1 gm IV stat), catheterize the bladder, and remove the placenta gently by holding umbilical cord and identifying the cleavage line.
- If placenta is not delivered by manual removal of the placenta, consider pathological adherence of the placenta.
- If placenta is not delivered as a result of constriction ring or technical difficulty in passing the hand through the cervix and / or lower segment, extract the placenta using ovum forceps or wide curette in the operation theatre.

### Treatment of retained placental fragments

- Remove placental fragments by hand, ovum forceps or wide curette.

**Note:** Very adherent tissue may be morbidly adherent placenta. Efforts to extract fragments that do not separate easily may result in heavy bleeding or uterine perforation.

## TREATMENT OF COAGULATION FAILURE

- For anemia, transfuse type-specific blood (or O negative blood).
- For thrombocytopenia, particularly if platelets are less than 50,000, transfuse platelets.
- For abnormal bedside coagulation tests or for prolonged PT or PTT or INR > 1.3, transfusion of fresh frozen plasma (15 mL/Kg body weight).
- In transfusing more than 6 units of RBCs or is anticipated, give 4 units of FFP, 1 unit of platelet and 1 unit of cryoprecipitate (if available) to avoid a transfusion related dilutional coagulopathy.

## TREATMENT OF PPH AFTER ACUTE INVERSION OF THE UTERUS

### Treatment of pain and shock:

- Treatment of hemorrhagic shock

**If the woman is in severe pain, give pethidine 1 mg/kg body weight (maximum of 100 mg) IM or IV slowly or give morphine 0.5 mg/kg body weight. General anesthesia may be required in certain patients.****Manual replacement:**

- Give prophylactic antibiotics (Ampicillin 2 gm IV or Cefazolin 1 gm IV stat).
- Once the diagnosis is made, uterine replacement should be attempted promptly using Johnson's method.
- Once uterine replacement is successful, the uterus should be held in place for few minutes and uterotonics administered.
- Placenta should only be removed after repositioning of the uterus.
- If the uterus cannot be easily replaced, a tocolytic (nitroglycerine 125µg IV) to relax the uterus may be used.

### **Surgical replacement:**

**Huntingdon's operation:** The abdomen is opened and gentle upward traction can be used with two Allis clamps placed sequentially on the round ligaments to pull out the uterus.

**Haultain's operation:** If Huntingdon's operation fails, then a midline vertical incision in the posterior uterus can be made to aid in lifting the fundus.

### **Follow up after arresting PPH**

- Closely monitor vital signs preferably continuously or every 15 minutes and urine output for at least 2 hours.
- Monitor bleeding and vital signs (PB, PR, RR) for next 6 hours every 30 minutes.
- Check the uterine tone every 15 minute for the next two hours.
- Continue with IV fluid and oxytocin drip for next 2 hours.
- Continue with blood transfusion if already initiated or start transfusion if indicated.
- If patient is stabilized, assist her to initiate breast feeding if appropriate.

See [figure 21](#) below for PPH management algorithm.

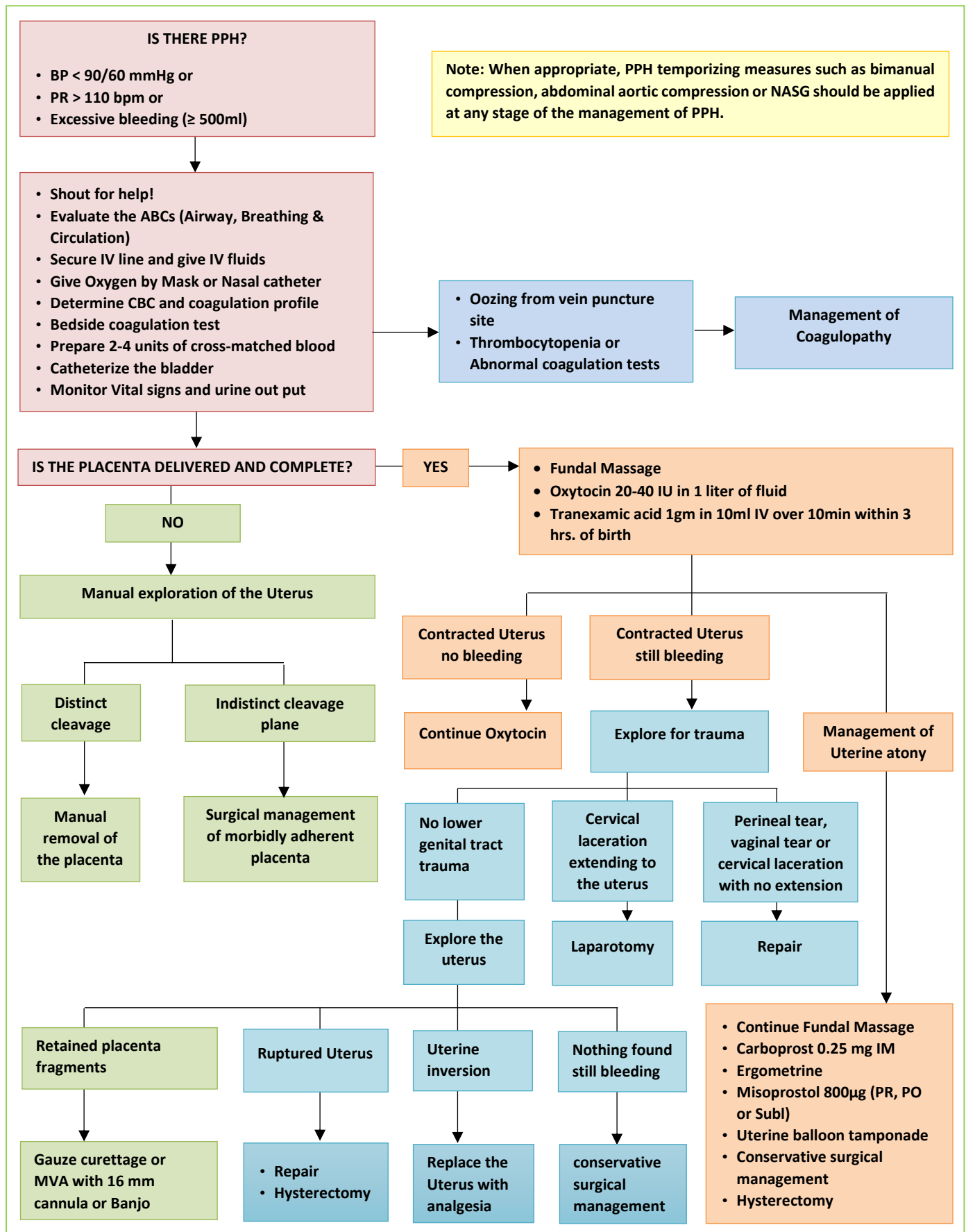


Figure 21. Postpartum hemorrhage (PPH) management algorithm.

## SECONDARY POSTPARTUM HEMORRHAGE

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### CAUSES

### DIAGNOSIS

- Sub-involution of the uterus, signs of intrauterine infection and retained pieces of placental tissue are common in the first two weeks.
- Ultrasound to check retained placental tissue.
- When bleeding occurs late in the post partum period, (3<sup>rd</sup> to 6<sup>th</sup>wk), pregnancy test needs to be performed to rule out choriocarcinoma and the specimen of uterine evacuation needs to be sent for histological examination.

### TREATMENT:

- Treat anemia and shock as appropriate (see section on hemorrhagic shock).
- Specific management depends on underlying cause:
  - **Sub-involution:** Oxytocin in drip or ergometrine (1 tablet PO twice a day for 2-3 day). If bleeding is not controlled with these drugs give misoprostol 800 µg sublingually or rectally.
  - **Infection:** Antibiotics against common organisms of the vagina.
  - **Retained placental tissue:** Evacuate the uterus using manual vacuum aspiration with large sized cannula (if there is active vaginal bleeding or medical management fails).
- Hysterectomy may be done if there is indication.



## POST TERM PREGNANCY

### DEFINITION

Post term pregnancy is a pregnancy that advances to or beyond 42 completed weeks or 294 days of gestation from the first day of the last normal menstrual period (LNMP).

### RISK FACTORS

- Previous history of postterm
- Nulliparity
- Male fetus of the index pregnancy
- Obesity
- Genetic predisposition
- Older maternal age
- Maternal or paternal personal history of postterm birth

### DIAGNOSIS

The diagnosis is based on accurate gestational dating. The most common methods to determine the gestational age (GA) are:

1. Knowledge of the date of the LNMP.
2. Early ultrasound assessment performed before the 24th week of gestation (preferably CRL measurement before 14weeks).

**If LNMP is known and reliable, calculate the gestational age from the given date.**

- The given LNMP is said to be reliable:
  - If the date of onset of the LNMP is accurately recalled
  - If she had at least three regular menstrual cycles before the LNMP, and
  - If she was not using any form of hormonal contraceptives for at least 3 months prior to the LNMP.

**If LNMP is not known or not reliable, use**

- **History:** If date of quickening is recalled accurately, calculate the GA by adding 20 weeks in nullipara or 18 weeks in multipara to the weeks lapsed since the date of quickening.
- **Physical Examination:**
  - If there is a documented symphysis fundal height determination in early pregnancy before 20 weeks of gestation calculate the gestational age by adding the lapsed weeks since the date of the fundal height determination.
  - If there is documented early detection of fetal heart tones, calculate the GA by adding the lapsed weeks since the date of the detected fetal heart tones.

**Note:** Fetal heart tone is detected at the earliest using fetoscope at 18-20 weeks and Doppler at 10-12 weeks.

- **Diagnostic Tests:** If there is a documented early positive pregnancy test, calculate the gestational age by adding six weeks to the lapsed weeks since the date of the positive pregnancy test.

**Note:** The earliest possible time for urine pregnancy test to be positive is at 6 weeks from LNMP.

## MANAGEMENT

- The mode of treatment is termination of pregnancy.
  - Induction of labor:
    - Performed at 42 weeks if the cervix is favorable.
    - If the cervix is unfavorable (bishop score  $\leq 5$ ), ripen the cervix before induction.
  - Elective cesarean delivery if indicated.
- After 41 weeks of gestation the risk of perinatal mortality and morbidity increases. Hence to reduce the risk initiate more frequent antepartum fetal wellbeing assessment at 41 weeks. It can include:-
  - Fatal kick count: if less than 10 kicks per 12 hrs or less than 3 kicks per hour (morning, afternoon, evening) further testing is required.
  - Non-stress test (NST) or BPP or modified BPP twice a week.
- Intrapartum management:
  - During labor and delivery the fetal condition should be followed closely.
  - FHB follow up with CTG or strict one to one follow up.

## COMPLICATIONS

### Fetal

- Asphyxia
- Meconium aspiration syndrome
- Macrosomia ( $\geq 4000$  g)
- Shoulder dystocia
- Birth injury
- Fetal dysmaturity (post maturity) syndrome
- Fetal death

### Maternal

- Prolonged labor
- Feto-pelvic disproportion
- Increase risk of operative delivery
- Genital tract injury
- Postpartum hemorrhage

## INDUCTION AND AUGMENTATION OF LABOR

### INDUCTION OF LABOR

#### DEFINITION

Induction of labor is the artificial stimulation of uterine contractions before the spontaneous onset of true labor to achieve vaginal delivery.

#### CLASSIFICATION

- Planned (elective) or
- Emergency.

#### INDICATIONS

Common indications include: -

#### CONTRAINDICATIONS

**Absolute:** placenta previa, vasa previa, abnormal lie, malpresentations, previous uterine scar (e.g. myomectomy, CS), contracted pelvis, macrosomia, twin pregnancy, invasive cervical cancer, active genital herpes infection, severe IUGR with confirmed fetal compromise.

**Relative:** Bad obstetric history, grand multiparity.

#### PRECONDITIONS

- Get informed consent.
- Document the indication.
- Make sure that there are no contraindications.
- Determine if the cervix is favorable. The **Bishop scoring (cervix score) system** can be used to determine if the cervix is favorable or not. If unfavorable (Bishop score < 6), cervical ripening is indicated. See [table 13](#) below the modified Bishop scoring.
- Ascertain availability of labor ward staff and the capacity to do emergency CS.

*Table 13. Assessment of cervix for induction of labour (Modified Bishop score).*

Score Parameter	0	1	2	3
Dilatation (cm)	closed	1-2	3-4	≥ 5

<b>Length (cm)</b>	> 4	3-4	1-2	<1
<b>Consistency</b>	firm	average	soft	N/A
<b>Position</b>	posterior	mid	anterior	N/A
<p><b>Interpretation of the Bishop's score:</b></p> <ul style="list-style-type: none"> <li><b>Score <math>\geq 6</math>: Favourable</b> - cervical condition and induction is likely to succeed. There is no need for cervical ripening. Induction using oxytocin can be planned.</li> <li><b>Score <math>\leq 5</math>: Unfavourable</b> - cervix is unlikely to yield for induction; cervical ripening is needed for success with induction; postpone induction for next week if possible or use cervical ripening and plan induction for next day.</li> </ul>				

## CERVICAL RIPENING

**Cervical ripening** is the use of pharmacological or mechanical means to soften the cervix.

- The cervical ripening agent may also initiate labor. If not, oxytocin can be used for induction.
- Generally, cervical ripening and induction of labor are on a continuum and not all women undergoing induction of labor need cervical ripening.

## PHARMACOLOGIC METHODS FOR CERVICAL RIPENING AND INDUCTION

### Prostaglandin E1 (Misoprostol):

- Possible routes of administration:
  - Vaginal (place into the posterior fornix):** 25 mcg (only if misoprostol is available in the form of a 25-mcg tablet), if required repeat after 6 hours.  
*NOTE: Do not divide or cut a 200-mcg tablet into smaller pieces, as this is inaccurate.*
  - Oral:** 25 mcg; if required repeat after 3 hours.
    - If 25 mcg is not available, dissolve one 200 mcg tablet in 200 mL of water and administer 25 mL of that solution as a single dose.
    - For patients with PROM, oral route of administration is preferred for priming and induction.
- Discontinue misoprostol and begin oxytocin infusion if:-
  - Membranes rupture or cervical ripening has been achieved; or
  - 12 hours have passed since the first dose of prostaglandin.

### Prostaglandin E2 (Dinoprostol):

- Prostaglandin E2 (3 mg pessary)** is placed high in the posterior fornix of the vagina and may be repeated after six hours if required.

## MECHANICAL AGENTS FOR CERVICAL RIPENING

Mechanical agents work by directly causing cervical dilation, and by releasing endogenous prostaglandins and oxytocin

### Balloon / Foley catheter:

- After insertion, leave the Foley catheter until it is spontaneously expelled or keep it in place for at least 12 hours, or until contractions begin.
- Following priming with catheter, most women require further induction of labor with oxytocin and/or amniotomy.
- Note that oxytocin infusion can be started with a balloon catheter in place or after it has been removed.
- If there is a history of bleeding or ruptured membranes or obvious vaginal infection, do not use a balloon or Foley catheter.

### Osmotic dilators:

These are hydrophilic agents that absorb water and thus gradually expand within the cervical canal, which in turn causes the cervix to dilate (E.g. laminaria).

## AMNIOTOMY (Artificial Rupture of Membranes)

Amniotomy is a non-pharmacological method where the amniotic membranes can be ruptured artificially to induce or augment labor. Amniotomy may be contraindicated in pregnancy with known or suspected vasa previa, any contraindications to vaginal delivery or unengaged presenting part (although this obstacle may be overcome with the use of a controlled amniotomy or the application of fundal or suprapubic pressure).

## OXYTOCIN INDUCTION

- During induction, monitor and record rate of infusion of oxytocin, duration and frequency of contractions, maternal pulse and fetal heart rate every 30 minutes (never leave her alone).
- The effective dose of oxytocin varies greatly among women. Cautiously administer oxytocin in IV fluids; gradually increase the rate of infusion until adequate contraction is achieved.
- Oxytocin induction can be done either by oxytocin infusion or with infusion pump.
- In women with intact membranes, amniotomy should be performed where feasible before starting oxytocin induction.
- Allow a delay of six hours after administration of the last dose of vaginal prostaglandins before commencing oxytocin.

### Oxytocin infusion

- Use 0.9% N/S or R/L for infusion. To ensure even mixing, the bag must be turned upside down several times before use.

- The initial infusion rate should be set at 1 to 2 milli units / minute. The infusion rate is increased every 30 minutes up to a maximum of 40 mU / min (250 ml/hour). See [table 14](#) below for the details.
- As alternative, for induction of a primigravid woman only, oxytocin with starting dose of 3.0 to 6.0 mU / min can be used.
- Aim to maintain the lowest possible dosage consistent with adequate uterine contraction which is 3-5 contractions in 10 min, each lasting 40-60 sec.
- Label the bag and keep timely record of the drops used. Monitor and record maternal and fetal conditions, and labor progress according to the labor protocol.
- Continue the oxytocin infusion for at least one hour after delivery.

**NOTE:** *In the event of uterine hyperactivity and/or fetal distress, the infusion must be discontinued immediately.*

**Prolonged oxytocin infusion:** If a new bag of fluid is required and if the oxytocin dose is maintained with the first dose of oxytocin, add 2 IU of Oxytocin in one liter of IV fluid and continue with the last maintenance drop (see [table 14](#) below). Oxytocin infusions which are maintained with the second and third dose need adjustment of oxytocin concentration i.e. If the oxytocin dose is maintained with the second dose, add 5 IU of oxytocin in one liter of IV fluid and if the oxytocin dose was maintained with the third dose, add 10 IU of oxytocin in one liter of IV fluid and continue with the last maintenance drip rate.

#### **Oxytocin infusion with pump:**

- When induction of labor is undertaken with infusion pump the recommended regimen is a starting dose of 1-2 milliunits per minute and increased at intervals of 30 minutes.
- The minimum possible dose of oxytocin should be used and this should be titrated against uterine contractions aiming for a maximum of 3-4 contractions every 10 minutes.
- The maximum dose used should not exceed 32 milliunits per minute.
- Dilutions and dose regimens for oxytocin infusion with pump include:
  - 30 IU Oxytocin in 500mls of normal saline, hence 1ml/hr = 1 milliunit Oxytocin per minute.
  - 10 IU Oxytocin in 500mls of normal saline, hence 3mls/hr = 1 milliunit Oxytocin per minute.

#### **COMPLICATIONS OF INDUCTION:**

- Failed induction
- Increased risk of CS
- Atonic PPH
- Iatrogenic prematurity

- Uterine hyper stimulation/ tetanic contractions
- Uterine rupture
- Fetal distress
- Placental abruption
- Water intoxication
- Amniotic fluid embolism

## FAILED INDUCTION

**Definition:** Failure to achieve regular (e.g. every 3 minutes) uterine contractions and cervical change after at least 6 - 8 hours of the maintenance dose of oxytocin administration, with artificial rupture of membranes if feasible.

- If the induction is not for an emergency condition and the fetal membranes are intact (e.g. IUFD with unruptured membranes), the induction can be postponed.
- If the pregnancy has to be terminated on the day of the induction or the membranes are ruptured, cesarean section is the only available option.

**Table 14. Oxytocin infusion rates for induction of labor.**

<b>Oxytocin Dose</b>	<b>Oxytocin Concentration (mIU/mL)</b>	<b>Time since induction (hours)</b>	<b>Drip Rate: (Drops/Minute)</b>	<b>Approximate Dose (mIU / minute)</b>	<b>Total volume infused (ml)</b>
<b>First dose:</b> 2 IU of oxytocin in 1000 ml fluid	2 mIU/mL	0:00	20	2	0
		0:30	40	4	30
		1:00	60	6	90
		1:30	80	8	180
<b>Second dose:</b> Add another 2 IU of oxytocin to the remaining first dose fluid	5 mIU/mL	2:00	50	12	300
		2:30	60	15	375
		3:00	80	20	465
<b>Third dose:</b> Add another 2 IU of oxytocin to the remaining second dose fluid	10 mIU/mL	3:30	50	24	590
		4:00	60	30	665
		4:30	80	40	760
	As above	5:00	As above	As above	880
<b>Prolonged oxytocin infusion: If a new bag of fluid is required adjust the concentration based on the maintenance concentration.</b>					
If induction was <b>maintained with the first dose</b> , add 2 IU of oxytocin in 1000 ml of fluid	2 mIU/mL		Mainten ance Drip Rate		
<b>If induction was maintained with the second dose</b> , add 5 IU of oxytocin in 1000 ml of fluid	5 mIU/mL		Mainten ance Drip Rate		
<b>If induction was maintained with the third dose</b> , add 10 IU of oxytocin in 1000 ml of fluid	10 mIU/mL		Mainten ance Drip Rate		



## UTERINE HYPER STIMULATION

### Definition:

Uterine hyper stimulation is when there are six or more contractions in 10 min and / or durations of contractions of 60 or more seconds.

### Management:

- Stop the infusion, put the woman on left lateral position and assess the FHR:
  - If the FHR is abnormal, manage for non-reassuring fetal heart rate pattern and relax the uterus using betamimetics (if feasible): terbutaline 250 mcg IV slowly over five minutes OR salbutamol 10 mg in 1 L IV fluids (normal saline or Ringer's lactate) at 10 drops per minute.
  - If the FHR is normal, observe for improvement in uterine activity and monitor the FHR. If normal activity is not established within 20 minutes and betamimetics have not been administered, relax the uterus using betamimetics.
- Observe for improvement in uterine activity, and monitor the FHR: If both mother and fetus are in good condition, restart at half dose of the last dose causing uterine hyper stimulation.

## AUGMENTATION OF LABOR

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### DEFINITION

Augmentation of labor is stimulation of the uterus to increase the frequency, duration and/ or strength of contractions of spontaneously initiated labor.

### METHODS

The methods for augmentation are **ARM** and **oxytocin**.

- The procedure is generally similar to that of induction (see the section above).
- If there is no urgency to expedite delivery, oxytocin infusion is initiated one hour after ARM and if the ARM failed to correct the weak contractions.

### INDICATION

The main indication for augmentation is weak and ineffective uterine contractions leading to abnormal progress of labor.

### CONTRAINDICATIONS

Contraindications for oxytocin use include; breech presentation, scarred uterus, multiple pregnancy, feature of CPD, secondary hypotonic contractions due to obstructed labor etc...

## OPERATIVE VAGINAL DELIVERY

### DEFINITION:

Operative vaginal delivery refers to an assisted delivery in which the operator uses obstetric forceps, vacuum / ventous, or other devices to extract the fetus from the birth canal.

### VACUUM DELIVERY

---

#### DEFINITION:

Vacuum delivery is an assisted instrumental vaginal delivery using ventouse (vacuum extractor). Its main components are the suction cup (metallic or plastic), vacuum pump and traction devices.

#### INDICATIONS:

- Prolonged second stage of labor.
- Non reassuring fetal heart rate pattern.
- To shorten second stage in: eclampsia, significant cardiac or pulmonary diseases, glaucoma, and cerebrovascular disease (e. g. CNS aneurysms).
- Cord prolapse in 2<sup>nd</sup> stage where vaginal delivery is believed to be faster than CS.

#### PREREQUISITES:

- Vertex presentation
- Fully dilated cervix
- Engaged head: station at 0 and below or not more than 2/5 above symphysis pubis
- Ruptured membranes
- Gestational age 34 weeks and above
- Adequate pelvis
- No contraindication to vaginal delivery

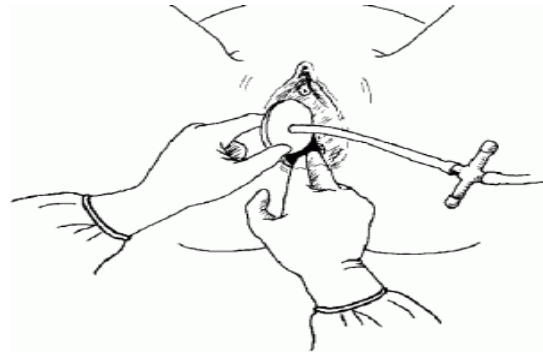
#### PREPARATION:

- Counsel and get written consent.
- Empty bladder.
- Local anesthesia infiltration for episiotomy if episiotomy is required.
- Assemble, check all connections and test the vacuum on a gloved hand.

## PROCEDURE

### Application:

- Identify the flexion point.
- Apply the appropriate size cup that can fit near to the occiput.
- The edge of the cup should be at about 1 cm anterior to the posterior fontanel (or the center of the cup should be at about 3 cm anterior to the posterior fontanel) and on the sagittal suture.
- Check for correct application and ensure that there is no maternal soft tissue (cervix or vagina) within the rim of the cup ([figure 22](#)). If there is maternal tissue entrapment, release it before creating vacuum.



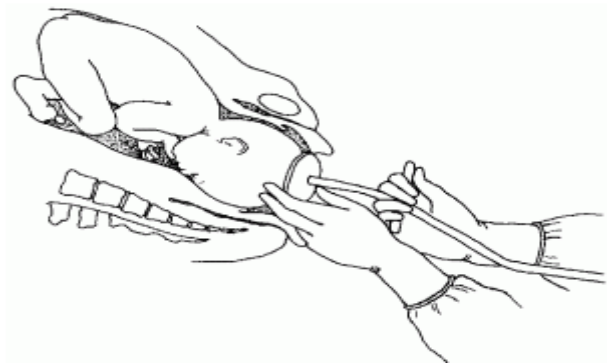
**Figure 22. Applying a vacuum cup.**

### Vacuum creation

- Create a vacuum of 0.2 kg/cm<sup>2</sup> (approximately 200 mmHg) negative pressure and check that maternal tissue (cervix or vagina) is not entrapped.
- Gradually increase the vacuum to 0.8 kg/cm<sup>2</sup> (approximately 600 mmHg), and recheck the application and that maternal tissue is not entrapped.

### Traction

- Start traction with contraction with a finger on the scalp next to the cup to assess potential slippage and descent of the vertex.
- Pull in line with the pelvic axis and perpendicular to the cup.
- Between contractions, check the fetal heart beat and cup application.
- As soon as the head is delivered, release the vacuum and proceed with the delivery of the fetus ([figure 23](#)).



**Figure 23. Applying traction.**

### Further care

- After delivery inspect the vagina and cervix; and repair if there is any tear or episiotomy.
- Proceed with the immediate neonatal care and examination.

## FAILED VACUUM

*Diagnosis of failed vacuum* is based on any one of the following conditions:-

- The head does not advance with each pull.
- The fetus is undelivered after three pulls.
- The fetus is not delivered within 30 minutes.
- The cup that is applied appropriately and pulled in the proper direction with maximum negative pressure slips off the head twice.

***NB: If vacuum delivery fails, the fetus should be delivered by Cesarean section.***

## COMPLICATIONS AND MANAGEMENT

### Fetal complications

- Localized scalp edema (caput succedaneum or chignon) under the vacuum cup is harmless and disappears in few hours.
- Cephalohematoma requires observation and usually will clear in three to four weeks.
- Scalp abrasions (common and harmless) and lacerations may occur. Clean and examine lacerations; and suture if necessary.
- Intracranial hemorrhage: very rare but requires immediate intensive care.
- Necrosis is extremely rare.

### Maternal complications

- Tears of the vagina or cervix should be repaired as appropriate.

## FORCEPS DELIVERY

### DEFINITION

Forceps delivery is an assisted vaginal delivery effected using obstetric forceps.

### CLASSIFICATION:

- **Low forceps:** applied when the station is +2 or below.
- **Outlet forceps:** applied when the fetal head is at station +3 (at the pelvic floor).

### INDICATIONS:

- The same as indications for vacuum delivery.
- In addition, it can be applied for after-coming head in breech presentation (Piper's forceps) and mentoanterior face presentation.

### PREREQUISITES:

- Presentation & position

- Vertex presentation with occipito-anterior (OA).
- Face presentation with mento-anterior (MA).
- Station of +2 or below
- Fully dilated cervix
- Ruptured membranes
- Adequate pelvis
- Provider should be skilled in performing forceps delivery
- No contraindication to vaginal delivery

### PREPARATIONS:

- Counsel and get written consent.
- Local anesthesia infiltration for episiotomy if episiotomy is required.

### PROCEDURE:

#### Application in occipito anterior:

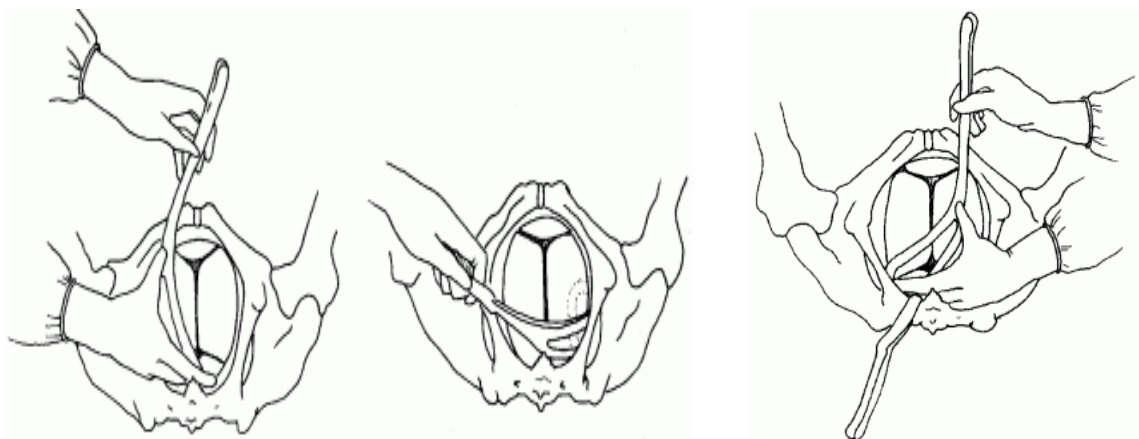
- Orientation: Hold completely locked forceps in front of the perineum to orient and identify the right and left blades.
- Lubricate the blades of the forceps.
- Insert two fingers of the right hand into the vagina on the side of the fetal head.
- Slide the left blade gently between the head and fingers to rest on the side of the head (see [figure 24](#) below).
- Repeat the same maneuver on the other side, using the left hand and the right blade of the forceps (see [figure 24](#) below).
- Depress the handles and lock the forceps (see [figure 25](#) below).
- Check that application is correct and no maternal tissue is entrapped.

**NOTE:** Difficulty in locking usually indicates incorrect application. In this case, remove the blades and recheck fetal position. Reapply only if OA is confirmed.

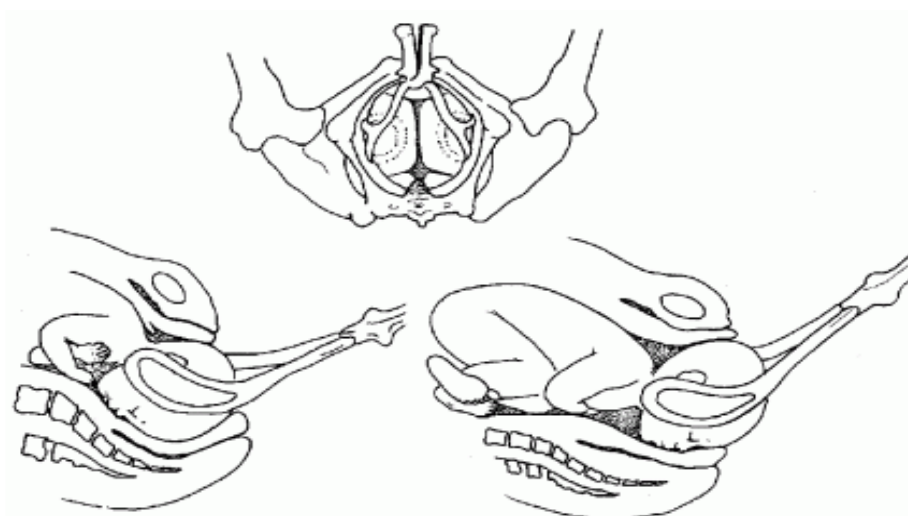
- After locking, apply steady traction inferiorly and posteriorly synchronized with each contraction following the pelvic curve (see [figure 25](#) below).
- Between contractions check fetal heart rate and application of forceps.
- When the head crowns, make an episiotomy if necessary.
- Once the fetal head reaches the pelvic floor, lift the head slowly out of the vagina.

**NOTE:** The head should descend with each pull. And, only two or three pulls should be necessary.

- Remove first the right forceps followed by the left.



**Figure 24.** *Applying the right and left blade forceps.*



**Figure 25.** *Locking and applying traction.*

### **Further care**

- After delivery inspect the vagina and cervix; and repair any tear or episiotomy.
- Examine the newborn as described for vacuum delivery.

### **FAILED FORCEPS**

A failed forceps is diagnosed if:

- Locking of forceps is difficult.
- Fetal head does not descend with each pull.
- Fetus is undelivered after three pulls with no descent or after 30 minutes.

**NOTE:** *After failed forceps, cesarean delivery is undertaken if the fetus is alive.*

## COMPLICATIONS AND MANAGEMENT

### Fetal complications:

- Injury to facial nerves: This injury requires observation as it usually resolves spontaneously.
- Lacerations of the face and scalp may occur. Clean and examine lacerations, and suture if necessary.
- Fracture of the facial bones or skull usually needs further evaluation and management.

### Maternal complications:

- Tear or laceration to the cervix, vagina, or vulva. Examine all women carefully after forceps delivery and repair any tears.
- Uterine rupture may occur and requires immediate treatment.
- Postpartum hemorrhage (traumatic PPH).

## CRANIOTOMY

---

### DEFINITION:

Craniotomy is a delivery procedure where the head of a dead fetus is perforated to evacuate the brain tissue and decrease its size to effect extraction of the fetus.

### INDICATION

- Obstructed labor in cephalic presentation with a dead fetus.
- Entrapped after-coming head with a dead fetus.

### PREREQUISITES:

- Pelvis with a true conjugate diameter of more than 7.5 cm.
- Dead fetus.
- Fully dilated cervix.
- Descent of 2/5 or below in cephalic presentation or entrapped after coming head.
- Ruptured membranes.
- Intact uterus and no imminent uterine rupture.

### PREPARATIONS:

- Secure IV line; hydrate and resuscitate the woman as required.
- Determine hemoglobin / hematocrit, blood group, cross match and others based on complications.
- Give broad spectrum antibiotics.

- Counsel and obtain written consent.
- Give pain medication (pethidine, local, spinal or general anesthesia) as required.
- Alert the OR staff. It is preferred to perform the procedure in the OR.
- Put patient in lithotomy position.
- Clean and drape the vulva and perineum.
- Catheterize the bladder.

## PROCEDURE:

### Cephalic Presentation

#### *Skull perforation*

##### *For vertex presentation*

- Make a cross-shaped incision through the skin of the head up to the skull bone with a finger feel for a gap (a suture line or a fontanel) between the bones ([figure 26](#)).
- Push a perforator or scissors between the bones and enter into the cranium.



**Figure 26. Cruciate incision on scalp.**

##### *For face presentation:*

- Enter the cranium through the orbit/ or hard palate.

##### *For brow presentation:*

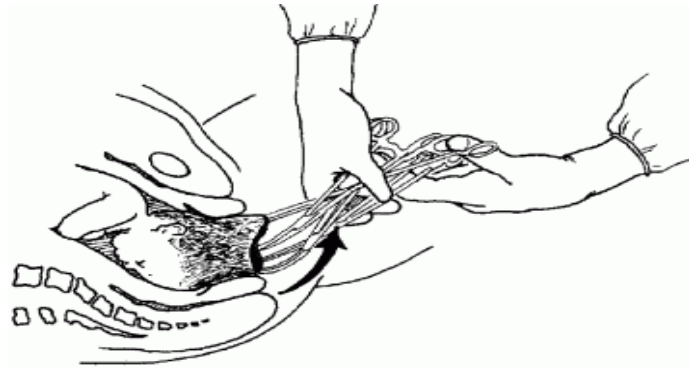
- Enter the cranium through the frontal bones.

#### *Scalp Traction*

- Introduce the perforator, with closed blade, under palmar aspect of fingers protecting anterior vaginal wall and bladder at predetermined site. Avoid sudden sliding of your instrument over the skull and getting into maternal tissue.
- Open the perforator or the scissors and rotate it to disrupt the brain tissue; the brain tissue should now be coming out from the hole.
- Put 3-4 cranioclast, strong vulsellum forceps, kochers or heavy-toothed forceps on the skin and bones (one of the blades passes within the skull of the fetus, while the other is introduced externally to the cranium).
- Pull on the forceps to achieve vaginal delivery (see [figure 27](#) below).
- Protect the vagina by avoiding sharp scalp bone edges tearing the vaginal wall by your finger or by removing the offending bones.



- As the head descends, pressure from the bony pelvis will cause the skull to collapse, decreasing the cranial diameter.



**Figure 27. Extraction by scalp traction.**

#### **Breech presentation with entrapped after coming head:**

- Make an incision through the skin at the base of the neck.
- Insert a craniotome (or large pointed scissors or heavy scalpel) through the incision and tunnel subcutaneously to reach the occiput.
- Perforate the occiput and open the gap as widely as possible.
- Apply traction on the trunk to collapse the skull as the head descends.

#### **FURTHER CARE**

- Leave a self-retaining catheter in place until bladder injury is ruled out.
- Ensure adequate fluid intake and urinary output.
- Provide emotional and psychological support.

#### **COMPLICATION AND MANAGEMENT**

- Tear or laceration to the uterus, cervix, vagina or vulva. Examine the woman carefully and manage accordingly.

**NOTE:** *If the head is not delivered easily, perform a caesarean section.*

## **CRANIOCENTESIS**

### **DEFINITION**

Craniocentesis is a procedure where a puncture is performed over the skull in case of hydrocephalic fetus to drain the CSF fluid and achieve vaginal delivery (or to deliver the hydrocephalic head through the uterine incision at time of cesarean section).

## INDICATION

- Cephalic or after coming breech presentation with hydrocephalic dead fetus.
- A live fetus with congenital malformation/s which is incompatible with life and severe hydrocephalus (HC>40cm).

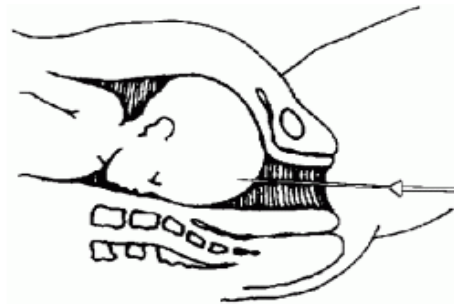
## PREREQUISITES

- Dead hydrocephalic fetus.
- A live hydrocephalic fetus having congenital malformation incompatible with life.
- Descent of 2/5 or below in cephalic presentation or entrapped after coming of head.
- Ruptured membranes.
- Intact uterus or no imminent rupture.

## PROCEDURE

### Cephalic presentation with dilated cervix:

- Pass a large-bore spinal needle through the dilated cervix and through the sagittal suture line or fontanel of the fetal skull (see [figure 28](#)).
- Drain / aspirate the CSF until the skull has collapsed and allow normal delivery to proceed.



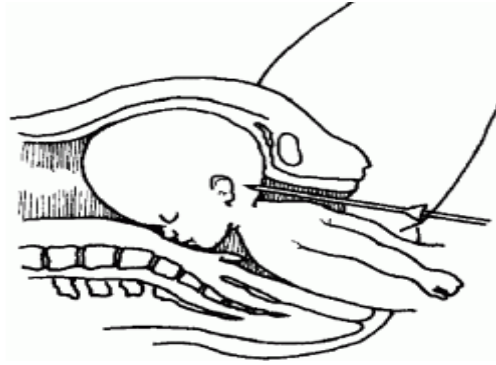
**Figure 28.** Craniocentesis with a dilated cervix.

### Cephalic presentation with closed cervix:

- Palpate for the location of fetal head.
- Apply antiseptic solution to the supra pubic skin.
- Pass a large-bore spinal needle through the abdomen and uterine wall, and through the hydrocephalic head.
- Drain / aspirate the CSF until the skull has collapsed and allow normal delivery to proceed.

### After-coming head during breech birth:

- After the rest of the body has been delivered, insert a large-bore spinal needle through the dilated cervix and foramen magnum (see [figure 29](#)). Alternatively, the CSF can be drained by opening the spinal canal (spondylotomy). If the fetus has spina-bifida, the draining may be achieved by reaching the cranium through the defect and spinal cord.
- Drain / aspirate the CSF until the skull has collapsed and deliver the after-coming head as in a breech birth.



**Figure 29.** *Craniocentesis of the after coming head*

#### **During caesarean:**

- After the uterine incision is made, pass a large-bore spinal needle through the hydrocephalic skull.
- Aspirate the cerebrospinal fluid until the fetal skull collapses.
- Deliver the baby and placenta as in caesarean.

#### **Further care:**

- Leave a self-retaining catheter in place until it is confirmed that there is no bladder injury.
- Ensure adequate fluid intake and urinary output.
- Provide emotional and psychological support.

#### **COMPLICATION AND MANAGEMENT**

- Tear or laceration to the cervix, vagina, or vulva. Examine the woman carefully and repair any tear.

## CESAREAN SECTION AND TRIAL OF LABOR AFTER CESAREAN SECTION (TOLAC)

### CESAREAN SECTION

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#### DEFINITIONS:

- **Cesarean section (CS) /delivery:** - is the delivery of the fetus (es), placenta and membranes through an incision on the abdominal and uterine wall at or after 28 weeks of gestation.
- **Elective CS:** - is a planned cesarean delivery performed before the onset of labor or the appearance of any complication that might constitute an urgent indication.
- **Emergency CS:** - is when the CS is done in labor or due to any complication that necessitates immediate delivery.

#### TYPES OF UTERINE INCISION FOR CS

- Lower transverse uterine incision: - commonest and preferable type of incision.
- Lower vertical uterine (De Lee) incision.
- Upper vertical uterine incision (classical incision).

#### PREREQUISITES:

- Appropriate indication.
- Competent team of providers.
- Appropriate facility and equipments.

#### INDICATIONS

Cesarean section is performed when safe vaginal delivery either is not feasible (absolute) or would impose undue risks to the mother and/or the fetus/es. Common indications include:-

- Previous CS not eligible for trial of labor after cesarean (TOLAC).
- Non reassuring fetal heart rate pattern (NRFHRP).
- Feto-pelvic disproportion (FPD) such as CPD.
- Failure to progress in labor despite adequate uterine contraction.
- Contraindications for induction/ augmentation.
- Antepartum hemorrhage.
- Malpresentations (breech, brow, face and shoulder presentation).
- Fetal malposition (persistent occipito posterior, deep transverse arrest).

- Cord prolapse or presentation.
- Previous uterine incision (myomectomy, metroplasty, uterine perforation).
- Failed induction.
- Failed TOLAC.
- Multiple pregnancy (first non-vertex, triplet or more).
- Macrosomia with EFW  $\geq 4.5$  kg for non-diabetics or EFW  $\geq 4.0$  kg for diabetics in pregnancy.

### INVESTIGATIONS:

- Hemoglobin / hematocrit.
- Blood group (ABO) and Rh.
- Basic investigations done during pregnancy (e.g. HIV, HBsAg) if not done previously.
- Investigate specific clinical complications as required.
- At least 2 units of cross matched blood should be prepared for conditions that have high possibility of transfusion need such as: active bleeding, placental abnormalities (previa, abruption, adherent placenta), preeclampsia complicated with HELLP syndrome, anemia, coagulopathy, previous uterine scar, and over distended uterus and other predisposing factors for atonic PPH.

### PREOPERATIVE PREPARATION / PLAN:

#### Schedule:

- **Elective CS:-**
  - Plan on days when the facility is fully functioning (working hours) preferably early in the morning.
  - Elective repeat CS is done at 39 weeks.
- **Emergency CS** cannot be planned.

#### Feeding:

- **Elective CS:** NPO for 8 hours for regular meal and 2 hours for clear fluid (commonly done after mid-night for morning planned CS)
- **Emergency CS:** Limit feeding to fluid diet in laboring women with increased risk of emergency CS (e.g. TOLAC, induction in non-reassuring biophysical score).

#### Other pre-operative considerations:

- Revise the clinical history including anesthetic risk assessment, drug allergy (any), and medical illness.
- Plan CS procedure ahead of time based on the individual clinical situation.
- Obtain informed written consent.
- Type of anesthesia (Spinal / GA).

- Preparation of blood (if required).
- Incision types (skin and uterine).
- Additional procedures (e.g. tubal ligation, IUD).
- Secure IV (16 or more gauge canula).
- Catheterization.
- Prophylactic antibiotic (15 to 60 minutes prior to skin incision give penicillins (e.g. ampicillin 2g Iv) or a first generation cephalosporin (e.g. cephalexin, cefazolin,...) .
- Administer antacid solution PO (or through NG tube).
- Clip the hair (if necessary) at the operation site but DON'T shave.
- Make sure the anesthesia team is ready.
- Make sure the necessary drugs and equipment are in place.
- Make sure neonatal resuscitation set and personnel are in place.
- Check fetal heart beat before proceeding to the CS.

### INTRA-OPERATIVE CARE

- Record maternal vital signs before anesthesia.
- *Position on operation table:* tilt the table to left or place a pillow under the woman's right lower back.
- Ensure appropriate monitoring of vital signs during the CS.
- After delivery of the baby administer 20 IU oxytocin in 1000 ml of N/S or R/L at 60 drops per-minute for two hours.
- After delivery of the baby and placenta perform BTL or insertion of IUCD if the woman is already appropriately counseled and has chosen the method.

### POSTOPERATIVE CARE / FOLLOW-UP

- Check and record vital signs on arrival to the ward, every 15 min until she is fully awake / stabilized, every hour for 4 hrs and every 4 hours then after.
- Check for vaginal bleeding and make sure the uterus is contracted.
- Check and record urine output every 4 - 6 hours.
- Provide analgesics as required.
- Initiate breast-feeding and skin-to-skin contact with the baby as soon as the mother is awake.
- Start sips of fluid after ascertaining that she is conscious and bowel sounds are active. Provide food when she is drinking and tolerating fluids.
- Discontinue IV fluids once fluid diet is started unless she is on IV medication.
- Ambulate early.
- Look for evidences of PPH, pulmonary infection, UTI and wound infection.

- Inspect the wound site in 48 to 72 hours.
- Discharge after 48-72 hours if vital signs are within normal range, mother has started regular feeding, breast-feeding is initiated and there is no evidence of wound infection.

## TRIAL OF LABOR AFTER CESAREAN SECTION (TOLAC)

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### DEFINITION

*Trial of labor after cesarean section (TOLAC)* is allowing vaginal birth by a woman who has undergone a caesarean section in a previous pregnancy.

A woman who has had one caesarean section in previous births has two options of mode of delivery in a subsequent pregnancy: **TOLAC** or **planned Elective Repeat Caesarean Section (ERCS)**. Both options have inherent benefits and risks.

### BENEFITS AND RISKS (TOLAC Vs ERCS)

#### TOLAC

- **Benefits:**
  - High success rate (72 to 75%).
  - Less postpartum febrile morbidity.
  - Reduced anesthesia related risk.
  - Shorter hospital stay and recovery.
  - Early smooth mother-infant interaction.
- **Risks:**
  - Uterine scar dehiscence (<1%).
  - If TOLAC fails increased fetal and maternal postpartum morbidity
  - Increased likelihood of future vaginal delivery.

#### Elective repeat caesarian section (ERCS)

- **Benefits:**
  - Able to plan delivery date.
  - Avoids the risk of uterine rupture.
  - Decreases the risk of pelvic organ prolapse.
  - BTL (bilateral tubal ligation) can be done at the same time.
- **Risks:**
  - Longer hospital stay and recovery time.

- Increased complications related to anesthesia, hemorrhage and postoperative infection.
- Increased likelihood of future CS.
- Increased risk of placenta previa and adherent placenta in subsequent pregnancies, and abdomino-pelvic adhesion with successive CS delivery.

#### **ELIGIBILITY FOR TOLAC:**

- One previous lower uterine segment caesarian section.
- Clinically adequate pelvis.
- Labor should start spontaneously.
- Singleton pregnancy.
- Cephalic presentation.
- No malposition and malpresentation.
- No other uterine anomalies, scars or previous uterine repair for rupture.
- Estimated fetal weight <4000gms.
- Informed consent

#### **CONTRAINDICATIONS FOR TOLAC**

- Clinically contracted pelvis.
- Prior complicated caesarian section (extensions), classical or T- shaped incision.
- Prior uterine repair for rupture and trans fundal surgery.
- Obstetric, medical or surgical conditions that prevent vaginal delivery.

#### **MANAGEMENT**

##### **Antenatal follow-up:-**

- Does not differ from that of routine ANC but emphasize on:
  - Indication for previous caesarian section.
  - Post-operative course.
  - In doubtful situations, get relevant information from previous document.
  - Clinical pelvic assessment at 36 weeks.
  - Estimation of fetal weight.
- Counseling -
  - Asses and inform all individual risks and benefits of TOLAC.
  - Document the counseling process and plan of management.
  - Get informed consent.
- Investigations:
  - U/S - fetal weight estimation, placental localization



- Others (see section on ANC)
- Visits - routine unless otherwise indicated.

**NOTE:** Mothers should be instructed to come to hospital at onset of labor or if labor does not start after 41 weeks of gestation or if any complications arise without delay.

### **Intrapartum**

- **Latent phase:**
  - Admit to labor suite and evaluate the parturient promptly.
  - Normal activity with no restriction.
  - Update Hct/Hgb.
- **Active phase:**
  - Reevaluate parturient.
  - Follow labor using partograph.
  - Fetal Monitoring
    - FHB: - record every 15 minutes.
    - If available, use continuous electronic monitoring and closely follow FHB pattern (decelerations / bradycardia).
  - Labor Progress
    - Assess cervical dilatation and descent every 2-4 hrs.
    - Be alert to identify active phase arrest timely.
- **Maternal condition -**
  - Closely watch for evidence of scar dehiscence. The clinical features associated with uterine scar rupture/dehiscence include:
    - FHR abnormality /abnormal CTG.
    - Severe abdominal pain, especially if persisting between contractions.
    - Acute onset abdominal tenderness.
    - Vaginal bleeding.
    - Hematuria.
    - Cessation of previously efficient uterine activity.
    - Maternal tachycardia, hypotension, fainting or shock.
    - Recession of station of the presenting part.
    - Change in abdominal contour.
  - Pain management (see section on Management of Labor and Delivery: pain management).

### **Delivery and Immediate Post delivery**

- Delivery care: - should be conducted like others.
- Immediate post-delivery care: -

- Look for excessive vaginal bleeding and signs of hypovolemia.
- When there is excessive vaginal bleeding or signs of hypovolemia, explore the whole of the genital tract.
- If defect is detected / suspected do emergency laparotomy (and perform repair or hysterectomy).

**When to declare failed TOLAC:-**

The length of TOLAC should be individualized to declare failure: -

- If labor doesn't progress as expected.
- If any evidence of scar dehiscence develops.

## FAMILY PLANNING

### INTRODUCTION

Family planning (FP) allows individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births. It is achieved through use of contraceptive methods and the treatment of involuntary infertility.

### CHOOSING A METHOD OF CONTRACEPTION

#### Factors to consider

- Availability of a given method
- Efficacy
- Convenience
- Safety
- Duration of action
- Reversibility and time to return of fertility
- Effect on uterine bleeding
- Frequency of side effects and complications
- Protection against sexually transmitted diseases
- Medical contraindications

### CATEGORIZATION OF FP BASED ON TIMING OF SERVICE PROVISION:

1. Interval / elective FP
2. Post abortion FP
3. Emergency contraception
4. Postpartum family planning

**Postpartum family planning (PPFP)** is the prevention of unintended pregnancy and closely spaced pregnancies through the first 12 months following childbirth. Timing could be:

- **Post-placental**– within 10 minutes after delivery of placenta (e.g. IUD, tubal ligation during CS).
- **Immediate postpartum**- within 48 hours after delivery (e.g. IUD, bilateral tubal ligation with mini-laparotomy, vasectomy, implants).
- **Early postpartum** – 48 hours up to 6weeks (e.g. lactation amenorrhea, condoms, implants, mini pills)
- **Extended postpartum** – 6 weeks up to one year after birth. Unique considerations for providing PPFP (IUCD, implants, tubal ligation, vasectomy, condoms, lactational amenorrhea).

Below are two diagrams ([figures 30](#) and [figure 31](#)) depicting the timing and the possible method options for breastfeeding and non-breast feeding mothers.

<b>Postpartum contraception options for breast feeding women</b>					
Immediately after delivery up-to 48 hours	Initiation of FP methods for Breast Feeding Women				
	3 Wks	4 weeks	6 weeks	6 months	9 months
Lactational Amenorrhea Method - LAM					
Progestin only pill - POP					
Implants					
Condom/ Spermicides					
			Diaphragm/ Cervical cap		
IUD			IUD		
Female Sterilization			Female Sterilization		
		Emergency Contraception - EC			
			Combined Pill - COC		
			Progestrone Iniectionable (DMPA & NET-		
		Male Sterilization			

Figure 30. Post partum contraception options for breast feeding women.

<b>Postpartum contraception options for non-breastfeeding women</b>					
Immediately after delivery up-to 48 hours	Initiation of FP methods for Non-Breastfeeding Women				
	3 Wks	4 weeks	6 weeks	6 months	9 months
Progestin only pill - POP					
Implants					
Condom/ Spermicides					
			Diaphragm/ Cervical cap		
IUD			IUD		
Female Sterilization			Female Sterilization		
		Emergency Contraception - EC			
		Combined Pill - COC			
		Progestrone Iniectionable (DMPA & NET-ET)			
		Male Sterilization			

Figure 31. Post partum contraception options for non-breast feeding women.

## COUNSELLING

*Clients can be counseled on FP during:*

- Preconception
- Antenatal
- Intrapartum but not during active labor
- Immediate post-partum
- During maternal visit for immunization and other visits

*During counseling the following issues need to be addressed:*

- Explain that she can become pregnant as soon as four weeks after delivery if she has coitus and is not exclusively breastfeeding. Therefore she needs to start thinking early about what FP method she will use.
- If she (and her partner) want more children, advice that waiting at least 2 years before trying to become pregnant again is good for her and her baby's health.
- Information on when to start a method after delivery varies depending whether a woman is breastfeeding or not. Make arrangements for the woman to see a family planning counselor, or counsel her directly.
- Counsel on safer sex including use of condoms for dual protection from sexually transmitted infections (STI) or HIV and pregnancy. Promote safe sex especially if she is at risk of acquiring STI or HIV.
- Her partner can decide to have a vasectomy (male sterilization) at any time.

## COMPREHENSIVE ABORTION CARE

### DEFINITION:

Abortion is termination of pregnancy before viability; i.e. less than GA of 28 weeks from the LNMP or if GA is unknown fetal weight of less than 1000 gms.

### CLASSIFICATION:

#### Based on gestational age (GA): -

- 1<sup>st</sup> trimester abortion (less than or equal to 12 weeks of gestation)
- 2<sup>nd</sup> trimester abortion (12 to 28 weeks of gestation)

### CLINICAL ASSESSMENT

- **A complete patient history** should be obtained:
  - Major medical problems
  - Past surgeries
  - Past obstetric history
  - Current medications and allergies.
- **Assess gestational age** using LMP and physical examination:
  - Abdominal examination: assess fundal height.
  - Pelvic / bimanual examination.
  - If there is a discrepancy > 2 weeks between LMP and uterine size by exam, an ultrasound should be done to determine actual gestational age.
- **Ultrasound:**
  - The preferred method to ascertain gestational age and should be used if available.
- **Other investigations:**
  - Hematocrit/hemoglobin
  - Blood group and Rh
  - Screen for HIV (optional)
  - Other labs as indicated (hCG if concerned about molar pregnancy, etc.)
- **Contraception:**

- Discuss post-abortion contraception and document the choice in the chart. Some contraceptive methods can be initiated immediately after administration of mifepristone and prior to completion of the abortion process.
- **Informed consent:**
  - Make sure to provide detailed information in the patient's preferred language.
  - Obtain written informed consent.

## MANAGEMENT

The choice of management approach depends on

- Gestational age
- Clinical diagnosis
- Availability of methods of uterine evacuation
- The skill of the providers
- Choice of the women

The management approaches of abortion can be classified as;

- Expectant
- Medical
- Surgical

## EXPECTANT MANAGEMENT

- In cases of threatened abortion, pregnancy can continue till term and clients can be managed expectantly.
  - Medical treatment is not usually required.
  - Avoid strenuous activity and sexual intercourse.
- In cases of inevitable and incomplete abortions expectant management is a reasonable management option if there is no active bleeding and the uterine contraction is strong or adequate enough to expel the contents of the uterus.

## MEDICAL ABORTION

Medical abortion is termination of pregnancy using drugs. The type and doses of the drugs vary depending on the gestational age.

### Medical management of induced abortion at $\leq 24$ weeks of gestation:

See [table 15](#) below for medical management regimens for induced abortion at  $\leq 24$  weeks of gestation.

**Table 15. Medical management regimens for induced abortion at ≤ 24 weeks of gestation.**

GESTATIONAL AGE	COMBINATION REGIMEN (RECOMMENDED <sup>a</sup> )		MISOPROSTOL -ONLY (ALTERNATE)	REMARK
	MIFEPRISTONE	MISOPROSTOL		
≤ 12 WEEKS	200 mg PO once day one AND	800 µg B, PV or SL * 24 - 48 hrs later	800 µg B, PV or SL 24 - 48 hrs later	<ul style="list-style-type: none"> <li>Up to 9 wks → Out patient</li> <li>9-12 wks → In patient</li> </ul>
13 - 24 WEEKS	200 mg PO once day one AND	400 µg B, PV or SL 24 - 48 hrs later Every 3 hrs	400 µg B, PV or SL Every 3 hrs	Inpatient

B: buccal; PO: oral; PV: vaginal; SL: sublingual

**NOTE:**

\* Repeat doses of misoprostol (400 µg) every 3 hrs can be considered at 9-12 weeks of gestation to achieve success of the abortion process. This requires admission.

**Medical management of induced abortion at 24-28 weeks of gestation:**

- Limited evidence as to the optimal dosing.
- Dose and route of misoprostol: 200 µg vaginal/ sublingual/ buccal every 3 hours.

**NOTE:** From 24 up to 28 weeks of gestation there is no standard protocol (refer the national 2nd trimester abortion guideline).

**Medical management of patients with previous uterine scar**

- All patients should receive the same dose of mifepristone (200 mg oral) 1-2 days before misoprostol.
- The dose of misoprostol depends on the gestational age and number of prior uterine scars.



## Medical management of patients with spontaneous abortion or post-abortion care (PAC)

See [table 16](#) below.

**Table 16. Misoprostol regimens for spontaneous abortion or post-abortion care (PAC).**

Indication		Dose	Route	Remark
Incomplete abortion	Up to 13 weeks	600 µg Misoprostol	Oral	Repeat dose can be considered to increase success
		400 µg Misoprostol	Sublingual	
	13 weeks or above	Misoprostol 400 µg	Buccal / sublingual/ vaginal every 3 hrs.	Consider giving vaginal route only in the absence of vaginal bleeding
Missed abortion	Up to 12 weeks	600 µg Misoprostol	Sublingual	Repeat dose can be considered to increase success
		800 µg Misoprostol	Vaginally	
	13 to 24 weeks	Misoprostol	400 µg Sublingual/Vaginal every 4-6 hrs.	Pretreatment with Mifepristone 1-2 days before misoprostol

### Management of the placenta

- Immediate routine removal is not required.
- If not expelled after 4 hours of fetal expulsion give:
  - Sublingual / buccal misoprostol same dose as used for the termination.
  - Or
  - Run oxytocin 20 IU in 500 ml or 40 IU in 1000 ml NS/RL.
- If the placenta is not delivered within 4 hours after fetal expulsion or if bleeding develops, proceed with gentle removal of placenta with sponge forceps.

### SURGICAL ABORTION

For pregnancies up to 12 weeks of gestation the preferred surgical method of termination is manual or electric vacuum aspiration.

### Manual vacuum aspiration (MVA):

Pre-procedure steps for MVA:

- Preoperative antibiotics: 200 mg Doxycycline / Metronidazole 1 gm / Azithromycin 500 mg orally once within one hour prior to the procedure.
- Routine cervical preparation is not mandatory for first trimester MVA unless in special circumstances.
- Provide pain medication 30 minutes prior to the procedure. Diclofenac 75 mg IM stat or Ibuprofen 800 mg PO stat can be used.
- Do bimanual examination; assess the cervix and position of the uterus.
- Evaluate the product of conception up on completion of the procedure.

### Dilation and Evacuation (D&E):

- D & E is a surgical method which involves dilatation of the cervix and evacuation of the content of the uterus using specialized forceps.
- It needs highly trained /skilled provider.
- It is performed at or beyond GA of 13 weeks.

#### *Paracervical block*

- Use 1-2 ml of 1- 2% lidocaine at the site of tenaculum application (12 o'clock)
- 5 ml of 1-2% lidocaine at 4 and 8 o'clock at the cervico-vaginal junction, or 5 ml of 1-2% lidocaine at 4, 8 and 10 o'clock.
- Avoid 3 and 9 o'clock injections to prevent inadvertent intravascular administration.

### Subsequent management

- *Post abortion family planning:*
  - All clients with post abortion and safe abortion should be counseled on all contraception options before, during and after the procedure as part of abortion care.
  - See [table 17](#) below for eligibility for different contraception methods for different contraceptive methods.

**Table 17. Eligibility for different contraception methods.**

Contraceptive method	Post-abortion condition		
	1 <sup>st</sup> trimester	2 <sup>nd</sup> trimester	Immediate post-septic abortion
Combined oral contraceptive pills (COC)	1	1	1

Progesterone only injectable	1	1	1
Progesterone only implants	1	1	1
Copper bearing IUCD	1	2	4
Condoms	1	1	1
LNG-releasing IUD	1	2	4

- ***Rh-immunoglobulin (Anti-D):-***

- Rh-immunoglobulin (Anti-D) should be administered to all Rh-negative unsensitized women within 72 hours of abortion care if affordable.
  - 50 microgram IM for 1st trimester
  - 300 microgram IM for 2nd trimester

- ***Reproductive health services:-***

- Identify any other reproductive health services that the woman might need like:-
  - A tetanus prophylaxis or tetanus booster
  - Treatment for sexually transmitted infections or
  - Cervical cancer screening

## **FOLLOW UP AFTER DISCHARGE**

- There is no need for routine follow-up visit.
- Ensure expulsion, summary is documented on the medical chart before discharge.
- Confirm the woman is provided with contraceptive method of her choice.
- Confirm anti-D is given for Rh negative unsensitized woman.
- Inform her that it is normal to have minimal vaginal bleeding for few days after abortion.
- Advice to come back if there is:-
  - Too much bleeding
    - Soaking more than two pads per hour for two consecutive hours
    - Any heavy bleeding that makes the woman uncomfortable or symptomatic (dizziness, lightheadedness or fatigue)
    - If the bleeding continues for more than 2 weeks
  - Fever and/or severe abdominal pain/cramp
  - Bad smelling or unusual vagina discharge with or without abdominal pain/cramp

## COMPLICATIONS AND MANAGEMENT

**Infection and sepsis:** can be managed with IV antibiotics and evacuation. Surgical intervention/referral may be needed in case of further complications (abscess collection, peritonitis, uterine perforation etc.).

**Trauma:** can be managed with repair or there may be a need to do laparotomy.

**Hemorrhage:** depending on the extent of blood loss there may be a need for fluid resuscitation, blood transfusion, MVA in case of retained conceptus.

## HIV IN PREGNANCY

### DEFINITION

Prevention of Mother to Child Transmission (PMTCT) is the prevention of transmission of HIV virus from the mother to the fetus and child during pregnancy, childbirth and breastfeeding.

### RISK OF MTCT

The risk of mother to child transmission (MTCT) varies during pregnancy, labor and delivery and breastfeeding (see [table 18](#) below)

**Table 18.** Rates of HIV transmission during pregnancy, labor and delivery, and breastfeeding.

Estimated Risk of MTCT	
Timing	Transmission rate without Intervention
During pregnancy	10 – 25 %*
During labor and delivery	35 – 40 %
Overall with breastfeeding to 6-14 months	35 – 40 %*
NOTE: * Rates of transmission vary because of differences in population characteristics such as maternal CD4+ cell counts, RNA viral load, exclusivity and duration of breastfeeding.	

### Factors that affect the rate of MTCT

#### Maternal Factors:-

- High maternal viral load.
- New or recently acquired maternal HIV infection.
- Low CD4 count.
- Advanced maternal disease.
- Viral or parasitic placental infections during pregnancy, labor and childbirth.
- Maternal malnutrition.
- Nipple fissures, cracks, mastitis and breast abscess.
- Poor ART adherence.

- Active lower genital tract infections like herpes simplex.

***Infant factors:-***

- First infant in multiple birth
- Pre-maturity and low birth weight
- Longer duration of breastfeeding
- Mixed feeding during the first six months of life
- Oral diseases in child

***Obstetric and delivery practices:-***

- Ante-partum procedures (e.g. amniocentesis, external cephalic version).
- Rupture of membrane for more than four hours.
- Vaginal delivery compared to CS.
- Injuries to birth canal during child birth (vaginal and cervical tears).
- Invasive childbirth procedures (e.g. episiotomy).
- The first twin in vaginal delivery of multiple pregnancies.
- Delayed infant drying with clean towels and eye care.
- Routine vigorous infant airway suctioning.
- Instrumental deliveries (vacuum & forceps).
- Fetal birth trauma.

## **EFFECT OF HIV ON PREGNANCY**

There is increased risk of low birth weight, intrauterine growth restriction, preterm delivery and perinatal mortality.

## **EFFECT OF PREGNANCY ON HIV**

There is no known effect of pregnancy on HIV.

## **PREVENTION OF MTCT OF HIV**

There are four prongs to prevent mother-to-child transmission of HIV (PMTCT).

- **PRONG 1:** Primary prevention of HIV infection:-
  - Focuses on keeping people HIV-negative.
  - Prevention of new infections means that fewer women and men will have HIV and fewer infants will be exposed to HIV.
  - Promote safer and responsible sexual behavior and practices through BCC using the “ABC” approach.
  - Provide early diagnosis and treatment of sexually transmitted infections.
  - Make HTC widely available.
  - Provide pretest test information.

- **PRONG 2:** Prevention of unintended pregnancies in HIV-positive women –
  - Emphasizes on reducing the number of unplanned or unwanted pregnancies.
  - Effective family planning counseling and service is important to help HIV-infected women prevent unintended pregnancies and space births. It should be conducted sensitively, maintaining confidentiality and privacy, and must demonstrate respect for clients' rights.
  - FP/HIV services integration is a valuable approach in reducing the unmet needs of both family planning and HIV care services.
  - Counseling on FP should be started in the antenatal period.
- **PRONG 3:** Prevention of HIV transmission from women living with HIV to their infants – addresses care for HIV-positive women during pregnancy, labor and childbirth, and breastfeeding and care for their infants.
- **PRONG 4:** Provision of treatment, care, and support to women living with HIV, and their infants, partner, and families – including on-going chronic care and treatment for HIV-positive pregnant/postpartum women and their HIV-exposed, and HIV-positive children both during and beyond the PMTCT intervention period.

## DIAGNOSIS:

- All pregnant women attending maternal health services (i.e. antenatal, labor, postpartum) should have screening for HIV with serologic tests following the national PMTCT guideline (using the opt-out approach)
- If test result becomes positive: request laboratory tests (CD4 count & viral load).
- Clinical symptoms and signs of opportunistic infections should be thoroughly looked for and appropriate laboratory tests should be requested & the clinical stage of the disease assigned.
- If the test becomes negative, repeat HIV counseling and testing in the third trimester preferably between 28 to 36 weeks or during labor as appropriate.
- All HIV positive pregnant or lactating women should be retested with a second specimen before initiating ART.

## MANAGEMENT

### Preconception care:

Once a patient is diagnosed to be HIV positive the following should be done:

- Counseling on the diagnosis and linkage to trained personnel for further counseling.
- Baseline investigations including CD4 and viral load.
- Advise on contraception use with focus on avoiding unintended pregnancy; the preference is to give them dual contraception with one of them being condoms.

- Advise on general health including good nutrition. Adequate caloric intake; consumption of iron rich foods (beans, lentils, meat, liver); iron and folate for three months; and intake of iodized salt.
- Prevention of malaria: Use of ITN for women living in malaria endemic areas.
- Screening & treatment for opportunistic infections & STIs.
- Initiate ART/ link to PMTCT unit. ART should be initiated for all pregnant and breastfeeding women living with HIV regardless of the clinical stage and CD4 cell count; and continued lifelong.
- Discuss on future plan for pregnancy and necessary preparations.
- Provision of prophylaxis for opportunistic infections: Cotrimoxazole for stages 2, 3, 4 HIV/AIDS and those with CD4  $\leq 350$ .
- Discuss the importance of partner involvement & screening.
- Avoid pregnancy for 6 months after recovery from any chronic infections (e.g. Tb).
- If the patient has plan of pregnancy counsel on the following:
  - The impact of HIV on pregnancy.
  - The risk of MTCT.
  - Available methods for reduction of MTCT.

**NOTE:** *The above mentioned counseling also apply to pregnant mothers.*

### **Antepartum care by visit and trimester of pregnancy:**

In addition to the routine ANC, HIV positive pregnant women need special care and should have more visits. As soon as the patient has a missed period she should visit the antenatal care clinic and have pregnancy test.

- Once pregnancy is confirmed, careful clinical evaluation (detailed history and physical examination).
- All HIV positive pregnant, laboring and lactating women should be retested at the initiation of HAART in order to ensure correct diagnosis.
- All HIV positive pregnant, laboring and lactating mothers will be initiated on HAART for life (TDF, 3TC and DTG).
- HIV positive woman already on ART at time of pregnancy should continue and stay on the same regimen.
- Pregnant women with WHO clinical stage 1 and 2 can safely be initiated on ART in ANC; however, those diagnosed with advanced HIV disease at ANC (WHO stage 3 and 4) and opportunistic infections should promptly be referred to ART clinic for diagnosis and treatment of OI and initiation of ART.
- However, following which, at the discretion of the ART clinic provider, they can be transferred back to PMTCT unit for their on-going care and treatment.



- Monitoring and support for HAART adherence.
- Early ultrasound for determination of gestational age.
- Routine laboratory screening tests like in any pregnant women (VDRL, HBsAg, CBC, Blood group and Rh, and others as needed).
- There is no need to wait for CD4 count to initiate treatment. But CD4 count is important to monitor response to treatment. If available, however, viral load monitoring is more effective to detect emergence of treatment failure.
- Viral load monitoring to detect emergence of treatment failure.
- Advise the mother on the importance of having strict ANC follow up.
- Discuss with the mother the risk of MTCT and the possible complications that can occur due to the HIV infection including IUGR.
- Administer vaccinations like TD.
- Nutritional supplementation like in other pregnant women.
- Follow the fetal growth with serial US every 3-4 weeks.
- Discuss on the mode of delivery based on the national PMTCT guideline. Individualize birth plan based on the viral load and the duration of HARRT.
- Discuss on the postpartum infant feeding plan.
- Discuss on post-partum administration of ART to the neonate for reduction of MTCT.
- Assess the patient's support system and offer counseling if concerns arise.

### **Intrapartum care:**

- Safe delivery practices and avoiding invasive procedures whenever possible:
  - Avoid artificial rupture of membranes to shorten labor and expedite delivery whenever there is a spontaneous rupture of the membrane.
  - Avoid routine episiotomy.
  - Limit use of vacuum extraction and prefer obstetric forceps whenever instrumental delivery is indicated.
  - Avoid repeated vaginal examinations during labor.
  - Treat chorioamnionitis with appropriate antibiotics.
- Provide essential newborn care (ENC). See section on ENC.
- **Mode of delivery:-**
  - For women on HAART,
    - If the viral load is  $> 1000$  copies/ml elective cesarean section at gestational age of 38 weeks should be considered.
    - If the viral load is  $\leq 1000$  copies/ml there is no added benefit from cesarean section. Hence, the mother should be counseled on vaginal delivery.

- In the absence of viral load, a woman adherent to HAART for at least one month is considered to have lower viral load. Clinical judgment of the provider in consultation with the woman can be the way to decide the route of delivery.
  - The benefits and risks of different modes of delivery should be discussed with women living with HIV, including vaginal delivery, and elective and non-elective C-section.
- If the mother is already started on ART it should be continued intrapartum.
  - If she is a newly diagnosed RVI patient and not started on ART it should be started intrapartum and continued post-partum irrespective of the CD4 count.
  - Emergency CS is reserved for patients with obstetric indications.
  - When indicated for other medical or obstetric reasons, CS should still be offered, as for all women.

### Post-partum care

- Continue initial ART for those who are initiated earlier. Start ART for HIV positive mothers who are breastfeeding even if it was not started before.
- For mothers who fulfill Acceptable, Feasible, Affordable, Sustainable and Safe (AFASS) criteria, formula feeding should be considered after thorough discussion with the family.
- For those who do not fulfill AFASS, advise on exclusive breastfeeding for six months and complementary feeding should start at 6<sup>th</sup> month. Breastfeeding should be continued until the first year of life but not more than two years.
- Give NVP + AZT syrup for the first 6 weeks and continue NVP syrup only for the next 6 weeks for all HIV exposed infants (see [table 19](#) below for dosing).

**Table 19. Enhanced Post-natal Prophylaxis (e-PNP) for HIV Exposed Infants.**

Infant age / weight		Formulation	Dosing
0-6 weeks	< 2500g	NVP 10mg/ml +	10 mg ( 1ml ) once daily +
		AZT 10mg/ml	10 mg (1ml ) twice daily
	> 2500g	NVP 10mg/ml +	15mg (1.5ml) once daily +
		AZT 10mg/ml	15mg( 1.5ml) twice daily
6-12 week		NVP 10mg/ml	20mg (2ml) Once daily

- Educate mothers on the importance of exposed infant follow-up, Co-trimoxazole preventive therapy and early infant diagnosis. (see [table 20](#) below for dosing)
  - DBS for DNA/PCR should be done at sixth week of life and HIV negatives should be followed as HIV Exposed Infant (HEIs).
  - DNA/PCR positive babies should be linked to pediatric ART for chronic HIV/AIDS care and follow up.

**Table 20. Dosage of Co-trimoxazole preventive therapy in infants and children.**

Age	Preparation of the Co-trimoxazole suspension and tablets		
	Suspension per 5 ml 200/40 mg	Pediatric tablet 100/20mg	Single strength adult tablets( 400/80 mg)
< 6 months	2.5 ml	1 tablet	½ tablet
6 months - 5 years	5ml	2 tablets	½ tablet

- Do confirmatory rapid HIV antibodies test for DNA/PCR negative HEIs six weeks after the cessation of breastfeeding.
- Discharge negative babies from follow up after rapid HIV antibody test and link the positive babies to chronic pediatric HIV care, treatment and follow up.
- Give postpartum family planning counseling and provide mothers with family planning method of their choice if eligible for the method of choice.
- Immunization and growth monitoring for the baby like in non HIV exposed babies.
- The mother and infant should do their follow up at the MNCH clinic, where they can get integrated MNCH and HIV care.
- After discharge link the mother to ART clinic in the following scenarios:
  - If the baby is DNA/PCR positive.
  - If the baby is rapid HIV AB test positive.
  - If the baby is dead.
  - If the mother develops any HIV/AIDS related complications of the disease or its treatment.

**NOTE:** *Adherence counseling and follow up is mandatory and it should be done for the mother and infant as a pair.*

## HYPERTENSIVE DISORDERS IN PREGNANCY

### DEFINITION:

**Hypertension:** A systolic blood pressure  $\geq 140$  mmHg, diastolic blood pressure  $\geq 90$  mmHg or both in two occasions taken 4 hours or more apart; or a single blood pressure recording of  $\geq 160/110$  mmHg.

**Proteinuria:** Two urine dipstick measurements of at least 1+ (30 mg per dL) taken six hours apart; at least 300 mg of protein in a 24-hour urine sample; or a urinary protein/creatinine ratio of 0.3 or greater.

### CLASSIFICATION:

1. **Gestational hypertension:** hypertension without proteinuria (or other signs of preeclampsia) developing after 20 weeks of gestation in a previously normotensive woman.
2. **Preeclampsia eclampsia syndrome**  
*Preeclampsia:* new onset of hypertension and proteinuria after 20 weeks of gestation in a previously normotensive woman.  
*Eclampsia:* grand mal seizure or coma in a woman with preeclampsia. Important causes of convulsion or coma like cerebral malaria, meningitis, hypoglycemia, previous seizure disorder, head injury or intracranial space occupying lesions have to be ruled out.
3. **Chronic hypertension:** hypertension that antedates pregnancy; is present before 20 weeks of gestation; or persists after 12 weeks postpartum.
4. **Superimposed preeclampsia**
  - Superimposed pre-eclampsia without severe features
  - Superimposed pre-eclampsia with severe features

### GESTATIONAL HYPERTENSION

Manage as an outpatient:

- Monitor blood pressure, urine (for proteinuria) and fetal condition weekly.
- If blood pressure worsens or the woman develops features of pre-eclampsia, manage as pre-eclampsia.
- Counsel the woman and her family about danger signs indicating severe pre-eclampsia or eclampsia.
- If all observations remain stable, allow to proceed with spontaneous labor and childbirth.

- If spontaneous labor has not occurred before term, induce labor at term.

## PRE-ECLAMPSIA

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### RISK FACTORS:

First pregnancy, young or old age, multiple gestation, history of hypertension, renal disease, diabetes, obesity, family history of pre-eclampsia.

### DIAGNOSIS:

- Hypertension and proteinuria are the hallmark features of preeclampsia.
- Severity features of preeclampsia are:
  - Headache, blurred vision, oliguria (<400 ml/24 hours), epigastric pain or pain in right upper quadrant, difficulty breathing (pulmonary edema).
  - Low platelet count (<100,000/ $\mu$ l).
  - Elevated liver enzymes more than twice the upper limit of normal.
  - Serum creatinine higher than 1.1mg/dl or a doubling or higher of the baseline serum creatinine concentration in the absence of other renal disease.
- Laboratory tests such as urine protein, CBC, liver enzymes, LDH and renal function test should be determined.
- Ultrasound is used to monitor fetal growth and to assess fetal wellbeing.

### CLASSIFICATION

- Pre-eclampsia without severe features
- Pre-eclampsia with severe features

### TREATMENT OF PRE-ECLAMPSIA WITHOUT SEVERE FEATURES

Management varies depending on the gestational age

#### Gestational age less than 37 weeks

- Twice weekly outpatient follow-up is preferred as long as clinical features remain unchanged or are normalized (if it is convenient for the patient).
- Monitor blood pressure, fetal condition, CBC, liver and renal function tests twice weekly.
- Counsel about the danger signs associated with features of severe pre-eclampsia.
- Encourage the woman to eat a normal diet.
- Orient on fetal movement counting (kick chart) daily.
- Do not give anticonvulsant or antihypertensive unless clinically indicated.
- Delivery at 37 completed weeks.

- If follow up as an outpatient is not possible or if close observation is preferred, or pre-eclampsia progress rapidly, admit to hospital and:
  - Monitor blood pressure (twice daily), and urine output & weight (daily).
  - Auscultation of FHB & kick chart daily.
  - Do not give medications (as above).
  - Urine protein, fetal condition twice weekly.
  - Do not give diuretics (diuretics are harmful & only indicated for use in pre-eclampsia with pulmonary edema or congestive heart failure).
- If the diastolic blood pressure decreases to normal levels or her condition remains stable, send the woman home with the following instructions:
  - Advise her to rest & to watch out for severity features.
  - Continue follow up twice a week (as above).
  - If diastolic blood pressure rises again, readmit her.
- If the clinical features remain unchanged, keep the woman in the hospital and:
  - Continue the same management & monitor fetal growth & well-being (by symphysis fundal height, kick chart & other methods if available).
  - If there are signs of growth restriction, consider early delivery.
  - If not, continue hospitalization and terminate the pregnancy at 37 weeks.
- If clinical features worsen (urinary protein level increased), manage as severe pre-eclampsia.

#### **Gestational age $\geq 37$ complete weeks:**

- Delivery is recommended.
- Anticonvulsant during labor.

### **TREATMENT OF PREECLAMPSIA WITH SEVERE FEATURES**

Includes any one or more of the severity features. The steps of management include:

- General measures:
- Prevent convulsion
- Control hypertension.
- Delivery / expectant management in selected cases.

#### **General measures:**

- Admit the patient urgently, preferably to the labor ward.
- Manage in left lateral position.
- Setup IV line & infuse maintenance fluids.
- Monitor urine output and maintain urine output at  $>30$  ml/hr.

- Maintain a strict fluid balance chart.
- Prepare equipment for convulsion management at bed side (airway, suction equipment, mask & bag, oxygen).
- Never leave the patient alone.
- Monitor vital signs, FHB & reflexes.
- Auscultate the lung bases for fine crepitation. If they occur, withhold fluids & administer a diuretic (furosemide 40 mg IV stat).

#### **Anticonvulsant therapy (seizure prophylaxis):**

- Give Magnesium sulfate as shown in the box below.
- In all severe preeclamptic mothers during admission & continued during period of evaluation & observation for 24 hours.
- Diazepam: may be used as alternative, if MgSO<sub>4</sub> is not available (as shown below).

#### **Control hypertension:**

Antihypertensives should be started if the systolic BP is 160 mmHg or higher and/or diastolic BP is 110 mmHg or higher. Hydralazine or labetalol is the drug of choice for acute control.

**NOTE:** An important principle is to maintain BP above the lower limits of normal.

##### Hydralazine

- Give 5 mg IV slowly every 20 minutes until blood pressure is lowered (to diastolic blood pressure <110 mmHg). The maximum dose is 20 mg per 24 hours.

##### Labetalol

- *Oral treatment:* Administer 200 mg; repeat dose after one hour until the treatment goal is achieved. The maximum dose is 1200 mg in 24 hours.
- *Intravenous treatment:* Administer 10 mg IV. If response is inadequate after 10 minutes, administer 20 mg IV. The dose can be doubled to 40 mg and then 80 mg with 10-minute intervals until blood pressure is lowered below threshold. The maximum total dose is 300 mg; then switch to oral treatment.

##### Nifedipine

- As alternative for acute therapy, administer 10 mg orally. Repeat dose after 30 minutes if response is inadequate until optimal blood pressure is reached. The maximum total dose is 30 mg in the acute treatment setting. For maintenance therapy 10-20 mg PO bid is given.

##### Alpha methyl dopa

- Administer 250-750 mg every six to eight hours. The maximum dose is 3000 mg per 24 hours.

## PLANNING DELIVERY

### Gestational age < 28 weeks:

- Termination of pregnancy (expectant management is not recommended).

### Gestational age $\geq$ 28 weeks and <34 weeks:

Expectant management is recommended, provided that there is no indication for delivery.

#### *For expectant management:*

- Transfer to maternity ward.
- Follow vital signs every 4 hours.
- CBC every other day.
- Liver enzymes and creatinine twice weekly.
- Fetal kick count daily.
- Fetal surveillance twice weekly.
- Administer dexamethasone 6 mg IM every 12 hours for 2 days or betamethasone 12 mg daily for 2 days.

#### *Indications for delivery are:*

- Failure to control hypertension with two antihypertensive drugs with a maximum dose in 48 hours.
- Persistent maternal severity symptoms (severe headache, visual changes and abdominal and/or epigastric pain with elevated liver enzymes).
- HELLP Syndrome
- Eclampsia
- Pulmonary edema or left ventricular failure
- IUFD
- DIC
- Severe renal dysfunction

### Gestation 34 to 37 Weeks:

In women with severe pre-eclampsia and a viable fetus that is between 34 and 37 weeks of gestation, expectant management may be recommended, provided that uncontrolled maternal hypertension, worsening maternal status and fetal distress are absent and can be closely monitored.

### Gestation after 37 Completed Weeks:

For women with pre-eclampsia at term ( $\geq$  37 weeks), regardless of severity features, delivery is recommended.



## MODE OF DELIVERY

Mode of delivery depends on gestational age, fetal condition, presentation, cervical condition & maternal condition.

### Indication for Cesarean Section:

- Unfavorable cervix (firm, thick, closed) esp. in seriously ill patients.
- Poor progress of labor.
- Patient has not entered active labor within 8 hrs of induction of labor.
- If there is evidence of fetal distress, or other obstetric indications.

### Use of Anesthesia:

- Spinal anesthesia can be used, with adequate IV fluid loading (500-1000 ml), to reduce the risk of hypotension (except in patients with thrombocytopenia (platelets <100,000) or bleeding disorders).
- If general anesthesia is chosen use of thiopental, succinyl choline & nitrous oxide is preferable.

## INTRA PARTUM MANAGEMENT

- Absolute bed rest in left lateral position is essential.
- Antihypertensive drugs should be given as necessary to regulate diastolic blood pressure between 90 & 110mm Hg.
- Careful monitoring of FHB, maternal conditions & progress of labor.
- Pain management as required.

## POSTPARTUM MANAGEMENT

- Watch closely for at least 2 hours after delivery for complications such as shock, PPH & eclampsia.
- Anticonvulsive therapy should be maintained for 24 hrs to 48 hrs after delivery or the last convulsion, whichever occurs last.
- Continue anti-hypertensive therapy as long as the blood pressure is  $\geq 110$ mmhg.
- Continue to monitor urine output & check for coagulation failure, LFT and RFT.
- Postnatal follow-up of these cases is very important for the treatment of hypertension & possible complications such as DIC, acute renal failure and pulmonary edema.

## ECLAMPSIA:

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Treatment of eclampsia consists of:

- General measures.
- Control of convulsions (to stop ongoing convulsion & prevent subsequent convulsion).

- Blood pressure control, stabilization of the condition of the mother & fetus.
- Fluid balance.
- Delivery & intrapartum/postpartum care.

## GENERAL MEASURES

- Set up IV line & maintain intravascular volume & replace ongoing losses; avoid overload (if not done already).
- Position the patient on her side (left lateral) & in Trendelenberg (head down) position to reduce risk of aspiration of secretions, vomitus or blood.
- Aspirate (suction) the mouth & throat as necessary & ensure open airway.
- Give oxygen by mask at 6 liters per minute.
- Avoid tongue bite by placing an airway or padded tongue blade between the teeth & protect the woman from injury.
- Place an indwelling catheter to monitor urine output.
- Observe vital signs, FHB & reflexes frequently, and auscultate the lung bases hourly for crepitation indicating pulmonary edema. If pulmonary edema occurs, withhold fluids & administer a diuretic (e.g. furosemide 40 mg IV stat).
- Keep the patient in a quiet room. An attendant must always be present beside her.
- Administration of broad-spectrum IV antibiotics is recommended.

## ANTICONVULSANT THERAPY

- Administer anticonvulsant drugs to stop the ongoing convulsion & prevent subsequent attacks.

### *Magnesium sulphate:*

- $\text{MgSO}_4$  is the drug of choice (see the box and [annex 7](#) below for dosing).
- Despite the compelling evidence for the effectiveness of magnesium sulfate, it has potential for toxicity.
- Before repeat administration, ensure that respiratory rate is at least 12 per minute, patellar reflexes are present and urinary output is at least 30 ml per hour or 100 ml per 4 hours.
- Withhold or delay drug if respiratory rate falls below 12 per minute, patellar reflexes are absent or urinary output falls below 30mL per hour over preceding 4 hours.
- Keep antidote ready in case of respiratory arrest.
- If respiratory arrest occurs, assist ventilation (mask and bag, anesthesia apparatus, intubation) and administer calcium gluconate 1g (10 mL of 10% solution) IV slowly.

### **MAGNESIUM SULFATE SCHEDULES FOR SEVERE PRE-ECLAMPSIA AND ECLAMPSIA**

#### ***Loading dose***

- Magnesium sulfate 20% solution, 4g IV over 5 minutes.
- Follow promptly with 10 gm of 50% magnesium sulfate solution, 5 gm in each buttock as deep IM injection with 1mL of 2% lidocaine in the same syringe. Ensure that aseptic technique is practiced when giving magnesium sulfate deep IM injection. Warn the woman that a feeling of warmth will be felt when magnesium sulfate is given.
- If convulsion recurs after 15 minutes, give 2 gm magnesium sulfate (20% solution) IV over 5 minutes.

#### ***Maintenance dose***

- 5 gm magnesium sulfate (50% solution) + 1 mL lidocaine 2% IM every 4 hours into alternate buttocks.
- Continue treatment with magnesium sulfate for 24 hours after delivery or the last convulsion, whichever occurs last.

#### ***Diazepam:***

Diazepam is an alternative, but increases the risk of respiratory depression and newborn apnea, in babies who may already be suffering from the effects of utero-placental ischemia & pre-term birth. The effect may last several days. See the box below for dosing.

### **DIAZEPAM SCHEDULE FOR SEVERE PRE-ECLAMPSIA & ECLAMPSIA**

#### ***Loading dose***

- Diazepam 10 mg IV slowly over 2 minutes
- If convulsion recur, repeat the same dose

#### ***Maintenance dose***

- Diazepam 40 mg in 500 ml IV fluids (N/S or Ringer's lactate) no of drops titrated to keep the woman sedated but arousable.

### **ANTI-HYPERTENSIVE THERAPY**

The therapeutic goal is to keep the diastolic blood pressure <110 mmHg (between 90 and 100 mmHg) & prevent cerebral hemorrhage. For drugs used as antihypertensive medication refer to management of severe pre-eclampsia above (use same drugs & doses).

## FLUID BALANCE

- Keeping strict input & output record is essential and determine serum electrolytes.
- For unconscious patient, 5% DW & ringer's Lactate are infused for maintenance of nutrition & fluid balance during 24 hrs.
- Replace extra fluid loss through vomiting, diarrhea, sweating or blood loss.
- Nothing by mouth is allowed (if unconscious); when the patient becomes conscious & can drink, oral feeding of fluid is started.

## DELIVERY

- Delivery should take place within 12 hours of onset of convulsions.
- Delivery should take place as soon as the woman's condition has stabilized, regardless of the gestational age.

## INTRA PARTUM AND POSTPARTUM MANAGEMENT:

- As stated in the management of sever preeclampsia with severe features.

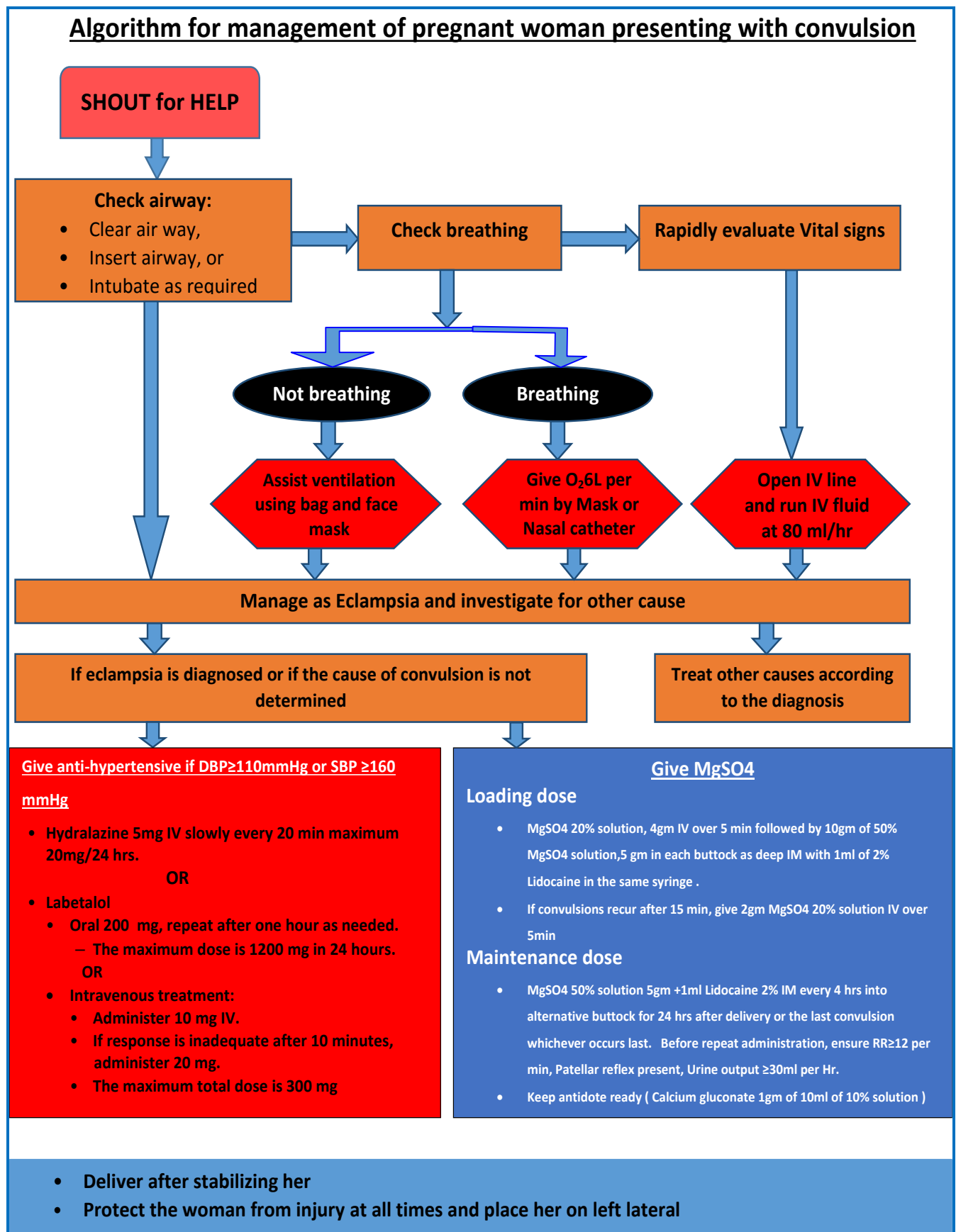
**NOTE:** *The management approach for a pregnant woman presenting with convulsion is summarized below in [annex 7](#).*

## CHRONIC HYPERTENSION

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- High levels of blood pressure maintain renal and placental perfusion in chronic hypertension; reducing blood pressure will result in diminished perfusion. Hence, blood pressure should not be lowered below its pre-pregnancy level.
- If the woman was on an antihypertensive medication before pregnancy and her blood pressure is well-controlled, continue the same medication if safe in pregnancy or transfer to medication safely used in pregnancy.
- If the systolic blood pressure is 160 mmHg or more, or the diastolic blood pressure is 110 mmHg or more, treat with antihypertensive medications.
- If proteinuria or other signs and symptoms of pre-eclampsia are present, consider superimposed pre-eclampsia and manage as pre-eclampsia.
- Monitor fetal growth and condition.
- If there are no complications, induce labor at term.
- If fetal growth restriction is severe and pregnancy dating is accurate deliver.
- Observe for complications (e.g. abruptio placentae, superimposed pre-eclampsia).

**Annex 7.** Algorithm for management of a pregnant woman presenting with convulsion.



## DIABETES MELLITUS IN PREGNANCY

### DEFINITION

Diabetes mellitus (DM) is defined as abnormal metabolism of carbohydrates which results in elevated blood glucose level.

### CLASSIFICATION

- **Pre-gestational Diabetes Mellitus** (Type I or Type II)
- **Gestational Diabetes Mellitus (GDM):** a carbohydrate intolerance resulting in hyperglycemia of variable severity with onset or first recognition during pregnancy.

### DIAGNOSIS

#### **GDM:**

A standard 75 gm OGTT is performed after fasting for 8 to 14 hours by giving 75 gm anhydrous glucose in 250 – 300 ml water. GDM is diagnosed at any time in pregnancy if one or more of the following criteria are met.

- Fasting plasma glucose 92–125 mg/dL (5.1–6.9 mmol/L).
- 1-hour plasma glucose 180 mg/dL (10 mmol/L).
- 2-hour plasma glucose 153–199 mg/dL (8.5–11.0 mmol/L).

**Pre-gestational DM:** is diagnosed if one or more of the following criteria are met:

- 
- 2-hour plasma glucose 200 mg/dL (11.1 mmol/L) following a 75 g oral glucose load,
- Random plasma glucose 200 mg/dL (11.1 mmol/L) in the presence of diabetes symptoms.

## MANAGEMENT OF PREGESTATIONAL DIABETES MELLITUS

### PRECONCEPTION CARE

- It requires multidisciplinary approach (internist, obstetrician, nutritionist, etc).
- Evaluate and treat diabetic complications before pregnancy (hypertension, retinopathy, nephropathy, neuropathy and cardiovascular disease).
- Measure and optimize thyroid hormone levels in women with type 1 diabetes.

- Review all current medications (e.g. ACE inhibitors, diuretics,  $\beta$ -Blockers, statins), and change to a form of therapy that has less fetal risk.
- Measure HbA1C (Hemoglobin A1c) monthly until satisfactory control is achieved (below 7%).
- Monitor blood glucose level to achieve the target blood sugar level:
  - Fasting capillary blood glucose: 80 -110 mg/dL.
  - 2 hr capillary postprandial blood glucose: < 150 mg/dL.
- Give folic acid supplementation, 4 mg daily before conception until 12 weeks of gestation to minimize risk of congenital anomalies.
- Provide counseling:
  - Inform about risks of miscarriage, congenital malformation, preeclampsia and perinatal mortality with poor glycemic control and unplanned pregnancy.
  - Encourage regular exercise and weight control.
  - Encourage a diet with complex carbohydrates, soluble fiber, and reduced levels of saturated fats. Avoid simple sugars.
- Use effective contraception until target blood glucose control is achieved before conception.
- Pregnancy is not recommended in the presence of ischemic heart disease, active proliferative retinopathy (untreated), severe renal insufficiency (creatinine clearance <50ml/min, serum creatinine > 2.0 mg/dL or heavy proteinuria (>2g/24hr.)), and if HgbA1c >10%.
- Proliferative retinopathy during pregnancy has substantial risk of visual loss. It should be treated before pregnancy.

## ANTENATAL MANAGEMENT OF PREGESTATIONAL DM

Antenatal management of pregestational DM requires multidisciplinary team approach (diabetic clinic and antenatal clinic).

### Initial evaluation:

- Screen, monitor and manage for maternal medical complications of DM (retinopathy, nephropathy, hypertension, ketoacidosis, thyroid disease and cardiac disease).
- Have baseline investigations (renal function test, urine protein level, liver function tests).

### Follow up:

- Patients are seen every 2 – 3 weeks during the first two trimesters, every 1-2 weeks until 36 weeks then weekly until delivery. But more frequent visits may be necessary.

### Ultrasound:

- **First trimester** - Ultrasound for pregnancy dating and viability.

- **Second trimester:** - Anatomic ultrasonogram at 18-22 weeks, including examination of the fetal heart.
- **Third trimester:** - Assess fetal growth every 4-6 weeks. Initiate antenatal surveillance with BPP/NST (starting from 28 to 32 weeks) every 2 weeks and weekly after 36 weeks of gestation. There may be a need for frequent fetal surveillance and growth monitoring.

### Preeclampsia prevention:

- Low-dose aspirin as a preventive medication after 12 weeks of gestation.

### Blood Glucose Monitoring:

- The management of diabetes in pregnancy must focus on good glucose control achieved using a careful combination of diet, exercise, and insulin therapy.
- The goal is to maintain capillary glucose levels as close to normal as possible.
  - Fasting glucose level of 95 mg/dL or less
  - Pre-meal values of 100 mg/dL or less
  - 1-hour postprandial levels of 140 mg/dL or less, and
  - 2-hour postprandial values of 120 mg/dL or less.
  - During the night, glucose levels should not decrease to less than 60 mg/dL.
  - Mean capillary glucose level should be maintained at an average of 100 mg/dL with a HbA<sub>1c</sub> concentration no higher than 6%.
- An ideal glucose monitoring involves capillary glucose checks on rising in the morning, 1 or 2 hr after breakfast, before & after lunch, before dinner & at bed time.
- If performance of six measurements is not possible, fasting and postprandial monitoring of blood glucose is recommended to achieve metabolic control in pregnant women with diabetes.
- In resource poor settings FBS & 2 hrs postprandial should be checked at least twice weekly.

### Dietary management:

- Three meals and three snacks of diabetic diet are recommended; however, in overweight and obese women the snacks are often eliminated.
- **Total calories:** The appropriate caloric intake depends on pre-pregnancy weight i.e. 30 Kcal/kg/day if the woman is at ideal body weight, 24 Kcal/ Kg /Day if 20-25% above ideal weight, 12-18 Kcal/ Kg /Day if more than 50% above ideal body weight and 36-40 Kcal/ Kg /Day if more than 10% below ideal body weight.
- **Distribution of calories: Breakfast:** The breakfast meal should be small (approximately 10% of total calories) to help maintain postprandial euglycemia. Carbohydrate intake at breakfast is also limited since insulin resistance is greatest in the morning. **Lunch:**



30% of total calories, *dinner*: 30% of total calories, and *snacks*: 30% of total calories are distributed as needed.

#### **Exercise:**

- Non strenuous exercise, 3 times per week for 30 – 60 minutes. Using the upper body and walking appear to be more appropriate.
- Contraindications to exercise include PIH, PROM, preterm labor, incompetent cervix, persistent 2<sup>nd</sup> or 3<sup>rd</sup> trimester bleeding and IUGR.

#### **Insulin Therapy:**

- Insulin requirement increases throughout pregnancy, most markedly in the period between 28–32 weeks of gestation.
- *Dosage:*
  - Starting insulin dose is 0.7-1.0 units/kg daily.
  - A combination of short & intermediate acting insulin is necessary to maintain glucose levels.
  - From the total dose two-thirds before breakfast (NPH and regular insulin in a 2:1 mixture), one-third before dinner (NPH and regular insulin and as 1:1 mixture). Then each element of insulin is individually adjusted in order to keep blood glucose level between 70-130mg/dl.
  - The regular insulin should be given approximately 30 minutes before eating to reduce glucose elevations associated with eating.

#### **Timing and route of delivery:**

- Optimal timing of delivery relies on balancing the risk of intrauterine fetal death with the risks of preterm birth.
- Early delivery (at GA of 37wks) may be indicated in some patients with vasculopathy, nephropathy, poor glucose control, or a prior stillbirth after confirmation of fetal pulmonary maturity.
- Most other cases can be allowed to progress to 38 – 39 wks of GA as long as antenatal testing remains reassuring. But expectant management beyond 40 wks is not recommended.
- Delivery between 34 weeks plus 0 days and 36 weeks plus 6 days is reserved for failure of in-hospital glycemic control or abnormal fetal testing.
- Cesarean section is reserved for obstetric indications.

#### **INTRAPARTUM MANAGEMENT**

- Patient is kept NPO after midnight.
- Usual dose of intermediate-acting insulin is given at bedtime.

- Withhold morning (AM) insulin injection.
- Begin and continue glucose infusion (5% dextrose in water) at 100 – 150 mL/hr.
- Add 10 U of regular insulin to 1000 mL of solution containing 5% dextrose. Begin infusion of regular insulin if capillary glucose is greater than 80 mg/dL. (see [table 21](#))
- Use fluid without dextrose if capillary glucose is greater than 180 mg/dL.
- Begin oxytocin as needed.
- Monitor maternal glucose levels hourly. Adjust insulin infusion.

**Table 21. Insulin infusion protocol.**

Plasma / Capillary Glucose (mg/dL)	Infusion Rate (U/hr)	Approximate Infusion Rate (Drops/min)	IV fluid
<80	Insulin off	40	5% dextrose
80-100	0.5	20	5% dextrose
101-140	1.0	30	5% dextrose
141-180	1.5	50	5% dextrose
181-220	2.0	60	Without dextrose
>220	2.5	80	Without dextrose

#### **Intermittent Subcutaneous Injection Method:**

1. Give half of the usual insulin dose in AM.
2. Begin and continue glucose infusion (5% DW) at 100 mL/hr.
3. Begin oxytocin as needed.
4. Monitor maternal glucose levels hourly.
5. Administer regular insulin in small doses (2-5U) to maintain glucose levels of 80-120 mg/dL.

## **MANAGEMENT OF GESTATIONAL DM**

### **ANTENATAL MANAGEMENT OF GDM**

#### **Identification of risk factors:**

- Risk assessment should be done at the first prenatal visit. If one or more of risk factors are present, perform 75-g 2-hour OGTT as soon as feasible. If GDM is not diagnosed, 75 gm 2-hour OGTT should be repeated at 24 to 28 weeks of gestation (or any time a patient has signs and symptoms of hyperglycemia)

- Risk factors for GDM include:-

- Age  $\geq 35$
- Pre-gestational BMI  $\geq 25$
- PCOS
- First degree relative with DM,
- Glucosuria (2+ or above on 1 occasion or of 1+ or above on 2 or more occasions)
- Large for gestational age
- Polyhydramnios
- Previous macrosomic baby
- Previous congenital anomaly
- Unexplained still birth
- Previous GDM

#### Ultrasound evaluation:

- Early U/S – for dating and to check for congenital anomaly.
- Serial US to assess fetal growth every 4 to 6 weeks and initiate fetal surveillance with BPP starting from GA of 32 WKs.

#### Diet and Exercise:

- Life style change is an essential component of management of GDM and may suffice as the treatment for many women.
- Dietary management is similar to pre-gestational DM.
- Medications should be added if needed to achieve glycemic targets.

#### Insulin:

- Insulin is the preferred medication for treating hyperglycemia in gestational diabetes mellitus as it does not cross the placenta to a measurable extent.
- Insulin therapy should be considered for patients treated with nutrition and exercise therapy when 1 hr postprandial values exceed 130–140 mg/dL or 2 hr postprandial values exceed 120 mg/dL or fasting glucose exceeds 92 mg/dL persistently over 2 weeks (more than half of the tests are beyond normal limits).

#### Metformin:

- If a patient cannot take insulin or declines, metformin can be used. Counsel about metformin risks.
- *Starting dose:* 500 mg at night for 1 week, increase to 500 mg twice daily. Check baseline creatinine.

#### Timing and route of delivery:

- Delivery can be planned between 39 and 40 wks, but not later than 40 wks.
- Induction of labor is recommended at 38 wks in patients with poor glycemic control.
- If early delivery is indicated (before 39wks) lung maturity should be checked.
- CS is done only for obstetric indications.

## POSTPARTUM FOLLOW UP

- Determine random blood glucose within 4 hours of delivery.
- If FBG exceeds 126 mg/dL or RBS exceeds 200 mg/dL, insulin in a lower dose (usually one third to half of the antenatal dose) or metformin would be required.
- If the mother received insulin in the antenatal period, the dose needs adjustments to pre pregnant doses in those with type 2 diabetes mellitus.
- For those with GDM, no treatment is required and usually maintained on diet alone.
- **Note** that determination of OGTT at 6 - 12 wks postpartum is required to exclude overt diabetes.
- Ensure that women who have pre-proliferative diabetic retinopathy or any form of referable retinopathy diagnosed during pregnancy have ophthalmologic follow-up for at least 6 months after delivery.

## COMPLICATIONS

- **Maternal:** Preeclampsia, infections (UTI, chorioamnionitis, endomyometritis, vulvovaginal candidiasis), PPH, polyhydramnios, increased C/S rates.
- **Fetal:** Macrosomia, respiratory distress syndrome, hypoglycemia, hypocalcemia, hyperbilirubinemia, congenital malformations (for pre-gestational), IUGR (for pre-gestational).

## FAMILY PLANNING

- All reliable methods of family planning can be used as appropriate for the needs of the individual woman with diabetes.
- Combined hormonal contraceptives and DMPA should be avoided in women with pre-gestational DM who have vascular complications.
- Permanent methods of contraception are ideal if family size is complete.

## MALARIA IN PREGNANCY

### DEFINITION

Malaria is an infectious disease caused by protozoan parasites from the Plasmodium family which affects human red blood cells that can be transmitted by the bite of the female Anopheles mosquito. Blood contamination and mother to fetus (vertical transmission) during pregnancy are also potential modes of transmission.

### CLASSIFICATION

- **Based on severity:** Uncomplicated & complicated malaria.
- **Based on the etiologic agent:** Plasmodium (P.) falciparum, P. vivax, P. ovale, P. malariae and P. knowlesi Malaria.

**NOTE:** - *Mixed infections involving more than 1 species of Plasmodium may occur in areas of high endemicity and multiple circulating malarial species.*

### CLINICAL MANIFESTATIONS

The symptoms and signs vary based on the severity of the malaria. Manifestations of Severe malaria (cerebral malaria, pulmonary edema, acute kidney injury, hypovolemic shock, metabolic acidosis and hypoglycaemia) are usually seen in non-immune population including pregnant women.

#### Uncomplicated Malaria

- Uncomplicated malaria is symptomatic malaria parasitaemia with no signs of severity and/or evidence of vital organ dysfunction.

#### Complicated Malaria (severe Falciparum malaria)

- Complicated malaria is acute falciparum malaria with signs of severity and/ or vital organ dysfunction.

### DIAGNOSIS

- Diagnosis is based on suggestive symptom, signs ([table 22](#)) and laboratory tests.
- The general principle is all cases of suspected malaria should have a parasitological test (microscopy or rapid diagnostic test) to confirm the diagnosis.

**Table 22. Clinical findings in uncomplicated and complicated malaria.**

### UNCOMPLICATED MALARIA

- Fever
- Shivering/chills
- Headaches
- Muscle/joint pains
- Nausea/vomiting
- False labour pains
- Physical examinations may reveal pallor and splenomegally.

### COMPLICATED MALARIA

- Cerebral malaria (severe *P. Falciparum* malaria with coma GCS <11, coma for > 30 minute after a seizure, more than two convulsions in 24 hours)
- Severe Anemia Hgb < 5gm (Hct <15%)
- Hypoglycemia (blood glucose <40 mg/dl)
- Acute kidney injury (creatinine >3 mg/dl)
- Metabolic acidosis (plasma bicarbonate <15 mmol/litter)
- Pulmonary edema (rapid breathing >30 BPM or Oxygen saturation <90%)
- Respiratory distress, deep breathing (acidotic breathing).
- Disseminated Intravascular coagulation (abnormal spontaneous bleeding)
- Hyperparacitemia (>2% of RBCs parasitized or > 100,000copies of parasite/ml)
- Prostration: - Generalized weakness so that the patient is unable to walk or sit up without assistant.

The following tests can confirm the diagnosis:

#### 1. **Microscopy of a thick and thin blood film:**

- Thick blood film is more sensitive at detecting parasites (absence of parasites does not rule out malaria).
- Thin blood film helps to identify the parasite species.

#### 2. **Rapid antigen detection (diagnostic) tests:**

**NOTE:** *If facilities for testing are not available, begin therapy with anti-malarial drugs based on clinical suspicion (e.g., headache, fever, joint pain) especially at risky areas.*

## DIFFERENTIAL DIAGNOSIS

All acute febrile illnesses which are prevalent in the geographic context should be considered including pregnancy related diseases (both antepartum & postpartum). See [figure 23](#).

**Table 23. Differential diagnosis for malaria.**

Uncomplicated Malaria	Complicated Malaria
<ul style="list-style-type: none"><li>• Acute pyelonephritis</li></ul>	<ul style="list-style-type: none"><li>• Pyogenic meningitis</li></ul>
<ul style="list-style-type: none"><li>• Typhoid fever/ Typhus</li></ul>	<ul style="list-style-type: none"><li>• Eclampsia</li></ul>
<ul style="list-style-type: none"><li>• Pneumonia</li></ul>	<ul style="list-style-type: none"><li>• Epilepsy</li></ul>
<ul style="list-style-type: none"><li>• Chorioamnionitis</li></ul>	<ul style="list-style-type: none"><li>• Encephalitis</li></ul>
<ul style="list-style-type: none"><li>• Relapsing Fever</li></ul>	<ul style="list-style-type: none"><li>• CNS tumors</li></ul>
<ul style="list-style-type: none"><li>• Postpartum endometritis</li></ul>	<ul style="list-style-type: none"><li>• Congestive Heart Failure</li></ul>
<ul style="list-style-type: none"><li>• Acute hepatitis</li></ul>	

## OBSTETRIC COMPLICATIONS OF MALARIA

Complications of malaria in pregnancy vary according to transmission intensity and the level of acquired immunity.

### Low or unstable malaria transmission areas:

In low or unstable malaria transmission areas (like many malarious areas in Ethiopia), the lack or little immunity to malaria predisposes pregnant women to a higher risk of developing severe malaria and subsequent obstetric complications including:

- Spontaneous abortion
- Stillbirth
- Premature delivery, low birth weight
- Maternal & Neonatal deaths

### Stable transmission areas:

In stable transmission settings, partial clinical immunity acquired during years of exposure reduces the risk of severe disease. The major complications are:

- Low birth weight (LBW) / IUGR
- Maternal anemia.

## PREVENTION OF MALARIA

- Use of long-lasting insecticidal nets (LLINs).
- Prompt diagnosis and effective treatment of malaria infections.

## MANAGEMENT

- Management of malaria needs a multi-disciplinary approach including obstetricians, internists and neonatologists.
- Uncomplicated falciparum malaria can progress rapidly to severe form of the disease, especially in people with no or low immunity. Severe falciparum malaria is almost always fatal without treatment. Therefore, early diagnosis, and prompt and effective treatment within 24 to 48 hours of the onset of malaria symptoms is very crucial.

### Uncomplicated Falciparum Malaria:

#### *First Trimester:*

- For pregnant women diagnosed with uncomplicated malaria prompt treatment with chloroquine (treatment schedule as with non-pregnant adult patients i.e. 4, 4, 2 tabs base) is recommended. Alternatively, hydroxyl-chloroquine plus Clindamycin can be given.
- Give quinine salt (dihydrochloride or sulfate) 10 mg/kg body weight by mouth three times daily plus clindamycin 300 mg every six hours for seven days.
- If clindamycin is not available, treat with quinine monotherapy: Quinine salt (dihydrochloride or sulfate) 10 mg/kg body weight by mouth three times daily for seven days.
- An Artemisinin-based Combination Therapy (ACT) can be used if quinine is not available, or if quinine plus clindamycin fails, or if adherence to seven-day treatment with quinine cannot be guaranteed.

#### *Second and Third Trimesters:*

- Treat orally based on national policy with any of the ACTs: e.g. Artemether (80 mg) plus Lumefantrine (480 mg) twice daily for three days (assuming a body weight of 50 kg or more).

### Uncomplicated P. Vivax, Ovale and Malariae:

#### *First Trimester:*

- *Areas with Chloroquine-Sensitive P. Vivax Parasites:* Give chloroquine 10 mg/kg body weight by mouth once daily for two days followed by 5 mg/kg body weight by mouth on day three.
- *Areas with Chloroquine-Resistant P. Vivax Parasites:* Before considering second-line drugs for treatment failure with chloroquine, clinicians should exclude poor patient compliance and a new infection with P. falciparum. If diagnostic testing is not available, treat as for falciparum malaria. The treatment option for confirmed chloroquine resistant vivax malaria is quinine salt (dihydrochloride or sulfate) 10 mg/kg body weight by mouth three times a day for seven days.

#### *Second and Third Trimesters:*



- *Areas with Chloroquine-Sensitive P. Vivax Parasites:* Either ACT or chloroquine alone are the two treatment options.
- *Areas with Chloroquine-Resistant P. Vivax Parasites:* Treat with ACT (see dose above).
- *Areas of mixed Falciparum-Vivax Malaria:* In areas of mixed transmission, the proportions of malaria species and their drug sensitivity patterns vary. If microscopic diagnosis is available, specific treatment can be prescribed. Where unavailable, assume the infection to be due to *P. falciparum* and treat accordingly.

### **Complicated (Severe) Malaria**

- Pregnant women with severe malaria should be given parenteral antimalarial drugs in full dose without delay.
- Artesunate (IV or IM) is the preferred drug for all severe forms in all trimesters. Begin treatment with IV or IM route for at least 24 hours and until the woman can tolerate oral medications. Then give a complete oral treatment with ACT for three days.
- Parenteral Quinine dihydrochloride can be given in areas where artemether is not available. Quinine dihydrochloride loading dose of 20 mg/kg diluted in IV fluid (5% dextrose) over four hours; then 8 hours after the start of the loading dose, give maintenance dose of quinine, 10 mg/kg over 4 hours. This maintenance dose should be repeated every 8 hours.

**NOTE:** - *Avoid premaquine both in pregnant and breastfeeding mothers.*

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