Ministry of Health of Palestine
Women's Health and Development Unit

Obstetric

Guidelines and **Labor Ward** Protocols

Updated version March, 2024

UNFPA

وزارة الصحة الفلسطينية
Ministry of Health

Foreword

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Ministry of Health

It is with great pride that I am introducing the updated Obstetric Guidelines and Labor Ward Protocols, emphasizing their role in enhancing the standards of quality maternal care. The Palestinian Ministry of Health recognizes the pivotal role obstetric services play in our healthcare system, serving as a cornerstone of hospital care for countless women annually.

The updated guidelines address healthcare disparities and serve as an essential tool for healthcare providers to guide them in their practice. The ultimate goal of these context- specific guidelines is to reduce maternal and neonatal morbidity and mortality, by improving maternal access to a safe, quality, and dignified childbirth.

The revision process is the culmination of extensive national collaboration among expert obstetricians, and midwives from the West Bank and Gaza strip.

In closing, I call upon all healthcare professionals and stakeholders in Palestine to embrace these guidelines with dedication and to apply them with the utmost care and professionalism.

Together, we can create a future where every pregnancy is cared for, every birth is safe, and every mother and child thrive.

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The ways inside the maternity unit

The different topics of this chapter present the activities performed in different places of the maternity. To make the guidelines more practical, these activities are described according to the place where these activities are achieved.

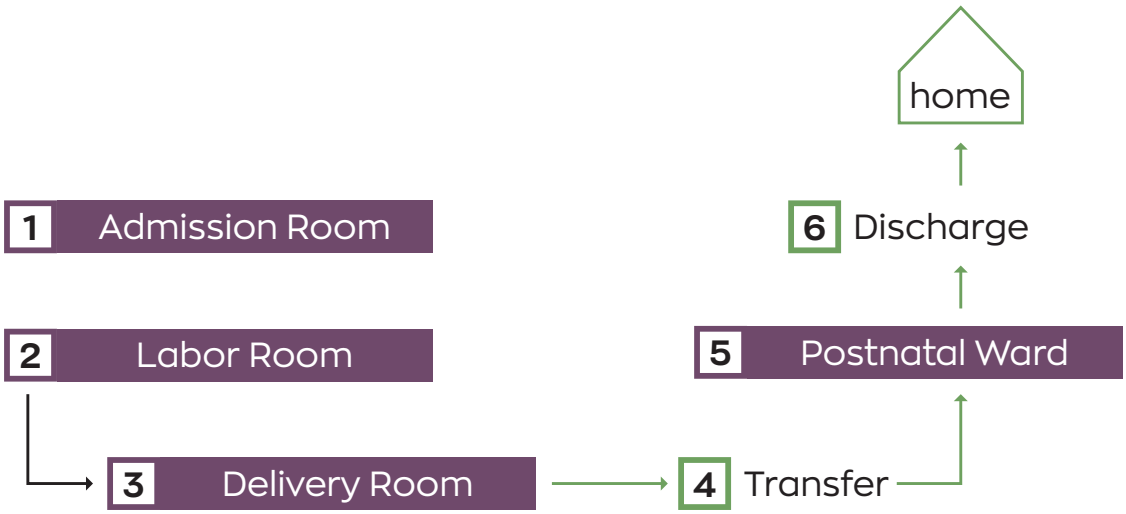


Figure 1 the ways inside the maternity unit

1.	**Risk assessment and admission to labor room**
Location	Admission Room
Standard Statement	All women in established labor should be admitted to the hospital

Initial Risk Assessment:

- Welcome and greet the woman.
- Obtain and record demographic, medical, surgical, obstetrical, gynecological, menstrual and contraceptive history.
- Inquire about the woman's complaint e.g. SROM, contractions onset and frequency, fetal movement, bleeding.
- Review the referral note or antenatal records for any medical or obstetric problems including recent blood test results.
- Confirm gestational age (figure 1).
- Conduct abdominal exam (asses Fundal height, fetal lie, presenting part, engagement).
- Assess uterine contractions (duration, and frequency).
- Ask the woman to empty bladder and send urine specimens for protein and analysis.
- Place woman on CTG for 20-30 minutes.
- complete maternal observations; Temperature, Pulse, Blood pressure.
- Check group B streptococcus (GBS) status- urine and or vaginal swab cultures.

The midwife should decide if the case is low risk or high risk

If low risk ⟶ Midwife led care
If high risk ⟶ Doctor led care

All unbooked patients should be evaluated by a doctor regardless of the risk assessment

After risk assessment, decide if the woman in labor or not. See figures 2 and 3

High risk women

- Grand multiparous (≥4 births)
- History of previous postpartum hemorrhage
- Antepartum hemorrhage
- Preterm labor
- Suspected fetal macrosomia
- Suspected IUGR
- Induction of labor
- Preeclampsia
- Malpresentation
- Multiple pregnancy
- Moderate and severe Anemia
- Women with medical disorders i.e. diabetes, cardiac disease, etc.
- Previous CS delivery
- BMI >35 kg/m2

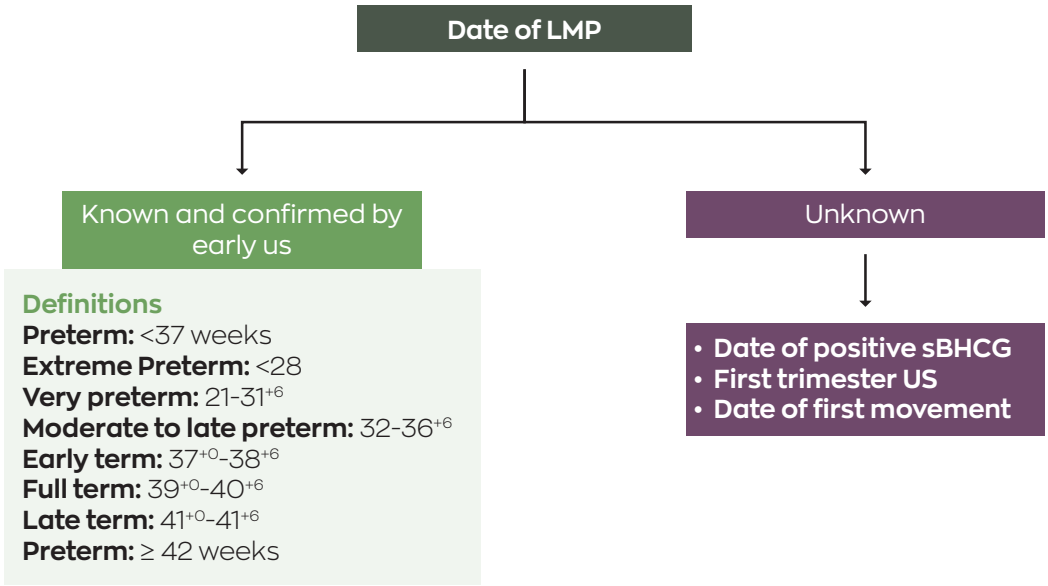


Figure 2 Confirmation of gestational age

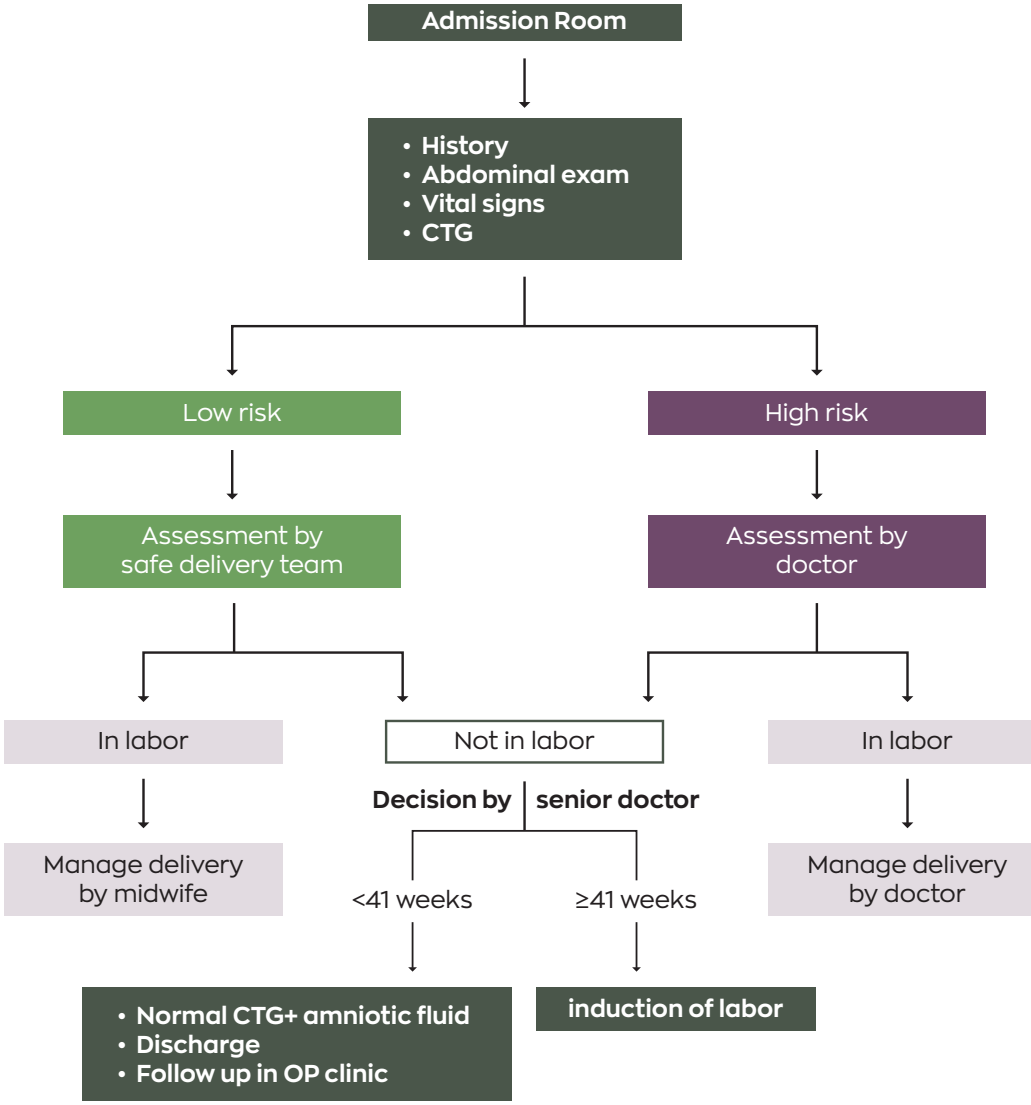


Figure 3 Risk assessment and management

Appendix 1: Risk Assessment on Admission at Onset of Labour

Intrapartum and Fetal Monitoring Risk Assessment Tool Complete within one hour of labour admission to MLBU or Delivery Suite or arrival of midwife at home.	Name Hospital Number or add patient identifier label

E3 Alert checked Tick once confirmed	**Weight:** kg **BMI:**

Risk Factors - Continuous fetal monitoring and obstetric involvement required during labour			
Significant mevonium stained liquor	Yes	Multiple pregnancy	
Unbooked in this pregnancy	Yes	APH (previous or current)	
Abnormal fetal movements currently	Yes	Prematurity (<37 completed weeks)	
Abnormal presentation or lie	Yes	Postmaturity (>42 completed weeks)	
Atypical antibodies on G+S	Yes	IUGR / SGA <10th centile	
Diabetes type 1 and 2	Yes	Oligohydramnios / polyhydramnios	
Gestational diabetes	Yes	Low placenta (on most recent scan)	
Epilepsy	Yes	BMI > 40 on admission to labour*	
Cardiac or Renal Disease	Yes	Fetal abnormality*	
Hypertension / Pre-eclampsia	Yes	Maternal medication*	
VBAC / previous uterine surgery	Yes	Significant psychiatric concers*	
Pyrexia > 37.5° or suspected sepsis	Yes	Social factors (e.g. hx of substance misuse, domestic abuse, recent migrants, asylum seekers or refugees) *	
PROM > 24 hours	Yes		
Risk Factors - Not requiring continuous fetal monitoring but requiring obstetric opinion and I A			
Grand multiparity >5	Yes	Clotting abnormality	Yes
Declines Blood products	Yes	Increased VTE risk	Yes
Fetal macrosomia (>90th centile)	Yes	Significant fibroids	Yes
Blood borne virus (HIV / Hep B)	Yes	Anaemia Hb <90g	Yes
GBS risk	Yes	Intrauterine death	Yes
Complication in previous delivery* (3rd/4th degree tear, MROP, shoulder dystocia, PPH >1L)	Yes	Other significant medical history*	Yes
Planned for low risk midwifery led care with intermittent fetal auscultation			
Low Risk pregnancy at term	Yes	Risk identified, but already considered in ANC and midwifery led care planned	Yes

Risk factors highlighted in green are able to deliver on MLBU as per guideline
*Continuous Monitoring and consultant unit may not be required following consultation with the Obstetric Team or if plan clearly documented antenatally

Date of risk assessment:	dd/mm/yyyy	**Time (24 hours):**	

Risk assessment undertaken by:					
Name:		**Signature:**		**Designation:**	

Figure 4 Maternity clinical guideline for intrapartum care

2.	**Intrapartum Care**
2.1	**First stage of labor**
Location	Labor room
Standard Statement	All women in active phase of must be assessed and observed for changes and progress
Definition	The active phase of labor starts from **5 cm** to fully dilated cervix

2.1.1	**Routine Care and Labor Care Guide**

On admission:

- Inform the woman and her family that she will be admitted to labor room.
- Establish a rapport with the woman.
- Treat all women in labor with respect.
- Ask her permission before all procedures and observations.
- Open a file and start labor care guide (WHO LCG).
- **Insert IV Canula**.
- Withdraw blood for lab tests (CBC & blood type)
- Ask the woman to empty urinary bladder and send urine specimens for protein and analysis (if not previously done).

Ongoing risk assessment:

- Women may continue to be classified as low risk if ongoing assessments in labor are normal, i.e. observations, FH monitoring and progress are within normal parameters.
- If new risks are identified for women under Midwifery led care, they should be re-categorized as high-risk and switched to doctor led care.

PROCESS:

- Start an LCG for every woman starting the active phase of labor to document your assessments, monitor progress of labor, and guide management accordingly.
- Record fetal condition including:
  - Fetal heart rate every 30 minutes for low-risk women and every 15 minutes for high-risk women
  - Amniotic fluid color.
  - Molding of the fetal head.

Use the following features & keys for recording:

Amniotic fluid:

- I = Intact membrane.
- C = Clear liquor
- B = Blood Stained.
- M = Meconium staining.

Molding:

- Grade 0 = Bones normally separated.
- Grade + = Bones touching each other.
- Grade ++ = Bones overlapping but easily separated.
- Grade +++ = Bones overlapping but cannot be separated.

- **Record maternal condition:**
  - BP Q 4 hours.
  - Pulse Q 1 hour.
  - Temperature Q 4 hours.
  - Urine output: Check & record all urine passed for protein whenever possible.
  - Drugs administered including Oxytocin an analgesic.
  - Oral fluid intake and IV fluids.
- **Record progress of labor:**
  - **Cervical dilatation (in cm):**

Perform vaginal exam Q4 hours if labor progress is normal. More frequent exam may vary according to cervical dilatation at the time of admission and progress of labor as recommended by the WHO LCG shown in the box below.

Re-evaluation of vaginal exam according to cervical dilatation

- 5 cm = after 4 hours
- 6 cm = after 4 hours
- 7 cm = after 3hours
- 8 cm = after ≥2.5 hours
- 9 cm = after ≥2 hours

- **Descent of the head**: abdominally (Fifths palpable per abdomen).
- **Uterine contractions**: Q 30 minutes showing duration and frequency (number of contractions in last 10 minute)

Uterine contractions features:

Frequency:

- Normal: 3-5 contractions per 10 min
- Abnormal: ≤ 2 or >5 contractions per 10 min

Duration:

- Normal: 20-60 seconds
- Abnormal: < 20 or >60 seconds

WHO LABOUR CARE GUIDE

Name **Parity** **Labour onset** **Active labour diagnosis [Date**]

Ruptured membranes [Date **Time**] **Risk factors**

			Time	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
			Hours	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3		
			ALERT	← ACTIVE FIRST STAGE →												← SECOND STAGE →				
SUPPORTIVE CARE	Companion	N																		
	Pain relief	N																		
	Oral fluid	N																		
	Posture	SP																		
BABY	Baseline FHR	<110, ≥160																		
	FHR deceleration	L																		
	Amniotic fluid	M+++, B																		
	Fetal position	P, T																		
	Caput	+++																		
	Moulding	+++																		
WOMAN	Pulse	<60, ≥120																		
	Systolic BP	<80, ≥140																		
	Diastolic BP	≥90																		
	Temperature °C	<35.0, ≥ 37.5																		
	Urine	P++, A++																		
LABOUR PROGRESS	Contractions per 10 min	≤2, >5																		
	Duration of contractions	<20, >60																		
	Cervix [Plot X]	10																		
		9	≥ 2h																	
		8	≥ 2.5h																	
		7	≥ 3h																	
		6	≥ 5h																	
		5	≥ 6h																	
	Descent [Plot O]	5																		
		4																		
		3																		
		2																		
		1																		
		0																		
MEDICATION	Oxytocin (U/L, drops/min)																			
	Medicine																			
	IV fluids																			
SHARED DECISION-MAKING	ASSESSMENT																			
	PLAN																			
	INITIALS																			

In active first stage, plot 'X' to record cervical dilatation. Alert triggered when lag time for current cervical dilatation is exceeded with no progress. In second stage, insert 'P' to indicate when pushing begins.

INSTRUCTIONS: CIRCLE ANY OBSERVATION MEETING THE CRITERIA IN THE 'ALERT' COLUMN, ALERT THE SENIOR MIDWIFE OR DOCTOR AND RECORD THE ASSESSMENT AND ACTION TAKEN.IF LABOUR EXTENDS BEYOND 12H, PLEASE CONTINUE ON A NEW LABOUR CARE GUIDE.
Abbreviations: **Y** – Yes, **N** – No, **D** – Declined, **U** – Unknown, **SP** – Supine, **MO** – Mobile, **E** – Early, **L** – Late, **V** – Variable, **I** – Intact, **C** – Clear, **M** – Meconium, **B** – Blood, **A** – Anterior, **P** – Posterior, **T** – Transverse, **P+** – Protein, **A+** – Acetone

Figure 5 WHO Labor Care Guide (LCG)

- **Labor Support:**
  Encourage the woman to have support from birth companion of her choice.

- **Mobilization (Ambulation & Position):**
  - Encourage ambulation if continuous monitoring is not required.
  - Encourage and help the woman to move and adopt whatever positions she finds most comfortable throughout labor.
  - Encourage the woman to avoid lying in supine position.
  - If lying down, encourage a left lateral tilt.

- **Hygiene measures:**
  - Offer the woman to have a shower upon admission if she desires & her condition allows that.
  - Tap water may be used if cleansing is required before vaginal examination.
  - Assist the woman in keeping her perineum clean & dry after each vaginal exam.
  - Encourage & assist having warm shower if it is possible.
  - Routine hygiene measures taken by staff caring for women in labor including standard hand hygiene and single-use non-sterile gloves, are appropriate to reduce cross-contamination between women, babies, and healthcare providers.
  - Selection of protective equipment must be based on an assessment of the risk of transmission of microorganisms to the woman, and the risk of contamination.
  - Change wet linens whenever appropriate and necessary.

- **Nutrition & fluids:**
  Allow oral intakes of fluids, some candies & soft food.

- **Bladder care**
  - Encourage voiding every 2 hours to minimize the risk of retention of urine (Full bladder may affect the normal course of labor).
  - Bladder catheterization is not mandatory unless indicated.

- **Follow-up:**
  - Follow the progress of labor utilizing the LCG.
  - Conduct vaginal exam in the following conditions:
    - Upon admission.
    - After ARM and or SROM.
    - Q 4 hours to assess labor progress or if there is a concern about progress.

- **Document:** all care procedures, assessment findings, all vaginal exams, intakes & outputs if indicated

Artificial rupture of membranes (ARM) is not recommended routinely for normally progressing labor

2.1.2	Abnormal progress and Augmentation of active phase of labor

All women in the active phase of labor should be monitored carefully to detect slow progress of labor to allow appropriate management in a timely manner.

- **PROCESS:**
  - Monitor progress utilizing the Labor Care Guide, which defines slow progress as shown in the box below.

Slow progress of labor

- 5 cm = ≥6 h (cervical dilatation remains at 5 cm for 6 or more hours)
- 6 cm = ≥5 h (cervical dilatation remains at 6 cm for 5 or more hours)
- 7 cm = ≥3 h (cervical dilatation remains at 7 cm for 3 or more hours)
- 8 cm = ≥2.5 h (cervical dilatation remains at 8 cm for 2.5 or more hours)
- 9 cm = ≥2h (cervical dilatation remains at 9 cm for 2 or more hours)

As long as maternal and fetal wellbeing is maintained

  - **If slow progress is noted, inform the senior physician.**
  - Ensure adequate hydration.
  - Ensure adequate relaxation, coping with labor pain, and analgesia.
  - Encourage the woman to empty bladder if not emptied in the last 3h.

- **Under supervision of the senior physician:**
  - Exclude labor obstruction and fetal distress.
  - Perform amniotomy if:
    - The head is engaged.
    - The cervix is well-applied to the head.
    - Cord presentation is excluded.
  - Augment uterine contractions with amniotomy combined with oxytocin infusion.

The midwife will obtain the doctor's order before initiating any Oxytocin infusion

- **Oxytocin infusion for labor augmentation:**
  - Commence oxytocin via a dropper machine.
  - Follow the following standard regimen of oxytocin:
    - Add 5 IU of oxytocin to 500ml bag 0.9% NaCL. This makes each ml of the solution contain 10 milli unit (mu) oxytocin.
      - **Low dose regimen:**
        - Starts at 1-2 mu/min.
        - Increase by 1-2 mu/min every 30 minutes.
        - Maximum dose 36 mu/min
      - **High dose regimen:**
        - Starts at 2-4 mu/min
        - Increase the dose by 2-4 mu/min or every 15 minutes
        - Maximum dose is 36 mu/min

Milliliters per hour	Milliunits per minutes	Dose increment time
6	2	0
12	4	30
18	6	60
24	8	90
36	12	120
48	16	150
60	20	180
72	24	210
84	28	240
96	32	270

- **Keep the woman on continuous fetal monitoring.**
- Utilize the LCG to evaluate progress of labor.
- Reassess progress by vaginal examination after 4 hours.
- If the oxytocin dosage should be increased above "Max" rates, slower incremental increases may be used after consultation with the consultant.
- Reduce oxytocin if good contractions have been established to prevent uterine tachysystole especially in multiparous women. This should be left to the senior doctor to decide on whether to continue on the same rate or to reduce it.
- **Discontinue oxytocin if:**
  - Uterine tachysystole (Refer to management of uterine hyperstimulation).
  - Prolonged fetal heart decelerations.
  - Persistent fetal bradycardia.

- If oxytocin is discontinued, inform the consultant on call for appropriate further management.
- Document oxytocin initiation including time, dose, amount, type of fluids, rate, & route, vaginal exams, progress, intake & output, contractions assessment & findings, fetal wellbeing.

Be careful when dealing with multiparas as those may over contract & rupture if oxytocin is used unwisely

Low transverse CS is indicated if:

- Patient has no cervical changes for 4 hours despite adequate uterine activity.
- Patient has no cervical changes for 6 hours with ROM and inadequate uterine activity.

2.	**Intrapartum Care**
2.2	**Second stage of labor**
Location	Delivery room
Standard Statement	Childbirth has special needs. These can be met by skilled and knowedgeable care providers for providers for a safe delivery for mother and baby.
Definition	Second stage of labor starts with full dilation of the cervix and ends with complete fetal explusion.

2.2.1	**Preparation for normal delivery**

- If required, the mother should be transferred on bed with side rails from the first stage room up to the delivery room.
  - Primigravida is transferred whenever cervix is fully dilated.
  - Multigravida is transferred at 7-8 cm dilated or as necessary.
- The midwife should inform the doctor about the woman's status.
- Prepare all equipment necessary for delivery and resuscitation of newborn.

Contents of Delivery Trolley

Top shelf

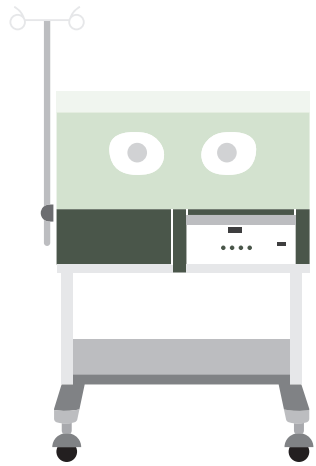
sterile delivery set (scissors sponge holder, kidney basin two artery forceps, small bowels, needle holder, gauze, two legging four drapes).

Bottom shelf

- Bottle of chlorhexidine solution.
- One pair sterile gloves – size as required
- 2, 5, and 10 ml syringes & needles size G20.
- Ampoule lignocaine 1 %
- Polidine solution.
- Oxytocin ampules.
- Methergine.
- Alcohol swab

Equipment required for newborn

- Incubator warmed overhead heater
- warmed wrap.
- Suction catheter G8 or G10.
- Suction bulb
- One labelled cot
- Identification bracelet
- Umbilical clamp
- Weight scale
- Oxygen source
- Thermometer
- Syringes 1ml , Needles G25
- V it K 1 mg ampoule
- Laryngoscope
- Bag and mask for newborn



2.2.2	**Routine management of normal second stage of labor**

- Confirm that the woman has fully dilated cervix (note & record).
- Explain to the woman her progress and how she can help herself to accomplish this stage smoothly.
- Support the woman in coping with pain & pushing efforts.
- Monitor fetal wellbeing Q15 minutes for low risk and Q 5 minutes for high-risk women.
- Monitor mother wellbeing: Pulse and BP Q1 hour, and pulse rate, respiratory rate and temperature Q4 hours.
- Empty bladder.
- Encourage the woman to push when she feels the urge to and when the head is visible since pushing early in the second stage may exhaust the mother and fetus and increase the mother's risk of perineal tears.
- Assist & guide the woman to push correctly & effectively in the position she likes.
- Inform & praise the woman for the effective pushing & throughout the process of 2nd stage i.e. "progress is good, head is coming..."
- Observe the perineum for crowning.
- Ask the woman to "blow air" (panting) when the head crowns.
- Routine episiotomy is not recommended, but if indicated cut RML episiotomy at crowning after infiltration of local anesthetic.
- Guard the perineum during birth; while delivering the head, with fingers of the right hand support the perineum, while the second hand applies pressure to the fetal head to avoid too fast expulsion and to help the de-flexion of the head.
- Ask the woman not to push once the baby head delivers.
- Check for cord around the baby's neck:
  - If loose cord: slip it over the baby's head.
  - If tight cord or coiled around the neck more than once: Double clamp it and cut it between the two clamps before unwinding it from around the neck.
- Deliver the baby's shoulder with the next contraction.
- Deliver one shoulder at a time; first the anterior shoulder, then the posterior shoulder.
- Support the perineum until the baby's head and posterior shoulder are delivered.
- Place the baby on the mothers' abdomen (skin-to-skin).
- Document: Delivery notes, all medications & procedures, mother's observations & baby initial observations

2.2.3	**Management of prolonged second stage of labor**

Call the senior doctor if the woman is undelivered:

- Primigravida: after 3 hours without epidural and 4 hours with epidural
- Multiparous: after 2 hours without epidural and 3 hours with epidural

Assessment	**Management**
- **Position of the fetal presenting part** - **Pelvic size**	→ - **Change of posture** - **Oxytocin** - **Instrumental delivery** - **Episiotomy** - **LSCS**

Refer to figure 5 for summary of management of abnormal second stage of labor.

Caution with grand multiparous women
Large fetus + grand multipara= Increased risk of uterine rupture

CS is indicated during the second stage if:

- Fetal distress and presenting part above 0 station.
- Failure of instrumental vaginal delivery
- Fetal presenting part remains above 0 station

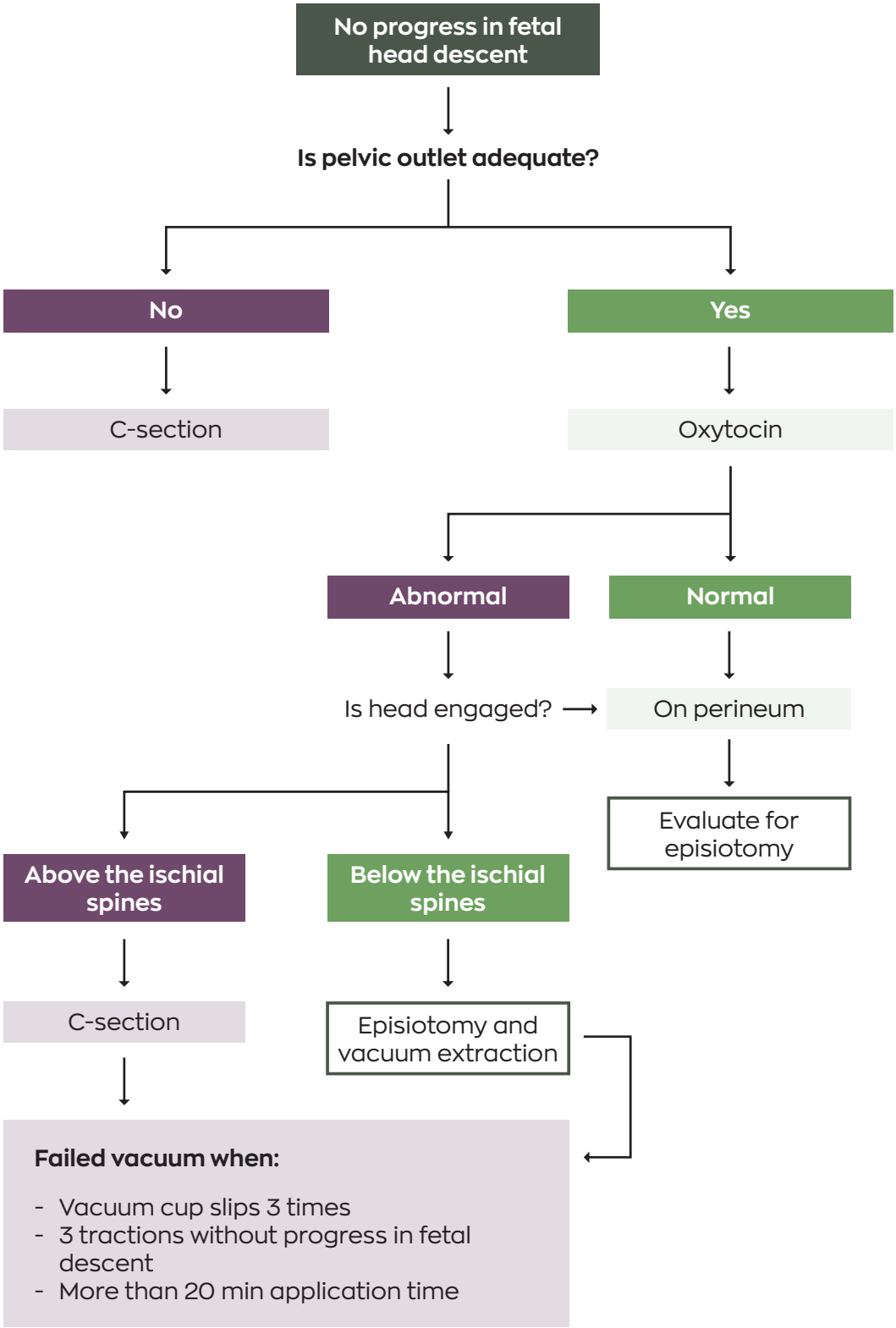


Figure 6 Management of slow second stage of labor

2.	**Intrapartum Care**
2.3	**Intrapartum fetal monitoring**
Location	Labor room
Standard Statement	All fetuses of women in labor should be monitored appropriately. All women should have a base line CTG monitoring for at least 20-30 minutes on admission.
Definition	Normal fetal heart Rate at term is 110-160 bpm

- **Use intermittent external fetal monitoring if the woman is low risk with normal admission CTG.**
- **Use continuous external fetal monitoring for the following indications:**

Indications for continuous intrapartum fetal monitoring are shown in the table below.

Antenatal condition	Intrapartum condition
Fetal	**Fetal**
Abnormal umbilical artery doppler velocimetry	Abnormal fetal heart rate on auscultation or admission tracing (20-minute strip)
Breech presentation	Meconium-stained amniotic fluid
Multiple pregnancies	
Oligohydramnios	
Rh isoimmunization	
Maternal	**Maternal**
Anemia	Hypertonic uterus
Antepartum hemorrhage	Induced or augmented labor
Cardiac disease	Intrauterine infection or chorioamnionitis
Diabetes	Post-term pregnancy (>42 weeks' gestation)
Hypertension (preeclampsia or eclampsia)	Preterm labor (< 32 weeks' gestation)
Hyperthyroidism	Previous cesarean delivery
Morbid obesity	Prolonged membrane rupture > 24 hours at term
Renal disease	
Vascular disease	Regional anesthesia
Recent abdominal trauma	

Evaluate the fetal monitoring utilizing DR CBRAVADO

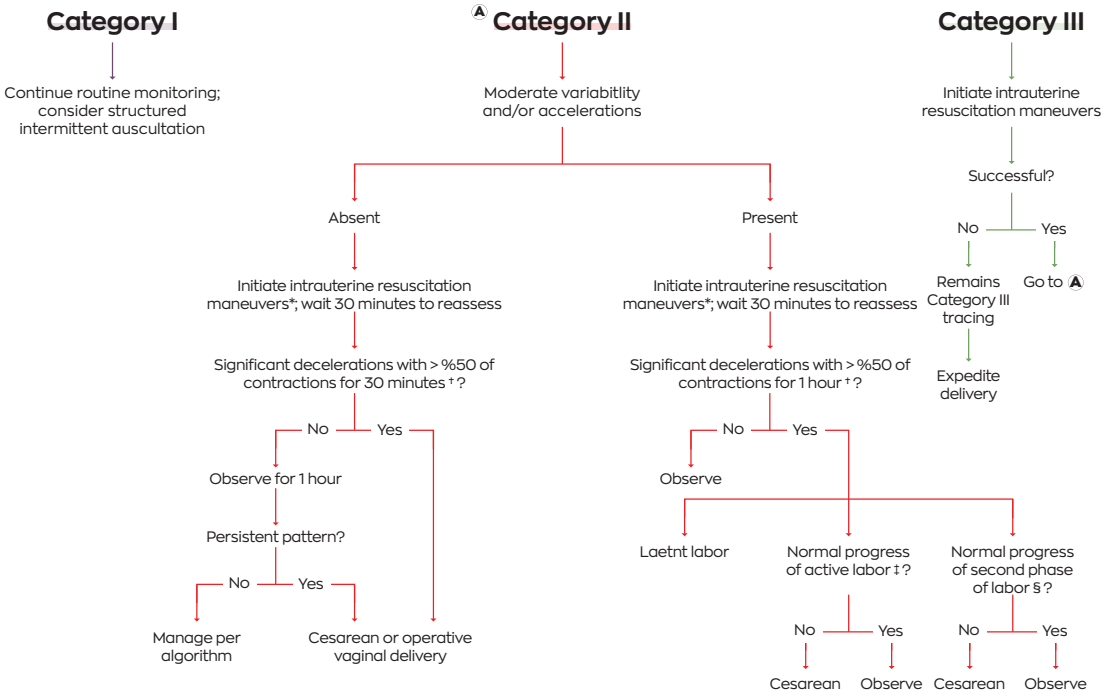
DR	Determine Risk
C	Contractions
BR	Baseline Rate
V	Variability
A	Accelerations
D	Decelerations
O	Overall Assessment and written plan

The table below shows the management of continuous electronic fetal monitoring findings by the National Institute of Child Health and Human Development (NCHD) category (Stoplight algorithm for intrapartum monitoring of fetal heat rate (FHR))

Management of intrapartum fetal heart rate tracings

Fetal heart rate tracing	Possible etiologies and interpretation	Management
Category I		
Baseline 110 to 160 beats per minute with moderate variability and no late or variable decelerations. Accelerations and early decelerations may be present or absent.	This is a normal tracing.	Intermittent or continuous fetal monitoring based on clinical status and underlying risk factors. Review every 30 minutes in the first stage and every 15 minutes in the second stage of labor.
Category II		
Intermittent variable decelerations (<50 percent of contractions)	Common finding usually associated with normal outcome.	No intervention required.
Recurrent variable decelerations (>50 percent of contractions)	Umbilical cord compression. May be associated with impending acidemia, especially if progressive increase in depth, duration, and frequency. Moderate variability and/or accelerations suggest fetus is not currently acidemic.	Reposition mother to left or right lateral. Amnioinfusion is an option. Adjunctive measures to promote fetal oxygenation (intravenous fluid bolus, reduce uterine contraction frequency) may be useful. Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic.
		Delivery is indicated if tracing does not improve and acidemia suspected.
Recurrent late decelerations	Transient or chronic uteroplacental insufficiency, such as from hypotension, tachysystole, or maternal hypoxia. Accelerations and/or moderate variability suggest fetus is not currently acidemic.	Reposition mother to left or right lateral. Adjunctive measures to promote fetal oxygenation include intravenous fluid bolus, reduce uterine contraction frequency. Persistent late decelerations with minimal variability and absent accelerations suggest fetal acidemia; this is even more likely if variability is absent (category III). Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic.
		Delivery is indicated if tracing does not improve.
Fetal tachycardia (baseline heart rate greater than 160 beats per minute for at least 10 minutes)	Infection, medication, maternal medical disorders, obstetric complications, fetal tachyarrhythmia (typically rate over 200 beats per minute). Fetal acidemic more likely when associated with minimal or absent variability, absent accelerations, and/or recurrent decelerations.	Treat underlying cause, if known. Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic.
		Delivery is indicated if tracing does not improve and acidemia suspected.

Bradycardia (baseline heart rate less than 110 beats per minute for at least 10 minutes)	Acute onset may be due to hypotension, umbilical cord occlusion, rapid fetal descent, tachysystole, abruption, uterine rupture. Fetal acidemic more likely when associated with minimal or absent variability and absent accelerations during baseline periods.	Treat underlying cause, if known. Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic. Delivery is indicated if tracing does not improve and acidemia suspected.
Prolonged decelerations (15 beats per minute drop below baseline for more than 2 and less than 10 minutes)		
Minimal variability	Fetal sleep, medication, fetal acidemia. If due to fetal sleep, should recover in 20 to 60 minutes. If due to maternal medication, should recover as medication wears off.	If decreased fetal oxygenation suspected, reposition mother to left or right lateral. Adjunctive measures to promote fetal oxygenation include intravenous fluid bolus, reduce uterine contraction frequency. Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic.
		If no improvement and no accelerations, delivery is indicated if acidemia suspected or confirmed by scalp pH.
Tachysystole (more than 5 contractions in 10 minutes, averaged over 30 minutes) with fetal heart rate changes. Tachysystole that is spontaneous and associated with a normal fetal heart rate pattern does not require treatment, but the possibility of placental abruption as the underlying etiology should be considered.	Spontaneous labor: Tachysystole may be associated with fetal acidemia if accompanied by recurrent fetal heart rate decelerations.	Reposition mother to left or right lateral, oxygen supplementation, intravenous fluid bolus. If ineffective, reduce uterine contraction frequency with a tocolytic. Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic.
	Induction or augmentation.	Decrease or stop uterotonic medications. Reposition mother to left or right lateral, intravenous fluid bolus. If ineffective, reduce uterine contraction frequency with a tocolytic. Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic.
Category III		
Absent baseline variability and recurrent late decelerations, recurrent variable decelerations, or bradycardia	Increased risk of fetal acidemia.	Prepare for delivery and reposition mother to left or right lateral, intravenous fluid bolus. Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic. If no improvement after conservative measures and scalp stimulation does not result in acceleration, delivery is advisable.
Sinusoidal	Increased risk of hypoxemia. Risk of acidemia increased if prolonged or amplitude of 15 beats per minute or more.	Prepare for delivery and reposition mother to left or right lateral, oxygen supplementation, intravenous fluid bolus. Initiate scalp stimulation to provoke fetal heart rate acceleration, which is a sign that the fetus is not acidotic. If no improvement after conservative measures and scalp stimulation does not result in acceleration, delivery is advisable.



*-Intrauterine resuscitation and interventions
1. Change maternal position (lateral recumbent, hands/knees)
2. Assess maternal vital signs (hypotension, fever, tachycardia) and correct as able
3. Discontinue uterine stimulation (stop oxytocin [Pitocin] if using, remove dinoprostone [Cervidil] if in place)
4. Consider use of tocolytics such as terbutaline
5. Administer maternal oxygen via nonrebreather at 10 L per minute
6. Perform vaginal examination (assess for placental abruption, cord prolapse, rapid descent)
7. Bolus 1 L intravenous fluid
8. Initiate amnioinfusion if repetitive variable decelerations present
9. Modify pushing efforts if in second stage of labor
10. Consider need for expedited delivery

†-Clarifications for Category II management Significant decelerations:
Variable decelerations > 60 seconds and with nadir > 60 beats per minute below baseline or < 60 beats per minute

Late decelerations
• Initiation of algorithm may be delayed 30 minutes while assessing whether intrauterine resuscitation methods worked
If expedited delivery is recommended, accomplish within 30 minutes
• Algorithm may be overridden at any time if it is determined to be in the best interest of the fetus to act earlier

‡-Normal labor progress in active phase: ≥ -6cm dilation with ruptured membranes and increase of cervical dilation/effacement/fetal station with either 4 hours of adequate cervical contractions (200 mVUs) or 6 hours of inadequate contractions

§-Normal labor progress in second phase: advancement in fetal sta- tion after 2 hours of pushing in multiparous women or 3 hours in nul- liparous women without an epidural; 3 hours in multiparous women or 4 hours in nulliparous women with an epidural

Figure 7 Intrapartum fetal monitoring -Management

2.	**Intrapartum Care**
2.4	**Third stage of labor**
Location	Delivery room
Definition	Third stage of labor starts with delivery of the fetus till complete expulsion of the placenta and membrances

2.4.1	**Active management of third stage of labor**

After delivery of the baby:

- Congratulate and reassure the woman.
- Observe & evaluate the vital signs.
- **Give the 10 IU oxytocin** to the mother at the delivery of anterior shoulder or immediately after delivery of the baby.
- **Clamp & cut the cord** after at least 1-3 min.
- Collect fetal blood from umbilical cord stump if indicated.
- **Deliver the placenta using Control Cord Traction (CCT):**
  - Hold the cord close to the perineum using sponge holder.
  - Hold the clamped cord & the end of forceps with one hand.
  - Place the other hand just above the woman's pubic bone & stabilize the uterus by applying counter traction while pulling out the cord, to prevent uterine inversion.
  - Keep slight tension on the cord & wait a strong uterine contraction.
  - When uterus becomes rounded or the cord lengthens, very gently pull out the cord to deliver the placenta while continuing applying counter traction to the uterus with the other hand.
  - If the placenta does not descend during 30-40 seconds of CCT, do not continue to pull out the cord & wait until the uterus is well contracted again & repeat CCT.
  - When the placenta is delivered, hold the placenta in two hands & gently turn it until the membranes are twisted then slowly pull to complete the delivery.
  - Inspect the placenta carefully for completeness.
  - Send the placental for histopathological examination if indicated (Still birth, IUGR, chorioamnionitis, etc.).
- **Perform uterine massage** after the placental delivery to make sure the uterus is well contracted.

Active management of third stage

- Uterotonics (Oxytocin 10IU IM/IV)
- Delayed cord clamping 1-3 min
- Delivery of placenta by CCT
- Uterine massage *

*There is no robust evidence that sustained uterine massage has a role in prevention of PPH

Figures 8 and 9 summarize the prevention of postpartum hemorrhage.

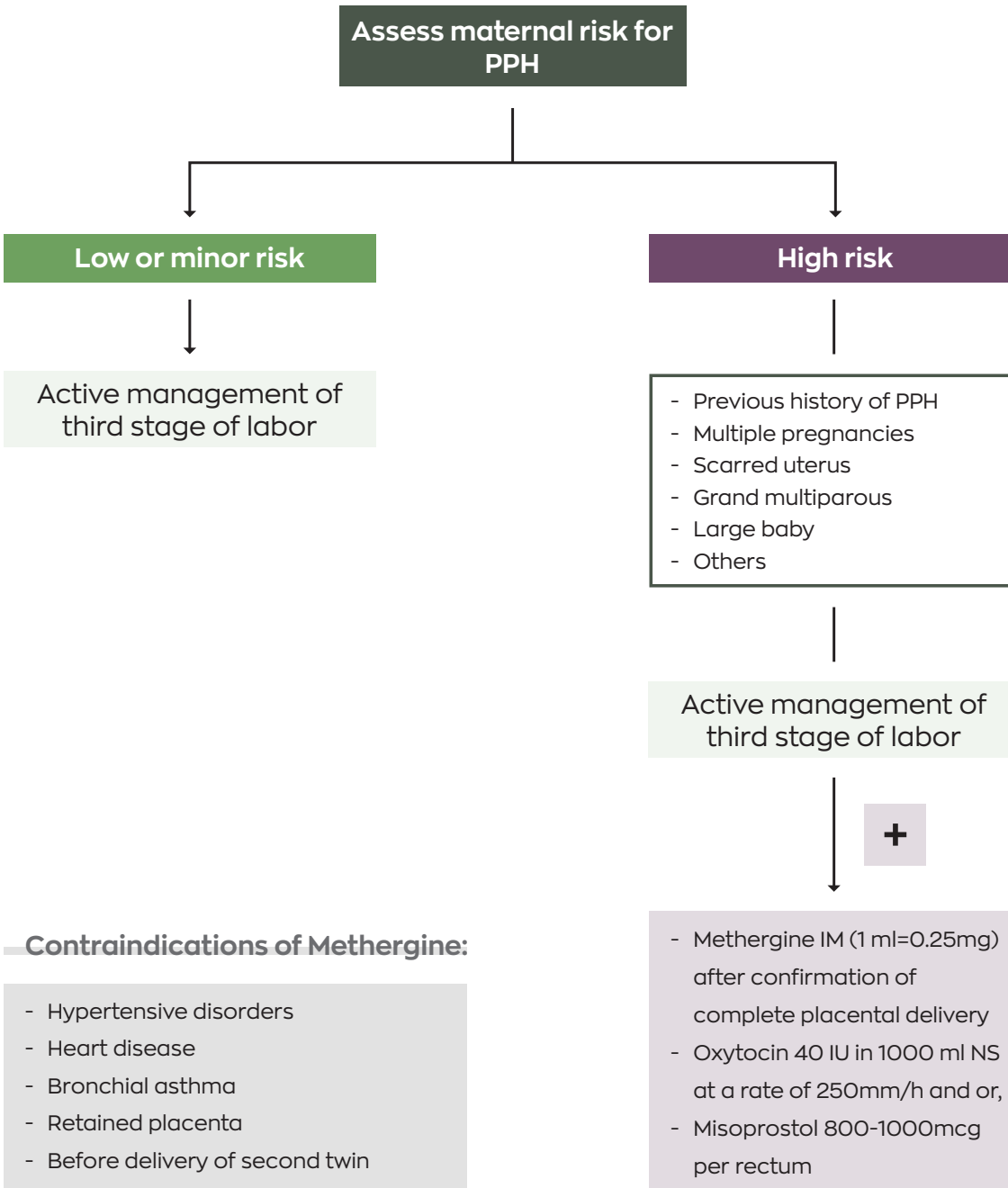
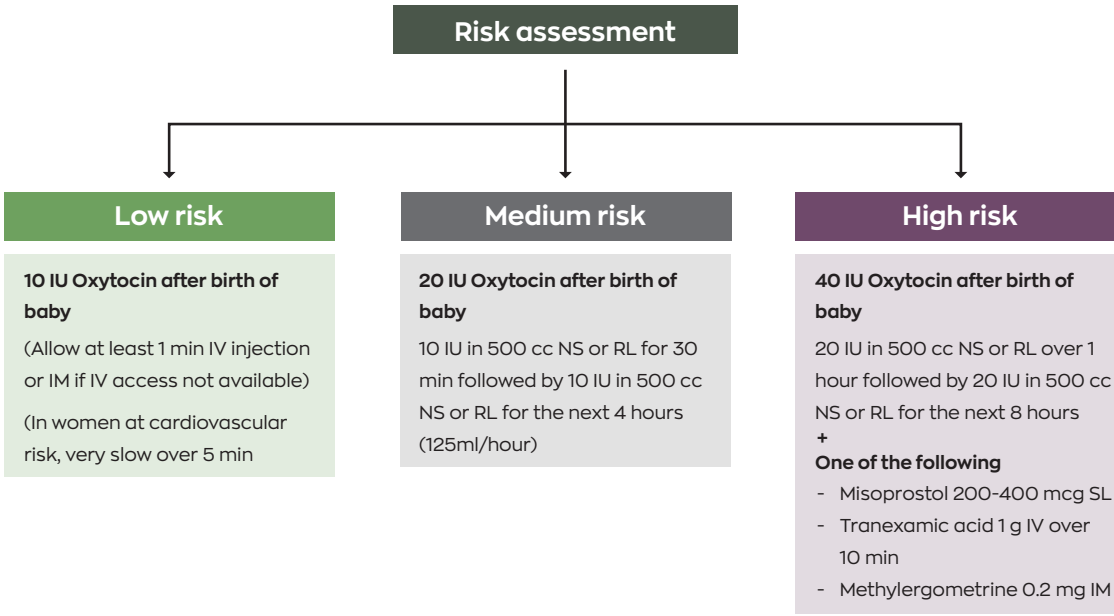


Figure 8 Prevention of postpartum hemorrhage- Two risk categories



Oxytocin is recommended as the first line uterotonic agent and is the most important component of active management of 3rd stage of labor. If Oxytocin in not available or if quality cannot be guaranteed, one of the following can be used:

1. Heat stable carbetocin (100 micg IV over 1 minute or IM)
2. Misoprostol (400-600 mcg, orally)
3. Methylergometrine (0.2mg IM/IV)
4. Oxytocin and ergometrine fixed dose combination (5 IU/0.5 mg, IM)

Figure 9 Prevention of postpartum hemorrhage- three risk categories

2.4.3	Examination after third stage of labor

Perform detailed examination after the third stage of labor, as illustrated in figure 10.

- **Explore and examine the perineum** thoroughly including a digital rectal exam to exclude perineal tears, obstetric anal sphincter injuries, and or isolated rectal buttonholes tears. This should be done prior to suturing of tears including episiotomy.
- Repair episiotomy and or tear properly under adequate anesthesia.

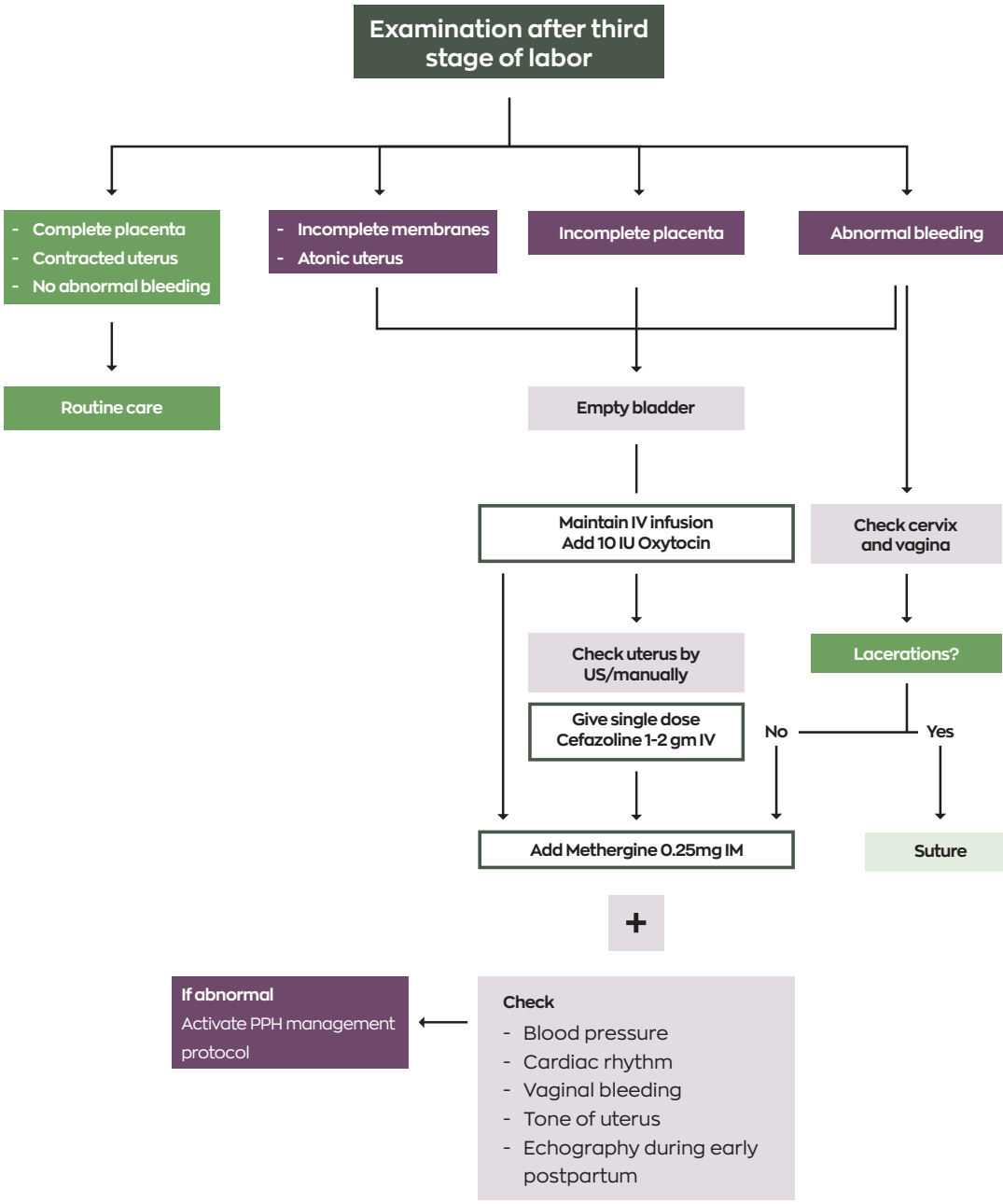


Figure 10 detailed examination after the third stage of labor

Episiotomy

- A surgical incision made intentionally to increase the diameter of the vulva outlet to facilitate delivery.
- **Episiotomy should not be cut routinely**. Follow the selective approach.
- There are different types of Episiotomies example: Median, Medio- lateral and J-aped.
- In Palestine, use right mediolateral episiotomy.

1. Cut of episiotomy

1.1. Anesthesia:

- While the patient in dorsal recumbent position, inject 10 ml of lignocaine 1% along the track of the proposed incision,
- Allow time for local anesthesia to take effect.
- Some cases may need local infiltration on both sides.

1.2. Technique:

- At crowning, place two fingers between the head and the perineum.
- Make a timed incision (i.e. when the perineum is bulging i.e. with imminent delivery),
- Use a strong sharp pair of curved scissors, starting interiorly from the midpoint of the posterior fourchette
- Cut obliquely backwards, outwards at an angle of 60 degrees from posterior fourchette.
- Protect the anus and the anal canal during the incision, keeping 2.5cm away from the anal margin.
- Pick up with a hemostat any significant bleeder if any.
- Protect the fetus (during labor).

CAUTION:

- **Avoid too early or too late incision.**
- **Avoid too long incision, which could lead to the ischiorectal fossa which is a potential bleeding site and hematoma formation.**
- **Avoid too lateral incision as it may injure Bartholin's gland and/or result in troublesome bleeding**
- **Avoid median episiotomy which is associated with increased incidence of anal sphincter injuries.**

2. Repair of episiotomy (figure 11 below)

- Await delivery of placenta
- Put the woman in lithotomy position.
- Maintain adequate local anesthesia with lignocaine spray and/or local injection of 1% lignocaine solution.
- **Start with good exposure of the wound under good light source**
- Explore the vagina and perineum for any associated tears.
- Perform rectal exam to exclude 3rd and 4th degree tear
- Repair episiotomy under strict aseptic technique.
- A continuous non-locking suture technique used to close muscles and skin layers (one suture).
- Vicryl Rapid 2/0 is a suitable suture material for perineal repair.

Step 1: Suturing the vagina

- Identify the apex.
- Insert the anchoring suture 0.5 cm above the apex.
- Repair the vaginal wall with a continuous non-locking stitch with approximately 0.5 cm between each stitch.
- Continue to suture until the hymenal ring are reached, ensuring sutures are not placed in the posterior fourchette.
- Place the needle behind the hymenal ring and emerge in the center of the perineal muscle.

Step 2: Suturing the perineal muscle

- Check the depth of the trauma.
- Repair the perineal muscles in one or two layers with the same continuous stitch:
  - Ensure the muscle edges are opposed carefully leaving no dead space.
  - Visualize the needle between sides to prevent stitches being inserted into the rectal mucosa.
  - On completion of the muscle layer, the skin edges should align so that they can be brought together without tension.

Step 3: Suturing the skin:

- Reposition the needle at the inferior end of the wound.
- Commence suturing the skin from the apex of the wound.
- Stitches are placed below the surface of the skin; the point of the needle should be repositioned between each side, so that it faces the skin edge being sutured.
- Use subcuticular suture technique.
- Continue taking bites of tissue from each side until the superior wound edge is reached.
- Sweep the needle behind the fourchette back into the vagina. Tie off the stitch in vagina and cut (the knot is tucked into the vagina to minimize discomfort). Alternatively, the stitch may be completed using the “Aberdeen” knot. The Aberdeen knot’ is a method to secure that ensures that the knot is completely inverted in the mucosa with minimal knot bulk at the surface

At the end of repair, remove vaginal pack (if any had been used) and perform a PR digital examination to exclude any transfixing sutures

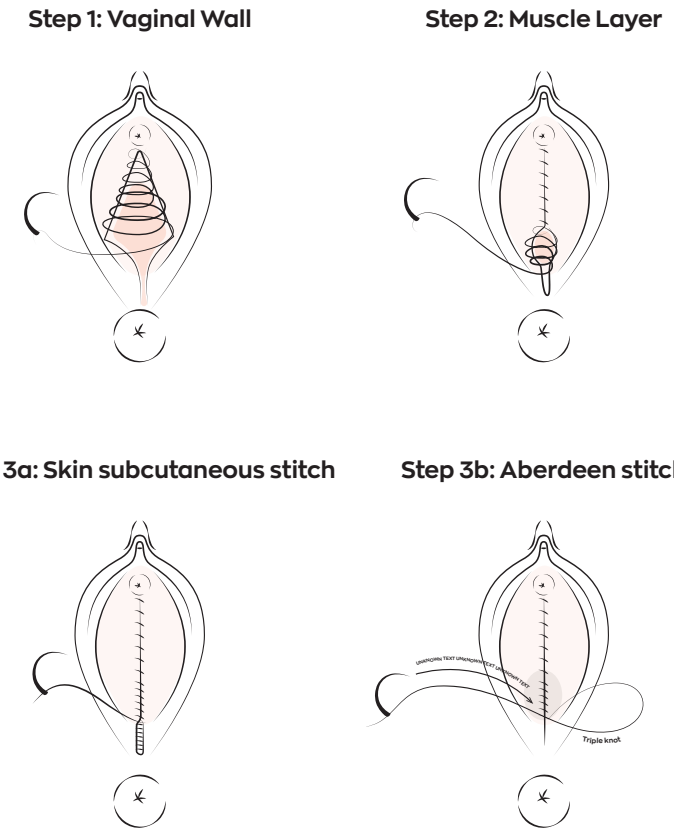


Figure 11 Steps of episiotomy repair

3. Postnatal follow up of episiotomy:

- Examine the perineum few hours later and then next morning.
- If hematoma developed, re-open the wound under GA and evacuate the clots and then secure proper hemostasis before repairing the incision again.
- If infection occurs, avoid immediate re-suturing and await wound to clear up perfectly before repair with secondary suturing few weeks later.

Spontaneous perineal tears

- All women undergoing a vaginal delivery should have a careful examination of the perineum, vagina and rectum prior to suturing to accurately assess the degree of the tear because most anal sphincter defects are unrecognized at delivery.
- Pill-rolling digital exam plus rectal examination are essential to detect anal sphincter tears and buttonhole injuries.
- All women having instrumental delivery or who have extensive perineal injury should be examined by an experienced obstetrician, trained in the recognition and management of perineal tears.

Classification of spontaneous tears	
Degree	**Trauma**
First	Injury to the **skin only**
Second	Injury to the perineum involving **perineal muscles** but not involving the anal sphincter
Third	Injury to perineum involving the **anal sphincter complex:** **3a:** less than 50% of External Anal Sphincter (EAS) thickness torn **3b:** more than 50% of EAS thickness torn **3c:** Both Internal Anal Sphincter (IAS) and EAS torn
Fourth	Injury to perineum involving the anal sphincter complex (EAS and IAS) and **anorectal mucosa.**

- **The following principles should be followed when performing perineal repairs:**
  - Suture as soon as possible following delivery to reduce bleeding and risk of infection.
  - Check equipment and count swabs prior to commencing the procedure and count again following completion of the repair.
  - Good lighting is essential to visualize and identify the structures involved.
  - Ask for more experienced assistance if in doubt regarding the extent of trauma or structures involved.

Difficult trauma should be repaired by an experienced operator in theatre under regional or general anesthesia

- Ensure good anatomical alignment of the wound and give consideration to cosmetic results.
- In extensive perineal trauma, insert an indwelling catheter for 24 hours to prevent urinary retention.

Rectal examination after completing the repair will ensure that suture material has not been accidentally inserted through the rectal mucosa

Management of first, second, third- and fourth degree tears		
	1st and 2nd degree tears	**3rd and 4th tears**
1. Skill of operator	Repair to be undertaken only by trained practitioner. A trained practitioner should be always available to provide training and supervision.	Repair to be undertaken only by consultant obstetrician or by obstetric trainee under direct supervision. Inexperienced attempts at repair contribute to maternal morbidity, especially subsequent anal incontinence
2. Anesthetic	Implement local anesthetic e.g. Lignocaine (0.5% 5 ml) or regional pudendal block.	Regional or general anesthesia
3. Suture material	Use absorbable sutures such as polyglactin (Vicryl) or polglycolic acid (Dexon)	Fine monofilament sutures such as 3-0 PDS are recommended. (use vicryl/dexon if PDS is N/A)
4. Method of repair		
Rectal mucosa	----------	should be repaired first with interrupted or continuous 3-0 vicryl suture
Internal anal sphincter	----------	Should be repaired using 3-0 PDS by interrupted mattress sutures
External anal sphincter	----------	Should be repaired using 3-0 PDS either by interrupted end to end for and complete incomplete tear or interrupted overlap method for complete tear
Vaginal tissue	continuous non-locking Sutures	continuous non-locking Sutures
Muscle	continuous non-locking Sutures	continuous non-locking Sutures
Perineal skin	continuous subcuticular Sutures	continuous subcuticular Sutures
In 2nd, 3rd, and 4th degree tears = vaginal tissue+ muscle+ skin are repaired by one suture just like episiotomy repair.		

Post-repair care		
	1st and 2nd degree tears	**3rd and 4th tears**
1. Antibiotic prophylaxis	----------	Cefotaxime or cefuroxime 500 mg bid for 5 days Metronidazole 500 mg tds x5days
2. Laxative	----------	Lactulose 10 ml bedtime for at least 10 days
3. Analgesics	Remember to ensure that adequate analgesia is prescribed	Analgesia will need to be given regularly. Agents which cause constipation (opioids) should be avoided. The rectal route should not be used for administration.

Documentation must include:

- An Accurate description / diagram of injury.
- Anesthesia (type and amount).
- Suture material.
- Exact Method for repair.
- Records of PV & PR examination once repair complete.
- Final equipment/swab/suture check.
- Name in print letters (or stamp) and signature.

2.4.5	**Placental disposal**

- Check the file (check if there is a need for pathology or swab culture).
- Prepare the equipment; receiver, clean gloves, scale, disposable plastic waste bag.
- Wash hands thoroughly.
- Wear gloves.
- Inspect the placenta: Maternal & fetal surfaces & membranes for any missing parts.
- Keep placenta & inform physician if any missing parts or cotyledons.
- Put in a plastic waste bag & tie it.
- Weigh the placenta.
- Dispose the placenta following the infection control guidelines in the hospital, taking in to consideration that incineration is the best method.
- If needed for Pathology; such as for cases of stillbirth, labor room neonatal death or any other indicated cases:
  - Weigh the placenta while in receiver.
  - Subtract the weight of placenta & receiver from the weight of the receiver.
  - Put the placenta in special container inside formalin.
  - Label the container with name, date, time & type of tissue.
  - Dispose gloves.
  - Wash hands.
  - Document: Date, time, weight, inspection results on the woman's delivery file.

2.4.6	**Immediate newborn care**

- **Dry & wipe the eyes & stimulate the baby's breathing**:
  - If the baby is crying & breathing: leave the baby with the mother.
  - If the baby does not start breathing for 30 seconds: Ask for help & initiate steps to resuscitate the baby.

- **Give single dose Vit K 1mg IM**.
- **Attach identification bracelet** with appropriate color to the baby's wrist + legs
- **Complete a Cot card** of the appropriate color including the following details:
  - Mother's name
  - Newborn sex
  - Date and time of delivery
  - Type of delivery
  - Baby's weight.
  - Time of Vit. K administration

- Attach the card firmly to the baby's cot.
- If the baby is kept with his mother, make sure he is warm by placing him skin-to-skin on the mothers' abdomen & cover with soft cloth blanket & hat to prevent heat loss.
- Assist the woman to commence the initial Breastfeeding immediately after birth within the first 30 minutes to 1 hour after birth.

Document all procedures, mediations given, and assessment findings.

2.	**Intrapartum Care**
2.5	**Management of women with Viral hepatitis and HIV**
Location	Admission and Labor room
Statement	Health care providers in Maternity units are at increased risk of exposure to blood splashes and needle sticks.

- All staff must be aware of the hazards and every effort should be made to identify the woman during the antenatal period.
- Once a woman has been identified as a risk case 'DANGER OF INFECTION' Red labels should be placed in English on the front cover of case notes.
- The Infection Control Nurse should also be informed as soon as possible, to commence the cooperation between the different involved departments.

This is a to guidance for staff caring for a woman/ baby who has infective hepatitis or is known to be carrying hepatitis B Antigen (Australian Antigen) or is known to have or is suspected of having AIDS or HIV infection.

Care during the antenatal period

- All women screened positive should be labelled as a high-risk pregnancy.
- Gloves should be worn whenever blood or urine samples are taken.
- Vaginal examinations during the antenatal period should be kept to a minimum, and 2 pairs of surgeon's gloves should be worn for this procedure.

Inpatient antenatal care

- Admission only when deemed necessary.
- The woman should be admitted to an isolated room.
- No further precautions should be taken unless there is loss of liquor or blood.

Care in labor and at delivery

- Whenever possible, the woman should be admitted to and cared for during labor in one separate room.
- Equipment in the room should be kept to essential items, e.g. Bed, cot, trolley.
- The resuscitator should be placed outside the room (unless the woman is in premature labor) and only taken into the room if required.
- Disposable linen should be used at all times.
- One midwife should be allocated to care for the woman in labor and in addition to one other qualified assistant and one pediatrician should be present at the birth of the baby.
- Entry in and out of the room should be kept to a minimum and restricted to those responsible for the woman's care of labor and delivery.
- The midwife looking after such a woman must not be involved in the care of others at the same time.

- A special hepatitis/HIV pack containing personal protective equipment should be kept in labor room to be available for any person involved in the care of affected women. The pack should contain:
  - Plastic apron
  - Disposable gown
  - Surgeon gloves
  - Goggles/visor
  - Facial mask
  - Overshoes
- For vaginal examinations and delivery, disposable equipment should be used whenever possible.
- Internal monitoring by fetal scalp electrode should be avoided.
- The woman should only use one room toilet.

2.	**Intrapartum Care**
2.6	**Analgesia during labor and delivery**
Location	Labor room
Statement	All women have the right of pain relief during labor and obstetric procedures

2.6.1	**Pain relief during active phase of labor**

All women in the active phase of labor should be supported and provided with as much as possible of alternative methods as available to relieve pain during labor.

PROCESS:

- Assess the woman's tolerance of pain during labor.
- Support the woman during labor.
- **Respect the woman's right of requesting pain relief during labor.**
- Based on individual maternal condition and personal preferences, offer different pain relief modalities shown in the box below.

1. Simple comforting measures for pain relief:

- Championship
- Continuous midwifery care- Continuous support and encouragement
- Changing body position – lying down, sitting, walking, rocking movement
- Vocalization- Moaning, reading Quran, chanting, light accelerated breathing,
- Massage
- Hot/cold packs on lower abdomen groins or perineum
- Warm shower

2. Pain relief medications:

- Give pethidine 50-100 mg IM q 2-4 hours or 25-50 mg IV q 2 hours (Do not give pethidine if birth is anticipated within the next 2 hours unless the antidote-Narcan- is available).
- Fentanyl 50-100 mcg IV hourly is an alternative.
- Offer epidural analgesia whenever available.

Remember: Antenatal birth classes improve the woman's tolerance of pain during labor

Epidural analgesia

- An excellent analgesia and safe for baby and mother.
- It is the method of choice in some cases: e.g. hypertension, preterm labor, IUGR and breech & twin delivery.
- Epidural should be performed by anesthetist or under his supervision.
- Put the patient on her left side with legs moderately flexed or sitting.
- Do not hyper-flex the spine.
- Infiltrate the skin in the midpoint between L2 to L3 or L3 and L4 with local anesthesia.
- Insert the sharp long 16-gauge needle and advance it in the middle line till the tough ligamentum flavum is encountered. By experience only, you will feel that the needle is in a space immediately behind the ligament. The syringe empties easily. You may use the hanging-drop technique to estimate the progress of the needle.
- Avoid intrathecal injection. This can be confirmed by the inability to withdraw cerebrospinal fluid, or by a negative somatic anesthesia following a test injection of 2ml of the anesthetic drug.
- Inject about 20ml of anesthetic; slow injection will minimize the likelihood of hypotension.

Observe the mother carefully for:

- Vital signs.
- The side effects of epidural (see below box).
- Prolonged Labor (2nd stage)
- Absence of involuntary expulsive efforts and rifling action of the pelvic floor muscles may increase demand for instrumental delivery
- Persistent occiput-posterior position

- Put a large pillow beneath the head and the shoulders of the patient to ensure that the analgesic fluid will extend caudal and thus include the sacral nerves.
- Inject the solution.
- Follow VTE protocols for patient receiving anticoagulants.

EPIDURAL ANAESTHESIA: SIDE EFFECTS

1. Common Side effects

- Hypotension
  - which may result in fetal distress
  - or even fetal death if not corrected
- Bradycardia
- Hallucination
- Backache
- Paresthesia

2. More serious complications:

- Respiratory Arrest.
- Cardiac Arrest.
- Cardiovascular Collapse.

3. Slow-onset complications

- Agitation.
- Vertigo.
- Blurred Vision
- Nausea.
- Tremors.

4. Other Complications of Epidural

- Sepsis
- Failure of the technique
- Bladder atony and increased need for catheterization.

MANAGEMENT OF COMPLICATIONS:

- Prompt recognition and treatment are imperative
- Call anesthesiologist
- Intubate.
- Maintain a patent airway.
- Administer Oxygen.
- Administer Diazepam for convulsions.
- Vasopressor drugs as indicated.
- External cardiac massage for cardiac arrest

2.6.2	**Local analgesia during second and third stage of labor**

Perineal infiltration

- Provides good analgesia before episiotomy, low forceps or vacuum delivery and repair of first- and second-degree perineal tears.
- Lignocaine HCL, 1% (Xylocaine) is the most frequently used agent, which works within few seconds.
- Drape patient in dorsal recumbent position.
- Clean the area.
- Insert a couple of fingers into the vagina first to put the perineal tissues on a slight stretch along the proposed infiltration site.
- Use a long, fine needle on a 20 ml syringe.
- 10-20 ml. of 1% lignocaine is injected fanwise, start from the midline of the posterior fourchette (single puncture site).

- Avoid intravascular injection of lignocaine, which results in dizziness, collapse and hypotension.
- Convulsions have been recorded and treated by IV thiopentone!

Pudenal nerve block:

- Provides good analgesia for 2nd stage of labor, episiotomy, forceps or vacuum delivery and repair of all degree perineal tears.
- Palpate the ischial spines vaginally. The special 10 cm long needle protected with a guide (spinal needle is a suitable alternative) is slowly advanced toward the ischial spine.
- Penetrate the vaginal wall and advance the needle tip until it lies just below the and beyond the sacro-spinous ligament.
- Aspirate, if not in a vessel, (no blood is recovered),
- Inject 8-10 ml of 1% lignocaine.
- Repeat the same procedure on the other ischial spine.
- You may infiltrate the perineum to make sure that full analgesia is achieved.

Do not use more than 50 ml (300 mg) of Lignocaine for each individual patient.

3.	**Postanatal care after vaginal delivery**
Location	Delivery Room and postnatal ward
Definition	All women should be monitored and closely observed after childbirth

3.1	**Immediate postnatal care**

- Observe the woman in the labor room for 1 hour after birth.
- Document all procedures in medical records.

Observe, check, record for the followings every 15 minutes:

- Vital signs
- Fundal height + uterine contractility
- Lochia and or excessive bleeding
- Check perineum for swelling and/or bleeding if there is episiotomy or laceration.

- Ensure that bladder is empty.
- Initiate Breastfeeding with in the first 30 min to 1 hour after birth.
- Assist the mother to wear her clothes.
- Discuss with the mother the followings:
  - Self-hygiene especially around the perineal area
  - Episiotomy / perineal tear care.
  - Mobility
  - Importance of drinking fluids & proper diet.
  - Explain the danger signs to the woman.

Danger signs: i.e.

- heavy bleeding,
- fever,
- dizziness,
- headaches,
- blurred vision.

3.2	Transfer from delivery room to postnatal ward

Transfer of mother

- Transfer the woman to the ward after 1 hour or when appropriate after birth on a wheelchair.
- Inform the postnatal ward and inquire that if they are ready to receive the delivered woman.
- Assist / encourage the mother to empty bladder if she desires so.
- Urinary Foleys or epidural catheter must be removed before transfer to the ward if any has been applied, unless otherwise indicated.
- Assist the mother to move from the birthing bed to the wheelchair. If she has an epidural, we transfer her via trolley.
- Secure the mother on the wheelchair / trolley after the mother gets on it and put the side rails up once the mother is on the trolley

Avoid any form of injury during transfer e.g.

- Keep mother's hands inside the rails
- Secure and adjust I.V. if there is one
- Secure urine drainage bag if there is one
- Avoid banging the trolley, be observant and move carefully

- Take the mother's file and belongings with her.
- Transfer the mother to the ward.

Once the mother is in bed, she will be checked for lochia and uterus before leaving her with the ward nurse/midwife

Transfer of baby:

- Keep baby warm and airways clear.
- Carry a mucus extractor with you.

Observe the condition along the way; color, breathing and movements

- Check the baby with the receiving nurse;
  - Mother's name.
  - File number.
  - Sex of the baby.
  - Date of birth.
  - Umbilical site.
- Record details in the admission book if the baby is not for discharge

Make sure the baby's cot card and chart from the delivery suite are complete and the I.D bands are secure before leaving.

3.3	**Postnatal care in the postnatal ward**

- Orient the mother to the ward. e.g. bathrooms, kitchen, nurse' station, etc.

Continue woman's observation as followed every 1 hour for 4 hours:

- Vital signs
- Fundal height
- Lochia
- bleeding

- Encourage the woman to void frequently to keep bladder empty.
- Record the first void.
- Check perineal stitches/tears, if any every 8 hours.
- Check baby identification on each shift and before discharge.
- Assist the mother to have a shower when she desires / can do so.
- Encourage & assist Breastfeeding on demand.
- Assess breast once every shift for any tenderness, cracked nipples, and engorgement.
- Check the mother & baby blood groups & give anti – D if indicated.
- Discuss with the family their important supportive role for the mother after birth.
- Documentation: Procedures, assessment findings, teachings, etc.

4.	**Regulations of medication orders and procedures for IV drug administration**
Location	Labor and postnatal ward
Standard statement	• Prescription of medication is the responsibility of physician by Law. • The midwife can only administer the medications mentioned in this protocol for the mentioned purposes & indication/s after verification with the physician on call. • If any of these medications is to be administered for different indications or any other medication, the midwife must obtain a written physician order. • Correct administration to avoid error and ensure patient safety

4.1	**Regulations of medication orders**

General rules

- Order medicines as stocks run down.
- Check the drug cupboards routinely.
- Administer the prescribed medication to the woman using the following method:
  - Read the correct prescription carefully.
  - Select the required preparation.
  - Check the name and dosage of the drug, the expiry date.
  - Verify the preparation with the woman's prescription chart.
  - Ensure that the stock balances with the register for certain medication like pethidine.
  - Take preparation and prescription chart to the patient.
  - Confirm identity verbally or check with wrist band (Full name and chart number).
  - After administration, record in both register and mother's file/Kardex.
  - Unused preparations must be destroyed and recorded as wasted in the register and witnessed by a second person, especially for narcotic drugs.

- Store narcotic drugs (Pethidine) in a locked container always with no exceptions.
- Check the narcotic drugs (Pethidine) amount & compare its balance with the register each shift.

1. Intravenous Therapy:

The midwife **may commence** any of the following IV fluids when inserting canula **to keep vein open or in case of emergency**:

- Ringer Lactate (RL)
- Normal Saline 0.9% (N/S)

2. Anesthetic Agents:

The midwife may use the following local anesthetic agents while suturing tears and or episiotomy:

- Local infiltration: Lidocaine 1% or 2% up to 20 ml S/C.
- Local lidocaine ointment or spray.

3. Oxytocin Agents:

The midwife may administer the following oxytocic agents after normal birth to prevent postpartum hemorrhage as per protocol & guidelines recommendations:

- All women should receive 10 units Oxytocin IM or IV at delivery of anterior shoulder or immediately after delivery of the baby
- Cytotic and Prostaglandins: this should be decided by a physician.
- See details in the management of third stage of labor.

4. Pethidine / Analgesics:

The midwife must obtain a written order if she evaluates that the woman needs a pain relief medication.

Important Note: This protocol should be signed separately by the Obstetrician Consultant and by the midwife.

.....	.....
Obstetrician consultant Signature	Midwife's Signature

5. For the newborn:

- Vit K 1 mg IM for the newborn after birth.
- Oxygen in case of apnea (according to resuscitation guidelines): by face mask
- Intubation is to be performed by the pediatrician

- Additions of any medication such as Oxytocin to IV fluid should follow the written physician order.
- Any intravenous therapy for high risk cases should follow the written physician order.

PROCESS

- Assess the patient's condition with regard to ability to tolerate the drug.
- Explain the procedure to the patient.
- Wash your hands and prepare the necessary equipment.
- **Equipment required:**
  - Cleaned tray
  - Alcohol swab
  - Syringes/needles as required
  - Dry cotton
  - Water for injection for dilution
  - 0.9% NS for flushing or heparin flush (as per policy)
- Check the medication card for:

Name of patient	Route
ID number	Time to be given
Drug	Doctor's signature
Dosage	

- Obtain the medication locker keys from the charge nurse.
- Two nurses should check:

Name of drug

Dosage

Expiry Date

- Draw up the required amount of drug and dilute it.
- **10 ml of Normal Saline** will be drawn up for flushing, or more, if more than one drug is to be given. Heparin flush may also be drawn up if only cannula present.
- Check the medication label again, then proceed to the patient with the drug and the medication card.

- **Wash your hands.**
- Inspect the insertion site of the cannula, to ensure it is patent and not causing irritation/swelling/redness
- If an intravenous infusion is in progress, confirm it is running as desired.
- Clean the injection site with an alcohol swab, the nurse should wait until the alcohol evaporates.
- Switched off the infusion, or close the fluid path of a tap as stopcock.
- If only a cannula in situ, 5 ml of 0.9% NS should be gently injected.
- If the injection is to be made through a re-sealable latex site, a gauge 23 or 25 needle should be used.
- Inject the drug smoothly in direction of flow at the specified rate and:

  - Observe insertion site of the cannula
  - Frequently check blood return
  - Ask the patient for their reaction

- Flush the cannula with 5 ml. 0.9% NS if another drug has to be given.
- Finally, flush the cannula with 5 ml. 0.9% NS, or by turning on the flow of an appropriate I.V. infusion.
- Restart the infusion as prescribed rate.

  - If only a cannula in situ, a heparin flush may be used. Dilution 500 ml. 0.9% NaCl and 5000 units of heparin to ensure continuing patency. Heparin flush must be prescribed by the Doctor. 1 ml. of flushing fluid is required.

- Ensure the patient's comfort.
- Sign the medication card.
- Dispose sharps, as per hospital Policy.
- Clean the tray.
- Return the keys to the charge nurse

If a vial was re-constituted and not all amount used, it should be dated, timed and initiated at the time of preparation and stored in a refrigerator for the prescribed time.

Topic Two: Induction of labor

1. General principles of induction of labor
2. Pre-induction assessment
3. Cervical ripening
4. Methods of induction of labor
5. Induction of labor in previous cesarean section

Induction of labor	
Location	Admission, Labor and Delivery Room
Definition	IOL is the artificial initiation of labor after age of viability
Standard statement	Induction of labor should be used, when obstetrically indicated where delivery will make the fetus and/or mother benefit from a higher probability of a healthy outcome than if birth is delayed

1.	**General principles of induction of labor (IOL)**

- IOL should be performed only when there is a clear medical indication, and the expected benefits outweigh its potential risks.
- When planning IOL, preferences of each woman should be taken into consideration in addition to cervical status, the specific method of induction and associated conditions such as parity and rupture of membranes.
- IOL should be performed with caution since the procedure carries the risk of uterine hyperstimulation and rupture and fetal distress.
- Women receiving oxytocin, misoprostol or other prostaglandins should never be left unattended.
- IOL should be done at facilities where maternal and fetal well-being can be assessed, and cesarean section can be performed.
- Dating should be based on the earliest ultrasound scan confirming gestational age. If in doubt, assessment needs to be made by a consultant.
- If no pregnancy complication/s present Review at 40 weeks, Offer Membrane sweeping.
- If sweeping does not induce labor, appropriate fetal surveillance should continue until 41 weeks, when other formal method of IOL should be offered.
- Fetal surveillance should include CTG and ultrasound measurement of the amniotic fluid volume.
- IOL before 41 weeks due tsocial or political (e.g. restriction of movement) can be considered, provided the woman has a favorable cervix. This decision should be individualized, and the consultant should be involved, and the woman should be aware that the induction may carry some risks

Medico-legal issue:

- The midwife must always refer to a senior consultant before starting IOL.
- The decision for IOL should be made by a clinician at appropriate senior level with clear indication/s.
- A written informed consent should be obtained.

2.	**Pre-IOL assessment**

- **Woman should be aware that the indication may carry some risks.**

Checklist assessment	1.	Review maternal history.
	2.	Review the data used to estimate gestational age and date of delivery.
	3.	Determine fetal presentation.
	4.	Estimate fetal weight by ultrasound.
	5.	Perform a cervical examination: Bishop score must have been calculated and recorded.
	6.	DETERMINE membranes status.
	7.	Review the fetal heart rate pattern.
	8.	The reason for IOL must also be clearly available/documented.

- **The Modified Bishop cervical score** should be used as a standard objective clinical mean of assessment. The state of the cervix is an important predictor of successful IOL

Modifies Bishop score	0	1	2	3	Score
Cervical dilation (cm)	< 1	1-2 cm	3-4 cm	> 4cm	
Cervical Length (cm) (Effacement)	≥ 4 0-30%	2-3 31-50%	1-2 51-70%	< 1 > 80%	
Cervical Consistency	Firm	Average or Medium	Soft	-	
Position of Cervix	Posterior	Mid	Anterior	-	
Fetal station	-3	-2	-1	+1	
TOTAL					/13

3.	**Cervical ripening**

Classification:

- Unfavorable score: <5
- Moderately favorable score: 5-6
- Favorable score: ≥7

- Cervical ripening should be offered whenever the modified Bishop score is less than 7.
- Amniotomy and oxytocin, administered individually or in combination, are ineffective cervical ripening agents, and increase the risk of CS when used with an unfavorable cervix. They should not be routinely offered until the modified Bishop score is 7 or greater.
- All cervical ripening agents are appropriate for individuals who are colonized with group B Streptococcus Antibiotics should be started when the patient is in active labor or with rupture of membranes to ensure that antibiotics are administered 4 hours prior to delivery.

Methods of ripening

1. Mechanical options

1.1. Membrane sweeping (Stripping)

Sweeping is effective for promoting spontaneous labor and reducing the need for IOL.

- Discuss the benefits with the woman.
- Offer serial membrane sweeping (every 2 days) From 39+0 weeks and Prior to formal IOL.
- If the cervix is closed and membrane sweeping is not possible, cervical massage in vaginal fornixes may achieve a similar effect.

1.2. Balloon catheter:

- Health care providers should consider balloon catheters as first-line agents for cervical ripening, as they are safe and effective including and in a trial of labor after cesarean (TOLAC).
- Balloon catheter is equally as effective as prostaglandin E2 (PGE2) and slightly less effective than prostaglandin E1 (PGE1) for cervical ripening. It may have a greater safety profile than either prostaglandin.

Aspect	Consideration
Types	A single-balloon catheter (e.g. Foley bladder catheter): is placed in the extra-amniotic space using aseptic technique, should only be inflated with 30- 60 mL of water. Single balloon catheter is more cost effective. A double-balloon catheter: The inflation volume for the two balloons can range from a minimum of 20 mL (for the vaginal balloon) and 40 mL (for the uterine balloon) to a maximum of 80 mL for both balloons.
Indications	Preferred cervical ripening agent if: Previous CS Grand multiparity: Parity greater than or equal to five prior vaginal births Known SGA or FGR May be used following prostaglandins when there has been no/ minimal effect on cervical ripening and ARM is not technically possible
Contraindication	Ruptures membranes Undiagnosed bleeding Lower tract genital infection Abnormal FHR
Cautions	Unengaged fetal head Polyhydramnios
Benefit	Low cost and no specific storage or temperature requirements No evidence of an increased risk of infection

2. Pharmacological options

- Evidence suggests that vaginal PGE2 (dinoprostone) maybe as effective as oral PGE1 analogue (misoprostol) to achieve vaginal birth in 24 hours and in safety, but oral PGE1 is probably associated with a lower risk of CS.
- For PGE1 (misoprostol), vaginal administration is associated with **more uterine tachysystole and hypertonus, and possibly more uterine hyperstimulation** with FHR changes, than oral administration. Thus, if a decision is made to use misoprostol, it would be prudent to use oral misoprostol rather than vaginal. **Oral administration may have the added benefit of fewer vaginal examinations.**

Dissolve the misoprostol tablet in water and give as a solution to achieve the correct dose with minimal error (see table below)

1. MISOPROSTOL	
Dose	The dosage for the **oral route** is **50 (mcg) and** repeated **every four hours**
Re-dosing	as long as contractions are absent or non-painful, fetal heart remains normal or until a maximum dose (300 mcg/24 hrs.)
Misoprostol Solution Preparation	Dissolve 200 mg of misoprostol in 40 mL of warm water, resulting in a concentration of 5 mg/mL of misoprostol. Other concentrations may be used. Label the solution with the concentration. A large syringe works well to mix, store, and dispense the solution. The solution is stable for 24 hours. Small flakes of the starch carrier may remain undissolved, which does not affect the concentration of active medication.
Oxytocin administration	After **four hours** of the last dose of oral Misoprostol

Contraindications	Previous CS or significant uterine surgery Grand multiparity
Monitoring	Monitor fetal heart for 20 to 30 minutes prior to Misoprostol induction. CTG should be "normal" prior to administration of Misoprostol. Monitor CTG for at least 30 minutes after administration of Misoprostol and for 60 minutes after any episode of tachysystole. Monitor maternal vital signs before first dose, **every hour** for four hours, then every four hours until in active labor then follow protocol of management of active phase of labor. As soon as the patient experiences **two- three regular, moderate contractions per 10 minutes**, stop the misoprostol and do a CTG for 30 minutes as well as a cervical assessment. Do not interrupt or delay the process once it has started (e.g. due to labor ward over capacity)
If Bishop score is still <8 after 24 hours of Misoprostol, Discuss with consultant again	Consider Intra cervical balloon. Consider second Course of 24 hours of Misoprostol **with or without rest the patient for 24h (if maternal and fetal conditions are stable)** Consider CS The appropriate decision should be led by consultant

2. DINOPROSTONE	
Preparations	**Prostin E2 Vaginal Tablets (3mg)** Vaginal (Prostin®) gel (1 mg and 2 mg) Prepidil Vaginal gel (0.5 mg of dinoprostone in 2.5 mL) of gel Vaginal slow-release pessary (Cervidil® 10 mg) Prostin E2 (0.5mg) tablet PO
Prostin E2 Vaginal Tablets 3mg: The vaginal prostaglandins currently used in Palestine	
Contraindications	Hypersensitivity active cardiac, pulmonary, renal or hepatic disease Previous CS or major uterine surgery fetal malpresentation fetal distress. evidence of placenta previa or unexplained vaginal bleeding during this pregnancy.
Precautions	Asthma, COPD Epilepsy Raised intraocular pressure compromised cardiovascular, hepatic, or renal function
Monitoring	CTG should be done for at least 30 mins after receiving a dose of vaginal prostaglandin. The FH and maternal observations should be taken and recorded every 6 hours after insertion.
Dose	One tablet (3mg) to be inserted high into the posterior fornix. A second tablet (3mg) may be inserted after six to eight hours if labor is not established. Maximum dose 6 mg/ 24 hr.

3. COMBINATION THERAPY (BALLOON CATHETER PLUS A PROSTAGLANDIN)

Some trials have shown that the concurrent use of mechanical and pharmacologic ripening methods may have modest benefits over the use of a single method alone, without increasing the risk of adverse obstetric or perinatal outcomes. It's a **consultant decision.**

4.	**Methods of IOL**

- IOL is indicated when modified Bishop score is ≥7.
- The options of IOL include oxytocin and amniotomy.
- **The combination of ARM and intravenous oxytocin infusion to increase the chance of vaginal birth within 24 hours, is recommended.**

1. AMNIOTOMY	
Aspect	Consideration
Indications	Favorable cervix (Score of 7 or more) Following initial dose of dinoprostone or removal of balloon catheter, before commencement of oxytocin infusion To observe the color and amount of liquor when clinically indicated Less favorable cervix (Score of less 7) and there is clinical reason to avoid cervical ripening
Contraindications	Vasa previa Cord presentation
Cautions	Poor application of the presenting part Unstable lie Fetal head not engaged
Risk/benefit	Risk: Cord prolapse or compression, rupture of vasa previa, pain and discomfort. When it is used independent of another IOL agent, it is associated with a longer time to birth, higher rates of infection, and possibly an increase in CS rates. Benefit: It is more successful in multiparous patients with a favorable Bishop score. It is best followed by early use of oxytocin

2. OXYTOCIN	
Oxytocin regimen administration	The ideal dosing regimen of oxytocin should be individualized and titrated to uterine activity and FHR, and thus accurate uterine activity assessment is essential. Use the minimum dose required to establish and maintain active labor. Both **low-dose** and **high-dose** protocols may be used. Infusion should always be documented in mU/minute rather than mL/hour Once adequate contraction is achieved, maintain infusion rate.
Maximum dose	maximum dose is 40 milliunits/minute
Before administration	Confirm CTG normal If membranes are not ruptured, perform ARM Do not commence oxytocin before six hours of administration of vaginal PGE2 or four hours of oral misoprostol
Monitoring	Provide one-to-one midwifery care, whenever possible Start LCG Maternal and fetal observations as per first stage of active labor. Commence continuous CTG at the start of oxytocin Maternal pulse and CTG ***review*** before any increase in the infusion rate
Risk	Uterus is decreasingly responsive with prolonged labor due to receptors saturation. Volume overload and hyponatremia uterine tachysystole and hyperstimulation
Discontinue/ recommence	If oxytocin has been **discontinued for 30 minutes**, the FHR is reassuring and no uterine tachysystole present, recommence at half previous rate If oxytocin has been **discontinued for more than 30 minutes**, oxytocin must be restarted of the initial dose (2.0 milliunits per minute)

(Doctor order) Oxytocin dose (mU per min)	(Volumetric Pump) Volume infused (mL per hour)
1	6
2	12
3	18
4	24
5	30
6	36
7	42
8	48
9	54
10	60
11	66
12	72
13	78
14	84
15	90
16	96
17	102
18	108
19	114
20	120
22	132
24	144
26	156
28	168
30	180
32	192
34	204
36	216
40	240

An oxytocin drug additive label is placed on the infusion bag and signed, dated, and timed.

A non-dextrose solution must be used, the solutions of choice are **normal saline** or **Hartmann's solution**.

Oxytocin must be administered with an infusion pump to ensure accurate administration. It is not acceptable to use visual methods such as counting drops.

Avoid large volumes of oral and IV fluids with oxytocin administration. Notify senior doctor if dose exceeds 20 milliunits/minute.

Oxytocin Regimens

	For Nullipara: High dose regimen.	For Multipara: Low dose regimen.	For (more than P4): Low dose regimen.
Concentration	**5** I.U. of oxytocin in **500** mL of **normal saline** (NaCl) 0.9%.		
	At this dilution, a **6 ml/hr** infusion rate equates to **1** milli-unit of Oxytocin per minute (**mU/min**).		
Start at	**4** milliunits/ minute.	**2** milliunits/ minute.	**1** milliunits/ minute.
Increased by	**4** milliunits/ minute Every **15** minutes	**2** milliunits/ minute Every **30** minutes	**1** milliunits/ minute Every **30** minutes
Target	Until 4 contractions in 10 minutes, lasting 40-90 seconds each.		

Once **4** contractions in **10** minutes are achieved, **maintain infusion rate**.

If **20** milliunits/minute dose has been running for 30 minutes the **Senior doctor should review the woman prior to higher doses being administered**.

The overall **maximum dose** of oxytocin should not exceed **40** mU per minute.

Tachysystole OR uterine Hyperstimulation

If uterine hyperstimulation occurs during IOL:

- Assess fetal well-being with continuous CTG.
- Record maternal observations, including BP and uterine contractions.
- Position the mother to left lateral.
- Commence intravenous (IV) fluids via new administration set. IV bolus with 250-300ml lactated ringers.
- Vaginal examination to assess cervical dilation.

If FHR Category I	If FHR Category II or III
• Assess Uterine Contraction after 10 minutes. IF uterine activity has not returned to normal, Decrease oxytocin rate by half • • Re-Assess Uterine Contraction after 10 minutes. IF uterine activity has not returned to normal Discontinue Oxytocin	• Discontinue Oxytocin. • Notify Senior. • Consider tocolysis: Terbutaline: 250 micrograms subcutaneously or *Sublingual Glyceryl Trinitrate (GTN) spray 400 micrograms • IF FHR does not return to normal, prepare for instrumental birth or cesarean section

Failed/ unsuccessful IOL

Failure to generate regular (every 3 minutes) contractions and cervical change after at least **24 hours** of oxytocin administration, with intact membrane or **12 hours** of oxytocin administration with artificial rupture of membrane.

5.	**IOL in previous cesarean section**

- IOL is associated with a higher rate of uterine rupture than spontaneous labor with the relative risk of rupture reported higher in IOL with prostaglandins than without prostaglandins.
- In-depth counselling about the risks and benefits of IOL versus repeat CS, and the risks associated with waiting for spontaneous labor.
- Evaluate for sweeping of membranes after 38 weeks of gestation to promote the onset of spontaneous labor.
  - For a **favorable cervix:** choose ARM and administration of oxytocin, low dose regimen. Do not exceed a maximum dose of 20 mU/min.
  - For an **unfavorable cervix** discuss the risks and benefits of mechanical options of cervical ripening followed by AROM and oxytocin administration to limit the risk of rupture.

Topic Three: Cesarean delivery

1. **Preparation for cesarean delivery (Preoperative care)**
   - 1.1. Categories of cesarean section
   - 1.2. Preparation for Elective cesarean section
   - 1.3. Preparation for Emergency cesarean section

2. **Intraoperative care of cesarean section**
3. **Postnatal care for cesarean section**
   - 3.1. Postoperative care for cesarean section
   - 3.2. Removal of wound sutures and drains

1.	Preparation for cesarean delivery
Location	Delivery Room and postnatal ward
Statement	Pre-operative care for women undergoing elective or emergency caesarean section

1.1	Categories of Cesarean section

Use the following standardized scheme to document the urgency of CS:

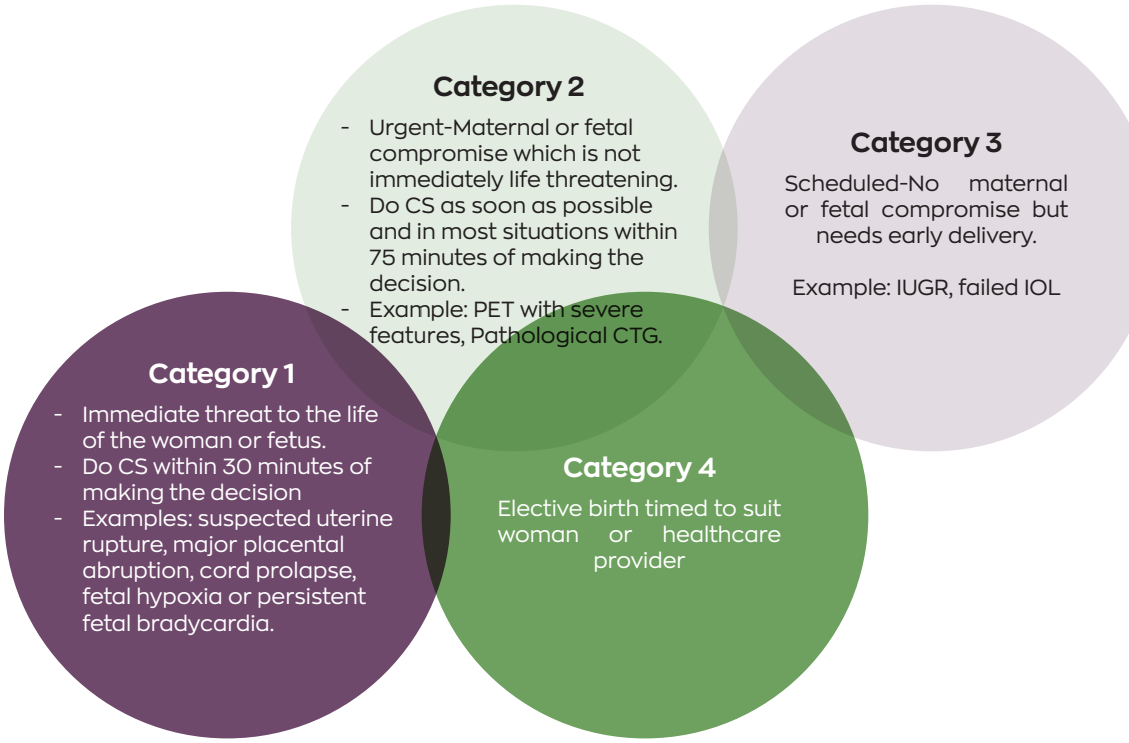


Figure 12 Categories of cesarean section according to urgency

1.2	Preparation for elective caesarean section (category 4)

Outpatient clinic preparation:

- Decision of CS should be made by consultant.
- Planned CS should not be done before completed 39 weeks, unless consultant decided otherwise.
- Provide all pregnant women with the necessary information and support to enable them to make informed decisions about childbirth, including implications for **future pregnancies and birth after cesarean section**.
- When a woman requests a caesarean delivery without medical indication, **explore, discuss and record the specific reasons for the request.**
- Inform and educate the women on the risks and complications of CS.
- If a woman requests a cesarean delivery but her current healthcare provider is unwilling to do this, **refer** the woman to another obstetrician.

In hospital pre-operative preparation:

- Receive & admit the woman.
- Ensure the written consent is ready before going to the theatre.
- Check & record vital signs.
- Insert IV cannula G 14 or G 16 and or G18.
- Perform an abdominal exam assessing lie, presentation.
- Perform a CTG for 20 minutes.
- Document fetal heart sounds if a CTG is not feasible.
- Obtain enough blood samples for CBC and **cross match**:
  - Cross match two units of blood as a routine
  - Cross match 4 units if:
    - **(a)** Anterior placenta over a previous scar
    - **(b)** Clotting disorder
    - **(c)** Placenta previa

- Inform pediatricians.
- Catheterize the patient with use of continuous drainage of urine bag.
- Ensure that pre-operative checklist is completed.
- Give pre-op medication as indicated & per prescription.

ERAS recommendations (Guidelines for pre- and intra-operative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®)	
Intervention	**Recommended**
Oral or mechanical bowel preparation before CS	No
Encourage women to drink clear fluids (pulp-free juice, coffee, or tea without milk) until 2 hours before CS	Yes
A light meal may be eaten up to 6 hours before CS	Yes, allowed rather than a recommendation

1.3	Preparation for emergency caesarean section

- Arrange for quick admission, if not yet admitted.
- Explain the situation to the patient and her husband as quickly and clearly as possible (document this in the notes).
- Obtain consent.
- Check & record vital signs.
- Insert IV cannula G 14 or G 16 and or G18.
- Obtain blood for laboratory work.
- Cross match two units of whole blood unless otherwise instructed.
- Give ranitidine 50 mg in 20 ml saline IV over 2 mins slowly (if not given orally in labor) and metoclopramide 10mg IV slowly over 2 mins and sodium citrate 30 ml orally theatre.
- Assess fetal heart sound by fetal heart detector or ultrasound.
- Keep patient on nil by mouth (NPO).
- Care of valuables such as jewelry, watch, or money.
- Remove prostheses such as artificial limbs denture, and contact lenses
- Remove of cosmetic such as lipstick, nail polish.
- Assure proper wearing like open gown and cap.
- Insert a Foley's catheter under aseptic technique.
- Complete patients' record, checking of patient identity
- Assist with transferring patient to surgery.
- Maintain left lateral tilt during transfer to surgery
- Give Oxygen by face mask in case of fetal/maternal distress.
- Hand over the needed medication to be given intra operatively ()
- Chart notes of pre-operative check list and lab result handed to theatre staff.

- For women undergoing elective or emergency CS, intravenous antibiotics should be administered routinely preferably within 60 minutes before the skin incision.
- In all women, a first-generation cephalosporin is recommended.
- In women in labor or with ruptured membranes, 500mg azithromycin, infused over 1 hour is given in addition to the first generation of cephalosporine to reduce postoperative infections. (ERAS)

2.	Intra-operative care for cesarean section
Location	Operation theatre

Preparation and Procedure:

- A consultant should be present in theatre if there is a placenta previa or anterior placenta in patients with previous scar.
- Place the woman in a supine position on the **operating table.** Apply a left lateral tilt of up to 15 degrees or appropriate uterine displacement.
- Forced air warming, intravenous fluid warming, and increasing operating room temperature are all recommended to **prevent hypothermia** during cesarean delivery. (ERAS)
- **Warm IV fluids** (500 ml or more) and blood products used during cesarean birth to 37 degrees Celsius.
- Warm all irrigation fluids used during caesarean birth to 38 to 40 degrees.
- **Follow infection control and aseptic technique:**
  - Use alcohol-based chlorhexidine skin preparation before CS or as instructed per hospital protocol.
  - Use aqueous iodine vaginal preparation before CS in women with ruptured membranes to reduce the risk of postpartum endometritis**.** If aqueous iodine vaginal preparation is not available or is contraindicated, aqueous chlorhexidine vaginal preparation can be used.
  - Remove the placenta in CS using controlled cord traction and not manual removal to reduce the risk of endometritis.
  - In women who have more than 2 cm subcutaneous fat, close the subcutaneous tissue space. This is not routinely recommended for subcutaneous fat < 2cm.
- Do not suture the visceral or the parietal peritoneum.
- Perform paired umbilical artery and vein measurements of cord blood gases for suspected fetal compromise.

Baby intra-operative care (ERAS):

- Ensure an appropriately trained practitioner skilled in the resuscitation of newborn babies is present for cesarean birth.
- In all settings that perform cesarean delivery, a capacity for immediate neonatal resuscitation is mandatory.
- Delayed cord clamping for at 1-3 minute at a term delivery is recommended.
- Delayed cord clamping for at least 30 seconds at a preterm delivery is recommended.
- Body temperature should be measured and maintained between 36.5 C and 37.5 C after birth through admission and stabilization.
- Routine suctioning of the airway or gastric aspiration **should be avoided** and used only for symptoms of an obstructive airway (by secretions or meconium).
- Routine neonatal supplementation with room air is recommended because the use of inspired air with oxygen may be associated with harm.

3.	Postnatal care for cesarean delivery
Location	Postnatal ward
Statement	Postoperative care for women undergoing cesarean section

3.1	Postoperative care for cesarean section

- Prepare a quiet room to receive the mother on return from theatre.
- Prepare recovery tray, oxygen, suction, drip stand, sphygmomanometer, stethoscope, and the patient's bed.
- Transfer patient to bed.
- Make sure that the mother is clean, dressed, and warm.
- Make sure that the mother has a bell at hand to call for help.
- Observation on arrival to the ward:
  - Assess & record baseline observation for temperature, pulse, respiration, blood pressure, lochia, wound, drain, uterine involution.
  - Continue assessing observations 1/4 hourly in the first hour, then 1/2 hourly in the second hour and 4 hourly thereafter.
  - Ensure that the woman is in left lateral position until recovery of full consciousness.
  - Observe for risk of airway obstruction or regurgitation or silent aspiration of stomach contents.
  - Observe dressing every half hour and replace as required
  - Put baby to breast feed as soon as possible.

Intravenous therapy/ infusion:

- A prophylactic low-dose oxytocin infusion (15–18 U/hour) should be commenced to prevent postpartum hemorrhage during the first 6 hours after birth.
- Give IV fluid: each 500 ml to run over 4 hours (3L/24 hours), unless otherwise instructed. Total hourly volume should be kept at or less than 1.2ml/kg.
- Discontinue IF fluids within 24 hours in patients tolerating oral intake.
- Prophylactic antibiotic therapy, if necessary, as ordered.

Fluid balance:

- Keep input/output charts including drains and gastric tube if any.
- Keep hourly chart in the first 6 hours and 2 hourly up to next morning round

Pain management:

- Pethidine 50-100 mg can be used in the first 12 hours postop. **Keep the use of opioid to the minimum.**
- Use paracetamol and, unless contraindicated, a non-steroidal anti-inflammatory drug (for example, ibuprofen) in combination after cesarean birth, to reduce the need for opioids, and to allow them to be stepped down and stopped as early as possible.
- In breastfeeding women, use opioid analgesics (for example, morphine, dihydrocodeine, tramadol or oxycodone) at the lowest effective dose and for the shortest duration, and not for more than 3 days without close supervision.

- Consider laxatives for women taking opioids, for the prevention of constipation.
- Consider anti-emetics for women taking opioids, if needed for nausea and vomiting.
- For other options including PCA, oral morphine, and epidural diamorphine discuss thoroughly with the anesthesia team.

Breastfeeding

Assist & encourage breast feeding Breastfeeding hourly for first 24 hrs then on demand.

Ambulation:

Encourage early mobilization after 6-8 hr of post-op and encourage good Posture.

Bladder care:

- Offer removal of the urinary bladder catheter once a woman is mobile after a regional anesthesia, but no sooner than 12 hours after the last 'top-up' dose.
- Urinary catheter to be removed 8-12 hours post general anesthesia unless otherwise instructed.

Bowel care:

Laxatives (two glycerin rectal suppositories) to be given in the first 24 hours.

Thromboprophylaxis

- Encourage passive leg movement, deep breathing, postnatal exercise and early ambulation.
- Follow VTE prevention protocol (Chapter III).

Diet:

- If women are recovering well after caesarean birth and do not have complications, they can eat and drink as normal:
- A regular diet within the 24 hours after cesarean delivery is recommended. (ERAS).
- Start with chewing gum after 4 hours to reduce the incidence of postoperative ileus.
- Give clear fluids; if well tolerated then soft diet can be commenced until return to routine regular diet.

Hemoglobin (Hb%):

- Check Hb% routinely on the first post-operative day, and again as instructed
- Check Hb routinely on the first post-operative day, and again as instructed

Anti-D injection

Anti-D is to be given within 72 hrs in cases of Rhesus Negative mother with a Rhesus Positive baby.

Hygiene:

Daily shower as required.

Wound:

- Remove drain/s within 48 hours provided the 24 hrs. collection is < 50 ml.
- Uncover and inspect the wound after 24 hours.
- Clean the wound keep it dry and inspect for signs and symptoms of inflammation.
- Remove sutures between the 5th and 7th day unless otherwise instructed by consultant.

Discharge:

- Women who are recovering well, apyrexial and do not have complications after caesarean birth, can be discharged from hospital after 24 hours with follow up as needed. **Do not discharge before 24 hours.**
- Patient should be taught about self & baby care, Breastfeeding, immunization, screening for special diseases, medication, follow up care and family planning.
- The mother should be referred to postnatal care clinics according to protocol.

3.2	Removal of sutures/clips/staples/drains

Points to consider:

- The sutures are usually removed between 5-7 postoperative days.
- Check the notes to ascertain the number of sutures/clips/staples to be removed.
- The procedure is explained to the woman.
- The woman is asked to use toilet and have a sit bath prior to the removal of any residual perineal suture.
- Ensure the women is in a comfortable position with incision exposed to good light.

Action:

- Prepare the requirement light lamp, trolley contains small dressing pack, disposable dressing scissors, stitch cutter, staple or clip remover, disposable gloves, micropore, and specimen swab tube.
- Hand washing and dry on paper towel.
- Clean trolley.
- Wash hands again.
- Open both packs - drop gloves and removal instrument on to sterile field.
- Antiseptic hand wash, dry hands-on disposable dressing towel.
- Put on gloves using a septic technique.
- Removal of sutures / clips / staples and place them on a small gauze swab.

Drain removal:

- Cut retaining suture using a suture cutter.
- In case of vacuum drain: close the drain valve.
- Whilst supporting abdomen around drain site with hand and piece of gauze pull drain out slowly and firmly.
- After procedure, the woman is made comfortable, and the trolley cleaned.
- Dispose of staples and clips into sharp box.
- Record procedure in woman's notes.

Topic Four: Patient discharge from hospital

1. Routine discharge procedure.
2. Discharge against medical advice.
3. Transfer of patient to another hospital

1.	**Routine discharge procedure**
Location	Postnatal ward
Definition	Leaving the health agency after reaching a state of high-level of wellness
Standard statement	• To ensure that all necessary documentation is completed. • To ensure all requirements for discharge have been met. • Discharge is to be planned: • After 24 hours for healthy normal delivery. • After 24-48 hours for uncomplicated CS delivery.

- Write the orders stating the time and date of discharge.
- Prescribe any take home medications.
- Write the discharge summary to be kept in the patients file, and photocopy will be given to the patient.
- Arrange for the outpatient clinic appointment if necessary.
- Document on an appointment card, which will be given to the woman.
- Complete the nursing record, all charts will be filed in the notes by the ward clerk.
- Notify the accounting department of the woman discharge to settle any outstanding charges (if appropriate).
- Give the woman her discharge summary, outpatient appointment and take home. medications, giving instructions how and when to take them.
- Ensure that the woman and relatives have appropriate knowledge and understanding regarding follow up care.
- Enter the discharge date and time in the admission book, and computer.
- Any babies should be carried by the nurse to the reception.
- Check the patients file to ensure all entries have been made, is complete with charts and returned to medical record.
- Notify the housekeeping and the information desk of the patients discharge.
- Educate / counsel mother before discharge home. (Self-care, baby care, warning signs, diet recommendations, fluid intakes, rest & mobility)
- !! If the patient is immobile, the patient should be taken by wheelchair.

Instruct the mother about the importance of visiting MCH center for postnatal check-up, baby's immunization, and Guthrie test), at day 3 and day 7 postpartum.

2.	**Discharge against medical advice**
Location	Postnatal ward
Definition	Mother leaves the health agency against her physician's order before she reaches a high level of wellness
Standard statement	Any woman wishing to leave the hospital against the advice of the attending consultant has the right to do so after explaining to her the potential risks & signing on a paper on her own responsibility.

PROCESS:

- Ensure all efforts have been made to discourage the woman from leaving.
- Ensure the woman and doctor have signed the discharge against medical advice form.
- Document in the woman's file.
- Document in the nursing notes.
- File the discharge against medical advice form in the woman's file.
- Follow the discharge procedure.
- Payment where appropriate will be finalized according to current hospital policy.
- Ensure and document the time when the patient left the hospital.

3.	Transfer of the patient to another hospital
Definition	Transfer of the patient who need special care that is not available in the current hospital. Transfer of the patient from one hospital to another because of change in her condition
Standard statement	To ensure safety and that adequate information is provided regarding patient care for the receiving hospital

The physician will:

- Obtain a written order from the treating consultant.
- Collect any photocopies of laboratory results and any other investigation reports.
- Copies of X-rays will be given to the patient if she requests them.
- **The patient's file must not leave the hospital.**
- Complete the transfer letter.
- Check with the receiving hospital that they are expecting the patient.
- Complete the discharge check list prior to the transfer.
- Enter time and date of transfer in the ward register, 24h bed statement and computer.
- Arrange for an ambulance and nurse escort/contact the hospital.
- supervisor in charge to arrange this.

The Midwife / Nurse will:

- Assist in arranging for the ambulance by contacting the nursing supervisor.
- Return the file to the admission office as per current hospital policies.
- Notify the admissions office, information desk, domestic services of the patient transfer.

Topic Five: Breastfeeding

1. **Promotion of breastfeeding**
   - 1.1. 1.1 Immediate initiation of breastfeeding
   - 1.2. 1.2 Teaching & counselling of breastfeeding
   - 1.3. 1.3 Procedure of breastfeeding
   - 1.4. 1.4 Maintaining and encouraging breastfeeding
2. **Care for the breasts during breastfeeding**
3. **Minor breast problems- Complications during breastfeeding**
   - 3.1. Flat nipples
   - 3.2. Engorgement
   - 3.3. Mastitis
   - 3.4. Sore nipples and nipple fissures

In a general, the guidelines are proposed for the entire medical team. Nevertheless, the prominent role of the midwives both in the promotion of breastfeeding and in the management of minor breast problems must be highlighted. So, this section concerns principally the midwives.

1.	Promotion of breastfeeding
Care group	All pregnant women & who gave birth in labor & delivery suite, postnatal ward or antenatal clinics.
Standard statement	All mothers will be educated and assisted to initiate breast feeding immediately after birth

1.1	Teaching and counseling of breastfeeding

The midwife / nurse will teach & counsel the mother about:

- Benefits of Breastfeeding for the mother & the newborn.
- Breastfeeding procedure.
- Breastfeeding positions & latch on.
- Exclusive Breastfeeding for the first 6 months & its importance for successful maintenance of Breastfeeding.
- Importance of immediate initiation of Breastfeeding after birth (with in the first 1 hour after vaginal birth and within 4 hours after C/S).
- Possible Breastfeeding problems & their management.
- Importance of continuing Breastfeeding even if the newborn is sick or the mother has minor breast problem such as: inverted nipple, sore nipple, or engorgement.
- Importance of eating well balanced diet & lots of fluids while Breastfeeding.
- Learning from previous breastfeeding experiences.
- Manual milk expression.
- Healthy diet and Vit D is recommended for breastfeeding women.

- Acceptable reasons not to breastfeed include HIV not on ART, active HSV 1, & Sepsis.
- Continue breastfeeding in case of breast abscess, mastitis, hepatitis B, C or TB.
- Document all issues discussed.

1.2	Immediate initiation of breastfeeding

The midwife / nurse will:

- Congratulate the woman for her safety & the new baby.
- Establish mother-newborn bonding by placing the newborn on the mother's abdomen (Skin-to-skin) after birth for at least 1 hour.
- For women delivering by CS:
  - Observe and assess the level of consciousness of the woman to choose the right moment for initiation of mother-baby relationship.
  - If possible, assist with skin-to-skin contact in the operating room.
- Initiate a friendly atmosphere and initiate a supportive discussion focusing on the importance of early bonding between the mother and her newborn.
- Rooming-in: Provide a suitable physical and emotional support to make the mother able and desire to hold her newborn.
- Assist the newborn to initiate suckling on the breast.
- Assess, supervise, support & instruct the mother while breastfeeding here newborn.
- Inform, discuss and instruct the mother the following appropriate breastfeeding issues at this stage:
  - Importance of early initiation of breast feeding.
  - Importance of colostrum to the newborn.
  - The alternative positions of breastfeeding (lying down or on one side position).
- Discuss with the husband and the close family members for their help and emotional support.
- Documentation: early initiation, skin-to-skin approach

Immediate and continued skin-to-skin care and breastfeeding should be practiced even if mother is confirmed or suspected to have COVID 19. (COVID-19 infection in pregnancy protocol, MoH, 2020)

1.3	Procedure of breastfeeding

All lactating mothers should be guided to proper Breastfeeding Procedure.

The midwife / nurse will:

- Welcome the mother in the postnatal ward.
- Review her delivery record for mode of delivery & special needs of the baby.
- Assess breast feeding previous history.
- Obtain consent before offering physical assistance with breastfeeding.
- Assist the mother to assume comfortable position.
- Place the baby in the mother's arms if sitting up or next to her if lying down.
- Position the baby so that his / her arms do not interfere with mouth to breast contact, the whole body must face the breast, mouth of a baby opposite to nipple, support baby's body to keep her high at the breast to prevent hanging at the nipple by placing the newborn on a pillow.
- Have the mother hold her breast with four fingers below & nipple & thumb above.
- Assist the mother to touch her baby's lower lip with her nipple until baby opens mouth wide.
- Observe breastfeeding procedure for at least 5-10 minutes for the first time.
- Check the mother's breast each shift for nipple soreness, cracking & engorgement.
- Encourage the mother to ask for help whenever she feels so when breastfeeding.
- Documentation: frequency, duration, problems, assessment findings.

The mother under assistance of the midwife/nurse will:

- Bring baby in close to her body.
- Removes her hand from around the breast, still supporting the baby's head to ensure proper nipple contact.
- Breast support can be used if the mother feels more comfortable or if she has a large breast.
- Duration of breastfeeding should be 10-40 min every 1-3 hours (on demand) (8-12 times/24 hours).
- Each breastfeed should be on one side of the breast, the next breastfeed should be on the other one.
- Remove the baby from the breast; the mother inserts one finger into the corner of the baby's mouth.
- Burp the baby.

Teach the mother:

- Advantages of exclusive breastfeeding.
- Importance of proper positioning & attachment.
- Encourage breastfeeding on demand.

The following situations indicate that the newborn is not attached to the breast:

- Very long feed (>40 min for most feeds).
- Very short feed (<10 min for most feeds).
- Very frequent feeds (>12 feeds over 24 hours for most days).

Indications of good attachment and positioning:

- Mouth wide opened.
- Less areola visible underneath the chin than above nipple.
- Chin touching the breast, lip rolled down and the nose is free.
- No pain.

Indicators of successful feedings for the babies:

- Audible and visible swallowing
- Sustained rhythmic suck.
- Relaxed arms and hands.
- Moist mouth.
- Regular soaked or heavy nappies.

Indicators of successful breastfeeding in women:

- Breast softening
- No compression of the nipple at the end of the feed.
- Women feel relax and sleepy.

Weak suckling reflex

All newborns with weak suckling reflex will be identified & their mothers will be assisted & guided properly.

- Observe & assess at least one feeding for each mother to be able to evaluate & identify problems.
- Inform the mother about the problem her newborn has, and reassure her that this may need patience, time, & observation.
- Documentation: observations, assessment findings, patient education and written information supplied: teachings (folders, leaflets, ...).

Advise & demonstrate to the mother to help her newborn to strengthen this reflex by inserting her clean little finger between & before feedings into the baby's mouth & allow him to suck for few minutes.

1.4	Maintaining and encouraging breastfeeding

All lactating mothers should be supported & counselled how to maintain exclusive breastfeeding.

Breastfeeding should be exclusive for 6 months

The midwife/nurse will:

- Be respectful to women and listen to their previous experiences of infant feeding.
- Emphasize the importance of continuing breastfeeding during the illnesses of the child, unless otherwise instructed by pediatrician.
- Give the newborns no food or drinks other than breast milk unless medically indicated.
- Practice rooming-In & allow the mother & newborn to remain together for 24 hours a day.
- Do not give artificial teats or pacifiers to breastfeeding newborns.
- **Document all breastfeeding counselling & teachings.**

Counsel the mother on:

- Maintenance of breastfeeding.
- Importance of colostrum for better immunity.
- Breastfeeding on demand (every 2-3 hours) day & night.
- Breastfeed from one breast at each time and, the next feed start from the other one.
- Proper latch on nipple and areola.
- Importance of taking care of the breast & nipples.
- Discuss disadvantages of supplementation especially bottle feeding.
- Discuss complementary feeding by adding food at the age of 6 months while continuing breastfeeding.
- Explain the effect of exclusive breastfeeding as a contraceptive method for the first 6 months after birth.
- Discuss the protective effect of breastfeeding from infection & other illnesses.

2.	Care for the breasts during breastfeeding
Definition	Care of breast through the period of breastfeeding
Standard Statement	All breastfeeding mother has the right to be checked for and educated on "how to take care of their breasts and nipples" post delivery

The midwife / nurse will:

- Discuss the importance of having the breast & nipples clean & dry before, after & between each Breastfeeding session.
- Assist the mother to have a shower in the morning.
- Advise moisturizing the breasts with her breast milk.

Advice mother not to use soaps, alcohol, and petrolatum-based preparations as they cause nipples to crack and remove protective secretions, in addition they may be distasteful to some infants who will then refuse to suckle.

- Nipples are lubricated with a few drops of expressed colostrum or milk.
- Assist & educate (especially primipara) how to clean & dry the breasts & nipples properly.
- Discuss with the mother importance of proper latch on to protect the nipple from cracks and sores.
- In case the breast/nipple needs any special treatment advice accordingly
- Documentation: all procedures conducted.

Educate the mother on other issues related to breastfeeding like body hygiene, proper diet, family planning.

3.	Minor breast problems
Definition	Common breast conditions that might interfere with breastfeeding
Standard Statement	The woman with any breast problem during lactating period should be investigated, diagnosed and managed properly

3.1	Flat and inverted nipples

Women having a flat or inverted nipple should start care during pregnancy.

The midwife / nurse will:

- Advise wearing a bra with a hole at the location of the nipple in the last few months of pregnancy. Mechanical Pressure may help to pull the nipple out.
- Immediately after birth (within the first ½ an hour):
  - **Build mother's confidence**-breasts will improve and become softer.
  - Explain & assist the baby to suckle BREAST not nipple (correct Latch on).
  - If difficult Latch on, be patient, & try again.
  - Pull back on breast tissue so nipple will come out.
  - Assist to breastfeed while the woman laidback or side-lying positions especially if large breasts.
  - Roll the nipple between thumb and index finger and immediately touch it with moist cold cloth, may help the nipple to come out.
  - Use both hands on each side of the breast to make a "sandwich" to squeeze the nipple and areola.
  - Let baby explore breast, skin-to-skin contact.
  - Help mother to position baby to breast feed with in the first ½ an hour after birth.
  - Help her to make nipple stand out more before a feed by 20 cc syringe or pump.

- For the first week or two:
  - Encourage on demand feeding.
  - Try different positions to hold the baby e.g. underarm.
  - Use syringe method or pump to pull out the nipple before feeding.
  - Use breast pump for several minutes to draw the nipple out.
  - Wear the nipple shield between feedings to keep the nipple out.
  - If the above didn't work, try using nipple shield while breast feeding.
  - If One breast is easier for the baby to grasp, breastfeed on that side. Pump the other side with deeply inverted nipple until adhesions loosen and nipple is out.
  - If both nipples are inverted, pump or express breast milk and feed with cup for the first few days; 8 or more times/24hours. Pumping/expression should be thorough & frequent.
  - Express breast milk into baby's mouth.

If baby is able to suckle:

- Feed frequently; help with positioning and attachment, use different positions.
- Start feeding from the engorged breast.
- Breastfeeding with no restrictions and on demand.

If baby is not able to suckle or suckling is not enough to empty the breast:

- Express milk before starting breastfeeding and give it to the baby by spoon/cup.
- Express milk by hand after each feeding.

Before feed to stimulate oxytocin reflex

- Warm compress on breasts or warm shower.
- Massage to neck and back.
- Light massage of breast.
- Stimulate nipple skin.
- Help mother to relax.

After feed to reduce edema

- Cold / ice compress on breasts for 20 minutes, then take it off for 20 minutes and repeat.
- Encourage wearing a supportive bra to hold the breast in position.
- Apply cabbage leaves on the engorged breast that might relieve engorgement.
- Stand in the shower, and let hot water between shoulder blades. Milk may leak out in the shower.

3.3	Sore nipples and nipple fissures

The midwife/nurse will

- Observe, assess, assist and correct the position.
- Assist the woman to breastfeed immediately after birth.
- Assist for correct latch on.
- Teach to break down sucking before taking the baby off the breast.
- Offer the least sore breast first.
- Reduce engorgement-suggest feed frequently, express milk.
- Encourage continuation of breastfeeding.
- Wash breasts only once a day & dry very well, and avoid using soap, or alcohol.
- Expose the breast to air after massaging a drop of breast milk on the nipple.
- Rub hind-milk on areola after feeds to avoid medicated lotions and ointments.
- Pain usually reduces after 7-10 days postpartum.

If not improved after 24h or developed fever or more severe symptoms, refer to the physician.

Look for a cause:

- Check attachment.
- Examine breasts-engorgement, fissures, Candida.
- Check baby for Candida, and tongue-tie.

Give appropriate treatment:

- Build mother's confidence.
- Improve attachment and continue breastfeeding.
- Reduce engorgement-suggest feed frequently, express milk.
- Treat for Candida if skin red shiny, flaky; if there is itchiness, or deep pain during or after feeding, or if soreness persists.

Treat candida as shown in the following box.

Treatment of Candida of the Breast

- Gentian violet paint:
  - To baby's mouth: 0.25% apply daily or alternate days for 10-14 days or until 3 days after he lesions have healed.
  - To mother's nipples: 0.5% apply daily for 10-14 days

OR

- Nystatin cream 100,000 IU/G:
  - Apply to nipples 4 times daily after breastfeeds
  - Continue to apply for 7 days after lesions have healed
- Nystatin suspension 100,000 IU/ml:

  Apply 1 ml by dropper to child's mouth 4 times daily after breastfeeds for 7 days, or as long as mother is being treated.
- Stop using pacifiers, teats, and nipple shields

3.4	Mastitis

Prescribe antibiotics & analgesics.

Antibiotic Treatment for infective Mastitis	
The commonest bacteria found in the breast is staphylococcus aureus. Therefore, it is necessary to treat breast infections with a penicillinase-resistant antibiotic	
Drug	**Dose Instructions**
Flucloxacillin	250 mg orally, Every 6 hours for 7-10 days
Erythromycin	250-500 mg orally, Every 6 hours for 7-10 days
Cephalosporin	250-500 mg orally, Every 6 hours for 10-14 Days
Cefaclor	250-500 mg orally, Every 8 Hours for 10-14 days.
Ibuprofen may help reduce inflammation and or **Paracetamol** for pain	

Improve drainage of breast by:

- Look for cause:
  - Poor attachment or incorrect sucking.
  - Pressure from clothes or fingers or position of sleeping or lying down or trauma of the nipple.
  - Large, pendulous breasts draining poorly

- Advice (whether or not you find a cause)"
  - Frequent breast-feeds initiating from the affected side. Feeding might clear the blocked duct.
  - Continue breastfeeding from affected side 8-12 times/24 hours.
  - Continue breastfeeding even though there is bloody discharge from the nipples if the affected breast is painful start with other one.
  - Gentle massage on the lumpy breast towards the nipple before and during the breastfeeding.
  - Advise warm compresses before breast feeding & cold compresses after feeding.
  - Change of feeding position to help remove milk around the breast.
  - Wear well-fitted supportive bra, not too tight or underwire bra.
  - Rest the mother not the breast.
  - Apply cold/ice packs reduce inflammation and swelling.

- **In case of breast abscess**, advise surgical treatment (incision & drainage).
- **In case of fungal infection**, prescribe anti-fungal treatment (see page 62).

Topic Six: Early Essential Immediate Newborn Care (EENC)

1. **Newborn care from 0 seconds to discharge**
   - 1.1. First 30 seconds
   - 1.2. From 30 seconds to 3 minutes
   - 1.3. Within 90 minutes
   - 1.4. From 90 minutes to 6 hours
   - 1.5. Examination of newborn

2. **Newborn resuscitation**

For more details, please refer to the National Neonatal protocol.

1.	Newborn care from 0 seconds to discharge
Standard Statement	All newborns should be assessed by skilled midwives and nurses, and referred to physician care whenever necessary
	Special care for delivered according to sequence time bands

1.1	First 30 seconds

The midwife will:

- Call out time of birth.
- Immediately dry the baby (starting within the first 5 seconds after birth), as follows:
  - use a clean, dry cloth and dry the baby thoroughly;
  - wipe the eyes, face, head, front, back, arms and legs; and
  - do a quick check of baby's breathing while drying (see below).
- Remove wet cloth and place baby in skin-to-skin contact with the mother.
- Cover the baby and mother with a clean warm cloth.
- Cover the baby's head with a bonnet.
- **DO NOT:**
  - do not routinely suction during the first 30 seconds:
  - do not suction unless the mouth/nose is/are blocked; and
  - do not suction meconium unless the baby is not vigorous.

1.2	From 30 seconds to 3 minutes

IF after thorough drying and stimulation (as close to 30 seconds as possible), newborn is gasping or is not breathing:

- Start of positive pressure Ventilation
- Call for help.
- Clamp and cut the cord with sterile scissors and with sterile gloves.
- Transfer to warm, firm surface.
- Inform the mother in a kind and gentle tone that the baby has difficulty breathing and that you will help the baby to breathe.

IF breathing or crying:

- If baby is breathing normally or crying, avoid manipulation such as routine suctioning that may cause trauma or introduce infection.
- Continue skin-to-skin contact with the baby prone on the mother's abdomen
- or chest.
- Postpone routine procedures such as weighing and measurements.
- Turn the baby's head to one side.
- Keep the baby's back covered with a blanket and head with a bonnet.

NOTES:

- **Do not:**
  - Do not separate baby from the mother as long as the baby is well – i.e. does not exhibit severe chest in-drawing, gasping or apnea, or severe malformation – and the mother does not need urgent medical stabilization.
  - Do not wipe off the vernix, if present.
  - Do not bath the baby during the first 24 hours of life.
- **If an identification band is used, place on the baby's ankle.**
- **If the baby must be separated from his/her mother, clamp and cut the cord and put the baby on a warm surface in a safe place close to the mother.**
- **Assist with multiple births - If there is another baby/ies, get help. Deliver the next baby. Manage as in a multiple pregnancy.**
- **Do appropriately timed cord clamping and cutting:**
  - Ensure gloves are sterile when touching or handling the cord.
  - If single health worker, wear double sterile gloves: remove soiled set of gloves prior to touching or handling the cord.
  - If other health worker: wash hands and use sterile gloves.
  - Clamp and cut the cord after cord pulsations have stopped (between 1– 3 minutes), as follows:
    - Apply a sterile plastic clamp or tie around the cord at 2 cm from the umbilical base;
    - Drain the cord of blood by stripping away from the baby;
    - Apply the second clamp at 5 cm from the umbilical base (which is 3 cm from the first clamp);
    - Cut close to the first clamp or tie using sterile scissors; and
    - Apply a second tie if there is oozing blood.
    - Put soiled instruments into a decontaminating solution.

1.3	Within 90 minutes

- Leave the baby on mother's chest in skin-to-skin contact, with the head turned to one side and mother in a semi-upright position, or on her side.
- Observe the baby. Only when the baby shows feeding cues (e.g. opening of the mouth, tonguing, licking, rooting), suggest to the mother to encourage/nudge her baby towards the breast.
- Provide breastfeeding support to ensure good positioning and attachment.
- When the baby is ready, advise the mother to:
  - Make sure the baby's neck is not flexed or twisted;
  - Make sure the baby is facing the breast with the baby's nose opposite
  - her nipple and chin touching the breast;
  - Hold the baby's body close to her body;
  - Support the baby's whole body, not just the neck and shoulders;
  - Wait until her baby's mouth is opened wide; and
  - Move the baby onto her breast, aiming the lower lip well below the nipple.
  - Look for signs of good attachment and suckling (See breastfeeding chapter).

NOTES:

- **IF** attachment or suckling is not good, try again, and reassess.
- Do not leave the mother and baby alone. Monitor breathing and warmth.
- **IF** the baby has signs of illness or does not show readiness to feed within 90 minutes, EXAMINE the baby and MANAGE urgent conditions.
- **IF** the breast is engorged, express a small amount of breast milk before starting breastfeeding to soften the areola area so that it is easier for the baby to attach.

Additional care:
For a visibly small baby or a baby born at < 36 week:

- Encourage the mother to keep the baby in skin-to-skin contact;
- Provide extra blankets to keep the baby warm;
- Do not bath the baby; and
- Ensure hygiene by wiping with a damp cloth, but only after 24 hours.

IF the mother is not in a condition allowing her to keep the skin-to-skin contact:

- Wrap the baby in a clean, dry, warm cloth;
- Place in a cot;
- Cover with a blanket; and
- Encourage another family member to keep the baby in skin-to-skin contact or use a radiant warmer if room is < 28 °C.

Prepare a very small baby (< 1500 g or a baby born > 2 months early) for referral. Keep the baby in skin-to-skin contact or in an incubator while waiting for referral

NOTE: Low-birth-weight (LBW) babies weighing >1200 g who do not have complications should be maintained in skin-to-skin contact with the mother or other family member immediately after birth, after drying them thoroughly to prevent neonatal hypothermia.

1.4	From 90 minutes to 6 hours

- After the baby has detached from the breast:
  - Wash hands;
  - Thoroughly examine the baby;
  - Put an identification tag around the ankle; and record.
  - Weigh the baby and give vitamin K prophylaxis:
  - Once 1 ampoule (1 mg/0.5 ml or 1 mg/ml)
  - For preterm neonates give 0.4 mg/kg IM (maximum dose, 1 mg).
  - Explain to the mother that you will be injecting vitamin K to prevent bleeding
  - Explain to her that there may be soreness at the injection site or other minor side-effects, but that these are uncommon and that the benefits of getting the injections outweigh the risks.
  - Ensure that there is no excessive bleeding before leaving the baby and mother.
  - Wash hands and record the injections.

1.5	Newborn examination

- Explain to the mother that you will examine her baby and checking for birth injuries and/or malformations, especially those that need additional care or early referral.
- **Examine the following:**

Vital signs	Heart rate, temperature
Look at the eyes	**If there is minimal discharge** use warm saline compressors. **If eyes are swollen and draining pus** refer/Consult appropriate care
Umbilical stump	
Birth injuries	Bruises, bumps, arm movement
Abdomen	For distension
Skin	For cuts or bruises
Mouth	for cleft lip / palate
Any other malformations	

  - Inform the mother of your examination findings.
  - Reassure her or refer as necessary.

NOTES:

- Do not touch the baby unless there is a medical indication.
- Do not give sugar, water, or formula.
- Do not give bottles or pacifiers.
- Do not throw away colostrum.
- If the mother is HIV-positive, take measures to prevent mother to-child transmission. Do counselling and testing.

- **Dry cord care:**
  - Do not bandage the stump or abdomen.
  - Avoid touching the stump unnecessarily.
  - **Instruct women to:**
    - Wash Hands
    - Keep cord stump loosely covered with clean clothes;
    - Fold diaper below the stump;
    - Cleaning the stump with alcohol is not recommended;
    - Wash stump with clean water and soap, only if it is soiled and dry it thoroughly with a clean cloth;
    - Seek care if the umbilicus is red or draining pus;
    - Treat local umbilical infection 3 times a day;
    - Gently wash off pus and crusts with boiled and cooled water, and soap.
    - **Consult or refer for appropriate care if pus or redness worsens or does not improve in 2 days.**

Advice on staying in the facility

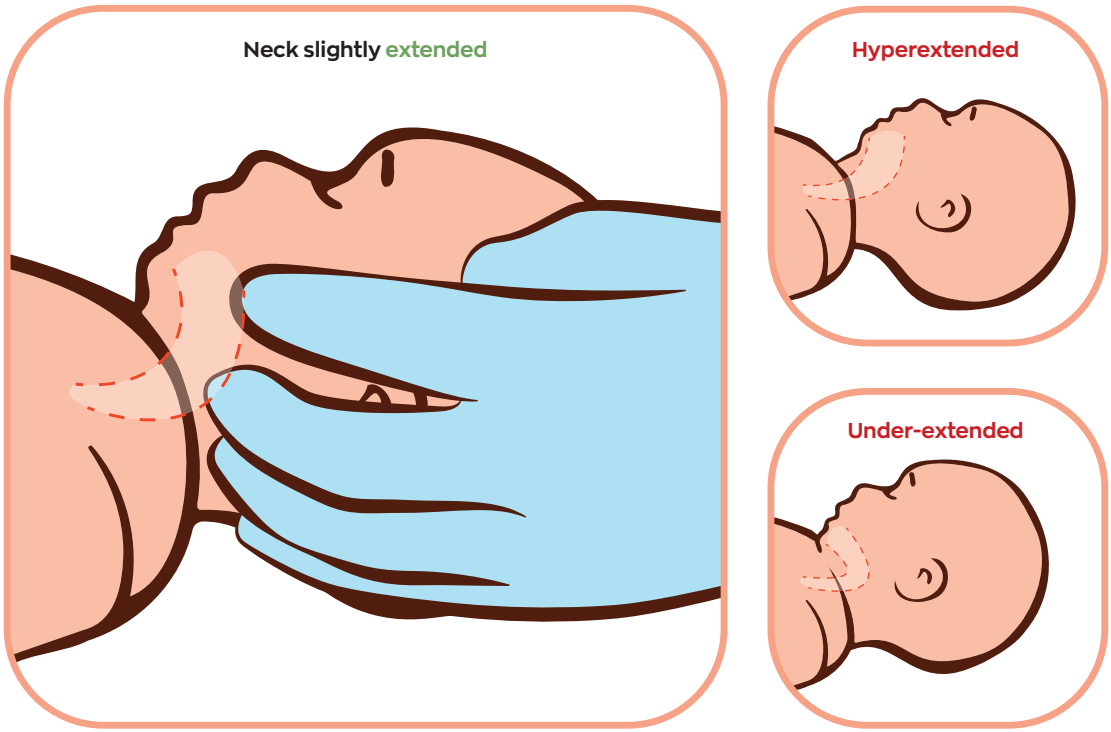
After an uncomplicated vaginal birth, advise the mother that she and her healthy baby should receive care in the birthing facility **for at least 24 hours.**

2.	Newborn resuscitation
Standard Statement	Health professionals should all be trained on neonatal resuscitation by an official trained key personnel

- **IF baby is gasping or not breathing after thorough drying and stimulation (for as close as possible to 30 seconds):**
  - Call for help and explain gently to the mother that her baby needs help to breathe.
  - Clamp and cut the cord immediately to allow effective ventilation to be performed.
  - Transfer the baby to the resuscitation area (a dry, clean, and warm surface).
  - Keep the baby wrapped or under a heat source, if available.
  - Consider immediate referral at any point, where feasible.

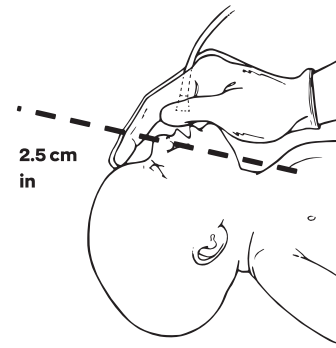
- **Open airway Clear the airway only if it is blocked:**
  - Position the head so it is slightly extended.
  - Only if the mouth/nose are blocked, introduce the suction/tube:
    - first, into the baby's mouth 5 cm from the lips and suck while withdrawing;
    - second, 3 cm into each nostril and suck while withdrawing;
    - repeat once, if necessary, taking no more than a total of 20 seconds; and
    - do tracheal suctioning, where feasible.

Neonatal Position for Opening the Airway
" Neutral Position"



- **DO NOT do routine suctioning of the mouth and nose of babies with:**
  - clear amniotic fluid if they are breathing on their own;
  - clear amniotic fluid prior to positive pressure ventilation if mouth and nose are free of secretions;
  - meconium staining if they have started breathing on their own, meaning that they are vigorous.

Free flow Oxygen with Tubing and Cupped hand

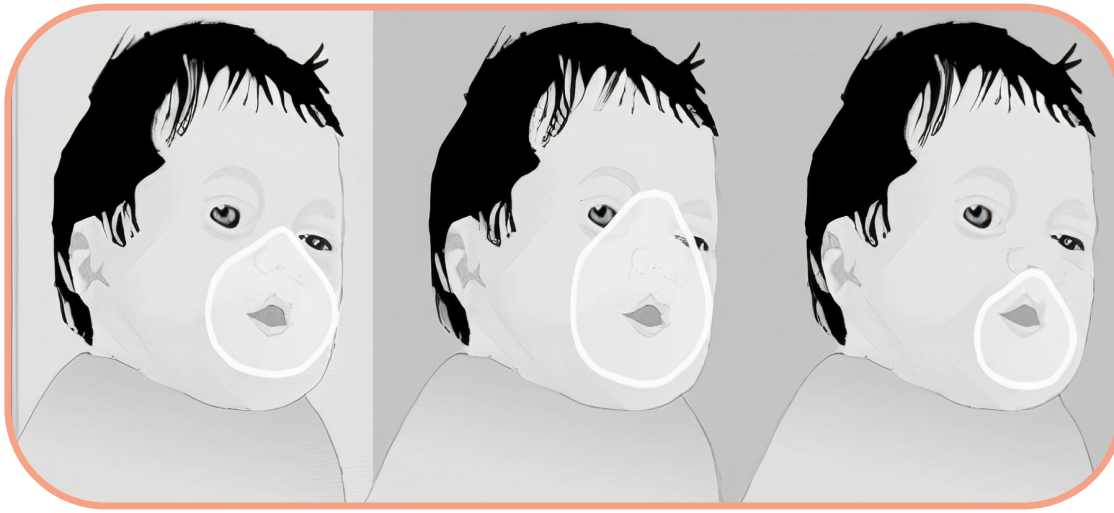


- O_2 flow rate 5L/min
- Oxygen remains concentrated at baby's face
- Hold 2.5cm from face
- As color improves gradually withdraw tubing

- **Ventilate, if still not breathing:**
  - Start bag/mask ventilation within one minute after birth:
  - for babies < 32 weeks, it is preferable to start with 30% oxygen, where feasible.
  - Place mask to cover chin, mouth and nose to achieve a seal.
  - DO not cover the eyes.
  - Squeeze bag attached to the mask 2–3 times with two fingers or whole hand, according to bag size.
  - Observe rise of chest.

IF chest is not rising → first, reposition the baby's head.
IF chest is still not rising → check for adequate mask seal.
IF chest is still not rising → squeeze bag harder.
IF chest is rising → ventilate at 40 breaths per minute until baby starts crying or breathing.

Place mask to cover chin, mouth, and nose to achieve a good seal



Correct:
Covers mouth and nose, but not eyes

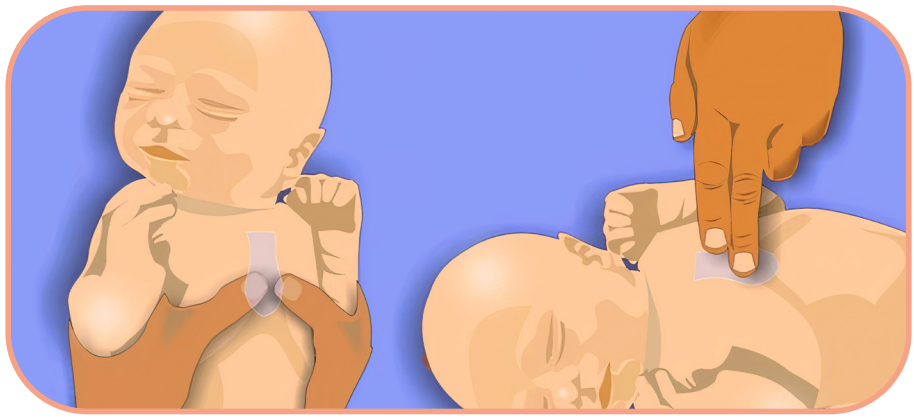
Incorrect:
Too large - covers eyes

Incorrect:
Too small - does not cover mouth and nose

- Check breathing; and check heart rate every 1–2 minutes of ventilation.
  - Assess chest rise.
    - Assess heart rate:
    - if heart rate is < 100 per minute, take ventilation corrective steps (see below); or
    - if heart rate is < 60 per minute, where feasible give supplemental oxygen, **chest compressions**, other ventilatory support and medications.

Cardiac Compression

Two-thumbs technique preferred



- **IF baby fails to improve** → follow ventilation corrective steps.
  Ventilation/ corrective steps:
  - Check position of the head.
  - Check for adequate mask seal.
  - Check for blocked airway.
  - Check resuscitator bag.

- **If the baby starts breathing or crying and has no chest indrawing, stop ventilation.**

Observe to ensure that the baby continues to breathe well. Then:

- return the baby to the mother's chest on skin-to-skin contact;
- exclude a second baby, give oxytocin (if not already given);
- wash hands, re-glove and trim the cord, as needed.

IF the baby is gasping or not breathing, or has severe chest in-drawing:

- Continue bag/mask ventilation.
- Continue assessing at regular intervals while transporting, and
- Where feasible, consider supplemental oxygen, chest compressions, other ventilation support and medications.

IF after 10 minutes of effective ventilation, the heart rate remains zero:

OR

IF after 20 minutes of effective ventilation, the baby does not start to breathe or gasp and heart rate is < 60 per minute:

- STOP bag/mask ventilation;
- explain to the mother in a kind and gentle tone that despite all attempts you were unable to help her baby to breathe;
- provide comfort care, including and psychosocial support; and
- **record the event.**

NOTES:

- While ventilating, refer and explain to the mother what is happening, what you are doing, and why.
- Ventilate, if needed, during transport.
- Record the event on the referral form and labor record.

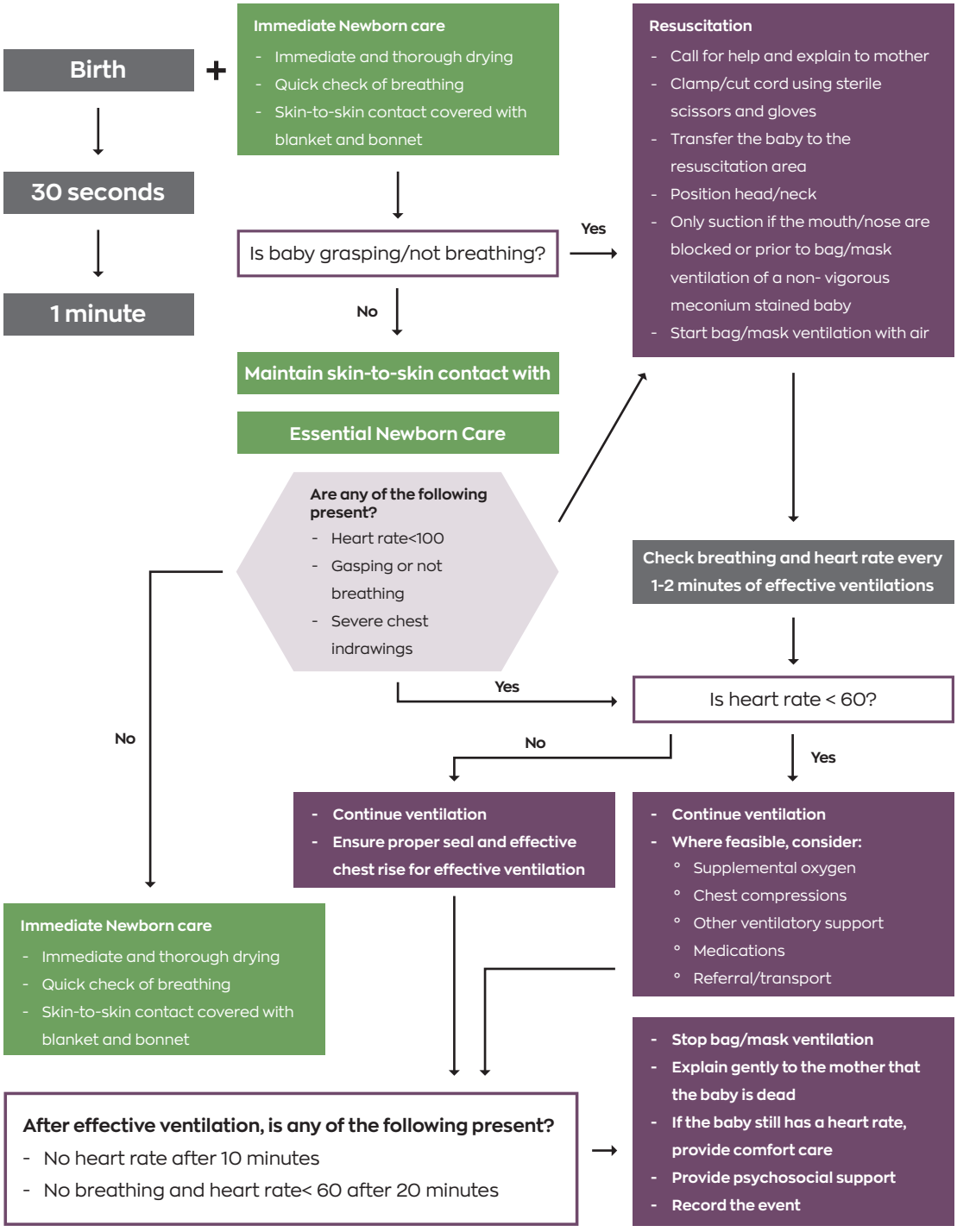


Figure 13 Neonatal resuscitation flowchart

Topic Seven: Antibiotic prophylaxis in obstetrical surgical procedures

1. General principles
2. Antibiotic regimens per procedure

Antibiotic prophylaxis in obstetrical procedures	
Care group	women undergoing elective/emergency obstetric procedures.
Standard Statement	Prophylactic antibiotic has been shown to decrease the postoperative morbidity.

1. General principles

- Antibiotic prophylaxis should be given for all Cesarean section deliveries.
- Prophylaxis should be administered within 60 min before the start of Cesarean section.
- Single dose of a targeted antibiotic, such as 1st generation cephalosporin the first line of antibiotic of choice unless allergy is present.
- For women with allergy to cephalosporin and penicillin, Clindamycin with Gentamycin is a reasonable alternative.
- If the procedure is longer than one hour or the estimated blood loss during surgery >1500 ml, an additional dose of prophylactic antibiotics may be given 3 to 4 hours after the initial dose.
- In patients with morbid obesity BMI >35, doubling the antibiotics dose maybe considered (weight adjusted).
- Antibiotics should be prescribed and signed for administration
- on the patient's medicine Kardex (treatment sheet).
- The midwife must check on the patient's return from theatre that
- the patient has received the antibiotics.
- If prolonged PROM, swab and culture for both maternal and fetal side of placenta and a second dose of IV antibiotic may be considered.

2. Antibiotic regimens per procedure

Guideline for perioperative antibiotic prophylaxis in obstetrical procedures

No.	Procedure	Antibiotic regimen
1	**Emergency or elective CS**	• A single dose of Cefazolin 1-2 g IV is given 15-60 minute prior to skin incision. • If not possible (e.g., emergency CS), administer as soon as possible after the incision • In case of **ALLERGY** a single dose of combination of Erythromycin 500 mg IV or 600mg + Gentamycin 1.5mg/kg (120mg) IV after clamping the cord. • If **blood loss exceeds 1500 ml** or the procedure lasts for **more than one hour**, or patient is with **uncontrolled DM**: second dose of the Cefazolin 1-2 gm IV is recommended after 3 hours. • Morbidly obese patient (BMI > 35): Double the dose of Cefazolin (2 gm) is given 60 minutes prior to skin incision.
5	**Manual removal of placenta**	A single dose of Cefazolin 1-2 g IV is given 15-60 minute before removal of the placenta.
6	**Repair of third- or fourth-degree perineal laceration**	A combination of Ceftriaxone 1 g IV and Metronidazole 500 mg IV is given intra-operatively and to be repeated 12hrs after procedure.
7	**Cervical cerclage**	a. No antibiotic prophylaxis is recommended before 18 weeks gestation. b. If patient > 18 weeks a single dose of combination of Cefazolin 1gm + Metronidazole 500 IV is recommended.
8	**Episiotomy without operative delivery**	Not recommended
9	**Operative vaginal delivery with episiotomy (forceps or vacuum extraction)**	A single dose of 1 g amoxicillin and 200 mg clavulanic acid IV is recommended as soon as possible and no more than 6 h after giving birth.
10	**Postpartum evacuation & curettage (E&C)**	Insufficient evidence to argue for or against the use of prophylactic antibiotics. **HOWEVER,** based on the clinical circumstances we do recommend a single dose of Cefazolin 1-2 g IV is given 15-60 minute before the procedure.

CHAPTER II MANAGEMENT OF HIGH RISK PEGNANCY

Topic One: Medical conditions in pregnancy

1. Anemia in pregnancy
2. Pre-gestational Diabetes in pregnancy
3. Urinary tract infection and asymptomatic bacteriuria
4. Heart disease
5. Bronchial asthma
6. Epilepsy
7. Thrombophilia
8. Cancer in pregnancy

1.	**Medical conditions in pregnancy**
Definition	Health problems related to pregnancy including preexisting chronic conditions and conditions that develop during pregnancy
Standard statement	All pregnant women with medical conditions should receive proper screening and medical care for a healthy maternal and fetal outcome

1.1	**Anemia in pregnancy**

- **AIM:** to maintain optimal hemoglobin level for delivery (not applied to hemoglobinopathies).

- **Definition:**

Hemoglobin concentration less than 11g/dl	
Mild anemia	Hb: 9-10.9 gm/dl
Moderate anemia	Hb: 7-9 gm/dl
Severe anemia	Hb: <7 gm/dl

The physician should be informed of all cases of moderate and severe anemia

Treat and consult with medical specialist/hematologist if any known case of:

- Hemolytic anemia
- Aplastic anemia
- Anemia of chronic disease
- Anemia with SLE
- Anemia due to hemoglobinopathies

- Check Complete Blood Count (CBC) **at booking antenatal** visit.
- Recheck CBC at 28 weeks and 36 weeks gestation:
  - **If Hb is > 11 g/dl** → No further Hb check is required.
  - **If Hb concentration < 11 g/dl and serum ferritin concentration <30 µg/L** indicate iron deficiency anemia → treat according to degree of anemia and gestational age.
  - **If Severe anemia (< 7 g/dl) at any gestational age needs:**
    - Hematological consultation
    - Blood transfusion
    - Further iron/folate supplementation.

I. Mild and moderate anemia before 34 weeks:

- Treat with elemental oral iron (100-200mg elemental iron and Folic acid 350-400 mcg) + Iron rich diet
- Recheck Hb after 2-4 weeks (Hb should increase by 0.8 g/dl/week).
- If Hb increases

  Continue on therapeutic dose for two months.
- if no Hb increase:
  - If Non-compliance and/or intolerance of iron preparation → change iron preparation/confirm compliance) and repeat Hb after two weeks, if no response consider hemotalogic consultation and parental iron.
  - If no Hb increase in spite of good compliance and tolerance → double the iron dose and repeat Hb after two weeks → if not increasing → consider causes of anemia other than nutritional and refer for Medical/Hematological evaluation.

- **Parenteral iron should be considered from the 2nd trimester onwards and during the postpartum period for women with confirmed iron deficiency anemia who fail to respond to or are intolerant of oral iron.**
- **Contraindications to parental iron:**
  - History of anaphylaxis or reaction to parental iron
  - First trimester of pregnancy
  - Active acute or chronic infection
  - Chronic liver disease

II. Mild and moderate anemia after 34 weeks:

- Treat with elemental oral iron 100-200mg elemental iron BID (twice daily) and Folic acid 350-400 mcg OD (once daily)
- If not responsive to maximum dose of elemental oral iron, consider parental iron.
- Upon admission in labor, cross match two units of Packed RBC
- to be ready for transfusion if need arise.
- If need for transfusion does not arise during labor, check Hb on the 1st day post delivery, transfuse if Hb < 7 g/dl, otherwise discharge on therapeutic iron dose and folic acid.

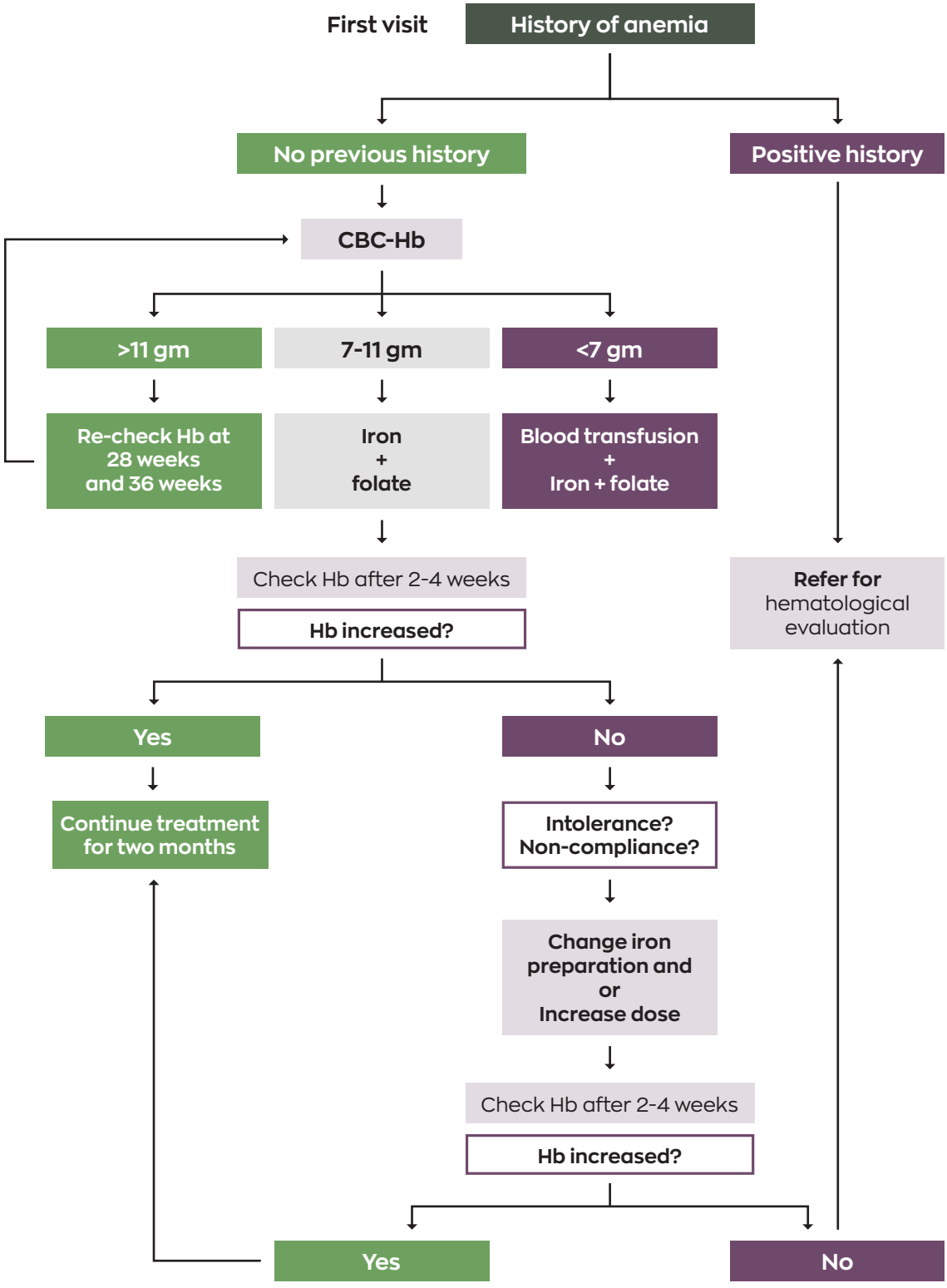


Figure 14 Anemia algorithm

1.2	Pre-gestational Diabetes in pregnancy

Please refer to Diabetes in Pregnancy National Protocol for a detailed guidance and information.

- **Pre-conception assessment, counselling and management**

  - Preconception services should be available for all women with established DM type I and II who are planning to conceive.
  - Diabetic women should be educated and counseled about the following:
    - Maternal and fetal implications and risks
    - Importance of proper management and control of diabetes, to achieve optimal glycemic control prior to conception to reduce the risk of abortions, congenital anomalies and complications of pregnancy.
    - Family planning needs: Women with poor glycemic control should use effective birth control.
    - Maximizing glucose control. **Aim at HbA1c <7%.**
    - Self-monitoring of blood glucose
    - Maintaining optimal weight
    - Evaluation for vascular complications
    - Monitoring for progression of retinopathy, screening for nephropathy
    - Modification of drug treatment if pregnancy is planned. **Oral hypoglycemics should be changed to insulin.**
    - Regular exercise program
    - Tobacco use cessation
    - Folic acid supplements of 5mg/d from preconception to 12 weeks gestation

  - **Refer to the figure below for preconception management of Pre-gestational DM**

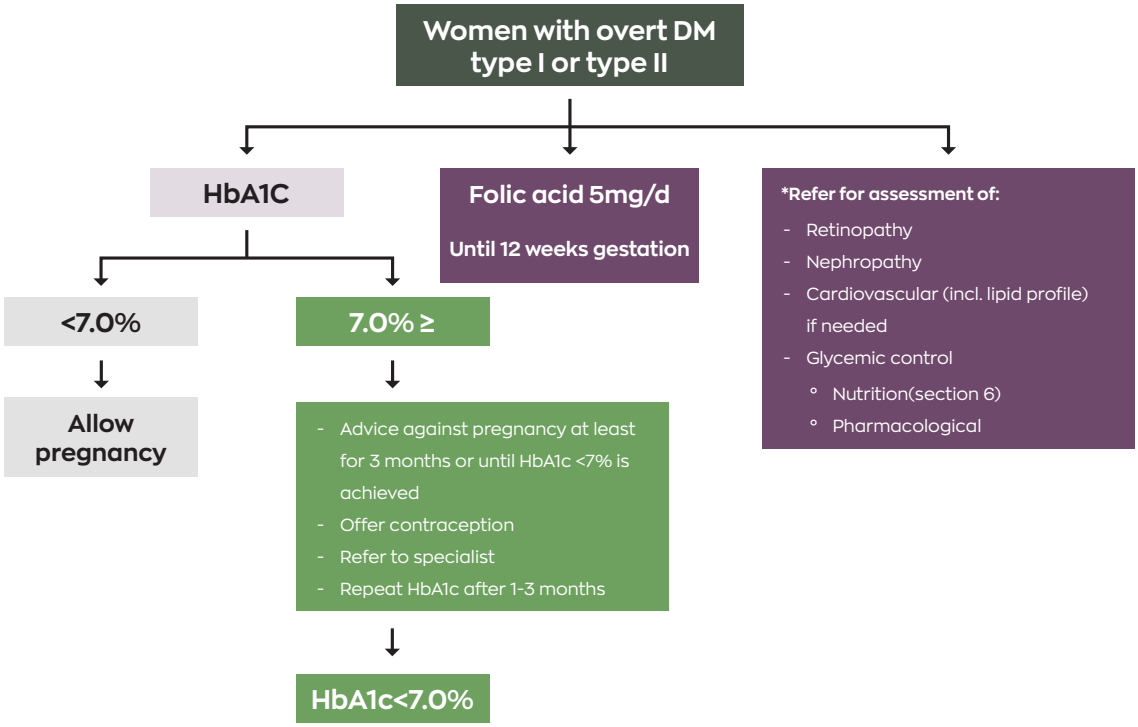


Figure 15 Preconception management of DM

- **Management in Pregnancy**
  - Pregnant women with type 1 or type 2 diabetes should:
    - Be cared for by a multidisciplinary team including obstetricians, endocrinologist/ diabetologist and other specialists upon need.
    - Receive an individualized insulin regimen and glycemic targets typically using intensive insulin therapy. **Refer to DM in pregnancy national protocol for insulin types and regimens allowed in pregnancy.**
    - Strive for target glucose values:

Target glucose values	
Fasting PG	< 92 mg/dl (5.1 mmol/L)
1h postprandial PG	< 140 mg/dl (7.8 mmol/L)
2h postprandial PG	< 120 mg/dl (6.7 mmol/L)

    - Advise pregnant women with diabetes who are taking insulin to maintain their capillary plasma glucose level not less than72mg/dl.
    - Be prepared to raise these targets if needed because of the increased risk of severe hypoglycemia during pregnancy.
    - Recommend self-monitoring of glucose both pre- and postprandially, to achieve glycemic targets and improve pregnancy outcomes.

- Course of antenatal care for women with pre-gestational DM

Time of intervention	Intervention
Booking visit ideally <10 weeks	Retinal and Renal assessment if not undertaken in the past 6-12 months
11-13^{+6}	• Combined test (incl. nuchal translucency for fetal anomaly) • Aspirin 100mg/d until 36 weeks
16-20 weeks	Retinal and Renal assessment
20-23 weeks	• DUSS and fetal echo • Screening for hypertensive disorders (urine dipstick for protein and BP)
28 weeks and every 2-3weeks	• Fetal growth scan • CTG • Amniotic fluid volume assessment • Screening for hypertensive disorders (urine dipstick for protein and BP)
36 weeks	• Fetal growth scan • CTG • Amniotic fluid volume assessment • Screening for hypertensive disorders (urine dipstick for protein and BP) • Discuss timing and mode of delivery

- **SPECIAL NOTES IN RAMADAN**
  - In Ramadan, patients on insulin should be advised not to fast.
  - In Ramadan and for those who insist to keep their fasting, insulin regiment would be altered to:
    - **Insulin morning dose to be given before breaking the fasting (Maghreb Fatour time)**
    - **Evening Dose to be given before sahour time**

- **Intra-hospital management of uncontrolled diabetic women**
  - Patients admitted for control of blood sugar, should be started on diabetic diet and Blood Sugar Profile (BSP) including measurement of Fasting blood Sugar, 1 hour postprandial (Post lunch, post dinner), and bedtime (e.g. FBS, I pm, 7 PM, 11:30 PM).

- Sliding scale is a good option for known diabetic patients who need to be shifted from oral hypoglycemic to Insulin and those with very high blood glucose levels.
- Sliding scale helps to calculate the average daily dose in order to decide on the appropriate insulin regimen and doses (please see insulin regimens and doses in the National DM in pregnancy protocol).

- Sliding -Scale

Blood sugar	Subcutaneous Regular insulin
<150 mg/dl	**No insulin**
160-200 mg/dl	**4 Units**
201-250 mg/dl	**8 Units**
251- 300mg/dl	**12 Units**
301- 350 mg/dl	**16 Units**
Levels of more than 350mg/dl requires consultant consultation	

- Detection of signs of complications
  - **Hypoglycemia**
    - **(Perspiration, headache, tachycardia, tremor)**
    - **Always keep a juice beside the patient**
  - **Ketoacidosis**
    - **(drowsy, stupor or coma. Acidotic breathing, dehydration, urine sugar & ketones)**

In Case of any of these complications occur. See the box below

To correct ketoacidosis	To correct hypoglycemia
1. Seek senior and medical help 2. The main 3 goals are: 3. Urgent investigation: serum glucose, bicarbonate, U&E, ABG & urine for sugar and ketones 4. Correct dehydration with normal saline, 6-7 liters might be needed 5. Intravenous infusion of insulin at a weight-based fixed rate (0.1 unit/kg body weight) until ketosis has subsided. 6. If blood glucose fall below 250 mg/dL (14 mmol/L), 10% glucose should be added to allow for the continuation of fixed- rate insulin infusion. 7. Insulin Fixed dose & Bicarbonate should be continued until the condition is stable, pH exceeds 7.3, and bicarbonate is greater than 18 mEq/L, and the patient is allowed to eat and retain a meal preceded by a subcutaneous (SC) dose of regular insulin. 8. Potassium should be monitored regularly and maintained between 4-5 mg/dl.	1. Make the patient take 10-15gm of fast acting carbohydrates (equivalent 7 jelly beans/sweet or half cup of fruit juice). 2. Check BS 15 min later, and repeat first step until level is maintained at 70mg/dl 3. Make patient take slow acting carbohydrates like a slice of bread to maintain their BS.

- **Timing and mode of delivery**
  - **Time of delivery:**
    a. **At 38 weeks:**
      - **For patients on with good control and with no complications or indications for earlier deliveries.**
      - **Fetal macrosomia is not an indication for premature delivery because termination of pregnancy does not improve maternal or fetal outcomes.**

    b. **At < 37 weeks:**

Indication
Poor glycemic control
Vasculopathy
Nephropathy
Prior IUFD/ stillbirth
Fetal compromise/ distress

  - **Mode of delivery:**
    - Diabetes is not considered a contraindication to vaginal birth or VBAC in the absence of any other obstetric indications.
    - **Vaginal delivery is recommended** for uncomplicated well-controlled diabetes with estimated fetal weight < 4 Kg.
    - Low threshold for CS if no satisfactory progress of labor (See LCG,).
    - Cesarean section maybe considered for women with previous history of shoulder dystocia.

- **Management of delivery**
  Management during vaginal delivery

- Aim is to keep the BS level between 72-126 mg /dl (4-7 mmol/l)
- Continuous CTG during labor.
- The neonatologist should attend all deliveries.

  - Immediate Random blood sugar (RBS) & hourly thereafter.
  - The result to be obtained urgently.
  - Women should receive adequate glucose during labor in order to meet their high-energy requirements.
  - Consider intravenous dextrose and insulin infusion from the onset of labor for women with DM type I and II.
  - Give 5 units of regular insulin in 500 ml of 5 % Dextrose water (D/W)
  - Start at a rate depending on the RBG and as follows:
    - If blood glucose is 72-126 give100ml 5%D/W per hour equivalent to 1 Unit of insulin per hour.
    - If blood glucose is > 126 mg/dl, double the dose 200 ml of 5% D/W per hour equivalent to 2 Units of Insulin per hour.
    - If blood glucose is <72mg/dl, give half the dose, 50 ml of 5% D/W equivalent to 0.5 Unit insulin per hour.

Management during elective cesarean section

- Communicate with the anesthetist.
- Schedule the patient as the first on the elective operation list.
- keep fasting from midnight.
- Withhold the morning insulin dose.
- Check fasting blood sugar and electrolytes at 6 am.
  - If blood sugar <100mg /dl, start 5% Dextrose IV (125 ml /hour).
  - If blood sugar is >100 mg /dl, discuss with anesthetist.
  - If general anesthesia is used for the birth in women with diabetes, monitor blood glucose every 30 minutes from induction of general anesthesia until after the baby is born and the woman is fully conscious.
- Suppression of pre-term labor with beta sympathomimetics and Corticosteroids may lead to severe hyperglycemia and alter the Insulin requirements, these drugs should be used when absolutely, necessary in a carefully controlled clinical setting. Alternative tocolytics are preferred such as Calcium channel blockers (Nifedipine).
- Diabetes is not a contraindication to corticosteroids.

- **Postpartum care**
  - Women with pre-gestational diabetes should be carefully monitored postpartum as they have a high risk of hypoglycemia
  - After delivery of the placenta, decrease the insulin infusion dose immediately to half the rate used during labor.
  - Thereafter, use Sliding Scale to monitor blood glucose levels to find the appropriate insulin dose.
  - Continue with Sliding Scale for 24 hours postpartum.
  - Encourage breastfeeding & explain effect of breastfeeding on blood glucose control and risk of hypoglycemia for diabetic women.
  - Refer women with pre-existing diabetes back to their routine diabetes care arrangements.
  - Metformin and glyburide may be used during breastfeeding.
  - Women with type I DM should be screened for postpartum thyroiditis with a TSH test at 6-8 weeks postpartum.

1.3	**Urinary tract infection and asymptomatic bacteriuria in pregnancy**

- Pregnant women per se are at increased risk of urinary tract infections (UTI).
- Additional risk factors (e.g. immunosuppression, diabetes, sickle cell anemia, neurogenic bladder, recurrent or persistent UTIs before pregnancy) increase the risk for a complicated UTI.
- UTI in pregnancy is associated with increased risk of preterm birth, low birthweight, and perinatal mortality.
- Untreated asymptomatic bacteriuria leads to 70% of symptomatic UTI (40% of acute cystitis and 30% of pyelonephritis in pregnancy).

At booking visit, all pregnant women should be screened for asymptomatic bacteriuria by urine culture.

Category	Definition	Empiric treatment*	Notes
ASYMPTOMATIC BACTERIURIA	Positive urine culture ≥ 100,000 CFU**/m with no signs or symptoms	Cephalexin-500 mg PO 4 times daily 7 days Amoxicillin-500 mg PO 3 times daily 7 days Amoxicillin-clavulanate- 500 mg PO 3 times daily 7 days Nitrofurantoin 100 mg PO 4 times daily 7 days	A urine culture should be repeated seven days after completion of antibiotic treatment as a test of cure
ACUTE CYSTITIS	Signs and symptoms (e.g. dysuria, urgency frequency, suprapubic pain) **AND** pyuria (>10 WBC/hpf***) **AND** positive urine culture ≥100,000 CFU/m	Cephalexin-500 mg PO 4 times daily for 7-14 days Nitrofurantoin 100 mg PO 4 times daily for 7-14 days **Or if the patient is unable to tolerate oral therapy** Cefazolin 1g IV 3 times daily for 7 days	Take a single urine sample for culture before starting empiric antibiotic treatment. A urine culture should be repeated seven days after completion of antibiotic treatment as a test of cure
PYELONEPHRITIS	Signs and symptoms (e.g. fever, flank pain) **AND** pyuria **AND** positive urine culture ≥100,000 CFU/mL Many patients will have other evidence of upper tract disease (i.e. leukocytosis, WBC casts, or abnormalities upon imaging)	Ceftriaxone 1g IV every 12 hours. Once afebrile for 48 hours, patients can be switched to oral therapy (guided by culture susceptibility results) and discharged to complete 10 to 14 days of treatment.	Fever should be managed with antipyretics (preferably, acetaminophen) Nausea and vomiting with antiemetics (doxylamine, and metoclopramide) Preterm labor and delivery are additional risks associated with pyelonephritis. These risks must be evaluated and managed early in the course of admission
RECURRENT UTI IN PREGNANCY	**3** or more uncomplicated UTIs in 12 months.	Nitrofurantoin- 50 to 100 mg PO at bedtime (This Rx should be avoided near term or when delivery is imminent because of the risk of neonatal hemolysis) **OR** Cephalexin-250 to 500 mg PO at bedtime	

Empiric treatment: change guided by urine culture, **CFU**: colony forming unit, **HPF**: high power field

1.4	Heart disease

- Heart disease in pregnancy is uncommon, but it is an important cause of maternal death. It is one of the top five causes of indirect maternal death in Palestine.
- Rheumatic heart disease is declining, but advances in the medical and surgical treatment of children with congenital heart disease have led to an increase in the number of women surviving into the reproductive age.
- **This section deals with two care groups:**
  - **Group 1** All pregnant women at risk of cardiac disease.
  - **Group 2** All pregnant women with confirmed pre-existing cardiac disease.

Pregnant women with cardiac disease should be under strict care of a multidisciplinary team (MDT) that include:

- Consultant obstetrician
- Consultant cardiologist or Obstetric Medical specialist
- Anesthetist
- Whenever necessary, cardio-thoracic surgeon and ICU consultant

Key messages:

- Be aware that the maximum physiologic effects of pregnancy on the heart, take place in the third trimester, labor, and postpartum period.
- Be aware that a stable asymptomatic cardiac patient might deteriorate rapidly in labor, or immediate postpartum and postpartum period, due to physiologic changes including autotransfusion.
- Be aware that 85% of maternal deaths due to cardiac diseases were in the immediate postpartum and postpartum period.
- Be aware that the continuous involvement of the MDT will improve the outcome.

Group 1: all pregnant women at risk of cardiac disease

- Be aware that 90% of mothers who died due to cardiac cause, did not have a confirmed pre-existing cardiac condition.
- The obstetrician should be able to recognize risk factors and red flags symptoms for cardiac disease:

Risk factors for cardiac disease		Red flag symptoms/signs
General risk factors	Obstetric risk factors	
• Advanced maternal age • Obesity • Smoking • Hypertension • Diabetes • Family history.	• Multiple gestation • Pre-eclampsia	• Dyspnea • Orthopnea • Paroxysmal nocturnal dyspnea • Chest pain • Raised respiratory rate • Palpitation and resting tachycardia • Palpitation associated with syncope or dyspnea

- Be aware that 18% of cardiac maternal deaths are attributed to arrhythmias, therefore palpitations should not be underestimated.
- The obstetrician should have a low threshold to consult a cardiologist if he suspects cardiac symptoms.

Group 2: all pregnant women with confirmed pre-existing cardiac disease

I. Pre-pregnancy management (Preconception care):

- Refer the patient to a cardiologist for risk assessment.
- If the cardiologist advises against pregnancy in high-risk cases such as Eisenmenger syndrome, pulmonary hypertension, and Marfan syndrome with aortic root involvement, the patient should be offered a safe contraceptive method. If intrauterine device is selected, insertion should be done in a hospital setting, where dealing with cervical induced bradycardia and hypotension is safer.
- Discuss maternal and fetal risks.
- Review drug treatment, particularly potentially teratogenic drugs.
- Offer genetic counseling to women with congenital heart disease or heritable conditions.
- Commence Folic Acid.
- **Maternal risk assessment** should be done according to the modified WHO risk classification.

Risk class	Risk of pregnancy by medical condition
I	No detectable increased risk of maternal mortality and no/mild increase in morbidity
II	Small increased risk of maternal mortality or moderate increase in morbidity
III	Significant increased risk of maternal mortality or severe morbidity. Expert counselling required. If pregnancy is decided upon, intensive specialist cardiac and obstetric monitoring needed throughout pregnancy, childbirth, and puerperium.
IV	Extremely high risk of maternal mortality or severe morbidity; pregnancy contraindicated. If pregnancy occurs, termination should be discussed. If pregnancy continues, care as for class III.

Modified from Thorne et al
WHO= World Health Organization

Modified WHO classification of maternal cardiovascular risk (Adapted from Thorn et al.)
Pregnancy conditions risk WHO I
Uncomplicated small or mild: • Pulmonary stenosis • Patent ductus arteriosus • Mitral valve prolapse
Successfully repaired simple lesion • Atrial or ventricular septal defects • Patent ducts arteriosus • Anomalous pulmonary venous drainage
Isolated atrial or ventricular ectopic beats
Pregnancy conditions risk WHO II or III
WHO II (If otherwise well and uncomplicated)
• Unoperated atrial or ventricular septal defects • Repaired tetralogy of Fallot • Most arrythmias
WHO II -III (Depending on individual)
• Mild ventricular impairment • Hypertrophic cardiomyopathy • Native or tissue valvar heart disease not considered WHO I or IV • Marfan Syndrome without aortic dilatation • Aorta <45mm in aortic disease associated with bicuspid aortic valve • Repaired coarctation
WHO III
• Mechanical valve • Systemic right ventricle • Fontan circulation • Cyanotic heart disease unrepaired • Other complex congenital heart disease • Aortic dilatation 40-45mm in Marfan Syndrome • Aortic dilatation 45-40 mm in aortic disease associated with bicuspid aortic valve
Pregnancy conditions risk WHO IV (Pregnancy contraindicated)
Pulmonary arterial hypertension of any cause
Severe systemic ventricular dysfunction (LVEF <30%, NYHA III and IV)
Previous peripartum cardiomyopathy with any residual impairment of left ventricular function
Severe mitral stenosis
Severe symptomatic aortic stenosis
Marfan Syndrome with aorta dilated >45mm
Aortic Dilatation >50mm in aortic disease associated with bicuspid aortic valve
Native severe coarctation
LVEF: left ventricular ejection fraction, NYHA: New York Heart Association

II. Antenatal management:

a. First Antenatal Visit:

- Pregnant women with heart disease should be seen at their booking visit by a consultant obstetrician.
- First visit should include detailed history, physical examination, and routine booking visit investigations.
- If the mother has a congenital heart disease, arrange a fetal echocardiogram at 24 weeks.
- **A formal referral to cardiologist must be made to help in the following:**

- Confirmation of the diagnosis if not made before
- Perform risk assessment based on clinical symptoms and tolerance to physical activity (NYHA classification) and the modified WHO risk classification.
- Decide the frequency of cardiology follow up during pregnancy.
- Decide where to deliver the patient, the level of CCU, and whether interventional cardiology is needed.
- Indicate if termination of pregnancy is in the best option for the patient.

New York heart association functional classification (NYHA):

- **Class I** No limitation of physical activity
- **Class II** Slight limitation of physical activity
- **Class III** Marked limitation of physical activity
- **Class IV** Inability to carry out any physical activity without discomfort and have orthopnea.

This classification is only of value if it indicates the severity of condition at the time of classification or if it is reliable in predicting the outcome of pregnancy.

- **Termination of pregnancy** might be considered in high-risk conditions:
  - The decision depends on an individual assessment of the risk of pregnancy and the desire to have a child.
  - The decision should be made by a combined committee of consultant cardiologist and consultant obstetricians.
  - Seek a religious authorization.

b. Subsequent Antenatal Care:

- Pregnant patients with heart disease should be seen by consultant obstetrician every two weeks till 32 weeks, and weekly thereafter till delivery.
- Look for the presence of risk factors for cardiac decompensation and aim for prevention or alleviating their consequences, these include:
  - Infections (urine culture in each trimester)
  - Hypertension
  - Obesity

- Anemia (CBC at each trimester)
- Multiple pregnancy
- Development of arrhythmia or change of classes to worse
- Respiratory disease

- Patients with cardiac disease who may go into cardiac failure, needs hospital care under joint supervision from cardiologist and obstetrician.
- Assess fetal growth and wellbeing clinically and by using serial ultrasound and cardiotocography.

c. Multidisciplinary team meeting at 32 weeks

- The patient should be reviewed by the anesthetist.
- The anesthetist should discuss the options of analgesia during labor including epidural analgesia.
- The anesthetist should discuss the options of anesthesia, in case the mother needed a cesarean section for an obstetric indication.
- The cardiologist should reassess the patient risk again and see if the original management plan needs to be updated.
- The feedback from the anesthetist and the cardiologist needs to be discussed thoroughly with the obstetrician.

Anticoagulation therapy in pregnant women with heart disease:

Consider Anticoagulation (in consultation with cardiologist) in pregnant patients with any of the followings:

a. Pulmonary hypertension (controversial)
b. Artificial valve replacement
c. Those with or at risk of atrial fibrillation.
d. Those with increased a risk of thromboembolism.

- To reduce the teratogenic effect and reduce pregnancy loss, patient should be started on Heparin or LMWH once she becomes pregnant. Continue heparin or LMWH until 13 completed weeks, and then start warfarin from 13-36 weeks. And return to I.V. heparin OR LMWH heparin thereafter.
- Warfarin may not be absolutely contraindicated as in indication (b). Even in the first trimester if Heparin wasn't enough.
- Subcutaneous prophylactic heparin or LMWH is not adequate in patients with prosthetic valves. Warfarin should be used until 36 weeks gestation.
- Aim for INR level of 2.5-3.5 times the control.
- At 36 weeks gestation, the risk of fetal/maternal bleeding is great, hence the patient should be shifted to LMWH.
- Aim for 1.5-2.5 the partial thromboplastin time (PTT) in un-fractionated heparin.

If the patient goes into labour while taking Warfarin.

1. Call the Cardiologist urgently.
2. Check INR 2.5-3.5 times control.
3. Give vit K injection to the mother.
4. Ask Blood Bank to prepare fresh frozen plasma to be given when needed.

Endocarditis prevention

- Antibiotics prophylaxis is not recommended for prevention of endocarditis in patients undergoing obstetrics procedures.
- Any infection in patients at risk of endocarditis should be investigated promptly and treated appropriately.
- Patients at risk include valve replacement, acquired vulvar heart disease with stenosis or regurgitation, structural congenital heart disease, hypertrophic cardiomyopathy, or previous episodes of infected endocarditis .
- These antibiotics should be given only with the present of suspected sepsis for these cardiac conditions (listed above) for LSCS or other procedures such as repair of third and fourth degree tears, manual removal of placenta, EUA or procedures where antibiotics would be routinely given.

Drug Regimes

1. Standard Regime
    - Intravenous Ampicillin 2 gm + Gentamycin (1.5 mg/kg) (not to exceed 120 mg) within 30 min of delivery
    - IV ampiclin 1 gm 6 hrs after delivery.

2. Alternative Regime (If the patient is allergic to penicillin):
    - Intravenous Vancomycin 1.0 g over 1-2 hr plus intravenous + Gentamycin 1.5mg / kg (not to exceed 120 mg) within 30 min of delivery.
    - Alternative regime is Teicoplanin 400 mg IV + Gentamycin 1.5 mg / kg (not to exceed 120 mg) within 30 min of delivery.
    - The same dose may be repeated once again 6 hrs after delivery.

III. Labor management:

a. General management:

- Labor should not be induced because of heart disease. IOL is reserved for obstetric indications.
- Cesarean sections are reserved for obstetric indications and specific cardiac conditions.
- If IOL is indicated, communicate with the MDT and inform the duty team including consultant on call in labor ward.
- Consultant on duty should review the patient and put the plan of management.
- Communicate with cardiologist and anesthetist for patients who are at high risk.
- Be careful with fluid management not to overload her.
- Avoid Methergin in 3rd stage of labor if possible.
- Keep patient comfortable and reassured.

b. First Stage of Labor:

- The MDT (obstetrician, cardiologist, and anesthetist), should be informed early that the patient is in labor.
- The MDT should guide the management.
- Maintain the patient in left lateral position to avoid aortocaval compression by gravid uterus in supine position.
- Midwife to set up an IV infusion of 5% Dextrose (500ml) at a rate of 80 ml / hour.
- Midwife should keep a fluid balance in patients with significant heart disease.
- Continuous cardiac monitor should be available in labor ward.
- Establish baseline readings BP, pulse rate, Temperature, Respiratory rate, O2 saturation, Hb CBC and urinalysis.
- Auscultation of the lung bases must be performed hourly.
- Analgesia is best given as epidural, which provide hemodynamic stability. However, it should still be used with extreme caution in patients with restricted cardiac outputs or right-to- left shunts.
- Vaginal examination should be limited to an essential minimum.
- Oxygen must be available and should be administrated intermittently or continuously if there is dyspnea or any evidence of cyanosis.
- Preparation for cardiac emergency should be made i.e. drugs (Digoxin, Lasix, Morphine or Pethidine, anti-arrhythmic drugs) and instruments (Endo-tracheal tube, Laryngoscope oxygen source).
- Make sure that all the instruments are in working order.

c. Second stage of Labor:

- In compensated cases: manage second stage routinely; there is no advantage to perform a routine instrumental delivery in a woman who is going to push the baby easily.
- Shorten second stage of labor: in patients who are symptomatic instrumental delivery may be advantageous provided that all conditions are fulfilled.

d. Third stage of Labor:

- Manage third stage actively.
- Avoid injection of Ergometrine.
- Inject 10 IU of oxytocin IM or IV at delivery of the anterior shoulder. This can be repeated if indicated.

IV. Postpartum care:

- CCU Should be available.
- The patient should be followed by the MDT until discharged.
- As postpartum period represents an extremely high-risk situation for patients whose grade of disease may deteriorate rapidly, intensive monitoring must continue while the patient in the labor ward.
- The patient should be assessed every 30 min by the team on duty.
- On transfer to the postnatal ward continuous care must be ensured by hourly assessment by the nurses.
- When the patient is discharged, a clear follow up plan should be explained to her. This includes cardiology follow up, anticoagulation and contraception advice.

Manage acute pulmonary oedema:

- Oxygen by face mask
- Put patient in propped up position
- Morphine 5-15mg IM.
- Input/output chart.
- Frusemide 20-40mg IV
- Digitalis

  (In consultation with Cardiologist/Obstetric Medical specialist)
- If not yet delivered, expedite delivery.

1.5	**Bronchial asthma**

- Baronial asthma is one of the most common chronic diseases complicating pregnancy (prevalence 4-8%).
- Defined as respiratory tract disease with hypersensitivity and respiratory obstruction
- Pregnancy may improve, worsen or have no effect on the course of bronchial asthma

Severe or poorly controlled asthma is associated with:

- Preeclampsia
- Gestational hypertension
- Preterm labor
- Low birthweight
- Intrauterine fetal growth restriction
- Congenital anomalies
- Neonatal hypoglycaemia, seizures and NICU admission

Pre-pregnancy counseling and management:

- Patient should be referred to medical specialist in asthma.
- Aim to achieve good control of asthma before pregnancy.
- Review the medications for asthma to make sure that they are safe to be used in pregnancy.
- Inform the woman that the use of Leukotriene receptor antagonists during pregnancy was not associated with adverse maternal or neonatal outcomes. However, further studies are still needed so the use of these medications should be based on individual benefit- need assessment, considering that maternal control of asthma is a priority.

Management of Asthma in pregnancy:

General measures

- Management should be under supervision of medical specialist.
- Aim to achieve a total freedom from symptoms so that the individual life style will not be affected.
- Emphasis is on prevention rather than treatment.
- Seek Medical specialist opinion when indicated.
- Reassure the woman that most drugs commonly used to treat asthma, including systemic steroids, are safe (10% active prednisone may reach the fetus).
- Use short acting Beta agonists as normal in pregnancy.
- Use long acting Beta agonists as normal in pregnancy.
- Use inhaled corticosteroids as normal in pregnancy.
- Women on oral corticosteroids should be monitored carefully for infection, GDM and preeclampsia due to an increase in risk.
- If these complications arise, they should be treated accordingly. Do not discontinue

or reduce the dose of oral steroids, the requirement for this drug should be determined according to the maternal condition.

- Maintain patients with infrequent symptoms on Ventolin less than once daily.
- Maintain other women on regular inhaled anti-inflammatory medications (usually steroids such as betamethasone).
- **If symptoms are not controlled** (the most sensitive indicator of inadequate control is breathlessness at night), the use of high dose inhaled steroids or long acting inhaled B-agonist (Salmetrol) is recommended.
- **If symptoms remain uncontrolled**: try either Theophylline, inhaled ipratropium or a course of regular steroid tablets.
- Women who have shown significant improvement on leukotriene receptor antagonists, that was not achieved on other medications, may continue these.

Management of acute severe asthma:

- Admit the patient and treat vigorously as this could be a life-threatening condition.
- Manage patients in the same way as non-pregnant patients in a step-wise approach.
  - O2 by face mask (maintain O2 Saturation at 94-98%).
  - Nebulized bronchodilator.
  - Oral/or IV steroids.
  - IV aminophylline/or B2-agonist
  - If the patient failed to respond to treatment and or/severe deterioration occurs: Pneumothorax has to be excluded by chest X-ray:

Chest X-ray should not be withheld because of pregnancy (ionizing radiation from single chest x-ray is ~ 0.002 Gy which is < 1/20 the maximum recommended dose in pregnancy: 0.05 Gy).

Management during labor and delivery:

- Reassure the woman that an acute attack of asthma is rare during labor and delivery.
- You may use prostaglandin E2 for IOL as it is a bronchodilator.
- You may use prostaglandin F2 alpha with caution for obstetric indications (it may cause bronchospasm).
- Women should continue their regular inhalers throughout labor.
- Those on maintenance oral steroids (> 7.5 mg prednisolone daily) or who are being treated with steroids for > 2 weeks should receive parental corticosteroids (100 mg hydrocortisone 6 hourly) during labor and until 24 hours postpartum.
- For pain relief in labor, epidural analgesia and Entonox may be safely used in asthmatic women:
- Avoid opiates in the case of a severe acute attack of asthma in labor.
- If anesthesia is needed, encourage epidural/spinal anesthesia, because general anesthesia is associated with increased risk of chest infection and atelectasis.
- Use active management of third stage to prevent postpartum hemorrhage.
- Avoid NSAID/Aspirin as much as possible for postpartum pain relief.

Breastfeeding:

- Encourage asthmatic women to breast feed their babies.
- Reassure them that all inhaled preparations, oral steroids and methylxanthines are safe in Breastfeeding.
- Explain that exclusive Breastfeeding probably reduces the risk of child atopic disease. (I:10. raised to 1:3 if both parents are atopic).

1.6	**Epilepsy**

- Epilepsy is the commonest neurological disorder to complicate pregnancy.
- During pregnancy, the frequency of epileptic seizures may increase, decrease, or remain unchanged.
- **Aim: To control seizures and minimize risk to mother and fetus**

Pre-pregnancy assessment, counseling, and management

Patients with uncontrolled epilepsy or patients who are taking more than one anti-epileptic drug should be referred to a Neurologist for detailed assessment and counseling.

Counsel and advice women:

- There is a low risk of fetal abnormalities if they were not exposed to anti-epileptic drugs in the periconception period.
- All anti-epileptic drugs have variable teratogenic effect with a 2-3 fold increase in risk of congenital anomalies.
- In women who are taking drugs, the risk of major fetal congenital malformation depends on the type, number and dose of the drug. Lamotrigine, and carbamazepine monotherapy at lower doses have the least risk of major congenital malformation.
- The risk of recurrence for major congenital malformation was increased in women with a previous child with major congenital malformation.
- The risk of anomalies can be reduced by taking folic acid 5mg throughout pregnancy.
- Children have 4% risk of epilepsy (~1% general population)

If patient seizure-free for 2 years:

- Reduce teratogenic risk by withdrawal from anti-epileptic drug. Change to mono-drug therapy, **this should be done by neurologist.**
- Monitor seizures whilst planning pregnancy.
- Commence daily folic acid 5 mg at least 12 weeks prior to conception if possible.
- Unstable patients should be evaluated by neurologist on a regular basis.
- Plan pregnancy, 6 months after stopping medications.

Management during pregnancy

- All patients with epilepsy should be referred for booking at hospital as early as possible.
- Multidisciplinary team care by obstetricians and neurologists should be continued.

Management at booking appointment

- Establish whether epilepsy stable or not and continue same pre-pregnancy recommendations.
- Advise continuation of folic acid (5mg) throughout the pregnancy.
- Consider changing the drugs time or/and route in case of severe or prolonged vomiting.
- Arrange ultrasound scan at 12 weeks for dating and to check for anencephaly.
- Arrange a detailed anomaly scan at 18-22 weeks to exclude cardiac and neurologic anomalies.
- Regular combined clinic visits at 28,32,36,40 weeks (to be discussed - standard antenatal care if stable on medication) including serial fetal growth assessment.
- There is no sufficient evidence on routine use of oral vitamin K from 36 weeks to prevent hemorrhagic disease of the newborn in mothers taking liver enzyme-inducing anti-epileptic drugs.
- There is no role for CTG for fetal surveillance in women with epilepsy.

Mode and timing of delivery:

- Epilepsy is not an indication for induction of labor or cesarean section.
- If recurrent seizures occur near-term consider elective LSCS - decision to be taken by Consultant Obstetrician.
- In case of preterm labor in women taking hepatic enzymes inducing anti-epileptic drugs (phenytoin, phenobarbitone, carbamazepine and topiramate) a regular dose of corticosteroid is sufficient.

Labor management

- Up to 5% of epileptic women experience seizures in labor and a further 1- 2% in the following 24 hours.
- **Steps should be taken to reduce risks of seizures in labor such as:**
  - Adequate analgesia and appropriate care to reduce stress and dehydration is important.
  - Nitrous oxide and oxygen (Entonox®), and regional analgesia are the recommended methods of analgesia.
  - **Pethidine should not be used for analgesia** because of the risk of a lowered seizure threshold.
  - Women should continue their medication during labor.
  - If not tolerated necessary medication can be given by naso-gastric tube or parental route.

- Continuous fetal monitoring is recommended in women at high risk of seizures or following intrapartum seizure.

Management of seizures during labor:

- Seizures in labor should be terminated as soon as possible to avoid maternal and fetal hypoxia and fetal acidosis.
- Benzodiazepines are the drugs of choice. Treat with IV Diazepam 10 mg followed by slow injections with 2 mg boluses.
- In cases of repeated seizures lorazepam 0.1 mg/kg IV (4 mg bolus, with a further dose after 10–20 minutes) is preferred. Diazepam 5–10 mg administered slowly intravenously is an alternative.
- If there is no intravenous access, diazepam 10–20 mg rectally repeated once 15 minutes later if there is a continued risk of status epilepticus, or midazolam 10 mg as a buccal preparation are suitable.
- If seizures are still uncontrolled, give phenytoin IV. The loading dose of phenytoin is 10–15 mg/kg.
- If the fetal heart rate does not recover within 5 minutes or if the seizures are recurrent, expedite delivery by cesarean section if vaginal delivery is not imminent.

- Inform Pediatricians at delivery (see below).

Postnatal management

- Babies should have 1mg vitamin K IM at birth to reduce risks of hemorrhagic disease of the newborn.
- Babies of women on phenobarbitone often experience withdrawal, they are jittery and irritable - monitor for fits.
- Encourage Breastfeeding as it is considered safe.
- Risk of seizures is higher postnatally and women should be advised to avoid triggers of epileptic fits such as sleep deprivation, stress, dehydration, and pain.
- Drugs need to be decreased slowly to pre-pregnancy doses over 3-4 weeks to avoid toxicity.
- Any woman having a seizure during labor must be observed closely for the next 72 hours.
- Pethidine should not be used for analgesia in these cases.
- Contraception:
  - Women with epilepsy should be provided with reliable contraception to avoid unplanned pregnancy.
  - The preferred choices for contraception in women with epilepsy are the copper IUCD, the levonorgestrel containing IUD, and the Depot Medroxyprogesterone injection.
  - Prescribe oral combined contraception containing at least 50µg estradiol for women on enzyme inducing anti-epileptic drugs. However, women should be advised about the increased risk of hormonal contraceptive failure even at higher doses with liver enzyme-inducing drugs.

1.7	**Thrombophilia**

Thrombophilia in pregnancy is an abnormality of blood coagulation predisposing to thrombosis during pregnancy.

Classification of thrombophilia

- Acquired: Antiphospholipid syndrome (APS)
- Inherited:
  - **Factor V Leiden mutation (FVL)**
  - **Prothrombin G20210A gene mutation (PGM)**
  - **Protein S deficiency**
  - **Protein C deficiency**
  - **Antithrombin deficiency**

Antiphospholipid syndrome (APS)

Making the diagnosis:

Revised Sapporo classification **criteria for antiphospholipid antibody syndrome (APS) ≥ 1 of clinical criteria and ≥ 1 of laboratory criteria.**

- **Clinical Criteria:**
  - Vascular thrombosis including clinical episode of arterial, venous, or small vessel thrombosis in any organ or tissue.
  - One or more unexplained deaths of a normal fetus ≥ 10 weeks.
  - One or more premature birth of normal neonate < 34 weeks due to eclampsia, severe preeclampsia, or placental insufficiency.
  - ≥ 3 unexplained pregnancy losses before 10 weeks gestation.

- **Laboratory criteria (on 2 or more occasions ≥ 12 weeks apart):**
  - Lupus Anticoagulant antibodies in plasma.
  - Anticardiolipin antibodies (IgG and/or IgM) in serum or plasma (titer> 40 glycopeptidolipid [GPL] or monophosphoryl lipid A [MPL] or > 99th percentile for normal population).
  - Anti-beta2 glycoprotein-I antibodies (IgG or IgM) in serum or plasma (titer > 99th percentile for normal population).
  - Lupus anticoagulant (LA) testing should include dilute Russell viper venom time (DRVVT)
  - Other tests may include:
    - activated partial thromboplastin time (aPTT)
    - modified aPTT
    - dilute prothrombin time
  - Confirmatory tests may include:
    - Using high phospholipid concentration.
    - platelet neutralizing reagent.
    - Using LA-insensitive reagent.

Whom to screen for APS:

a. One or more unexplained deaths of a normal fetus ≥ 10 weeks gestation.

b. Three or more unexplained pregnancy losses before 10 weeks gestation.

c. Personal history of unexplained VTE, new VTE in pregnancy, or history of VTE in women not previously screened.

When to Test

Laboratory testing is performed remote (at least six weeks) from the thrombotic event while the patient is not pregnant, and not taking an anticoagulant or hormonal therapy.

Management:

- Start women on 75 – 100 mg Aspirin daily once the pregnancy is confirmed
- For women with APS who have had a thrombotic event, prophylactic anticoagulation with heparin throughout pregnancy and six weeks postpartum is recommended.
- For women with APS who have not had a thrombotic event, clinical surveillance or prophylactic heparin used antepartum in addition to 6 weeks of postpartum anticoagulation maybe warranted (expert consensus).
- For long term management postpartum, patients with APS should be referred to a physician with expertise in treatment of the syndrome such as an internist, hematologist, or rheumatologist.
- Women with APS should not use estrogen containing contraceptives.

Inherited Thrombophilia:

High-risk thrombophilia defined as:

- Antithrombin deficiency
- Factor V Leiden homozygous
- Prothrombin G202010A mutation homozygous
- Double heterozygous of factor V Leiden and prothrombin mutation

Low-risk thrombophilia defined as:

- Factor V Leiden heterozygous
- Prothrombin G20210A heterozygous
- Protein C deficiency
- Protein S deficiency

Screening for thrombophilia may be considered for:

- Personal history of venous thromboembolism (VTE) not associated with risk factor (for example, fractures and surgery).
- First-degree relative (for example, parent or sibling) with a history of high-risk thrombophilia or VTE before age 50 years in the absence of other risk factors.
- There is insufficient evidence to recommend screening or treatment for inherited thrombophilia in women with: recurrent fetal loss, placental abruption, intrauterine growth restriction (IUGR), preeclampsia.

Screening for inherited thrombophilia (when appropriate) should include:

- Factor V Leiden mutation
- Prothrombin G20210A mutation
- Antithrombin deficiency
- Protein C deficiency
- Protein S deficiency.

Management of pregnancy with thrombophilia:

Management of different scenarios of thrombophilia is shown in the following flowchart

Assess women on individual basis Consult with or refer to expert as required		
I. **Family history but no personal history of VTE**	**ANTENATAL**	**POSTNATAL**
EITHER OF • > 1 laboratory thrombophilia* • APS**	**Therapeutic anticoagulation**	**Therapeutic anticoagulation 6 weeks or longer**

ANY One OF
• **Homozygous**
  • Factor V leiden
  • Prothrombin mutation
• **Compund heterozygous**
  • Factor V leiden/
  • Prothrombin mutation
• **Antithrombin deficiency**
	Standard prophylaxis	**Standard prophylaxis 6 weeks**

ANY One OF
• **Antiphsopholipid antibodies**
• **Heterozygous**
  • Factor V leiden
  • Prothrombin mutation
• **Protein C or S deficiency**
(confirmed outside pregnancy)
	Clinical surveillance
	
	If ≥ 2 other risk factors Standard prophylaxis
		Standard prophylaxis 6 weeks

*High-risk thrombophilia> 1 laboratory thrombophilia, homozygous FVL, homozygous prothrombin mutation, compound heterozygous FVL/prothrombin mutation, antithrombin deficiency, APS. Low-risk thrombophilia: heterozygous FVL, heterozygous prothrombin mutation, protein C deficiency, protein S deficiency ** APS based on laboratory criteria and APS-defining pregnancy morbidity and no personal or family history of VTE require antepartum and postpartum (for 6 weeks) Standard prophylaxis and low-dose Aspirin.		
II. **No family history and no personal history of VTE**	**ANTENATAL**	**POSTNATAL**

ANY One OF
• **> 1 laboratory thrombophilia**
• **Homozygous**
  • Factor V leiden
  • Prothrombin mutation
• **Antithrombin deficiency**
	Consider Standard prophylaxis	**Consider standard prophylaxis 6 weeks**

ANY One OF
• **Antiphsopholipid antibodies**
• **Heterozygous**
  • Factor V leiden
  • Prothrombin mutation
• **Protein C or S deficiency**
	Clinical surveillance
	
	If≥ 2 other risk factors Standard prophylaxis
		Clinical surveillance
		
		If ≥ 1 other risk factors Standard prophylaxis

- Worldwide, 1 per 1000-2000 cases
- The treatment planning should be individualized and made by a multidisciplinary team but the final decision is the right of the patient.
- The most common cancers affecting pregnant women are breast cancer, cervical cancer, lymphoma, ovarian cancer, leukemia, colorectal cancer, and melanoma.

Imaging work-up

- For imaging workup of cancer in pregnancy, **ultrasound is the safest imaging** and then **MRI without contrast**. CT scan is not recommended, unless it is strictly necessary.
- **Whole-body diffusion-weighted MRI** could be used for staging and for tumor response evaluation in pregnant women with cancer:
  - Pineapple juice is used as a negative contrast, allowing investigation of adhesions, peritoneal/intra-abdominal lesions; it is most frequently used in ovarian cancer.
  - The use of gadolinium for imaging in MRI is not recommended during pregnancy.

Surgery protocol:

- Although surgery is possible in all trimesters, it is preferably carried out in the (early) second trimester when the risk of miscarriage is decreased and the size of the uterus still allows a certain degree of access.
- Left lateral tilt position is advised during the surgery.
- **Laparoscopy is preferred** during pregnancy if possible, and the recommendations are a laparoscopic procedure of no longer than 90–120 min, with low intra-abdominal pressure of 10–13 mmHg, open introduction and an experienced surgeon.
- Adequate gynecological surgical assessment and staging can be done up to 22 weeks of gestation, and not recommended after that due to limited exposure.
- If suspected ovarian cancers, then must have biopsy if advanced disease or adnexectomy if indicated +/-frozen section and then acting according to result of pathology either wait staging postpartum or give chemotherapy if indicated and after the first trimester or termination of pregnancy. Again, this will depend on pathology and after discussion in MDT and carful counseling of the patient.
- Recommendations for systemic treatment and supportive medication:

Systematic treatment

1. Recommendations for chemotherapy and supportive medication:

- Dosing of chemotherapeutic drugs during pregnancy should be based on **actual weight.**
- The same dose/m2 or dose/kg2 should be used as in nonpregnant patients.
- Chemotherapy is contra-indicated in the first trimester of gestation to avoid interference with organogenesis; fetal benefit of treatment delay until the **second trimester** should be balanced against maternal risk.
- After 14 weeks of gestation, administration of a number of anticancer drugs is feasible including Taxanes, platinum agents, anthracyclines, etoposide and bleomycin.
- Chemotherapy is not recommended beyond 35 weeks: it is important to give a **3-week** window between the last cycle of chemotherapy and delivery to allow both maternal and fetal bone marrow to recover.
- Anti VEGF (intervascular endothelial growth factor) and other antiangiogenic drugs are contraindicated during pregnancy.
- Until safety data are available, targeted therapies should be avoided during pregnancy.
- Metoclopramide, 5HT3 antagonists, ranitidine, proton pump inhibitors, methylprednisolone, prednisolone or hydrocortisone can be used if necessary.

2. Recommendations for radiation oncology teams treating gynecological cancer patients

- Any radiation treatment to the pelvic region will deliver a significant dose to the fetus and should therefore be avoided if pregnancy is to be continued.
- Doses in the therapeutic range, starting from the first fraction, will lead to fetal death.
- The probability for a new pregnancy after successful cancer treatment decreases with the delivered radiation dose to the uterine structures.
- If radiation therapy is indicated after termination of pregnancy, it is advised that the **ovaries are marked with radiological visible clips or consideration for ovarian transposition** to guide **ovary-sparing radiation** therapy to decrease the risk of premature menopause.

Obstetrical care:

- All patients deserve referral to a **high-risk**, well equipped obstetric center for prenatal car.
- non-invasive prenatal testing (free-cell DNA) in women with a known cancer diagnosis is non-informative and alternative prenatal screening testing should be offered, if necessary.
- **NIPT can detect occult malignancy by detecting aberrant genome representation profiles of cancer related copy number variation**.
- **Fetal monitoring** should be performed before and after surgery to detect fetal distress.
- In case of uterine manipulations during surgery, **prophylactic use of tocolytics** can be considered
- In cases of cervical conization during pregnancy then cervical length assessment should done and then management according to the result of assessment either vaginal progesterone or cerclage.
- pregnant patients receiving **chemotherapy seem to be at increased risk for having a fetus with intrauterine growth restriction, preterm premature rupture of membranes and preterm contractions**.
- If possible, delivery should not be induced before 37 weeks to avoid acute neonatal morbidities and long-term prematurity related sequelae. When a preterm delivery is inevitable, steroids for fetal lung maturation should be considered.
- **C-section is indicated for cervical and also for most vulvar cancers**. As metastases can be found in the abdominal wound scar after surgery and C-section, a corporeal uterine incision is carried out to avoid surgical trauma of the lower uterine part harboring the cancer.

- Patients with cervical cancer that was already completely excised during pregnancy and ovarian cancer have no oncologic indications for C-section.
- **Oncological treatment can be continued immediately after vaginal delivery, and 1 week after uncomplicated C-section.**
- Thromboprophylaxis with low-molecular-weight heparin should be considered postpartum.
- **Breastfeeding is allowed if there is no ongoing chemotherapy or targeted therapy, if the time since last administration is at least 3 weeks.**
- **The placenta should be examined for metastatic disease**. In the rare case that the placenta shows metastases, three monthly clinical follow-up of the child is recommended by a specialized cancer expert in a pediatric oncology center

Neonatal and pediatric care:

- The neonate needs to be examined thoroughly by a neonatologist or pediatrician.
- After exposure to chemotherapy, hematological parameters, liver and renal function should be checked.
- Long term follow up is needed especially with specific chemotherapy agents, for example long term follow up of **auditory evaluation** and **echocardiographic** follow-up is needed in cases of platinum based and anthracycline respectively.

Topic Two: Obstetric conditions

1. Hypertensive disorders of pregnancy
2. Gestational Diabetes
3. Intrahepatic cholestasis
4. Antepartum hemorrhage
5. Hyperemesis gravidarum
6. Pre-labor rupture of membranes
7. Preterm labor
8. Management of breech presentation at term
9. Management of twins labor at term
10. Management of previous uterine scar (and VBAC)
11. Management of intrauterine fetal death

2.	**Obstetric conditions**
Definition	Any maternal or fetal problems related to pregnancy, childbirth, and postpartum
Standard statement	All pregnant women with obstetric conditions should receive proper screening and obstetric care for a healthy maternal and fetal outcome

2.1	**Hypertensive disorders in pregnancy**

- Hypertensive disorders of pregnancy are the most common medical problem seen in pregnancy, which represents a significant cause of maternal and perinatal morbidity and mortality.
- The hypertensive disorders of pregnancy are a recognized risk factor for future cardiovascular disease.
- **PET is one of the top three leading causes of maternal death in Palestine.**

Hypertension: Systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg over four hours, confirmed with repeated measures by a health professional

Severe Hypertension: Systolic BP≥160 mmHg and/or a diastolic BP ≥110 mmHg based on at least 2 measurements, taken within 15 minutes

2.1.1 General principles – hypertensive disorders of pregnancy

Classification of hypertensive disorders of pregnancy

Hypertensive disorders	Definitions	Notes
Chronic preexisting hypertension	Hypertension detected pre-pregnancy or< 20 gestational weeks or persists > 12 weeks postpartum.	Most cases are due to **essential hypertension.**
Gestational hypertension	Hypertension that develops for the first time at ≥20 weeks**, in the absence** of proteinuria or other findings suggestive of preeclampsia.	Women should undergo testing for preeclampsia to rule it out.
Preeclampsia (PET)	New onset of hypertension and proteinuria or the new onset of hypertension plus significant **end-organ dysfunction** with or without proteinuria in a previously normotensive patient, typically after 20 weeks of gestation or postpartum, and resolves within 3 months postpartum.	**Sub types of preeclampsia** are: Early-onset preeclampsia, which requires delivery before 34 weeks' gestation, or late-onset preeclampsia, with delivery at or after 34 weeks or later. **Atypical Preeclampsia** Onset <20 weeks —It is associated with molar pregnancy or antiphospholipid syndrome (APS). Delayed-onset or late postpartum preeclampsia: Onset or exacerbation of symptoms **>2 days** postpartum. most common presenting symptom was headache. Severe features of preeclampsia without hypertension: Observed in 15 % of patients with HELLP syndrome and in some patients with eclampsia.
Preeclampsia superimposed upon chronic hypertension	Characterized by: **Worsening or resistant hypertension** The new onset of proteinuria or a sudden increase in proteinuria, and/or Significant new end-organ dysfunction **after 20 weeks of gestation or postpartum in a patient with chronic hypertension.**	Superimposed pre-eclampsia may develop in ≈25% of women with chronic hypertension and more women with underlying renal disease Among women with chronic hypertension, rises in BP are insufficient to diagnose superimposed pre-eclampsia, as such rises are difficult to distinguish from the usual increase in BP after 20 weeks' gestation
Eclampsia	Presence of a generalized seizure that cannot be attributed to other causes	
HELLP syndrome	**H**emolysis, **E**levated Liver enzymes, and Low **P**latelets.	Hypertension may be present (HELLP in such cases is often considered a variant of preeclampsia)

General management rules

I. **Low-dose aspirin** should be initiated in risky groups for use for preeclampsia prevention if no contraindications are identified.

Dose	The recommended dose of Aspirin for preeclampsia prevention is **100-150 mg**
commencement	at 11–14^{+6} weeks of gestation, before 16 weeks of gestation
Duration	until either 36 weeks of gestation, when delivery occurs, or when PET is diagnosed

II. Frequency of antenatal surveillance of different types of hypertensive disorders of pregnancy

Classification	USS and other surveillances		Frequency[6]
Gestational hypertension	Maternal	• Urinalysis for protein • *Pre-eclampsia bloods	• Consider 1-2 per week • Consider weekly
	Fetal	• USS	• At diagnosis and 2-4 weekly
Pre-eclampsia	Maternal	• Urinalysis for protein (quantify if 1+) • *Pre-eclampsia bloods	• At diagnosis (repeated if negative) • Twice weekly (or more if unstable)
	Fetal	• USS • CTG	• At diagnosis and 2 weekly (or more if indicated)[8] • Twice weekly (or more if indicated)
Pre-eclampsia with FGR	Maternal	• As for maternal pre-eclampsia	
	Fetal	• USS • CTG	• *On admission and weekly (or more if indicated) • Twice weekly (or more if indicated)
Chronic hypertension	Maternal	• Urinalysis for protein • *Pre-eclampsia bloods	• Each visit • If sudden increase in BP or new proteinuria
	Fetal	• Early dating USS	• First trimester
		• USS	• Third 3rd trimester (or more if indicated)

III. Anti-hypertensive treatment

Some international guidelines (RCOG) consider antihypertensive medications for women with gestational hypertension whose BP is persistently 140/90 to 159/109 mmHg. However, in this guideline we do recommend admitting these women for intra-hospital assessment and management. Consensus on whether to give antihypertensives or not should be based on a thorough evaluation and consultant decision.

For chronic hypertension:

- Pre-pregnancy antihypertensive treatment is continued if safe in pregnancy or should be switched to an alternative treatment.
- Antihypertensive treatment can be temporarily stopped if:
- **Persistent systolic blood pressure less than 110 mmHg or**
- **Persistent diastolic blood pressure is less than 70 mmHg or**
- **The woman has symptomatic hypotension.**
- Prescribe antihypertensive treatment to women who are not already on treatment if they have:
- **sustained systolic blood pressure of 140 mmHg or higher or**
- **sustained diastolic blood pressure of 90 mmHg or higher.**
- Use labetalol to treat chronic hypertension in pregnancy. If labetalol is not suitable use nifedipine, or if both labetalol and nifedipine are not suitable use methyldopa
- When treating hypertension, aim for a target blood pressure of 135/85 mmHg

IV. Timing of delivery of hypertensive disorders of pregnancy

Indications for delivery with any HDP at any gestational age
Maternal indications 1. Repeated episodes of severe hypertension despite maintenance treatment with **three classes** of antihypertensive agents. 2. Abnormal neurological features (such as **eclampsia**, **severe intractable headache** or **repeated visual scotomata**); 3. Pulmonary edema (maternal pulse oximetry less than 95%) 4. Transfusion of any blood product 5. Epigastric pain or right upper pain unresponsive to repeat analgesics 6. Progressive thrombocytopenia or platelet count <50 × 109/L; **7. Abnormal and rising** serum creatinine; **8. Abnormal and rising** liver enzymes; 9. Hepatic dysfunction (INR > 2 in absence of DIC or warfarin), hematoma or rupture capsule 10. Coagulopathy in the absence of an alternative explanation 11. HELLP syndrome
Fetal indications 1. Abruptio with evidence of maternal or fetal compromise; or 2. fetal death, lethal anomaly, extreme prematurity. 3. No reassuring fetal testing, Persistent reversed end-diastolic flow in the umbilical artery, 4. Severe FGR, Estimated fetal weight <5th percentile 5. Oligohydramnios
Chronic HTN
Planned delivery may be offered at **37-38 weeks** to women with controlled chronic hypertension unless there are other medical indications requiring earlier delivery.
Gestational HTN
Delivery rather than expectant management **at 37-38 weeks** for all patients with uncomplicated gestational hypertension
Vaginal delivery is recommended unless there is other obstetric indication for a cesarean delivery.

2.1.2 Management of Preeclampsia (PET)

Outpatient Antenatal Screening

Maternal surveillance- Hospital Outpatient clinic	
Clinical assessment	At each antenatal appointment screen for symptoms and signs of PET with severe features. Low threshold for admission if any maternal and/or fetal wellbeing is a concern.
Lab workup	• Complete blood count with platelets • Serum creatinine level • Liver enzymes (AST, ALT, and bilirubin) • LDH in patients with abnormal liver chemistries **N.B:** prothrombin time, partial thromboplastin time, fibrinogen) are not routinely obtained but are indicated in patients with additional complications, such as placental abruption, severe bleeding, thrombocytopenia, or severe liver dysfunction In patients with acute upper abdominal or epigastric pain or those found to have severe liver dysfunction, glucose, amylase, lipase, and ammonia levels can help in differential diagnosis
Follow-up	The frequency of surveillance depends on the individual maternal condition. Should be seen **1-2 times weekly**. Lab tests performed **1-2 times weekly.**
Fetal surveillance	
Fetal Ultrasound	should be performed to assess fetal wellbeing, growth, amniotic fluid volume, and umbilical Doppler.
CTG	if greater than or equal to 28+0 weeks gestation **(1-2 times weekly).**
Follow-up	fetal sonography should be performed **once every 2 weeks** to assess fetal growth, and at least once every 2 weeks to assess amniotic fluid volume and umbilical artery Doppler

The presence of one or more of the following indicates a diagnosis of preeclampsia with severe features in a patient with preeclampsia

Severe blood pressure elevation
Systolic blood pressure ≥160 mmHg and/or diastolic blood pressure ≥110 mmHg on 2 occasions at least 4 hours apart while the patient is on bedrest
Symptoms of central nervous system dysfunction:
New-onset cerebral or visual disturbance, such as: Photopsia, scotomata, cortical blindness, retinal vasospasm **and/or** Severe headache or headache that persists and progresses despite analgesic therapy with acetaminophen and not accounted for by alternative diagnoses
Hepatic abnormality:
Impaired liver function not accounted for by another diagnosis and characterized by serum transaminase concentration >2 times the upper limit of the normal range **and/or** Severe persistent right upper quadrant or epigastric pain unresponsive to medication and not accounted for by an alternative diagnosis
Thrombocytopenia:
Platelet count <100,000 platelets/microL
Kidney function impairment:
Serum creatinine >1.1 mg/dL **and/or** Doubling of the serum creatinine concentration in the absence of other kidney disease
Pulmonary edema

Intra-hospital assessment and management

- Women with persistent BP ≥150/105 mmHg or with severe hypertension- Systolic BP 160 mmHg and/or diastolic BP 110 mmHg persisting for 15min should be admitted to hospital.
- PET lab workup should be done.
- **Do not leave the patient alone.**

I. Antihypertensive medications for urgent blood pressure control (target level BP 135/85)

Drug	Initial dose	Follow-up
Labetalol	20 mg IV gradually over 2 minutes.	**Repeat BP measurement at 10-minute intervals:** • If BP remains above target level at 10 minutes, give 40 mg IV over 2 minutes. • If BP remains above target level at 20 minutes, give 80 mg IV over 2 minutes. • If BP remains above target level at 30 minutes, give 80 mg IV over 2 minutes. • If BP remains above target level at 40 minutes, give 80 mg IV over 2 minutes. **Cumulative maximum dose is 300 mg.** **If target BP is not achieved, switch to another class of agent.** **Hold dose if heart rate <60 beats per minute.**
A continuous IV infusion of 1 to 2 mg/minute can be used instead of intermittent therapy or started after 20 mg IV dose with monitoring of blood pressure and heart rate		
Hydralazine	5 mg IV gradually over 1 to 2 minutes.	**Repeat BP measurement at 20-minute intervals:** • If BP remains above target level at 20 minutes, give 5 or 10 mg IV over 2 minutes, depending on the initial response. • If BP remains above target level at 40 minutes, give 5 to 10 mg IV over 2 minutes, depending on the previous response. **Cumulative maximum dose is 20 to 30 mg per treatment event.** **If target BP is not achieved, switch to another class of agent.**
Nifedipine immediate release*	10 mg orally.	**Repeat BP measurement at 20-minute intervals:** • If BP remains above target at 20 minutes, give 10 or 20 mg orally, depending on the initial response. • If BP remains above target at 40 minutes, give 10 or 20 mg orally, depending on the previous response. **If target BP is not achieved, switch to another class of agent.**
Nifedipine extended release	30 mg orally.	• If target BP is not achieved in 1 to 2 hours, another dose can be administered. • If target BP is not achieved, switch to another class of agent.
Nicardipine (parenteral)	Not available in our settings	
Inability to control maternal blood pressure despite using 3 classes of antihypertensives in appropriate doses is an indication for delivery regardless of gestational age.		

II. Assess hourly for signs / symptoms:

Headache
Blurred vision
Epigastric pain (Right upper quadrant pain)
Change in level of consciousness.
Nausea & vomiting
Dyspnea/SOB

RECOGNISE & PREVENT THE FOLLOWING COMPLICATIONS

1. Acute renal failure:

- Oliguria is common and may be improved by the treatment of hypovolemia.
- If **renal function tests are deteriorating** request a nephrological consultation.

2. Coagulopathy

- Low platelet counts regardless should be thoroughly investigated for an underlying coagulopathy/ intravascular coagulation (DIC). Order prothrombin time, fibrin degradation products, fibrinogen levels and factor VIII activity.
- Hematologist consultation early in the case of abnormal clotting studies.
- Treatment involves replacement of coagulation factors with fresh frozen plasma, cryoprecipitate and platelets.
- Early delivery of the fetus is desirable.

3. Cerebral hemorrhage

The risk can be reduced by:

- Prevention of eclampsia,
- Control of hypertension and
- Correction of coagulation abnormalities.

4. Cardiovascular complications

Hypertensive cardiac failure, cardiomyopathy and coronary artery insufficiency may complicate pre-eclampsia. A cardiologist opinion should be sought.

5. Hepatic complications

Pre-eclampsia may be complicated by hepatic enlargement, hemorrhage and rupture. Liver failure may occur in severe cases and is treated by supportive therapy. This may present as part of the HELLP syndrome.

6. Ocular complications

Eclampsia may be preceded by visual disturbance, particularly seeing flashing lights or stars. Retinal hemorrhage or detachment and macular edema may cause reduced acuity.

III. Decision and Timing of delivery

Timing of delivery is based on **gestational age**, the **severity of preeclampsia**, and **maternal and fetal condition**.

General rule: Be low threshold for delivery among women with preeclampsia
• Among women **with preeclampsia without severe features, expectant management** up to 37 weeks of gestation is recommended **(No later than 37 weeks).** • Among women **with preeclampsia with severe features at ≥ 34** weeks**, delivery** is recommended after maternal stabilization (antihypertensive Rx + MgSO4). • **Expectant management** of preeclampsia with severe features **at <34** weeks is consultant decision, **based on strict selection criteria** of those appropriate candidates and in a hospital with resources appropriate for maternal and neonatal care **(See table below).** • Patients eligible for expectant management <34 weeks will primarily be those in whom blood pressure can be controlled in a relatively short period of time and **without** manifestations of end-organ disease • During expectant management, **delivery is recommended at any time** in the case of deterioration of maternal or fetal condition.

IV. Management Options for Delayed Delivery in patients with Severe hypertension Preeclampsia and at < 34 weeks of gestation

Criteria	**Definition/Significance**	**Attempt to Delay Delivery**
Persistent headache/blurred vision or scotomata/mental status changes	Suggest central nervous system dysfunction	NO
Persistent epigastric pain or right upper quadrant pain	Suggest liver capsule distension or rupture	NO
Eclampsia	Generalized tonic clonic seizure	NO
Pulmonary edema and/or hypoxia (O2 saturation < **95%**)	Excessive fluid accumulation in the lungs	NO
Oliguria/Renal failure	Urine output of <500/24 hours or Creatinine > 1.2 (unless chronic renal disease)	NO
Hepatocellular injury	Serum transaminase > 2x normal	NO
Blood Pressure	> 160/110 mm Hg BP criteria for **Severe** Preeclampsia in the absence of other signs/ symptoms	Yes, if responds to treatment

Use Corticosteroids for preterm birth if not contraindicated, even in severe cases of hypertensive disorders of pregnancy

V. Magnesium sulfate ($MgSO_4$) For prevention of convulsions

a. Indications for $MgSO_4$

- Severe gestational hypertension
- Pre-eclampsia with severe features
- Chronic hypertension with super imposed preeclampsia with severe features
- Eclampsia
- HELLP syndrome.

b. Contraindications for MgSO4

- Myasthenia gravis.
- Cardiac conditions, e.g. conduction problems or myocardial damage.
- Hypermagnesemia
- Respiratory depression
- Hypocalcemia status.
- Precautions: Oliguria or renal failure (magnesium concentration can reach toxic levels as elimination is predominantly renal).

c. Regimens for MgSO4

Regimens with normal renal function		
loading	**Maintenance**	**Duration**
4-6 gm in 100 ml normal saline solution over 20-30 minutes * (6 gm for BMI > 35)	1-2 gm per hour	*Until 24 hrs after eclamptic seizure, or birth whichever is later
Regimens with renal insufficiency		
• Women with renal insufficiency should receive a **standard loading dose** • if the **serum creatinine is >1.2 and <2.5 mg/d**: 1 g/hour given as maintenance • **No maintenance dose if the serum creatinine is ≥2.5 mg/dL**		

d. Clinical issues during MgSO4 administration

Care before intravenous infusion	• Baseline observations (pulse, BP, respiratory rate, (SpO2) and Deep tendon reflexes). • Inform the woman of the side effects which may include feeling of warm flushing, nausea, vomiting, drowsiness and headaches. • Check blood tests= CBC, creatinine, electrolytes, LFTs • Monitor FHR/CTG	
Monitoring during loading dose	• Continuous SpO2, BP, pulse and respiratory rate every 5 minutes (for 20 minutes). • Observe for side effects. • Check deep tendon after completion of loading dose.	• If in labor monitor contractions for 10 minutes every 30 minutes. • Continuous CTG if greater than 28+0 weeks gestation • Auscultate FHR every 15–30 minutes if less than 28+0 weeks gestation.
Monitor during maintenance dose	• Respiratory rate / SpO2, blood pressure, pulse, –**hourly** • Patellar/brachial reflex **hourly**, Record as A=Absent, N=Normal, B=Brisk. • Urine output – review **hourly** (insert urine catheter). • Routine monitoring of magnesium levels **is usually not necessary**	
Stop the infusion IF	• Reflexes are absent. • The respiratory rate is less than 12 per minute or • The urine output drops below 100 mL in 4 hours. • Diastolic BP decreases more than 15 mmHg below baseline. • If the serum level is >9.6 mg/dL (8 mEq/L).	
Side effects	• Rapid infusion may cause diaphoresis, **flushing, and warmth** • **Nausea, vomiting**, headache, muscle weakness, visual disturbances, and palpitations also occur. • Dyspnea or chest pain may be symptoms of pulmonary edema, which is a **rare** side effect. • The **risk of postpartum hemorrhage is slightly increased** • Magnesium therapy results in a **transient reduction of total and ionized serum calcium concentration** due to **rapid suppression of parathyroid hormone** release, Rarely, hypocalcemia becomes symptomatic (myoclonus, delirium, electrocardiogram abnormalities)	
Effects on Fetus and neonate	• The cord blood concentration of magnesium sulphate approximates the maternal serum concentration. • May cause a **decrease in baseline** fetal heart rate, which generally remains within the normal range, and a **decrease in fetal heart rate variability**, which may be absent or minimal. • The biophysical profile score and NST **are not significantly altered**.	
When to check magnesium levels	• A seizure while receiving magnesium sulfate. • Renal insufficiency (creatinine >1.1 mg/dL). • Clinical signs/symptoms suggestive of magnesium toxicity. • AND, • Serum magnesium levels are checked every four to six hours as an adjunct to clinical assessment for magnesium toxicity	

e. Management of MgSO4 toxicity

- Call for medical assistance
- Stop infusion
- Administer oxygen at 8–12 liters/minute
- Monitor vital signs
- Check electrolytes, creatinine and **magnesium sulphate level**.
- Administer Antidote
- If the serum level is >9.6 mg/dL (8mEq/L), serum magnesium levels should be re-checked at two-hour intervals.

ANTIDOTE: Calcium gluconate

- For patients with less severe, but life-threatening, cardiorespiratory compromise: A starting dose of 10 mL of a 10 percent solution (1000 mg) over 10 minutes is used for. **Concomitant** intravenous administration of **furosemide** accelerates urinary excretion of magnesium.
- For patients in cardiac arrest or with severe cardiac toxicity related to hypermagnesemia: Give 15 to 30 mL of a 10 percent solution (1500 to 3000 mg) intravenously is administered

Choice of mode of delivery

- Vaginal delivery is preferred whenever possible.
- Avoid prolonged induction and inductions with a low likelihood of success.
- Offer cesarean delivery to a nulliparous patient with preeclampsia with severe features who is <32 weeks of gestation and has an unfavorable cervix, given the relatively high frequency of abnormal intrapartum fetal heart rate tracings and low likelihood of a successful vaginal birth (less than 40 percent).

Intrapartum care

- Continuous maternal and fetal monitoring is required, including for $MgSO_4$ toxicity
- Obtain IV access
- Monitor **BP hourly** as a minimum to identify worsening hypertension.
- Continuous CTG is recommended for gestations greater than 28 weeks
- In women with severe pre-eclampsia, consider limiting fluid intake to 60–80 mL/hr and monitor hourly fluid balance.
- An epidural is a useful adjunct therapy for BP control. Preload the patient with 500 ml of N/S to avoid hypotension. BP should be measured at least every 15 mins.
- Women with pre-eclampsia, eclampsia and HELLP syndrome may be at increased risk of primary postpartum hemorrhage, recommend active management of third stage. But do not routinely give ergometrine or syntometrine as it may produce an acute rise in BP.
- Consider placental histopathology, particularly if early onset PET and/or fetal growth restriction.
- Instrumental delivery is saved for obstetric indications.

Criteria for transfer to ICU

- Persisting convulsions.
- BP > 180/120 despite appropriate doses of labetalol/nifedipine.
- Pulmonary edema with oliguria.
- Oliguria with normal CVP, unresponsive to frusemide.
- Compromised myocardial function.
- Neurological impairment requiring ventilation.

- Massive blood loss.
- Inadequate staffing levels or experience (medical or midwifery).
- Other associated morbidities.

Management of Eclampsia

I. In patients with eclampsia, initial management should aim at control of convulsions whilst maintaining the airway and preventing trauma.

Patient Intervention	
When seizure begins	1. Call for help (senior OB and anesthesia) 2. Position patient in a left lateral decubitus position, head of bed down 3. Prevent maternal injury, side rails up, pad as appropriate 4. Establish open airway, maintain breathing, and have suction available 5. Provide oxygen
When seizure ends	• Check and treat blood pressure per protocol • Obtain IV access: 1 or 2 large-bore IV catheters as soon as possible • Start magnesium loading dose
Medical Intervention	
Dose of magnesium sulphate	Magnesium Sulfate 4-6 grams IV loading dose over 20-30 minutes; followed by a 1-2 gram/hour maintenance dose if renal function is normal BMI >35 requires a 6gram loading dose and 2 grams per hour maintenance dose
In Recurrent seizure	Give additional 2-4 grams of magnesium sulfate over 5 minutes
In persistent Recurrent seizure	Administer one of the following **Medications** and notify anesthesiologist: • **Midazolam** 1-2 mg IV; may repeat in 5-10 minutes **OR** • **Diazepam** 5-10 mg IV slowly; may repeat q15 min to max of 30 mg **OR** • **Phenytoin** 1,250 mg IV at a rate of 50 mg/minute Other medications have been used with the assistance of anesthesia providers such as: • **Sodium thiopental** • **Sodium amobarbital** • **Propofol**
Resolution of seizure	
	• Maintain magnesium sulfate infusion for at least 24hours after the last seizure or after delivery, whichever is later. • Assess for any signs of neurologic injury/focal deficit: **head imaging should be considered if neurologic injury is suspected**. • Once the patient is stabilized preparations should be made for delivery if still pregnant; mode of delivery is dependent upon clinical circumstances surrounding the pregnancy.
Discontinue therapy	
	For preeclampsia with severe features and eclampsia: 24-48 hours after delivery or after last seizure.

II. Follow up management: Discuss with consultant anesthetist and obstetrician.

1. Assess conscious level once convulsions controlled.

- Coma may indicate the onset of cerebral edema, encephalopathy or intracranial hemorrhage.
- Neurological assessment (examine to exclude other causes of convulsions).

2. Management of the pregnancy:

- Pregnancy should be terminated but occasionally the patient requires to be transferred to a well-equipped facility.
- All patients with eclampsia should be managed in ICU.

3. Management of fluids

- The Anesthetist must be involved in decisions for the intra-venous regime. Its objective is to establish a safe replacement and maintenance of IV fluids:
  - **If urine output> 60 ml in first 2 hours → give 1000mls NS 12hourly (85mls/hour) via IV Canula.**
  - **If urine output < 60 ml in first 2 hours → give 500ml of Hemocoel over 20 mins and continue 85 ml/hour NS.**
  - **If output remains < 30 ml /hour (0.5mls/kg/ hour) for a further 2 hours ask to insert a CVP line.**
  - **Further fluid management should be guided by CVP.**
- Monitor for signs of pulmonary edema (basal crepitations) hourly and consider CXR if signs present.
- If there is pulmonary edema give frusemide 20 mg IV with a further 20 mg IV if there is no response (this is the ONLY INDICATION for frusemide in pre-eclampsia/ eclampsia).
- If oliguria continues in the absence of pulmonary edema consider giving a renal dose of dopamine 1 – 5 mg/kg/min

III. Postpartum management

- Keep in ICU for 24-48 hours.
- Continue MgSo4 infusion 24 hours after delivery or after last seizure.
- The patient should be assessed by a consultant prior to transfer to the ward.
- Renal function: Oliguria may persist for some hours following delivery especially following a cesarean section.
- Observe fluid balance records accurately. If a diuresis has not occurred within 12 hours → investigations of renal function should be carefully reviewed.
- Manage acute hypertensive episodes during postpartum as before delivery.
- Discontinue intravenous therapy 24-48 hours post-delivery.
- If oral antihypertensive therapy is needed → use Labetalol 200 mg PO twice daily or nifedipine 10 mg three times daily.
- Prevent thromboembolism (Refer to VTE protocol).
  - **Encouraging all patients wearing TED stockings until fully ambulant.**
  - **Consider giving LMWH in those with other risk factors e.g. obesity, and cesarean section.**
- Review the medication after 2 weeks.
- Give next appointment to be seen by the consultant at 2 weeks and 6 weeks later.

2.2	Gestational Diabetes mellitus (GDM)

For detailed and more comprehensive information please refer to the National Diabetes in Pregnancy protocol.

Early screening for DM

- Screen for women who are at risk for DM type I and II (look at risk factors in the Diabetes in pregnancy protocol).
- The non-pregnant population can be screened for DM **during the preconception period or early pregnancy** using any of the diagnostic tests listed in table2, whichever is readily available at the clinical setting.

Diagnosis	HbA1c (%)	FBG* (mg/dl)	2h 75-gOGTT** (mg/dl)
Normal	<5.7	<100	<140
Pre-diabetes	5.7- 6.4	100- 125	140- 199
Diabetes	≥ 6.5	≥126	≥200
*If FBG result was ≥126, the test should be repeated on the second day to confirm diagnosis of DM ** Single blood glucose test is taken two hours after ingestion of 75grams glucose. A single abnormal test is diagnostic			

- If the initial screening is negative, rescreen between **24 and 28 weeks of gestation**.

Diagnosis of GDM

- All pregnant women should undergo a screening for GDM at 24-28 weeks of gestation including those who underwent pre-conception or early pregnancy screening.
- Follow the one-step approach by 2-hour 75 g OGTT to screen and diagnose GDM.
- The diagnosis of GDM is made when **at least one** of the following plasma glucose values are met or exceeded:
  - Fasting: 92 mg/dL (5.1 mmol/L)
  - 1 h: 180 mg/dL (10.0 mmol/L)
  - 2 h: 153 mg/dL (8.5 mmol/L)

Management of GDM during pregnancy

a. General management principles

- Care by multidisciplinary team including obstetrician, diabetologist and nutritionist.
- Educate and advise women with GDM on the following:
  - **They should aim for target glucose values:**
    - Fasting PG < 92 mg/dl (5.1 mmol)/L
    - 1-hour postprandial < 140 mg (7.8 mmol)/L.
    - 2-hour postprandial < 121 mg (6.7 mmol)/L.
  - **They should perform self-monitoring of blood glucose; fasting and 1- hour post-meal blood glucose levels daily (4 times per day) if they are managing their diabetes with diet and exercise alone or taking single-dose intermediate-acting or long-acting insulin.**

- **Advise GDM women who are on a multiple daily insulin injection regimen to test their fasting, pre-meal, 1-hour post-meal and bedtime blood glucose levels daily (7 times per day).**
- **Advise women who are taking insulin to maintain their plasma glucose level not less than72mg/dl.**
- **Advise pregnant women with GDM to seek urgent medical advice if they become hyperglycemic or unwell.**

- If women with GDM do not achieve glycemic targets within 2 weeks from exercise and nutritional therapy alone, insulin should be initiated **(for insulin regimens, please refer to the Diabetes in Pregnancy Protocol).**

b. Pharmacological treatment

- Insulin is the drug of choice medication for treating hyperglycemia in GDM. Metformin and glyburide should not be used as first-line agents, as both cross the placenta to the fetus. Other oral and noninsulin injectable glucose-lowering medications lack long-term safety data.
- Metformin, when used to treat PCOS and induce ovulation, should be discontinued by the end of the first trimester.
- Insulin therapy should be combined with exercise and diet.

For women with GDM, Insulin is indicated in the following conditions:

- When target glucose levels cannot be consistently achieved through 1-2 weeks of nutrition therapy and exercise.
- Insulin should be started immediately if FBG is 110-124mg/dl (6-6.9 mmol/l) with polyhydramnios or macrosomia.
- Insulin should be started immediately if FBG is 126mg/dl with or without complications.

c. Maternal and fetal surveillance

The mother with GDM should be seen every 3-4 weeks until 32 weeks, every two weeks at 32-36 weeks and weekly from 36 weeks until delivery. This varies accordingly to control and presence or absence of complications.

- Screening for gestational hypertension and PET (BP and Urine dipstick for protein at each ANC visit).
- Serial fetal growth scan every 3-4 weeks starting from 28 weeks, and every 2-3 weeks after 32 weeks.
- Monitoring for amniotic volume starting from 28 weeks:
  - **Oligohydramnios: Amniotic fluid index <5 or deep vertical pocket <2.0 or**
  - **Borderline amniotic fluid index 5-7cm.**
  - **Polyhydramnios: Amniotic fluid index> 25 cm or deep vertical pocket >8.0 cm**
- Fetal CTG weekly or bi-weekly from 32 weeks.
- **Routine monitoring of fetal well-being by umbilical artery doppler before 38 weeks is not recommended unless there is a risk for IUGR.**

d. **For intra-hospital management of uncontrolled GDM, please see section 1.2, pre-gestational diabetes.**

Timing and mode of delivery

- Diabetes is not considered contraindication to vaginal birth after previous CS.
- Fetal macrosomia is not an indication for premature delivery because termination of pregnancy does not improve maternal or fetal outcomes.
- According to international criteria, a fetal macrosomia is defined as an estimated fetal weight of more than 4500gm. However, for Palestinian women it is favored to undergo cesarean delivery when the estimated fetal weight is more than 4000gm, provided that healthcare providers explain to women the risks and benefits of vaginal birth, induction of labor and cesarean delivery.

Indications for preterm birth at 36-37 weeks
Poor glycemic control
Vasculopathy
Nephropathy
Prior IUFD
Fetal compromise/distress

Management of labor and delivery

- Glucose control during labor is important for mother and neonate due to high rates of neonatal hypoglycemia.
- **Continues CTG** during labor is required.
- For women maintained on insulin during pregnancy, monitor plasma glucose every 4 hours during latent phase and **hourly** during active phase of labor.
- Plasma glucose should be kept in the range 74- 126mg/dl.
- Most women with GDM who require <1.0 unit/kg/d of insulin, can be monitored without IV insulin during labor. However, consider intravenous dextrose and insulin infusion in women with GDM if blood glucose does not meet the target range (74-126 mg/dl).
- Give 5 units of regular insulin in 500 ml of 5 % Dextrose water (DW)
- Start at a rate **depending on the RBG and as follows:**
  - **If blood glucose is 72-126 mg/dl, give 100ml 5% DW per hour equivalent to 1 unit of insulin per hour**
  - **If blood glucose is > 126 mg/dl, double the dose 200 ml of 5% DW /hour equivalent to 2 Units of Insulin per hour.**
  - **If blood glucose is <72mg/dl, give half the dose, 50mlof 5% DW equivalent to 0.5unit insulin per hour.**

Immediate and late postnatal care

Maternal care

- After delivery of the placenta stop the insulin infusion. In most cases of pure GDM, glucose regulation will return to normal after delivery.
- Encourage breastfeeding.
- Advise women with GDM and to attend to the postnatal care clinic (Please refer to postnatal guidelines).

Neonatal care

- Carry out blood glucose testing routinely at 2-4 hours after birth in babies of women with GDM with clinical signs of polycythemia, hyperbilirubinemia, hypocalcemia or hypomagnesemia.
- **Encourage early breastfeeding as soon as possible to avoid neonatal hypoglycemia. Extra caution should be taken with neonates born to mothers delivered by cesarean section under general anesthesia.**

Women with GDM should undergo 2h-75g-OGTT at six weeks postpartum to assess their risk for DM type II

2.3	Intrahepatic cholestasis (ICP)

Definition

ICP is a liver disorder in the late 2nd and early 3rd trimester of pregnancy, characterized by pruritus with increased serum bile acids and other liver function tests.

Diagnosis

- Itching in skin of normal appearance **AND** increased random total bile acid concentration of≥ 19micromole/L.
- Repeat bile acid level one week after the initial raised test, for confirmation
- The diagnosis of ICP in the postnatal period at least 4weeks after birth, by resolution of itching and liver function tests returning to normal (including bile acids).
- Pregnant women with itching and isolated raised transaminases alone (with normal bile acid concentrations) should not be diagnosed as ICP
- Liver failure (prolonged prothrombin time, or metabolic dysfunction such as hypoglycemia) is not a typical feature of ICP.

Gestational pruritis: Itching and peak bile acid concentrations <19 micromole/L	**Mild ICP:** peak bile acids 19–39 micromol/L and no other risk factors. **Moderate ICP:** peak bile acids 40–99 micromol/L and no other risk factors. **Severe ICP:** peak bile acids 100 micromol/L or more.

Prognosis

- **Mild ICP**: the risk of stillbirth is similar to the general population risk.
- **Moderate ICP**: the risk of stillbirth is similar to the general population risk until 38–39weeks' gestation.
- **Severe ICP**: the risk of stillbirth is higher than the general population risk.
- Stillbirth risk is not linked with alanine transaminase levels, but is linked with peak bile acid concentration
- The presence of risk factors and co-morbidities (such as gestational diabetes and/or pre-eclampsia and/or multifetal pregnancy) increase the risk of stillbirth and may influence decision-making around timing of planned birth.

Antenatal surveillance

- **Bile acid monitoring**:
  - After the initial and confirmatory tests, the subsequent testing frequency is determined on an individual basis.
  - **Testing frequency is later increased as follows**:
    - **Mild ICP**: weekly testing as they approach 38weeks' gestation to inform timing of birth.
    - **Moderate ICP**: weekly testing as they approach 35weeks' gestation
    - **Severe ICP**: further routine testing of bile acids might not impact on decision making and therefore may not be routinely required.

- **Medical treatment:**
  - There are no treatments that improve pregnancy outcome (or raised bile acid concentrations)
  - Prescribe topical emollients or antihistamines to help with the itching.
  - Ursodeoxycolic acid does not seem to reduce the adverse perinatal outcome, and hence routine prescription is not recommended.
  - In women with bile acid concentrations 40 micromole/L or more who are 34–36 weeks' gestation, ursodeoxycholic acid may help in reducing late preterm birth.
  - Consider maternal vitamin K treatment only in the presence of steatorrhea and/or evidence of abnormal prothrombin time.
- **Fetal monitoring:**
  - Advise women to carefully monitor fetal movement (quality and quantity) and to report any concerns.
  - CTG, Biophysical profile, serial growth scans, and doppler do not predict stillbirth or fetal compromise, hence they are not routinely recommended.

Time of delivery:

The decision should be individualized and made by a consultant, taken into consideration the presence of any other risk factors.

- **Mild ICP**: Consider planned birth at 39-40weeks' gestation.
- **Moderate ICP**: Consider planned birth at 38–39weeks' gestation.
- **Severe ICP**: Consider planned birth at 35–36weeks' gestation.

Labor and delivery:

- Perform intrapartum continuous fetal monitoring.
- Cesarean section is only performed for obstetric indications.
- Options of analgesia and anesthesia are similar to the general population.

2.4	Antepartum hemorrhage

Definition and classification

Bleeding from the genital tract after 24 weeks gestation until delivery of the fetus.

- Spotting – staining or streaking noted on underwear
- Minor hemorrhage – blood loss less than 50 ml which has settled
- Major hemorrhage – blood loss of 50-1000 ml, with no clinical signs of shock
- Massive hemorrhage - blood loss greater than 1000ml and/or signs of shock.

Etiology

- Placenta previa
- Placental abruption
- Vasa previa
- Local conditions of cervix, vagina, vulva
- Consider other rare lesions e.g. hemorrhoids
- Bleeding disorders

Management

- Doctor must be informed about every case of antepartum hemorrhage
- Keep NPO till further decision form the consultant or Senior resident.

If Minor ante partum hemorrhage characterized by history of mild APH with minimal blood loss on admission.

- **General rules**
  - **Obtain a detailed history** (precipitating factors and amount of blood Loss):
    - **Time of the onset of bleeding & the activities at the time & prior to the bleeding.**
    - **History of previous episode of bleeding**
    - **Amount of bleeding**
    - **Any history of pain, trauma, sexual intercourse & uterine contractions.**

    perform a general examination:
    - **Check the vital signs immediately.**
    - **Estimate the blood loss by examining the patient's clothing, legs & thighs.**
    - **Immediate assessment of the abdomen regarding:**
      - Fundal height
      - Consistency of the abdomen
      - Lie of the fetus
      - Uterine contractions or irritability
      - Uterine tenderness
      - Presence of fetal heart
  - **Check gestation.**
  - Check & evaluate the **CTG**.

- Check **ultrasound reports for placental site**.
- **Perform gentle speculum examinations**, unless known to have major placenta previa or if no ultrasound reports available.
- **Check lab results** & give **anti D if Rhesus negative**.

- **Specific rules**
  - **Transfer to ward if no signs of major bleeding, significant uterine tenderness, or fetal distress.**
  - **If term, consider induction of labor after discussing with the Consultant.**
  - **If preterm give dexamethasone (as per preterm protocol).**

If major or massive bleeding: As indicated by a significant vaginal bleeding or bleeding with significant constant uterine tenderness.

- **General rules**
  - Call for help.
  - Place obstetric emergency trolley beside patient bed.
  - Insert IV Cannula G 14 & initiate Hartmann's solution/Ringer lactate.
  - **Catheterize** for accurate monitoring of **urinary output.**
  - Measure intake & output Q ½ hour.
  - Record observations on **observation chart** and **measure all blood loss** accurately (consider weighing soaked linen) keep all pads for review.
  - Observe & measure bleeding closely & consider weighing linens & saving soaked pads for review.
  - Consider early transfusion of blood and blood products.

- **Specific rules**
  - **Major bleeding but no signs of imminent maternal shock or fetal distress:**
    - **Inform anesthetist and neonatal unit.**
    - **Discuss with Consultant and Hematologist if possible, especially if coagulation profile is abnormal.**
  - **Delivery method:**
    - **If no evidence of placenta previa, the cervix is favorable and there is no fetal distress, induction of labor may be appropriate, labor often progresses rapidly in the event of APH due to placental abruption.**
    - **There should be early recourse to cesarean section if blood loss increases or if there are subtle signs of maternal shock e.g. increasing tachycardia or fetal distress. Fit young woman maintains their blood pressure despite extensive bleeding.**
    - **In all other circumstances proceed immediately to cesarean section.**
  - The patient should be **closely monitored** in the labor ward until her condition is satisfactory. Observations continued in ICU observation chart.

- **DO NOT give NSAID e.g. Ibuprofen/diclofenac**: Risk of bleeding & renal shut down.
- **If massive APH indicated by blood loss in excess of 1000 ml or abruption resulting in fetal death**, follow the above steps in addition to the followings:
  - **Always inform consultant** on call as early as possible.
  - **Cross match** at least 6 units of blood.
  - Give **Oxygen**
  - **Blood transfusion** should be started as soon as possible.
  - If there has been an **abruption** resulting in fetal death the patient will always require at least 4 units of blood and 4 units FFP whatever the initial hemoglobin level and this should be given as soon as the cross match is completed (Refer to massive transfusion protocol).
  - If life threatening bleeding other relevant blood groups i.e. (Rh O negative blood) can be given without cross matching.
- If the patient is showing **signs of coagulation defects**, further steps are taken to obtain blood products i.e.
  - Fresh Frozen Plasma
  - Platelets
  - Cryoprecipitate

- Consider CVP line insertion by the anesthetist.
- **Coagulation profile** to be repeated every 4 hours in the first 12 hours.
- Deliver by cesarean section immediately if the fetus is still alive.
- **In the event of fetal death,** the mode of delivery is to be decided by the Consultant.
  - Decision for a vaginal delivery will be considered with an overall view of the patient's clinical scenario.
  - Induction of labor with very careful observation of maternal condition may be appropriate if the maternal condition is stable and if labor progresses rapidly.
  - Even if the fetus is dead immediate caesarean section may well be preferable UNLESS the cervix is found to be at least 4 cm dilated in which case it may be reasonable to perform an ARM and augment labor with oxytocin.
  - A caesarean section may still be necessary unless progress of labor is rapid.
- **After delivery,** maintain an **Oxytocin** infusion of 40 IU in 500 ml of Hartmann's solution at 125 ml/hour (20dpm) for at least 4 hours.

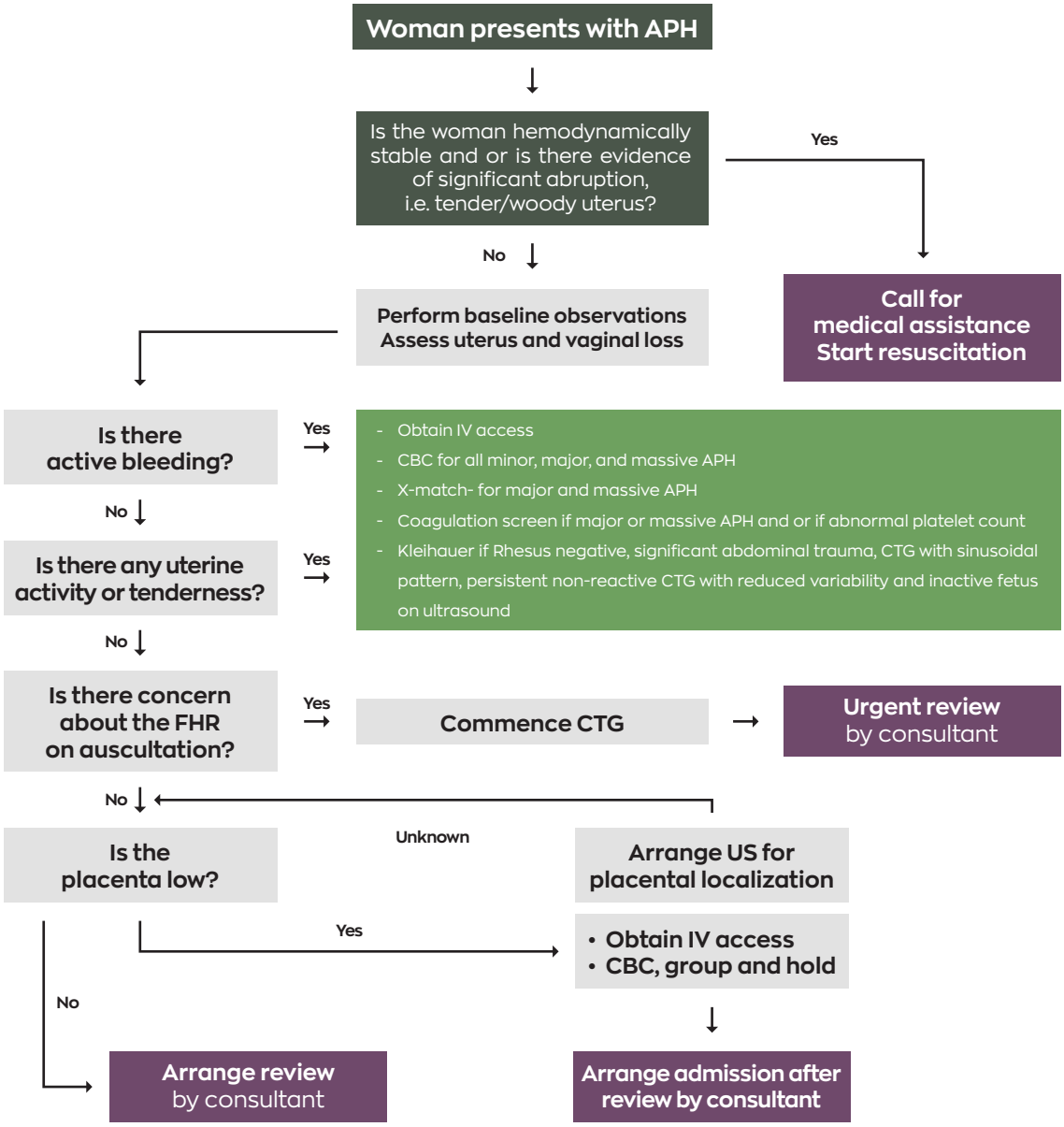


Figure 16 APH response and assessment

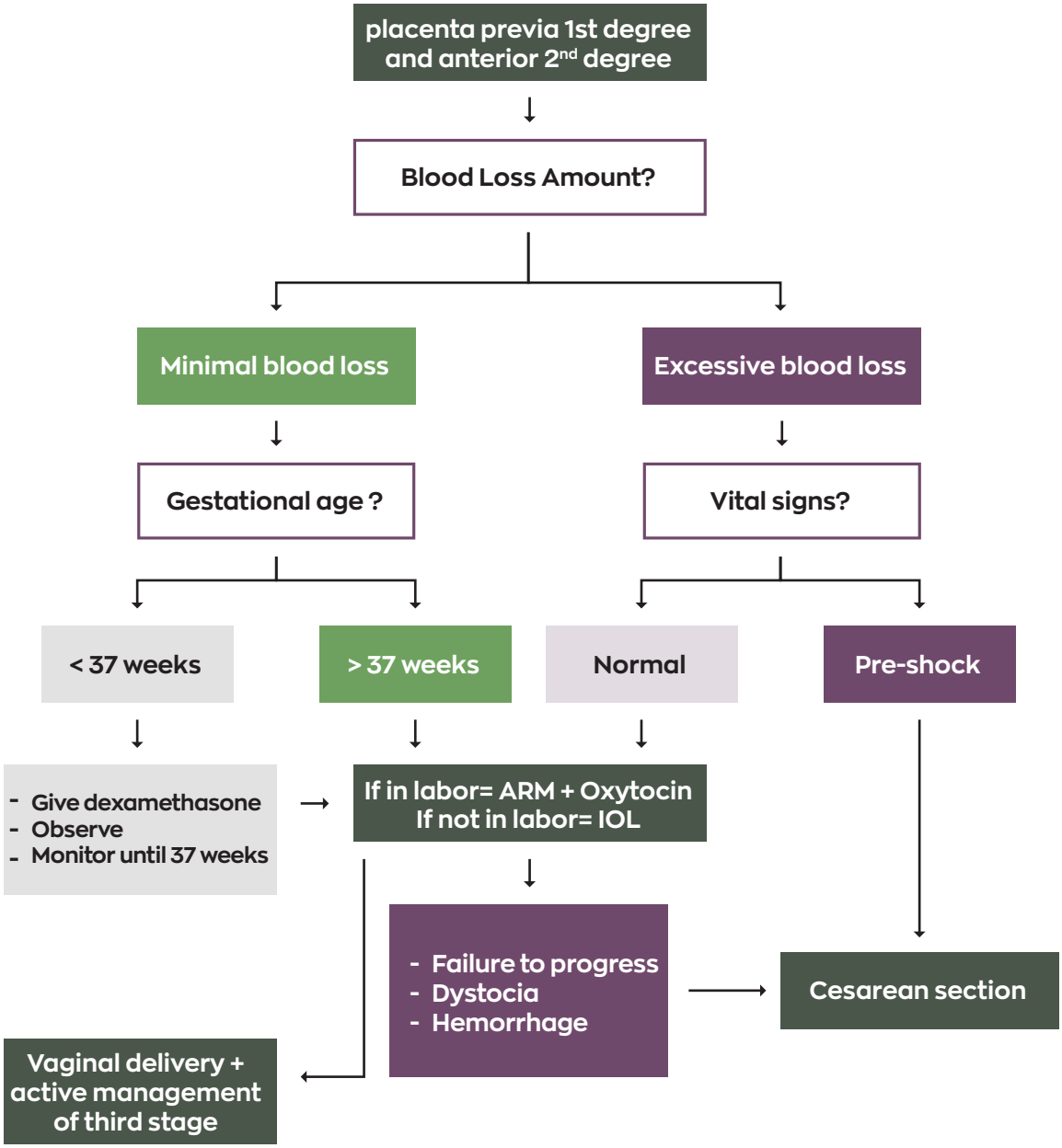


Figure 17 Placenta previa grade I and II

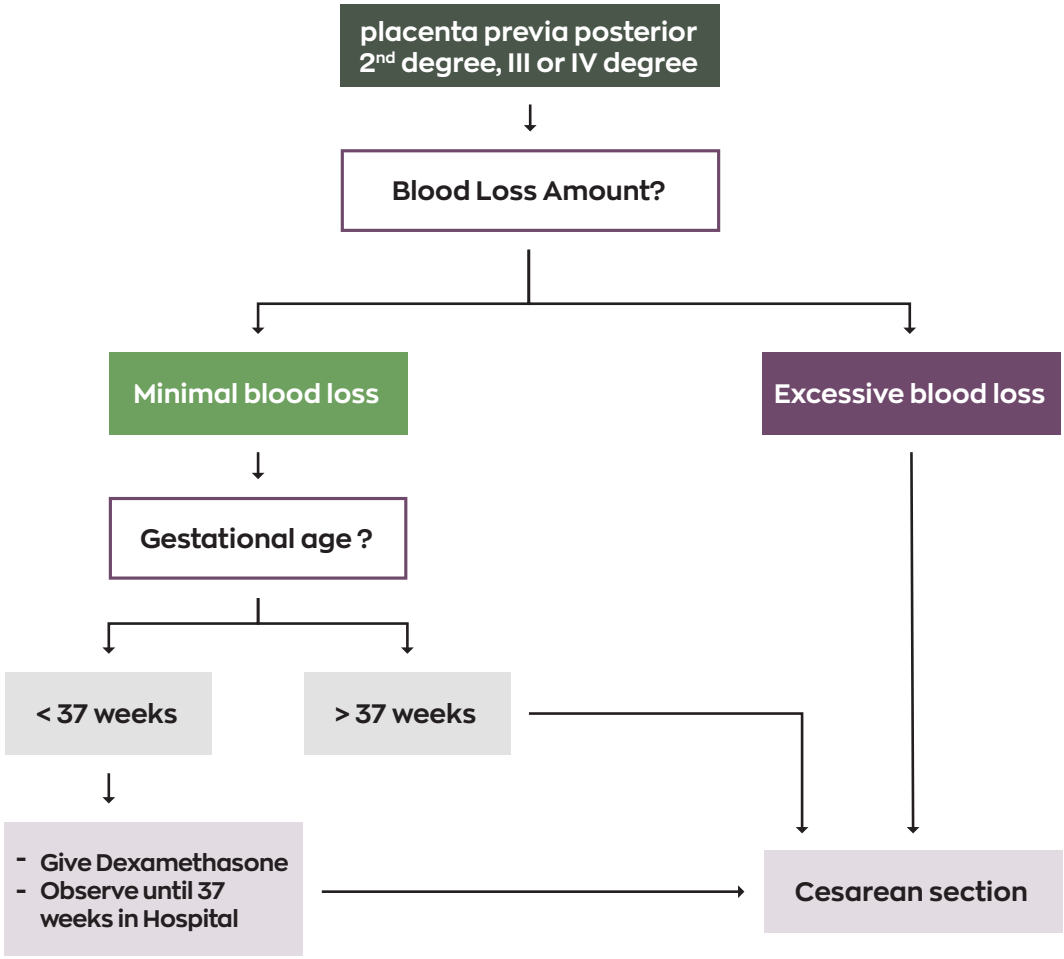


Figure 18 Management of placenta previa grade III and IV

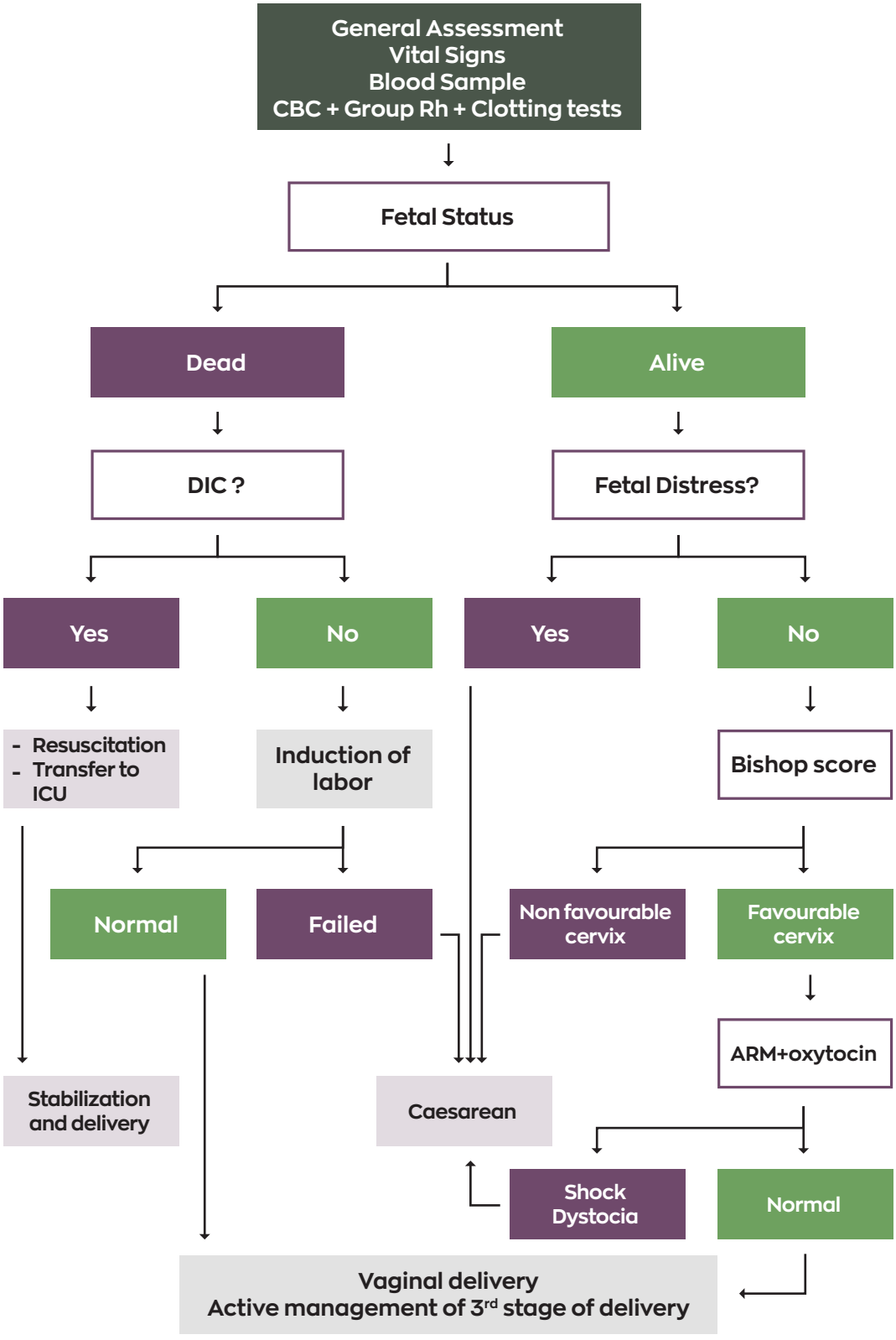


Figure 19 Management of abruptio placenta

2.5	Hyperemesis gravidarum

- **Nausea and vomiting in pregnancy:**
  Up to 80% of women have nausea, vomiting and/or dry retching in the first trimester without pathological cause, of which 90% resolves by the 20th week of gestation.
- **Hyperemesis gravidarum (HG):**
  - Occurs before 16wks in 0.3-3.6% of pregnancies.
  - HG is protracted nausea and vomiting identified with the triad of:
    - 5% Loss of pre-pregnancy weight
    - Electrolyte imbalance **AND**
    - Dehydration

Ketonuria is not reliably associated with the diagnosis or severity of HG

Prevention

- Prenatal vitamins started **3** months prior to conception.
- For patient with history of HG: prophylactic therapy with **B6** and **doxylamine**.

Diagnosis and monitoring

History	• Previous history of nausea and vomiting/HG • Quantify severity using *PUQE-24 score • History to exclude other causes: abdominal pain - urinary symptoms - infection – drug history- chronic Helicobacter pylori infection
Examination	• Temperature - Pulse - Blood pressure - Oxygen saturation-Respiratory rate • Weight • Signs of dehydration • Signs of muscle wasting • Abdominal examination • Other examination as guided by history
Obstetric ultrasound	• to confirm viability and gestational age and exclude multi-fetal or gestational trophoblastic disease
Investigation	• **Midstream urine:** UTI – ketones. • **Urea and electrolytes:** hypokalemia/hyperkaliemia - hyponatremia – dehydration - renal disease • **CBC:** - infection - anemia - hematocrit • **Blood glucose monitoring:** - exclude diabetic ketoacidosis if diabetic. • **In refractory cases or history of previous admissions, check:** • Thyroid function tests • Liver function tests: exclude other liver disease such as hepatitis or gallstones, monitor malnutrition • Calcium and phosphate • Amylase: exclude pancreatitis • ABG: exclude metabolic disturbances to monitor severity

*Modified Pregnancy- Unique Quantification of Emesis (PUQE-24) scoring system					
Score In the last 24 hours:					
How long have you felt nauseated or sick?					
How many times have you vomited or thrown u?					
how many times have you had vomit-like feelings without any substance?					
Mild ≤ 6	**Moderate = 7-12**		**Severe ≥ 13**		

Management of Nausea and Vomiting of Pregnancy

- **Mild Dehydration = PUQE-24 score: ≤ 6**
  Outpatient Care
  - lifestyle/Dietary modifications:
    - Frequent dry and small meals which are low in carbohydrates and fat but high in protein.
    - frequent small amounts of cold fluid
  - Stop oral iron supplements & multivitamins.
  - Continue Folic acid & pyridoxine supplementation.
  - Complementary therapies: Ginger, Peppermint.
  - Acupuncture and acupressure.
  - Oral anti-emetic regularly reduced to PRN when frequency of vomiting improves

- **Moderate Dehydration = PUQE-24 score= 7-12**
  Day Care management ≤ 6-hour admission (Patient if well goes home after treatment)
  - Rehydration guided by electrolytes and ketonuria.
  - Anti-emetics IM/IV
  - Thiamine
  - Reassess & Discharge if vomiting improved and patient tolerates light diet.

- **Inpatient hospital management**

Admission for intra hospital management is indicated in any of the following cases:

- Continuous nausea and vomiting and Inability to tolerate oral antiemetic's or failed Day Care management.
- PUQE-24 score: > 13.
- Malnutrition/continuing significant weight loss despite therapy or starvation ketoacidosis.
- Severe electrolyte disturbance e.g. potassium < 3.0mEq/L.
- Significant renal impairment or acute kidney injury: creatinine > 1mg/dl.
- Suspected or known comorbidity (e.g. UTI, diabetes, corticosteroids, severe epilepsy, transplant recipients, or others requiring essential medications).

- **Monitor** the patient 4 hourly unless otherwise indicated.
- Input / output chart.
- Record weight each admission.
- Psychological support and reassurance.
- Keep NPO for 24 hours-48 hours till vomiting stops. diet can be slowly started.
- Rehydration guided by daily monitoring of electrolytes & Ketones.
  - The optimum replacement fluid regimen has not been studied.
  - Potassium infusion rate 10mEq over 1 hour.
- **Pharmacological management:**
  - **Replacement of pre-existing fluid deficit:**

	First Liter over 2 hours	Second liter over 4 hours
Normal K	One liter of Ringer Lactate	0.9% Sodium Chloride or Ringer Lactate
K+ (3.5-3.9)	One liter of 0.9% Sodium Chloride with K^+ 20 mEq/L infusion pump at 500 ml per hour	
K+ (3.2-3.4)	One liter of 0.9% Sodium Chloride with K+ 40 mmol/L infusion pump at 250ml per hour	
K+:<3.2	One liter of 0.9% Sodium Chloride with K+ 40 mEq/L Given 3L/day	
Hyponatremia <120 mEq/L	must be corrected slowly as too rapid a correction can result in central pontine myelinolysis	

Ringer Lactate (Hartmann's solution) is a balanced isotonic solution containing Na+, Cl-, K+. HCO- (as lactate), Ca2+, and water.
Normal Saline is 0.9% NaCl isotonic solution containing Na+, Cl-, and water.

Dextrose D5W infusions can cause Wernicke's encephalopathy. Dextrose should not be prescribed unless sodium levels are normal, and thiamine has been administered. It may be indicated for particular patients such as those with diabetes.

- **Maintenance Rehydration Therapy:**
  - **3L-4L per day according to weight with K+: 0.5-1mEq/kg/day.**
  - **Dextrose D5W is not given before thiamine during maintenance therapy for NPO (Dextrose saline is used - concentrations of dextrose are unlikely to provoke this response).**
  - **Any on-going losses must be replaced.**
  - **Fluid and electrolyte regimes should be adapted daily according to daily measurements of serum sodium and potassium & urine output >100 mL/hour.**

- **Thiamine supplementation**
  - **Should be given routinely to all women admitted to hospital and before any dextrose containing solution.**
  - **Orally: 50mg three times a day (TDS) *OR***
  - **IV: 100mg diluted in 100mls of normal saline infused over 30-60 minutes once weekly.**

- **Antiemetics**
  - **Use combinations of different drugs in women not responding to a single antiemetic**
  - **Parenteral or rectal route are more effective than an oral regimen.**

Drug	Dose	Major side effects	Class
First line			
Doxylamine	6.25-25 mg TDS po, max 50 mg/day	Drowsiness, dizziness	H1 receptor antagonist
Cyclizine	50mg PO/IM/IV TDS		
Promethazine **(Phenergen)**	12.5-25mg 4-8 hourly PO or deep IM		
Chlorpromazine (Largactile)	10-25mg 4-6 hourly PO/ Deep IM	Sedation, hypotension, extrapyramidal symptoms	Antipsychotic phenothiazines
Second Line			
Metoclopramide	5-10mg 8 hourly PO/IV/IM (also available as oral solution)	Extrapyramidal symptoms (torticollis, oculogyric crisis)	D2 receptor antagonist
Domperidone	10mg 8 hourly PO, 30-60mg 8 hourly PR	Minimal	
Ondansetron	4-8mg 8 hourly PO/IV	Headache, GI upset, Does not appear to increase overall risk of birth defects Avoid in women with pre-existing QT prolongation	5-HT3 receptor antagonist
Third line = Corticosteroids (Additional therapy for refractory cases)			
Regime	**Dose**	**Rout/Duration**	
Hydrocortisone	100mg 12 hourly	IV for 48 to 72 hours until able to tolerate fluids followed by a tapering regimen of 40 mg oral **Prednisolone**	
Methylprednisolone	16 mg 8 hourly	IV for 48 to 72 hours. followed by a tapering regimen of 40 mg oral **Prednisolone**	

- **Antacid:** H2 receptor antagonists or proton pump inhibitors as anti -Gastroesophageal Feflux Disease (GERD).
- **Venous thromboprophylaxis** is mandatory.

- **Multidisciplinary team involvement**
  - **Enteral feedings: in significant weight loss and inability to maintain food for 1 to 2 weeks to enable normal function of the intestines.**
  - **Total Parenteral feeding: reduces perinatal morbidity risk but increases the risk of thrombosis and infection.**

- **Additional management:**
  - **Termination of pregnancy: Decision by MDT with documentation of therapy, indicated if life threatening condition:**
    a. A psychiatric opinion (individualized)
    b. Persistent Prolonged Severe vomiting despite treatment with continued progressive end- organ dysfunction or failure.
  - **Helicobacter pylori eradication for 2 weeks with triple therapy**

- **Discharge and Follow-up:**

• **When tolerating oral fluids and diet**
• **Reassurance & rest**
• **Information and education**
• **Dietary advice.**
• **Anti-emetic**
• **Thiamine-Folic acid**
• **Antiacid & laxative**
• **A follow-up appointment for antenatal care**

2.6	**Pre-labor rupture of membranes (PROM)**

Definition

- **Pre-labor or premature rupture of membranes (PROM**) is membrane rupture occurring before the onset of labor, irrespective of gestation.
- **Preterm PROM (PPROM)** refers to PROM before 37 weeks of gestation.

The midwife should inform the physician of all cases of PROM

Diagnosis

- Take a detailed history with particular focus on dates.
- Perform a complete physical exam and search for contractions.
- Confirm PROM by performing a sterile speculum exam:
  - to visualize amniotic fluid leaking from the cervical and or pooling and color of the fluid.
  - If amniotic fluid is not immediately visible, the patient can be asked to push on their fundus, Valsalva, or cough to provoke leakage of amniotic fluid from the cervical os.
  - If pooling of amniotic fluid is still not observed, insulin-like growth factor binding protein-1 test or placental alpha-microglobulin-1 test of vaginal fluid is performed in higher resource settings.

- If no amniotic fluid is observed, normal amniotic fluid volume on ultrasound, and the results of the insulin-like growth factor binding protein-1 or placental alpha-microglobulin-1 test are negative:
  - Do not give antenatal prophylactic antibiotics.
  - Explain to the woman that it is unlikely she has PROM, but that she should return for reassessment if there are any further symptoms suggestive of PROM or labor.

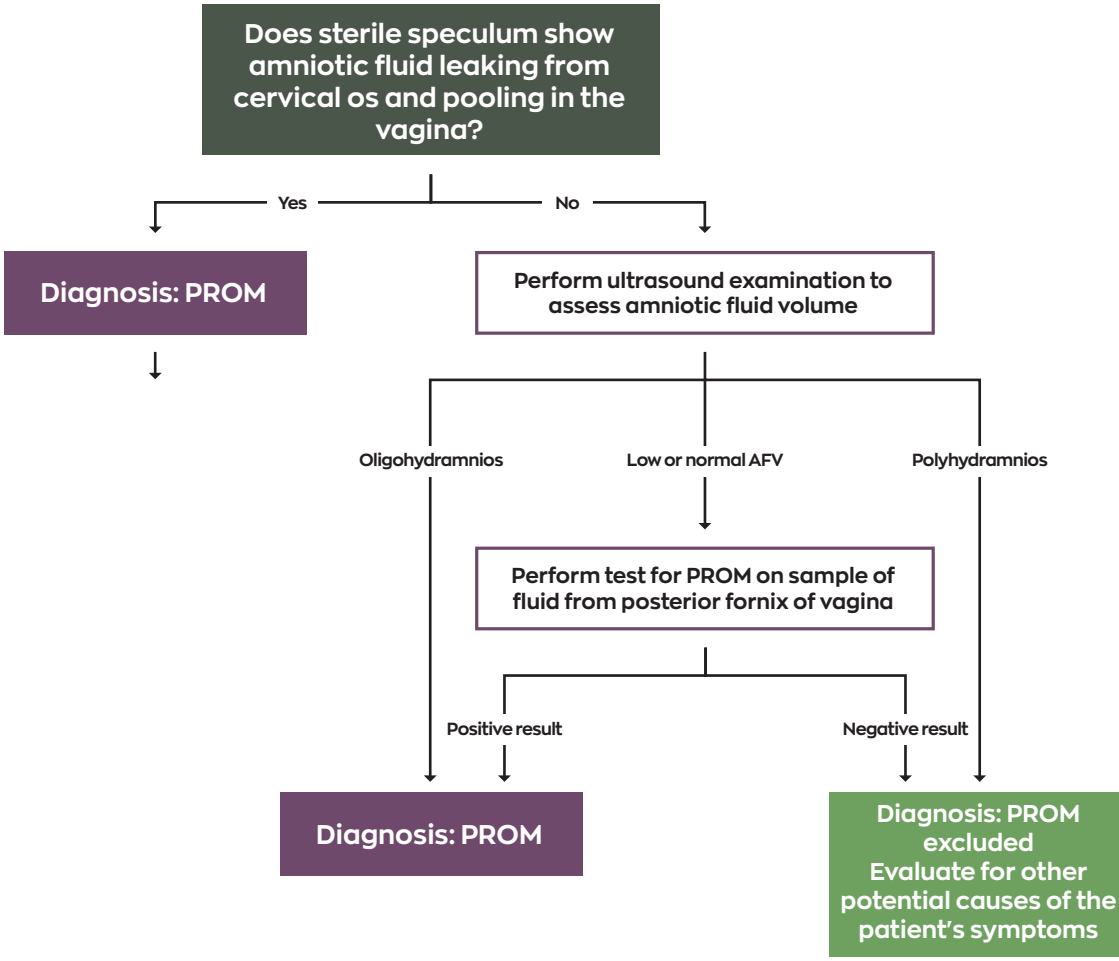


Figure 20 Diagnosis of PROM in patients who present with a history of leaking fluid

Management

- Hospital management is mandatory for confirmed PROM.
- The Management of PROM is according to Gestational age.
  - **Gestation ≥37 weeks**
    - Delivery is indicated for all patients with PROM ≥37 weeks of gestation.
    - Give antibiotic in labor in the following circumstances:
      - Maternal pyrexia
      - Known B hemolytic streptococcus carrier (GBS).
      - PROM ≥ 18 hours
    - **Oxytocin should be administered** immediately to induce labor:
    - If indicated, **Intravenous penicillin 3 g** be given as soon as possible after the onset of labor and 1.5 g four-hourly until delivery.
    - If meconium staining of the liquor, fetal tachycardia or decelerations, consider delivery by CS.

- **Gestation between 24 - 36^{+6} weeks**
  - Expectant management before 34 weeks
  - Either expectant management or immediate delivery for those 34 to 36^{+6} weeks.
  - In general, women with PPROM after 24 weeks' gestation and who have no contraindications to continuing the pregnancy should be offered expectant management until 37^{+0} weeks:
    - **Timing of delivery should be discussed with each woman on an individual basis with careful consideration of patient preference and ongoing clinical assessment.**
    - **Expectant management should be balanced with the risks of PPROM complications in expectantly managed pregnancies like intrauterine infection, placental abruption, and cord prolapse/compression.**
  - Digital vaginal examination is not indicated. A normal CTG without decelerations effectively excludes cord prolapse and cervical dilatation is very unlikely in the absence of painful regular contractions.
  - Conduct the following investigations:
    - **Complete blood count**
    - **Intracervical and HVS for culture and sensitivity**
    - **Mid-stream urine for culture and sensitivity**
    - **Ultrasound assessment of fetal status**
    - **If gestation ≥ 28 weeks, monitor with CTG.**

    Follow the above steps.

  - If not associated with uterine contractions, commence conservative management.
  - If the PROM is associated with uterine contractions, the decision to suppress labor is left to the Consultant judgment and the available neonatal care.

Conservative management:

- Give a single course of PO erythromycin 250 mg 6 hourly for 10 days.
- For women who cannot tolerate erythromycin or in whom erythromycin is contraindicated, give PO penicillin for a maximum of 10 days or until the woman is in established labor (whichever is sooner).
- Do not give women with PPROM co-amoxiclav as prophylaxis for intrauterine infection.
- **Daily** palpation for uterine tenderness, assessment of liquor color & CTG.
- **Weekly** Scan for estimated fetal weight and biophysical profile (BSP) (estimating AFV volume is not necessary as it rarely alters clinical management).
- If there is any evidence of infection, hemorrhage or fetal distress then labor should be induced or cesarean section if necessary (Consultants must be aware of such cases).
- In the case of **suspected sepsis**:
  - **antibiotics should be commenced immediately. If the results of an HVS suggest a specific organism, use appropriate antibiotics. Labor to be induced thereafter.**
  - **Labor will be induced by an Oxytocin infusion and managed as for preterm labor.**

- Tocolysis (For details, refer to preterm labor section)
- Used to delay delivery for 48 hours to allow administration of a course of corticosteroids and transfer to a setting with NICU.
- Corticosteroids (For details, refer to preterm labor section)
- Prescribe steroids to enhance fetal lung maturity:
  - **A course of corticosteroids can be considered for patients who present with PPROM at 34^{+0} to 36^{+6} weeks of gestation who are going to be managed expectantly, have not received a previous course of steroids, and who are scheduled for delivery in >24 hours and <7 days.**
  - **Either IM dexamethasone or IM betamethasone (total 24 mg in divided doses) is recommended as the antenatal corticosteroid of choice.**

- **Magnesium sulfate for neuroprotection** — Magnesium sulfate is administered prior to delivery in women who at risk of imminent delivery, with gestation at least 24 but <32 weeks.

- **Gestational age <24 weeks:**
  - Family counseling should be provided by a multidisciplinary team.
  - Prenatal and postnatal counseling regarding anticipated short-term and long-term neonatal outcome should take into consideration anticipated gestational age at delivery.
  - Maternal and neonatal outcomes should be considered.
  - Antenatal corticosteroids, Magnesium sulphate and tocolytics are not recommended at this gestational age.

2.7	**Preterm labor**

Definitions

- Preterm labor (PTL) is defined as early onset of labor before 37 weeks gestation recognized by regular uterine contractions associated with cervical changes (≥3m and or ≥75% effacement).
- PTL is one of the leading causes for adverse perinatal outcomes.
- PTL is categorized based on gestational age into:
  - Extreme preterm – less than 28 weeks
  - Very preterm- 28 to 31^{+6} weeks
  - Moderate to late preterm- 32 to 36^{+6} weeks

- In our settings, the cut off for **fetal viability is 24 weeks**. However, the WHO has set 22 weeks as the age of viability. Therefore, for births **between 22-24 weeks**, birthweight and NICU capability should be taken into consideration. A pediatrician should be informed of the impending delivery, although it should be clearly explained to the parents that the pediatrician will assess the baby but may not necessarily provide active resuscitation for the baby.
- Spontaneous miscarriage **between 20 and 24 weeks** should be managed in the labor room and treated as for preterm labor. However, fetal monitoring is not indicated, and vaginal delivery should be sought regardless of fetal presentations.

Diagnosis and Management

- **Specific actions**
  - All women with suspected preterm labor should be **seen by the physician** as soon as possible.
  - **Check gestation** by dates and scan results.
  - Evaluate the **CTG**.
  - Discuss with a senior obstetrician about whether and how to monitor the fetal heart rate for women who are between 24 and 26 weeks pregnant.
  - Include family members in the discussion, as appropriate. Explain that there is no evidence that using CTG improves the PTL outcomes for the baby compared with intermittent auscultation.
- **Physical examination**
  - Maternal vital signs
  - Abdominal examination to assess tone, tenderness.
  - Examine to determine **fetal size and presentation** (confirm by ultrasoundbym bad obstetric Outdnd increased materna;tality).
  - Assessment of contraction frequency, duration, and intensity.
  - **Sterile speculum examination** (use a wet non-lubricated speculum):
    - Visualize cervix and estimate cervical dilation; more than 3 cm differentiates the diagnosis between threatened and actual preterm labor.
    - Evaluate membrane status (intact or ruptured) and assess liquor.
    - Obtain cervico-vaginal fluid for fetal Fibronectin (fFN) testing, if available.

- Perform the following **investigations**:
  - Full blood count.
  - Midstream urine.
  - HVS at during sterile speculum examination.

- Fetal Fibronectin (fFN) Testing

  The risk of preterm birth is increased with elevated levels of fFN (typically > 50 ng/mL) in cervico-vaginal secretions after 22 weeks' gestation.

Indications fFN testing	Symptomatic threatened preterm labor in pregnancies <34 weeks of gestation with: • intact membranes, • cervical dilation <3 cm, and • cervical length 20 to 30 mm on TVUS examination

- If the membranes are intact and there are regular painful contractions, **a vaginal examination** is performed on admission by the physician.
- If membranes are ruptured refer to **PROM protocol**.
- **Inform neonatal unit** and check availability of places.
- If the cervix is not dilated, then **contractions should be monitored** either by palpation or CTG.
- **Obstetric ultrasound examination** for fetal, placental, and maternal anatomic abnormalities; confirmation of fetal presentation; estimation of amniotic fluid volume and fetal weight. This information may be used for counselling the woman about the potential causes and outcomes of preterm birth and determining the best mode of birth.
- Cervical length by transvaginal ultrasound (TVS)
  - **Cervical length >30 mm:**
    Symptomatic women with cervical length >30 mm are at low risk (<5 percent) of delivery within seven days.
  - **Cervical length 20 to 30 mm:**
    Symptomatic women with cervical dilation <3 cm and cervical length 20 to 30 mm are at increased risk of preterm birth, but most of these women do not deliver preterm. For this group of women, a cervicovaginal sample for fFN testing is optimal. If the fFN test is positive, start interventions to reduce morbidity associated with preterm birth.
  - **Cervical length <20 mm:**
    Symptomatic women with cervical length <20 mm are at high risk for preterm birth (>25%).
- A cause for the contractions such as UTI, intrauterine infection, multiple pregnancy, abruption placenta or polyhydramnios should be sought and treated accordingly.

Diagnosis of preterm labor:

- Uterine contractions (≥6 in 60 minutes) **PLUS**
- Cervical dilation ≥3 cm **OR**
- Cervical length <20 mm on transvaginal ultrasound **OR**
- Cervical length 20 to <30 mm on transvaginal ultrasound and positive fetal fibronectin

- If Diagnosis of PTL is confirmed commence tocolysis and give steroids.

Suppression of preterm labor (tocolysis):

- It is rarely indicated after 34 week gestation and is unlikely to be successful once cervical dilatation is **4 cm** or more.
- Only indicated to delay delivery by 48 hours to allow Dexamethasone in fetal maturation or to allow in utero transfer.
- **Nifedipine** Regimen is the first choice.
- Avoid using combination of tocolytic drugs.

- Contraindication for tocolytics:
  - Maternal contraindication to tocolysis (agent specific)
  - Any condition where prolongation of pregnancy is contraindicated including but not limited to:
    - **IUFD.**
    - **Lethal fetal anomalies.**
    - **Suspected fetal compromise.**
    - **Maternal bleeding with hemodynamic instability.**
    - **Preeclampsia.**
    - **Placental abruption.**
    - **Chorioamnionitis.**

1. Regime for Nifedipine Tocolysis:

Initial Dose	20mg Nifedipine PO stat
If contractions persist after 60 minutes	20mg Nifedipine PO may be given at 30 minute interval for a total three doses if required and the BP is stable.
Maintenance dose	• A maximum dose of 20 to 40mg every 6 hours maybe given, depending on uterine activity and other clinical conditions. • **Maximum dose of 160mg in 24 hours.** • Continue maintenance dose for 48 hours or until 24 hours after second dose of corticosteroids, whichever sooner. **Decision about stopping treatment will be made on individual basis, considering location, steroid cover, and gestational age.**
Adverse effects	Hypotension, tachycardia, palpitations, flushing, headache, dizziness, nausea.

2. Regimen for indomethacin:

- 25-50 mg Q6 hrs oral, or rectal for 48 hrs.
- Preferred in polyhydramnios.
- Before 32 week gestational age.

3. Steroid therapy: promoting pulmonary maturity

- Antenatal corticosteroid therapy is recommended for women **from 24 weeks to 34 weeks of gestation** when the following conditions are met:
  - Gestational age assessment can be accurately undertaken.
  - There is a high likelihood of preterm birth within 7 days of starting therapy.
  - There is no clinical evidence of maternal infection.
  - Adequate childbirth care is available (including capacity to recognize and safely manage preterm labor and birth)
  - The preterm newborn can receive adequate care.
- Aim to delay labor for a further 24 hours for maximum benefit.
- Rupture of the membranes is not a contra-indication for steroid therapy.
- Antenatal corticosteroid therapy is recommended for women with hypertensive disorders in pregnancy who have a high likelihood of preterm birth.
- Antenatal corticosteroid therapy is recommended for women with pregestational and gestational diabetes when there is a high likelihood of preterm birth, and this should be accompanied by interventions to optimize maternal blood glucose control in the hospital settings.
- Antenatal corticosteroid therapy is recommended for women with a high likelihood of preterm birth of a growth restricted fetus.

- Either IM dexamethasone or IM betamethasone (total 24 mg in divided doses) is recommended as the antenatal corticosteroid of choice.
  - Dexamethasone total four of 6mg doses 12 hours apart.
  - Betamethasone total two of 12 mg doses 12 hours apart.
- A single repeat course of antenatal corticosteroids is recommended for women who have received a single course of antenatal corticosteroids at least 7 days prior and, on clinical assessment, have a high likelihood of giving birth preterm in the next 7 days.

4. Magnesium sulfate for neuroprotection

There is evidence that magnesium sulfate reduces the severity and risk of cerebral palsy in surviving infants if administered when birth is anticipated before 32 weeks.

- Give magnesium sulfate for **neuroprotection of the baby** to women between 24 and 32 weeks of pregnancy who are:
  - in established preterm labor **OR**
  - having a planned preterm birth within 24 hours.
- Be aware that There is an increased risk of maternal side effects when magnesium sulfate is administered concomitantly with calcium channel blockers (Nifedipine).

For women on magnesium sulfate, monitor for clinical signs of magnesium toxicity at least every 4 hours by recording pulse, blood pressure, respiratory rate and deep tendon reflexes.

Magnesium Sulfate Loading Dose	Maintenance Dose	Repeat Treatment
4 g over 20 minutes	1 g/hour continued until birth or for 24 hours	No immediate repeat doses
6 g over 20 minutes	2 g/hour continued until birth or for 12 hours	If less than 6 hours have elapsed since discontinuation of infusion, restart maintenance dose. If more than 6 hours have elapsed, rebolus and start maintenance dose

For more details on magnesium contraindications, side effects, monitoring and toxicity refer to section hypertensive disorders of pregnancy.

5. Delivery:

- **Breech presentations** > 24 weeks but <32 weeks. **The delivery method should always be discussed with the Consultant on call.**
- **Cephalic** presentation should be allowed to **deliver vaginally**. Continuous fetal monitoring is essential. The attending doctor should be able to interpret the CTG.
- **Pediatricians** should be informed in advance before delivery. Pediatrician should be present at all preterm deliveries.
- **A swab should be taken from the placenta** (strip off amnion and swab underneath) and the placenta sent to histology with a form giving all details about pregnancy and condition of infant.

6. Prophylactic antibiotics:

- Do not use antibiotics to prolong pregnancy.
- GBS prophylaxis in women undergoing vaginal delivery:
  - Give antibiotics if unknown GBS status or until GBS results return and then manage accordingly.
  - If GBS positive on admission but patient does not go into labor, discontinue until onset of labor.
  - GBS prophylaxis not required if patient has a negative GBS result within the previous 5 weeks.

- Careful case selection and labor management that follow specific protocols have noted excellent neonatal outcomes.
- Perinatal mortality occurs in approximately 2 per 1000 births and serious short-term neonatal morbidity in approximately 2% of breech infants.
- Long-term (2 years) neurological infant outcomes do not differ by planned mode of delivery even in the presence of serious short-term neonatal morbidity.
- Even if a clear management plan is written in the notes, **consultant must be informed** upon admission of women with breech presentation as the management needs to be individualized.

Antenatal management

Refer women with a breech presentation between 35-36 weeks gestation for obstetric review as near as possible to 36 weeks

- Obtain **full obstetric history**.
- Perform **abdominal exam.**
- Perform **ultrasound examination** to confirm breech presentation, type of breech, placental localization, AF volume, exclude fetal and uterine anomalies/fetal head extension and/or IUGR.
- Offer external cephalic version (ECV) at ≥ 36-37 weeks' gestation provided that there is no contra-indication.
- **Setting and Consent:**

  i. **Obtain informed consent: In the absence of a contraindication to vaginal delivery (see box below):**

     - inform a woman with a breech presentation of the risks and benefits of a trial of labor and elective cesarean section (A woman's choice of delivery mode should be respected).
     - Inform women that the reported success rates of ECV is 40%-70%, and the maximum success rate is observed at 37 weeks.
     - Inform women that few babies revert to breech presentation after a successful ECV.
     - Document the consent discussion and chosen plan and communicate them to labor-room staff.
       - **Hospitals offering a trial of labor should have a written protocol for eligibility and intrapartum management.**
       - **Advise women with a contraindication for a trial of labor to have a cesarean section.**

Factors unfavorable for breech vaginal birth include the following:

- Contraindications to vaginal birth (e.g. placenta previa, cord presentation, previous caesarean section)
- Clinically inadequate pelvis.
- Any presentation other than a frank flexed or neutral head attitude.
- Large baby (usually defined as larger than 3800 g).
- Growth-restricted baby (usually defined as smaller than 2000 g).
- Fetal anomaly incompatible with vaginal delivery.
- Fetal or maternal compromise.
- Lack of presence of a clinician trained in vaginal breech delivery.

ii. Timing of ECV:

- ECV should be done at term from 37^{+0} weeks of gestation.
- In nulliparous women, ECV may be offered from 36^{+0} weeks of gestation.

iii. ECV procedure (See algorithm)

Prior to the procedure

1. Confirm that the setting is ready for emergency cesarean, if needed.
2. Check a written consent is completed and signed.
3. Record maternal baseline observations for pulse, respirations, and BP.
4. Perform a CTG for 20-30 minutes.
5. Check a formal ultrasound has been performed within 24 hours of the procedure.
6. Ensure the presentation is still breech by ultrasound.
7. Confirm the doctor performing the procedure is available in 30 minutes before administering the tocolytic.
8. Give 150mg oral Ranitidine and subcutaneous **Terbutaline** 0.25mg (250 mcg). Following administration of tocolysis monitor the maternal pulse, BP, and the FHR 10 minutely until the ECV is performed.
9. Perform the ECV 30 minutes after tocolysis, and or when maternal pulse is more than 100 bpm.
10. Perform ECV while the mother is awake and facilities for emergency CS delivery are available.
11. Confirm fetal wellbeing with CTG before and after ECV, Ultrasound guidance can be helpful.
12. Do not use regional anesthesia to facilitate ECV, evidences is insufficient to support its use.

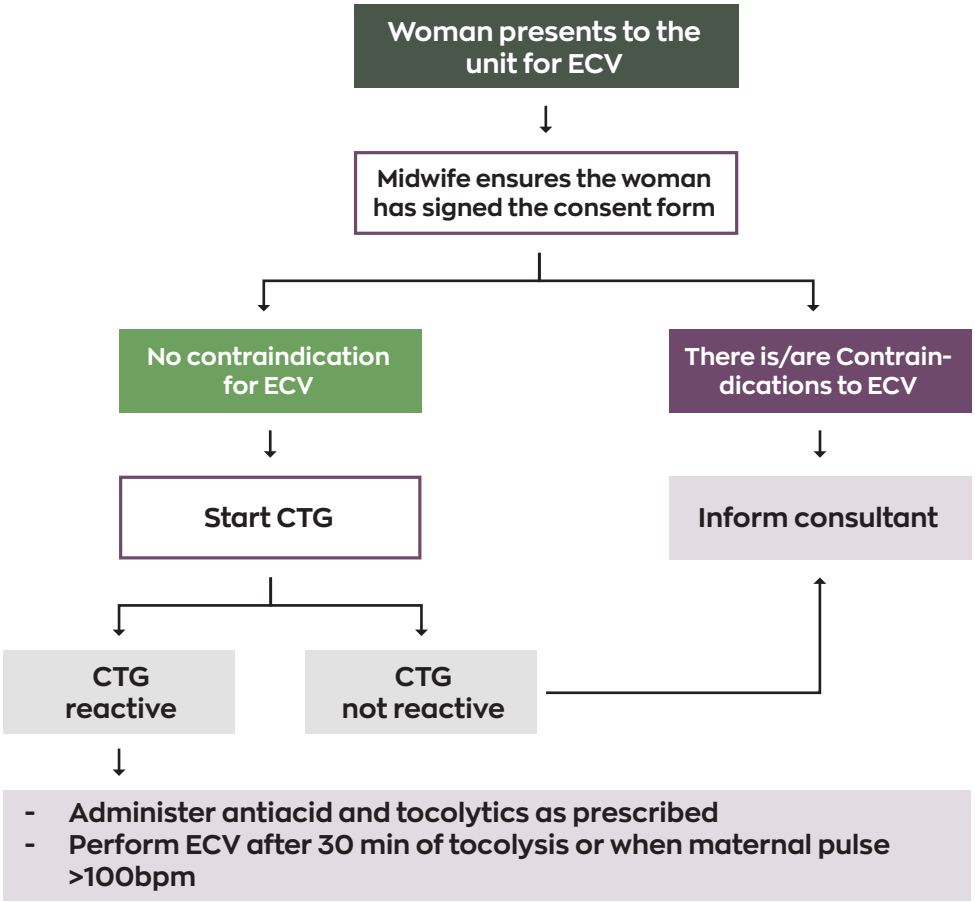


Figure 21 Algorithm ECV

Post procedure – (whether successful or not)

1. Monitor the FHR by CTG for 40 minutes.
2. Monitor the maternal pulse, BP, vaginal loss, and pain every 15 minutes for 60 minutes.
3. If the mother is Rhesus negative, obtain blood for a Group and Antibody screen (Kleihauer), then administer Anti-D as required.
4. Discharge the woman home after 1 hour provided:
    a. Maternal observations are normal.
    b. There is a reactive CTG.
    c. There are no signs of labor, abnormal vaginal loss, or abdominal pain.
    d. The medical team is satisfied with the maternal fetal condition.
5. Instruct the woman to come to hospital if any of these conditions occur.

If the ECV was not successful (failed) or not attempted:

- Council the women and her husband about the mode of delivery:
- If the decision was for vaginal delivery, and in the absence of fetal and or maternal contraindications, **allow pregnancy to continue to 40 completed weeks i**n the hope of spontaneous onset of labor.
- **Induction of labor is not recommended**.
- Explain to the mother and give her time to discuss the choice with her husband/ relatives.
- In planed caesarean section, allow pregnancy to continue to 39 completed weeks.
- PROM and pre-term labor are managed as in relevant protocol.

Intrapartum management

- Perform the **routine admission procedures**.
- **Check CBC, Blood type & Rh, save blood for X-match.**
- **Keep consultant informed.**
- **Selection criteria for trial breech delivery:**
  The decision regarding mode of delivery will depend on:
  - Gestational age.
  - Stage of labor or imminent birth.
  - Maternal and fetal risks.
  - Presence of unfavorable factors for trial of vaginal breech (above box).
  - Parental wishes after consultation with the obstetric team.

  Decision for trial of labor in breech presentation should be made by the concerned consultant or by a senior resident after comprehensive discussion with the consultant.

- Inform Anesthetist & Neonatologist.
- An intrapartum ultrasound should be performed if possible.
- If Ultrasound is not available, consider delivering undiagnosed breech presenting for the first time in labor by CS if you lack the information for fetal anomaly scan.
- Labor Management
  - Explain the delivery procedure to the patient and her husband.
  - Vaginal assisted breech delivery should be carried out by **the most senior available doctor** and **preferably by the consultant.**
  - **An Anesthesiologist as well as pediatrician should attend the delivery.**
  - Epidural analgesia can be employed.
  - Keep on continuous electronic fetal heart monitoring.
  - **Breech extraction** should never be undertaken except in the case of a second twin or dead fetus.
  - **Oxytocin Augmentation is acceptable in presence of slow progress of labor** (Refer to LCG).
  - **Forceps** should be available in advance.

- Conserve fetal membrane as long as possible and perform immediate vaginal examination if SROM.
- Full dilatation of the cervix should only be confirmed by a senior doctor or an experienced midwife as this is a very vital step.
- Allow a passive second stage without active pushing to last for 90 minutes, allowing the breech to descend well into the pelvis.
- Once active pushing commences, allow further 60 minutes and if delivery is not imminent, then, CS is recommended.
- Effective maternal pushing efforts are essential to safe delivery and should be encouraged.
- At the time of delivery of the after-coming head should be present to apply supra pubic pressure and engagement of the fetal head.
- Spontaneous or assisted breech delivery is acceptable. Avoid fetal traction and fetal manipulation must be only after spontaneous delivery to the level of the umbilicus.
- Nuchal arms may be reduced by the Løvset or Bickenbach maneuvres.
- The fetal head may deliver spontaneously, or by suprapubic pressure, by Mauriceau-Smellie-Veit maneuvre, or with the assistance of Piper forceps.

Stop trial of labor and consider CS if:

1. **Rate of cervical dilatation is slower than evidence despite good uterine contraction.**
2. **If the breech fails to descend.**
3. **If there is evidence of fetal distress.**

Preterm breech delivery: Mode of Delivery.

- Up to 28 weeks: allow for vaginal delivery if there is no contraindication.
- Between 28 – 34 weeks: Individual Consultant decision
- Between 35-37 weeks: Manage as term breech regarding mode of delivery.

There is insufficient evidence to support routine cesarean section for the delivery of preterm breech.

2.9	Management of twins labor at term

- Twin pregnancy is associated with higher perinatal mortality especially in the second twin and increased maternal morbidity.
- **Chorionicity and amnionicity should be informed before delivery.**
- **Timing of delivery for twins:**
  - Monochorionic monoamniotic: elective cesarean section at 34 week after administration of corticosteroids
  - Monochorionic diamniotic: delivery at 36-37 weeks for uncomplicated twins after administration of corticosteroids
  - Dichorionic diamniotic: delivery at 37-38 weeks for uncomplicated twins.

Intrapartum management

First Step Actions (see algorithm)

Specific Actions

- Inform the Consultant about the admission.
- If the first twin is not in vertex presentation, delivery should be done by CS.
- Recommend an epidural analgesia if the woman desires so.
- Continuous fetal monitoring for both twins.
- **Obstetric senior, anesthetist, pediatricians** should be present in labor ward during second stage.
- **Oxytocin infusion** prepared for use in second stage (10u in 500 ml normal saline).
- Once the first twin is delivered
  - **Clamp the cord** and divide. Do NOT give syntometrine.
  - **Check presentation/lie** of the second twin abdominally and vaginally to assess station of presenting part. Findings can be confirmed by ultrasound Scan.
  - **Correct lie to a longitudinal lie if applicable** (ECV or internal podalic version).
  - If contractions have not recommenced after 5 mins start an **infusion of 10 IU Oxytocin** added to 500 ml of Hartman's solution at 12 ml/hr (4dpm) doubling the rate every 5 mins.
  - Once the presenting part has descended into the pelvis, **perform an ARM** and await delivery as appropriate for the presentation.
  - **If the presenting part fails to descend, consider:**
    - Controlled ARM for a cephalic Presentation;
    - Breech extraction for a breech presentation or persistent transverse lie.

Breech extraction should be performed by grasping a foot PRIOR to rupturing the membranes and apart from extreme fetal distress should only be performed by an experienced resident doctor or Consultant.

  - Aim for delivery of the **second twin within 20-30 mins** of the first if possible.
  - Double clamp of **twin 2** for postpartum identification
- **The third stage** should always be managed actively.
  - After delivery methergine 0.25 mg IM stat should be given if not contraindicated or an infusion of 40u Oxytocin in 1000 ml normal saline should be given at 125 ml/hrs. for 4 hours or longer if otherwise indicated.

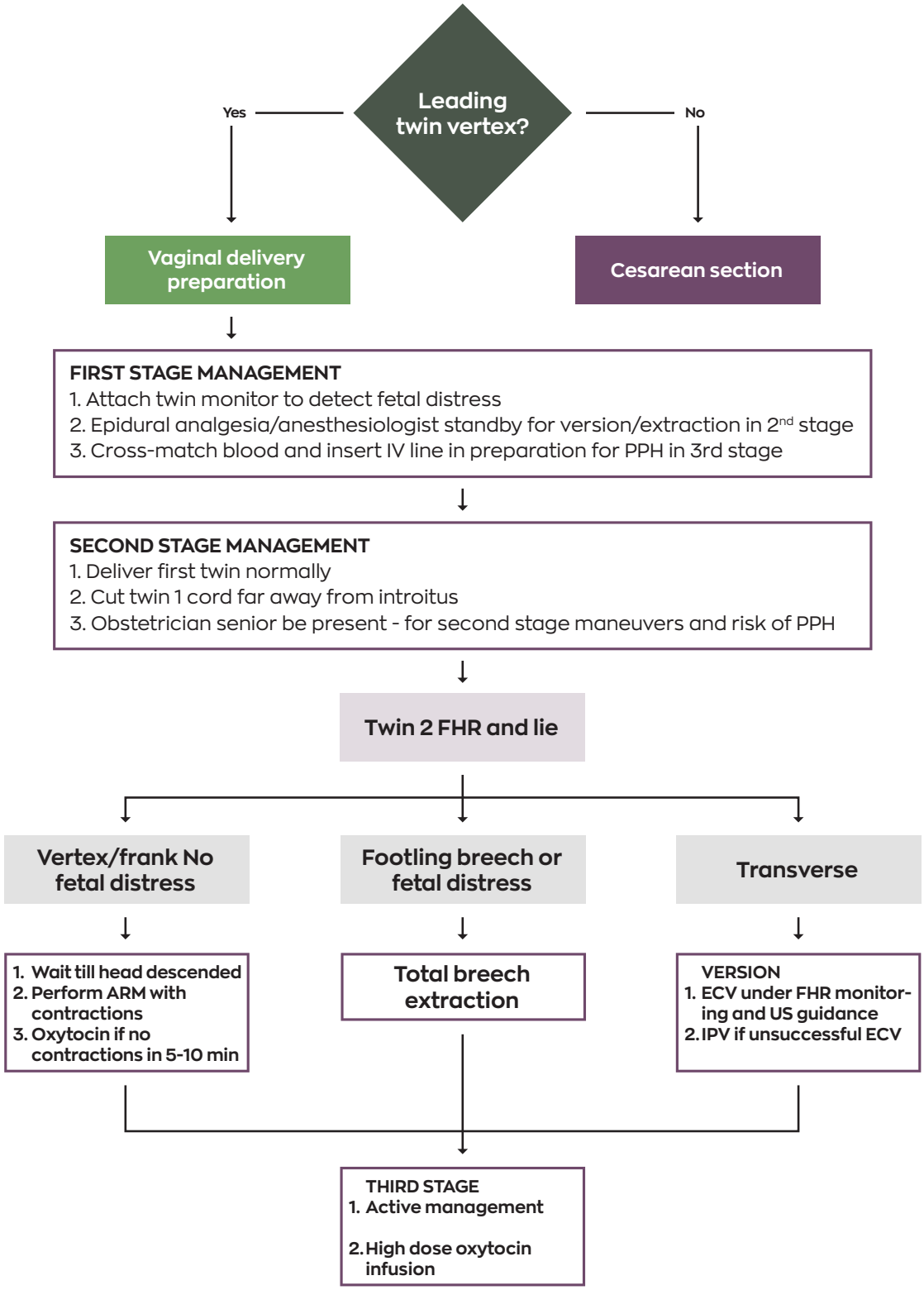


Figure 22 Intrapartum care for twins

TOLAC: trial of labor after previous one CS.
VBAC: vaginal birth after cesarean

TOLAC and planned VBAC

- The midwife must inform the physician for all cases of previous uterine scar.
- Planned VBAC or TOLAC should be conducted in an equipped labor ward under close supervision and continuous intrapartum care and with resources available for immediate cesarean delivery and advanced neonatal resuscitation.

Planned VBAC/ TOLAC is contraindicated in:

- Women with previous uterine rupture
- Women with previous classical cesarean scar
- Women with previous inverted T or J incisions, low vertical uterine incisions or significant uterine extension at the time of primary CS.
- Presence of other absolute contraindications to vaginal birth (e.g. major placenta previa).
- Trans-myometrial incision in myomectomy or to facilitate open fetal surgery.
- Uterine rupture after hysteroscopic resection of uterine septum is considered a rare complication. Allowing vaginal delivery should be based on an individual basis taking into consideration previous operation report to determine the risk.

- Factors that increase the risk of uterine rupture (not contraindications, but should be taken into consideration during the assessment of each case to decide if TOLAC should be proceeded:
  - Short inter-delivery interval (less than 12 months since last delivery).
  - Post-date pregnancy.
  - Maternal age of 40 years or more.
  - Obesity.
  - Lower pre-labor Bishop score
  - Macrosomia.

Intrapartum management

- Check that a decision for vaginal delivery has been made at a consultant level with consent of the patient after counselling about the advantages and risk of TOLAC (including scar rupture or dehiscence).
- If no decision has been made, discuss the case with the Consultant.
- Inform Anesthetist
- Intravenous access with full blood count and blood group.
- Continuous electronic fetal monitoring.
- Regular monitoring of maternal symptoms and signs.
- Regular 2-4 hourly assessments of progress in labor with a low threshold for detection of failure to progress. Progress in labor has to be almost ideal without much delay.

- Caution if induction (only mechanical allowed with cervical balloon, or ARM) and/or augmentation is/are considered necessary.
- Assess the case carefully before using Oxytocin, only consultant to order it

Watch for signs of scar dehiscence:

- Abnormal CTG
- Severe abdominal pain, especially if persisting between contractions
- Acute onset scar tenderness
- Abnormal vaginal bleeding
- Hematuria
- Cessation of previously efficient uterine activity
- Maternal tachycardia, hypotension, fainting or shock
- Loss of station of the presenting part
- Change in abdominal contour and
- Inability to pick up fetal heart rate at the old transducer site.

- Epidural analgesia could be used as the pain of uterine dehiscence will be felt despite epidural analgesia, but, do not use epidural opiates as these may mask the pain of dehiscence /rupture.
- Aim at achieving spontaneous vaginal delivery and be cautious with instrumental delivery.
- Be aware of postpartum bleeding (dehiscence as possible cause)
- Do not palpate or inspect the previous scar after delivery, as a routine.

Elective repeated cesarean section(ERCS):

- ERCS delivery should be conducted after 39+0 weeks of gestation.
- Antibiotics should be administered before making the skin incision (per protocol)
- Thromboprophylaxis according to existing guidelines.
- Early recognition of placenta previa, adopting a multidisciplinary approach and informed consent are important considerations in the management of women with placenta previa and previous cesarean delivery.

- Fetal death is a distressing status, requiring sympathy, counseling and precise decision.
- Intrauterine fetal death (IUFD) is the fetal demise at before onset of labor.
- Stillbirth is the delivery of a dead baby at and/or baby weighing > 500 gm.

General care aspects

I. Psychological support

- Deal with emotional upset / grief – Sensitive counselling as no cause is found in many cases.
- Give as much time and support as is necessary to parents to help them make any decisions required.
- Minimize the distress of the woman/parents, every care should be taken to explain all events and procedures to be undertaken.

II. Medical issues:

- **Treat underlying cause,** if necessary, like concealed abruption or severe pre-eclampsia.
- Carry out the **following investigations:**
  - Detailed **fetal ultrasonography** at time of diagnosis to identify structural anomalies / IUGR / hydrops.
  - **Maternal FBC, LFT, Clotting, glucose** (fasting blood sugar /RBS based on suspected etiology)
  - **Kleihauer test**.
  - **Thrombophilia screen and** antiphospholipid syndrome screen.
  - **Viral infection** screen
  - **Fetal karyotype** - amniotic fluid / placental tissue / fetal blood if needed.
  - **Placental / fetal swabs for culture**, fetal blood for viral infection screen

- **Post-mortem - counsel** with regards to extent of procedure, tissues to be removed and storage of tissue for further analysis.

Delivery

- Offer **initiation of delivery**:
- Prompt termination is not mandatory in the absence of other indications.
- Allow time for the woman and her husband to grief/and to decide about time of termination depending on their social circumstances and hospital setting.
- Method of termination depends on gestation age. Consultant should be involved in decision of method of IOL.
- Inform the woman that the risk of DIC is minimal, unless prolonged fetal death or if associated with placental abruption or severe pre-eclampsia.
- Provide adequate intrapartum analgesia.
- Keep membranes intact for as long as possible.

- Avoid operative delivery / perineal lacerations if at all possible.
- Encourage parents to hold baby if they wish/to give name.
- Obtain photographs / hand and footprints.
- Active management of third stage of labor.

Postpartum

- Discuss post-mortem and other investigations including fetal tissue removal (if applicable).
- Make arrangements for registration /death certificate.
- Manage **breast** engorgement:
  - Simple analgesia + firm support usually sufficient.
  - If medical treatment is required, give Bromocriptine/cabergoline.
- Inform the local Primary Health Centre.
- Discuss provisional diagnosis.
- In post-natal follow-up discuss:
  - Post-mortem results- if any tissue was sampled.
  - Results of other investigations.
  - Advice plan for subsequent pregnancy
  - Discuss contraception.

Topic Three: Emergency obstetrics

1. Postpartum hemorrhage
2. Massive blood transfusion protocol
3. Management of sepsis and septic shock in obstetrics
4. Shoulder dystocia
5. Cord prolapse
6. Ruptured uterus
7. Amniotic fluid embolism
8. Shock in obstetrics

3.	**Emergency obstetrics**
Definition	life-threatening medical problems that develop during pregnancy, labor and delivery, or postpartum
Standard statement	All pregnant women with emergency obstetric conditions should receive proper management on a timely manner without delay

3.1	**Management of Postpartum hemorrhage (PPH)**

- All women having PPH must be investigated, diagnosed & managed urgently according to the cause of bleeding.

The incidence of PPH can be reduced if active management of third stage of labor has been correctly achieved

- Other prophylactic interventions start during the antenatal period and include:
  - Identification and treatment of anemia.
  - Identification of any women with increased risk of PPH and plan for their delivery.

Definition and classification

I. Primary PPH

- Is defined as excessive bleeding in the first 24 hours after birth.
- The quantified blood loss of:
  - 500 ml for vaginal deliveries
  - 1000 ml for cesarean deliveries
  - Or any blood loss enough to compromise hemodynamic stability.
- According to the WHO, PPH is defined as the loss of more than **500 mL** of blood within 24 hours **after birth,** regardless of mode of delivery.

II. Secondary PPH

- Is defined as excess bleeding that occurs more than 24 hours after delivery and up to 12 weeks postpartum.
- This definition does not include reference to the volume of blood loss.
- The peak incidence is one to two weeks postpartum.

III. Severity of PPH

For Vaginal delivery:

- Minor: blood loss 500-1000 ml
- Major: blood loss > 1000 ml

For Cesarean section:

- Minor: blood loss 1000-1499 ml
- Major: blood loss ≥ 1500 ml

IV. Massive PPH

The blood loss ≥ 2000 ml (30% of the blood volume) from the genital tract within 24 hours of the birth of the baby

or

When the woman is hemodynamically compromised or showing signs of shock as a result of obstetric hemorrhage of any amount over 500 ml.

or

A blood loss can be considered a Massive Obstetric Hemorrhage in cases where four units of blood have been transfused and more units are required, regardless of blood loss.

V. Obstetric Shock index (SI)

- SI=The ratio of heart rate (HR) / systolic blood pressure.
- Obstetric SI has been defined as 0.7-0.9 compared with 0.5-0.7 for nonpregnant population:
  - OSI >or = 0.9 is associated with increased mortality.
  - OSI >1 = increases the likelihood of blood transfusion.

VI. Modified Shock Index

Heart rate (HR) / Mean arterial blood pressure (MAP)

Normal value is <1.3.

VII. Hemorrhagic shock

Hemorrhagic Shock refers to a reduction in tissue perfusion, which is insufficient to meet the metabolic requirements of tissues and organs because of hypovolemia secondary to massive hemorrhage.

Assessment for potential risk of PPH

- Each patient's risk for PPH is dynamic and therefore the risk assessment should be done at multiple time points during the antepartum, labor and postpartum period.
- Women with known risk factors should be delivered in health facilities with capacity for blood transfusion and surgical management.
- Use the **standardized PPH risk assessment tool** shown in the tables below.

1. Risk assessment prenatal, labor, and delivery admission	
Risks	**Plan of care**
Low Risk	
• Singleton pregnancy • No previous uterine incision • No history of PPH • No known bleeding disorder	• Blood group type and Rh
Medium Risk	
• Multiple gestation • >4 vaginal births • Prior CS or uterine surgery • BMI>40kg/m2 • Large uterine fibroids • History of previous PPH • Gestational age: • <37 weeks • >41 weeks • Fetal weight >4kg • Polyhydramnios • Preeclampsia • Diabetes • Chorioamnionitis • Platelets 50,000- 100,000 • Hematocrit <30% or Hb <10	• Blood group type and Rh • Close observation • Consider prophylaxis protocol (figure 23)
High Risk	
• Placenta previa, low lying placenta • Suspected/known placenta accrete • Abruption or active bleeding>than show • Known coagulopathy • History of >1 postpartum hemorrhage • Fetal demise • 2 or more medium risk factors • Platelets <50,000 • Hematocrit <24% or Hb <8	• Blood group type and Rh • Crossmatch 2 units PRBCs per order. • Close observation • Consider prophylaxis (figure 23)

2. Risk assessment at Birth and Ongoing Postpartum	
Risks	**Plan of care**
Low Risk	
• Uncomplicated vaginal delivery • No genital tract trauma	• Routine care • Measure blood loss
Medium Risk	
• CS during this admission (especially if urgent/ emergent/ 2nd stage) • Operative vaginal birth • Genital tract trauma including 3rd and 4th degree lacerations • Shoulder dystocia • Magnesium sulphate treatment • Oxytocin use • Prolonged second stage <2 hours • Prolonged labor or IOL > 24 hours • Precipitate labor	• Increase surveillance • Measure blood loss • Consider prophylaxis (figure 40)
High Risk	
• Active bleeding • Soaking < 1 pad per hour or • Passing 6 cm clot • Retained placenta • Non-lower transverse uterine incision for CS • Received general anesthesia • Uterine rupture • Uterine inversion • 2 or more medium admission or intrapartum risk factors	• Increase surveillance • Measure blood loss • Cross match blood • Give prophylaxis (figure 40)

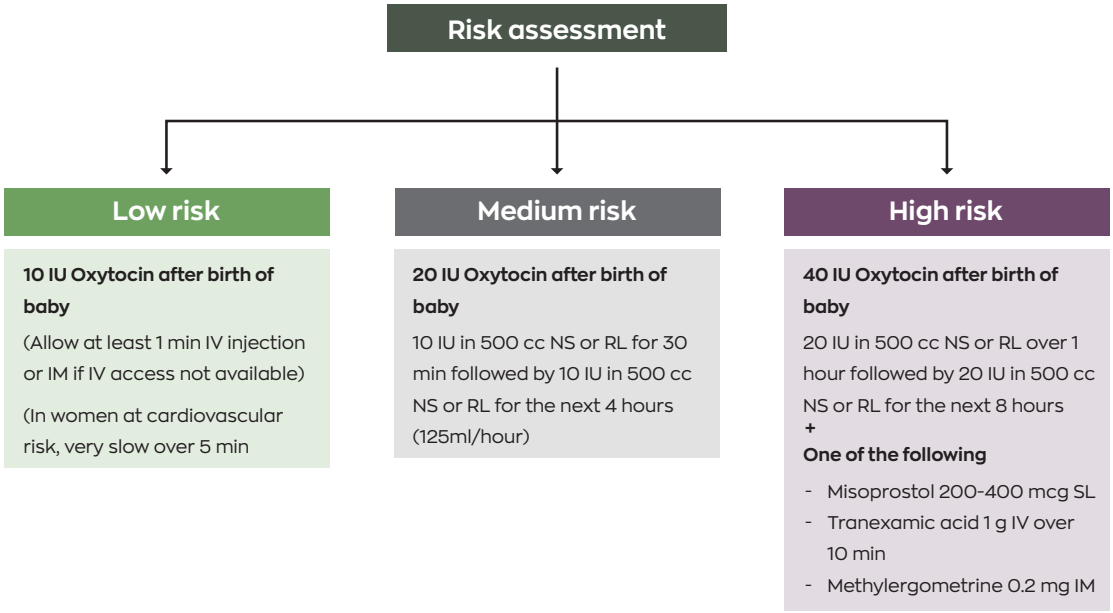
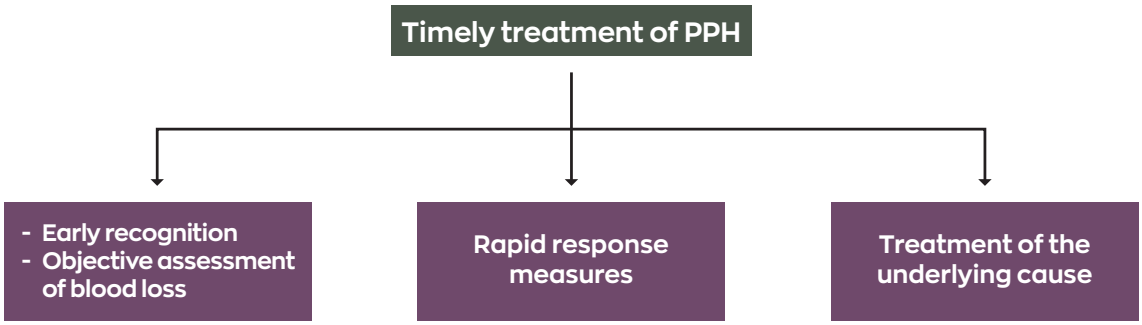


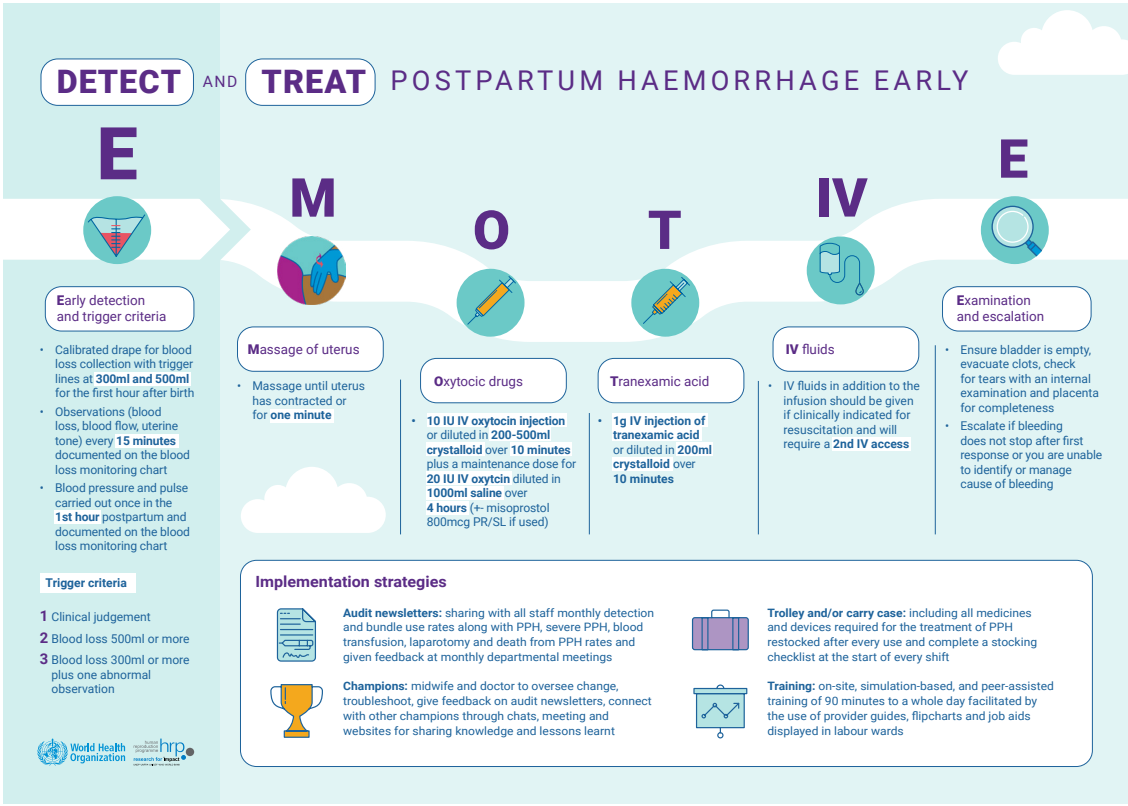
Figure 23 Standardized uterotonics for active 3rd stage of labor based on risk for PPH

Treatment of PPH



The WHO has recently introduced PPH detection and treatment bundle, which has shown significantly better maternal outcomes compared with the usual care.

Follow the WHO E-MOTIVE treatment bundle (shown in the figure below) for early detection and treatment of PPH.



I. Early Recognition

Deaths from maternal hemorrhage are often preceded by delays in recognition, diagnosis, and timely treatment of excess blood loss.

The most important key factors for proper and timely diagnosis of PPH are:

- Accurate estimation of blood loss before vital signs changes.
- Careful monitoring of the mother's vital signs postpartum to detect signs and symptoms of hypovolemia using Maternal Early Warning System (MEWS).
- Identifying the severity of postpartum hemorrhage.
- Assessment of PPH associated coagulopathy.
- Immediate diagnosis of the cause to initiate appropriate treatment.

1. **Accurate estimation of blood loss**

   "Routine objective measurement of postpartum blood loss is recommended to improve the detection and prompt treatment of postpartum hemorrhage. Methods to objectively quantify blood loss, such as calibrated drapes for women having vaginal birth, can achieve this."

2. **Careful monitoring of the mother's vital signs postpartum to detect signs and symptoms of hypovolemia using (MEWS)**

   MEWS is a screening tool specific for the obstetric population to help identify changes in the status of a patient to facilitate early intervention with the goal of reducing maternal morbidity and with mortality.

3. **Identifying the severity of postpartum hemorrhage**

   Clinical signs of excessive blood loss and hypovolemia include:

   - Tachycardia
   - Increased Respiratory rate.
   - Narrowing of the pulse pressure **(25< mmHg)**
   - (Pulse pressure = systolic BP – Diastolic BP) with hemorrhage arise in the diastolic pressure reflects vasoconstriction and narrows the pulse pressure
   - Shock index (**>0.9)** is more reliable indicator of hemodynamic changes due to blood loss.
   - Hypotension.
   - Cool extremities.
   - Change in skin coloring.
   - prolonged capillary refill 2> sec.
   - Altered mental status not due to head injury.
   - Low urine output.
   - Base deficit increasing, pH <7.2 Lactate >4 mmole.

4. **Causes of Postpartum Hemorrhage**

   The most common causes of PPH can be considered using the Four Ts:

   - **Tone (70-80%).**
   - **Trauma (20%).**
   - **Tissue = 10%**
   - **Thrombin (<1%).**

II. Rapid Response System/Team

- Rapid response systems are programs that are designed to improve the safety of hospitalized patients whose condition is deteriorating quickly.
- **A rapid response system includes four components**:
  - A mechanism for activating a rapid response.
  - A clinical team that can rapidly respond to and manage obstetric emergencies.
  - A system for feedback to improve future rapid responses.
  - An administrative structure to implement, train, and monitor activities.
- Each delivering facility needs to establish the criteria or critical event in which a Rapid Response Team is activated.
- Every shift/every day, each facility should determine the members of the rapid response team and the method of notifying the team. A notification and communication plan are vital.
- The members of the rapid response team are chosen depending upon the severity of illness of the patients and the resources of the hospital.

III. Standardized Stage based management of PPH plan:

Utilizing the following checklists can facilitate diagnosis as wells as proper and timely management based on the identified stage of PPH (stage 1 to stage 4).

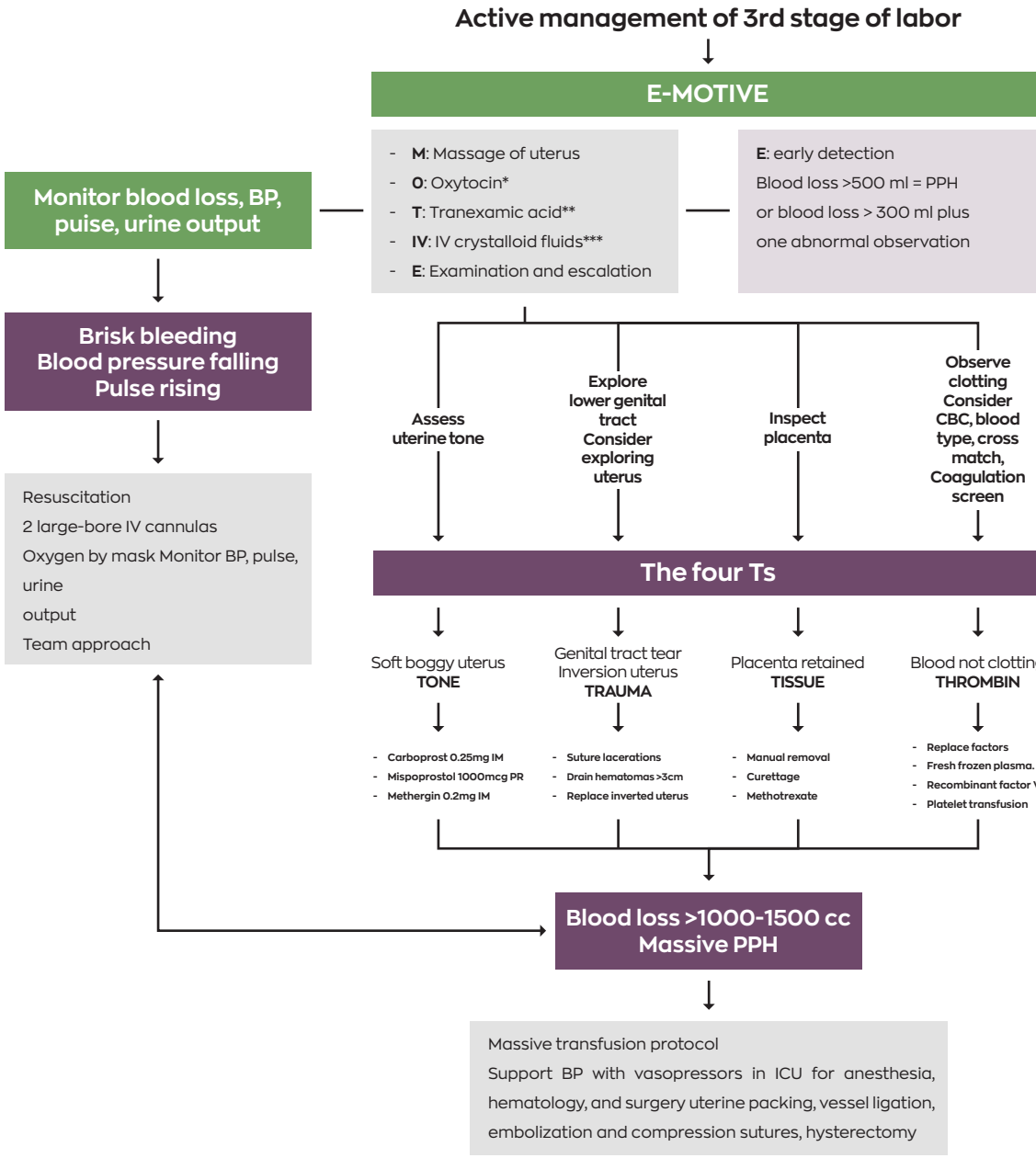
PPH Stage 1 (E-MOTIVE)	
Blood loss	(>500cc VD, >1000cc CS) with Normal Vital Signs (VS), Labs and clinical picture
Assessment	• VS, O^2 Sat q5 minutes • Record cumulative blood loss q5-15 min • Foley's catheter with hourly urine output
Intervention	• Get Help, senior/ consultant obstetrician, notify Anesthesia. • Assure primary IV access is at least 18 gauge (green) and patent. • IV fluid crystalloids in small boluses of 500 ml, and evaluate response after each bolus.
Action	• Massage fundus/expel uterine clots. • Quickly determine etiology (4Ts.) *(See figure) • If placenta not yet delivered remove placenta manually. • Prepare OR if indicated.
Medications (Treatment bundle/combined)	• Ensure /review 3rd stage oxytocin given. • Oxytocin infusion. • Tranexamic Acid (TXA)1 gram IV over 10 min. • Alternatives: Methergine (onset of action 3-5min), 0.2mg IM (if not hypertensive) • May repeat if good response to first dose, **BUT if no response** move on to 2nd level Misoprostol 800 mcg sublingually.
Blood products	Blood group, RH & cross match 2 units PRBC if not already done

PPH Stage 2	
Blood loss	Continued bleeding with total blood loss up to 1500 (1000-1500) with Normal VS., Labs and clinical picture.
Assessment	• VS, O_2 Sat q5 min. • Record cumulative blood loss q5-15 min. • Foley' catheter with hourly urine output. • Observe for signs of DIC including bleeding from the mouth, gums, needle puncture sites or surgical sites. • Announce clinical status to the team
Intervention	• Activate rapid response team. • Move to OR. • Place 2nd IV line (16-18 gauge). • Send Stat labs (CBC, PLT, PT PTT INR, Fibrinogen). • IV fluid crystalloids in small boluses of 500 ml, and evaluate response after each bolus. • Administer Oxygen to maintain oxygen saturation >95%. • Keep patient warm: warmed blankets or air-flow warmer.
Action	**Vaginal Birth**: Evaluation under GA, consider etiology of hemorrhage and take corrective action: • Uterine Atony: Bimanual uterine massage, Intrauterine balloon tamponade. • Retained POC: Manual removal or smooth Curettage. • Laceration: Repair, Hematoma: Packing or Evacuation. • Rapture uterus: Repair or rescue hysterectomy. • Uterine inversion: Manual replacement Cesarean Birth: • Inspect broad ligament /posterior uterus, exclude retained placenta. • Continued Atony: B-Lynch Suture Or other uterine compression sutures + Intrauterine Balloon. • Continued Hemorrhage: Uterine Artery Ligation/ Stepwise devascularization.
Medications (Treatment bundle/combined)	• Oxytocin infusion. • Misoprostol 800 mcg SL • Repeat TXA After30min
Blood products	Bring 2-unit PRBC, transfuse per clinical symptoms and signs do not wait for lab result.

PPH Stage 3	
Blood loss	**Continued bleeding with total blood loss > 1,500cc; or Brisk bleeding (>500cc/10min) or Any of these abnormalities in the context of bleeding (regardless of EBL or Transfusion):** • Abnormal vital sings: BP, Pulse, Shock Index, Urinary Output • Abnormal labs: Coagulation, pH, BD, Lactic ac, Hb/Hct (>4g drop in Hb). • Abnormal Clinical status (confused, lethargic).
Assessment	VS, O_2 Sat q5 min. Record cumulative blood loss q5-15 min. Foley's catheter with hourly urine output. Observe for signs of DIC including bleeding from the mouth, gums, needle puncture sites or surgical sites. Announce clinical status to the team

Intervention	Stage 2 interventions ***plus*** Mobilize team (additional surgeons, urologist, vascular, anesthesia 2nd, nursers, OR). Apply pneumatic anti-shock Garment, if available. Place central line. Rapid infuser for blood products and fluids. Fluid warmer, Monitor core temperature. **Keep patient warm.** Repeat labs (CBC, ABG, electrolytes) + coagulations.
Action	Achieve hemostasis. Intervention based on etiology Conservative Surgery Uterine compression suture e.g., B-Lynch Suture/Intrauterine Balloon Uterine Artery Ligation UAL/Stepwise devascularization/Hypogastric Ligation (experienced surgeon only). Escalate steps if bleeding continues Hysterectomy Damage control surgery (abdominopelvic packing followed by a period of medical stabilization in the intensive care unit).
Medications (Treatment bundle/combined)	Continue uterotonic medication as indicated
Blood products	Activate massive transfusion protocol

PPH Stage 4	
Blood loss	Cardio-vascular collapse in the context of massive hemorrhage Profound hypovolemic shock (blood loss not replaced) Amniotic fluid embolism (sudden cardio-vascular collapse) leading to heavy vaginal bleeding
Assessment	• Same as Stage 3 • VS, O_2 Sat q5 min. • Record cumulative blood loss q5-15 min. • Foley's catheter with hourly urine output. • Observe for signs of DIC including bleeding from the mouth, gums, needle puncture sites or surgical sites. • Announce clinical status to the team
Intervention	• Same as Stage 3 • Mobilize team (additional surgeons, urologist, vascular, anesthesia 2nd, nursers, OR) **plus ICU.** • Apply pneumatic anti-shock Garment, if available. • Place central line. • Rapid infuser for blood products and fluids. • Fluid warmer, Monitor core temperature. **Keep patient warm.** • Repeat labs (CBC, ABG, electrolytes) + coagulations.
Action	• Immediate surgical intervention to ensure hemostasis (Definitive Surgery Emergency hysterectomy + Damage control surgery). • Do not delay surgical intervention because of coagulopathy or patient's hemodynamic status. • The surgical intervention should be implemented concurrently with replacement therapy.
Medications (Treatment bundle/combined)	• Vasopressor as needed. • Administer broad spectrum antibiotics.
Blood products	Continue massive transfusion protocol



*Oxytocin; 10 IU IV diluted in 200-500 ml NS or RL over 10 min, plus 20 IU IV maintenance dose diluted in 1000ml NS/RL over 4 hours
**Tranexamic acid; 1 g IV or diluted in 200 ml NS/RL over 10 min
***Crystalloid fluids; NS or RL 500ml boluses, requires second IV-line access

Figure 24 Summary PPH Management Per Etiology

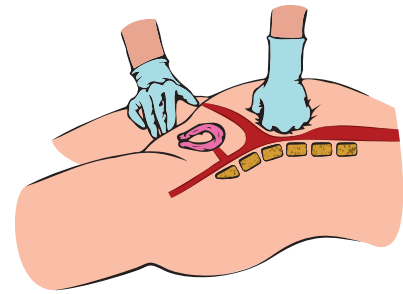
IV. Further procedures

Aortic Compression

I. Manual external aortic compression: Is a lifesaving intervention when there is heavy bleeding, regardless of the cause. It may be considered at different time points during management of PPH (e.g. while preparing for definitive management or during transfer of patient from one hospital to another).
The theory is that abdominal compression will decrease blood flow in the distal aorta, which helps control bleeding.

Steps:

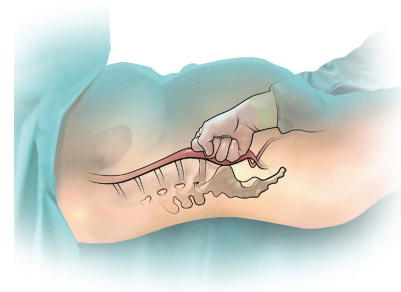
1. Explain the procedure to the woman if she is conscious and reassure her.
2. Stand on the **left of** the woman's **umbilicus**.
3. Use a **closed fist** with the right hand.
4. **Lean over** the woman so that your weight increases the pressure on the aorta. You should feel the aorta against your knuckles. **Do not use your arm** muscles; this is very tiring.
5. **Before exerting compression, feel the femoral artery pulse** using the index and the third fingers of the left hand**.**
6. Once you identify the aorta and femoral pulse, **slowly lean over** the woman and increase **pressure over the aorta**. To confirm proper compression/sealing of the aorta, check the femoral pulse.
7. **There must be no palpable femoral pulse.**
8. **The fingers should be kept on the femoral artery** as long as the aorta is compressed to ensure that the **compression is effective at** all times.
9. It is crucial **to release and re-apply compression every 30 minutes** to allow intermittent blood flow to the lower limbs.



II. Internal aortic compression is used in an open abdominal incision as a temporary vascular control during laparotomy. It is efficient and causes immediate and significant reduction in blood loss.

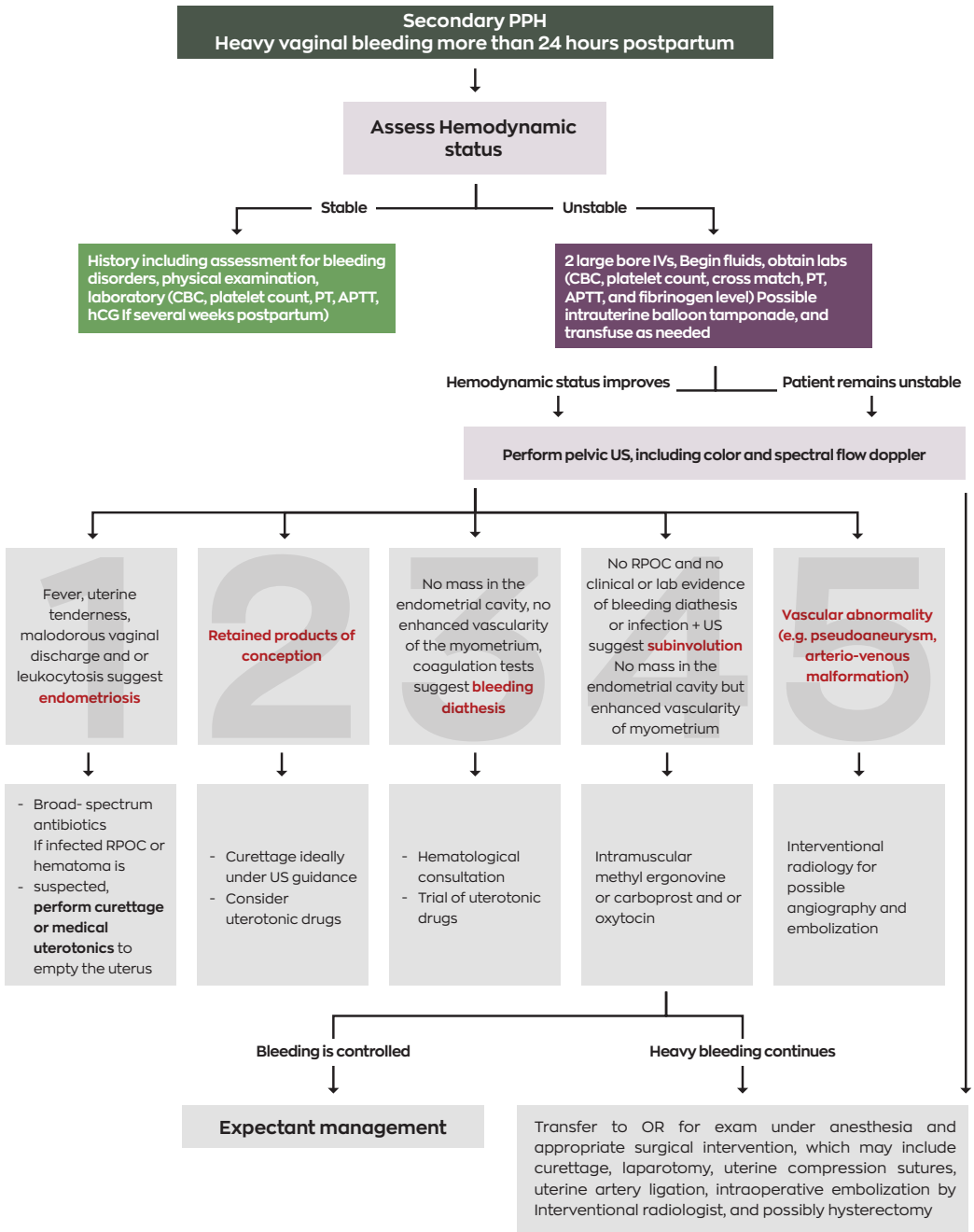
Steps:

1. It is necessary to move **uterus out of the pelvis**, identify the **sacral promontory**.
2. Use a **closed fist** or the heel of the hand to compress the aorta against the lumbosacral spine.
3. **Alternatively**, use a **moist rolled-up surgical pad** to compress the aorta.
4. **With a low transverse abdominal incision**, the aorta just above the lumbosacral promontory is closest to the surgeon.
5. **If vertical abdominal incisio**n, the subdiaphragmatic aorta maybe within reach of the surgeon.



III. **Mechanical devices for the external aortic compression:**
1. The abdominal aortic tourniquet.
2. The external aortic device

V. Diagnosis and management of secondary PPH.



Sample antibiotic regimens alternatives to the "Gold standard" gentamicin and clindamycin
Ampicillin-sulbactam 3g IV Q 6 hours
Cefoxitin 2g IV Q 6 hours
Ceftriaxone 2g IV Q 24 hours plus metronidazole 500mg PO or IV Q 8 hours*
Levofloxacin 500 mg IV Q 24 hours plus metronidazole 500mg PO or IV Q8 hours*
Should not be given to breasfeeding mothers
If Chlamydia infection nfection is suspected, azithromycin 1gm PO single dose should be added to the regimen

Figure 25 Diagnosis and management of secondary PPH

In Postpartum Hemorrhage Management:

- Determine the disposition of the patient: Consider Increased Postpartum Surveillance, and Hand off report of cumulative blood loss.
- Debriefing with the team.
- Debrief with the patient and family.
- Document interventions.

3.2	**Massive blood transfusion protocol**

- The Massive Transfusion Protocol (MTP) is a multidisciplinary process whereby blood and blood products can be rapidly obtained. Rapid and effective communication is necessary for a rapid response time.

- **Activation of the OB MTP is at the decision of the requesting physician and indications include the following:**
  1. Massive blood loss with profound hemorrhagic/hypovolemic shock
  2. Refractory hypotension (hypovolemic shock) not responsive to volume resuscitation
  3. Continued significant bleeding in the presence of an elevated INR >1.9, low fibrinogen (<200 mg/dL), or thrombocytopenia (<50,000/mL).

- MTP team must have a Leader, Runner, Reporter = MTP Coordinator, Blood Bank staff. Team members should have roles assigned beforehand (figure 43).

- The MTP procedure and information described in this section (figure 43), help **standardize** operational steps and **provides complete information necessary for a successful** obstetric MTP.

Continued bleeding OR bleeding with suspected coagulopathy OR bleeding with abnormal vital signs

Send urgent X-match sample to blood bank
Send urgent CBC, coagulation, ABGs to lab

Request 2 units PRBCS URGENTLY O-negative if cross-matched blood not available

Stabilize patient: Give Tranexamic acid (TXA) 18 IV slowly as early as possible
Transfuse 2 units PRBCs, Restrict crystalloid, maintain normothermia
Assess and treat the cause of bleeding
Reassess patient

Bleeding continues >1500cc or bleeding with hemodynamic instability or coagulopathy

Activate massive blood transfusion protocol (MTP)
+ Identify MTP coordinator name

Roles & Responsibilities

Director Lead clinician MTP Team Leader [OB/anesthesia/critical care)
- Activates MTP
- Identifies Runner
- Identifies reporter
- Follows MTP, Maintains communication with physicians / surgeon
- Deactivates MTP
- Maintain transfused bags for later reconciliation of products transfused- this information placed in patient's medical report
- Ensures documentation of MTP
- Examines the process of feedback and improvement

MPT coordinator Reporter
Act as communicator between MTP team leader, Blood bank, Labs and MTP runner
- Calls the blood bank and provide the following info:
- Contact name and phone
- Patient name and ID
- Location of transfusion
- Confirm this is emergency
- Notifies lab of MTP activation, ensures samples transported immediately
- Complete orders of blood products
- Receives each MTP box
- Reports lab values to Director
- Notifies blood bank of deactivation of MTP

Transporter = Runner (nurse, anesthesia tech.)
- Transports BB specimen immediately
- Receives blood products from BB and delivers to patient location immediately
- Waits for additional instructions from the Coordinator
- Return unused blood products to BB

Transfuse MTP BOX blood-actively warm

Rpeat TXA 18
Transfuse MTP BOX blood-actively warm
30 min after initial dose if significant continuing bleeding

Targets
- Temp. 35 °C
- Ht8g/dl
- INRS 1.5
- Fibrinogen 200-250 mg/dl
- Pt/aPTT<1.5x normal
- Platelets> 50,000
- Ionized calcium> 1.1nml/L
- pH> 7.2
- Base excess -6 to +6
- Lactate< 4mmol/L

MTP BOX ONE
4 PRBC
4FFP
6 Platelet
10 Cryoprecipitate

Calcium gluconate IV 10ml of 10% over 5 min with every BOX

MTP BOX TWO
4 PRBC
4FFP
6 Platelet
10 Cryoprecipitate

Subsequent boxes
4 PRBC
4 FFP
6 Platelet*
10 Cryoprecipitate*
*Every two packages or based on lab results

Monitor Every 30-60min:
- CBC
- Fibrinogen level
- INR
- ABG/lactate
- Ionized calcium/ potassium

Timely deactivation of MTP when:
- The patient is hemostatic (no bleeding requiring additional interventions) and stabilized with normalizing VS.
- Further resuscitation is useless

On-site lab supervisor (Clinical Lab Scientist)
- Ensures the procedures/policies are followed
- Ensures adequate staffing in transfusion service during MTP
- Provides assistance as needed
- Updates transfusion service Director of the MTP status as needed
- Examines the process (Appropriateness of activation, blood products Issued and patient outcome) for feedback and improvement

Transfusion Service Personnel/BB Staff
- Records provided patient info, with date and time the BB is notified of the MTP activation
- Performs a read back of the patient identifying info to the caller, to ensure the info is accurate
- Alerts the transfusion service and supervisor of MTP activation
- Assess the need for assistance
- Prepare blood products for immediate dispense
- Notifies the MTP coordinator when each new round of the products to be picked up. A new round will be automatically prepared once the previous round has been picked up
- Documents the date and time of the issue of the blood products during the MTP
- When emergency is over, will communicate with the coordinator all orders/forms to be completed and signed.

Figure 26 Massive Blood transfusion protocol (MTP)

3.3	Management of Sepsis and septic shock in obstetrics

- Sepsis is an emergency life-threatening condition in obstetrics associated with high mortality and morbidity especially when associated with septic shock.
- Sepsis remain one of the top four causes of maternal death in Palestine.

Definitions

- **Sepsis:** An organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion, or postpartum period up to 42 days after the pregnancy has terminated, irrespective of the cause.
- **Septic shock:** A subset of sepsis with underlying circulatory and cellular metabolism abnormalities that are profound enough to substantially increase mortality.

Causes

Leading causes of maternal sepsis

Antepartum	Intrapartum + Immediate Postpartum	Post-discharge
Septic abortion	Chorioamnionitis/intraamniotic infection	Pneumonia/ influenza
Chorioamnionitis	Endometritis	Pyelonephritis
Intraamniotic infection	Pneumonia/ influenza	Wound infection/ Necrotizing Fasciitis
Pneumonia/influenza	Pyelonephritis	Mastitis
Pyelonephritis	Wound infection/Necrotizing Fasciitis	Cholecystitis
Appendicitis		

Diagnosis

- Diagnosis of maternal sepsis: A Two-Step Approach
  - **Screening step** *followed by*
  - **Confirmatory step.**

Step 1: Screen all Patients with Suspected Infection → screen positive if two or more of the following criteria are met:

- Oral temperature < 36°C or ≥ 38°C
- Heart rate > 110 beats per minute and sustained for 15 minutes.
- Respiratory rate > 24 breaths per minute and sustained for 15 minutes.
- White blood cell count > 15,000/mm^3 or < 4,000/mm^3 or >10% immature neutrophils (bands).

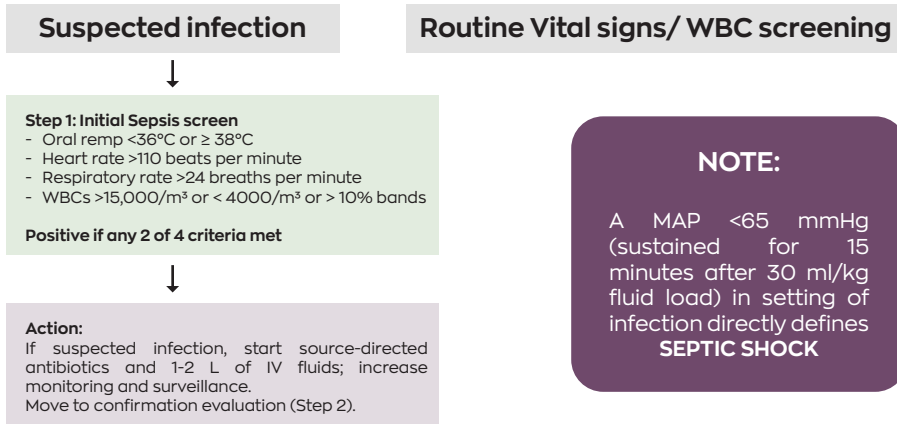


Figure 27 Step 1 Initial Sepsis Screen

Step 2: Confirmation of Sepsis **If the initial sepsis screen is positive with suspicion or evidence of infection, the next step is evaluation for end organ injury including laboratory studies** listed in the table below**, and prompt bedside evaluation by a physician or other clinician with the ability to escalate care.**

While waiting for organ injury laboratory results, you should start:

- Therapy should be promptly initiated for infection (ideally within one hour).
- Administration of antibiotics targeted for the presumed site of infection.
- And bolus of 1-2L intravenous fluids (IV).

Criteria for end-organ injury

Measure of End Organ Injury	Criteria Positive if one (1) or more criteria are met
Respiratory function*	Acute respiratory failure as evidenced by acute need forinvasive or non-invasive mechanical ventilation, OR $PaO_2/FiO_2 < 300$
Coagulation status	Platelets < 100 x 10^9/L, OR International Normalized Ratio (INR) > 1.5, OR Partial Thromboplastin Time (PTT) > 60 seconds
Liver function	Bilirubin > 2 mg/dL
Cardiovascular function	Persistent hypotension after fluid administration: Systolic BP < 85 mm Hg, OR MAP < 65 mm Hg, OR > 40 mm Hg decrease in SBP
Renal function	Creatinine > 1.2mg/dL, OR Doubling of serum creatinine, OR *Urine output less 0.5 mL/kg/hour (for 2 hours)*
Mental status assessment	Agitation, confusion, or unresponsiveness
Lactic acid	> 2 mmol/L in absence of labor (Lactic acid not used for diagnosis in labor, but remainsimportant for treatment.)

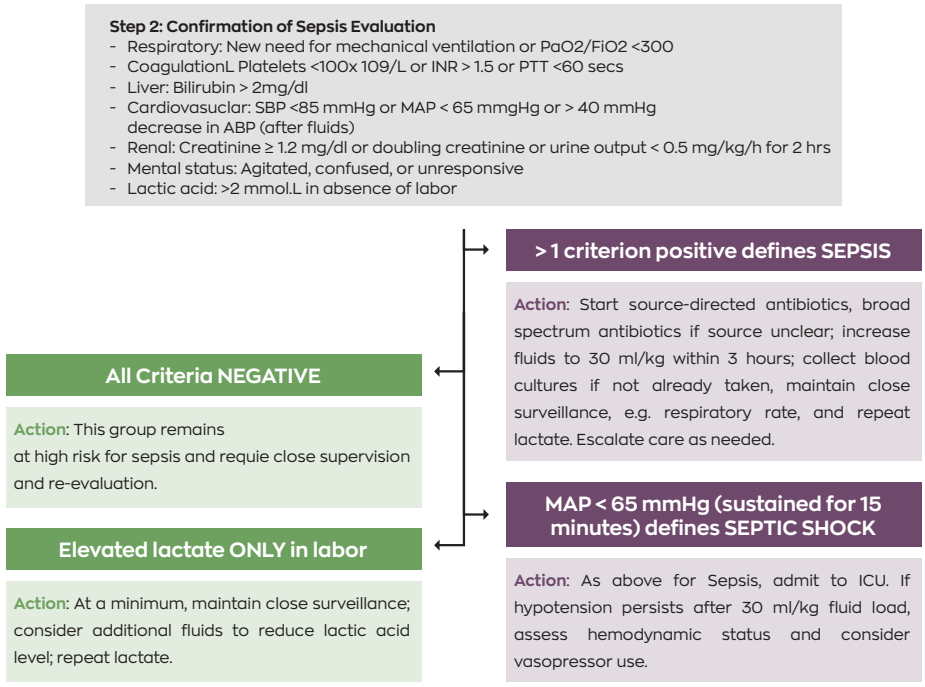


Figure 28 Step 2 Confirmation of sepsis

- Using the following standardized checklist facilitate confirmation and timely management of sepsis.

Measure of end Organ injury	Criteria	
Respiratory	• New need for mechanical ventilation • PaO2/FiO300 > 2	
Cardiovascular	After fluids	• SBP <85 mmHg • MAP < 65 mmHg • > 40 mmHg decrease in SBP
Renal	• Creatinine > 1.2mg/dL, OR • Doubling of serum creatinine, OR • Urine output less 0.5 mL/kg/hour x 2 hrs	
Liver	Bilirubin > 2 mg/dL	
Coagulation	• Platelets < 100 x 109/L, OR • International Normalized Ratio (INR) > 1.5, OR • Partial Thromboplastin Time (PTT) > 60 seconds	
Mental status	• Agitation • Confused • Unresponsiveness	
Lactate	> 2 mmol/L in absence of labor	

SEPSIS	If one or more criteria are met	FAST-M Bundle
SEPTIC SHOCK	If Hypotension with need for vasopressor support to maintain MAP >65 mmHg + Lactate ≥ 2 mmol/L (18mg/dl) after adequate fluid resuscitate	• As above for sepsis FAST-M Bundle + • Admit to ICU • If hypotension persists after 30 ml/kg fluid load assess hemodynamic status and consider vasopressor use.
Elevated lactate ONLY in labor	• Consider additional fluids. • Repeat lactate. • Maintain close surveillance.	
All criteria NEGATIVE	This group remains high risk for sepsis	

Standardized maternal sepsis treatment bundle (FAST-M)

- Key Principles:
  - Act quickly upon recognition of sepsis and septic shock.
  - Minimize time to treatment: Sepsis is a medical emergency.
  - Monitor closely for response to or lack of response interventions.
  - Communicate sepsis status during bedside care and handoff.

i. FAST-M

Fluids Caution in Pre-eclampsia, cardiovascular disease, severe anemia and pulmonary edema	Optimize **circulating volume** and **improve cardiac output**(blood pressure) and **tissue perfusion**	Patients with maternal sepsis received an **initial intravenous fluid bolus of 500ml crystalloid fluid** over 15minutes. Increase crystalloid fluid to **30 mL/kg within 3 hours** if not already done. **Reevaluate** patient's status after IV bolus. Failure to respond → higher level **care/ICU**. Additional fluids should be guided by frequent reassessmentof hemodynamic status
Antibiotics	Delayed antibiotics > 1hour = increase mortality	**Give IV maximum dose**, source-directed antibiotics, **broad spectrum antibiotics** if source unclear if not already done. Consider local policy, allergies, antivirals, anti-fungal. The choice and need for antibiotics should be **reviewed daily**, as soon as **culture and sensitivity results** are known. **Narrow and focus antibiotics** once pathogen and sensitivitiesare identified.
Source Control Any physical intervention that is undertaken to remove or eliminate a focus of invasive infection and to restore optimal anatomic function.	Early source control should be completed assoon as possible using the least invasive approach possible.	**Consider the site and nature** of the infection responsible for sepsis Use imaging studies as indicated to identify the anatomic site (s) of infection Use **surgical or procedural** interventions including: Surgical **debridement** **Delivery** **Uterine evacuation or curettage** Hysterectomy. Percutaneous **drainage** for Intra-abdominal abscess **Removal of foreign bodies** associated with the infection suchas catheters and intravenous access.
Transport (Escalation of Care) The need to transfer a patient with maternal sepsis should not be aonce decision and should be reviewed daily.	should usually be made by a senior clinician as part of their review.	Consider transfer to a **higher level of care** for any of the following: **Medically complex patient**; patient with significant comorbidities. Hypotension (**MAP below 65 mm Hg)** despite fluid resuscitation or need for **administration of vasopressors.** **Persistent hypoxia** (SpO_2 <92% on room air). **Altered mental status** (combativeness, confusion, disorientation). The patient requires higher level of care than the facility can provide.
Monitoring (of mother, fetus, and newborn)		Patients undergoing treatment for maternal sepsis should receive on-going **regular monitoring** of their vital signs to evaluate their **response to treatment** and help guide further management. In patient is being treated for maternal sepsis during the intrapartum period, **fetal monitoring is recommended**. Following the delivery of a patient being treated for maternal sepsis, **monitoring of the neonate's vital signs** is recommended

ii. Antibiotics and Source Control: Key Principles:

1. Early administration of antibiotics, ideally within one hour of presentation, is critically important in sepsis.
2. The initial choice of antibiotics in critically-ill patients is generally empiric and broad spectrum to cover most or all likely pathogens.
3. Assessment for source control (such as surgical/percutaneous drainage or debridement) should be initiated in a timely fashion using the least invasive approach possible.

Abdominal infection

- Ceftriaxone 1g IV q12h, OR cefotaxime 1g IV q8h, OR ceftazidim 1g IV q8h + metronidazole 500 mg IV q8h or clindamycin 900 mg IV q8h.
- Complicated cases (Appendicitis, bowel perforation with peritonitis): monotherapy with pipracillin_tazobactam 4.5 g IV q6h or Meropenem 1 g IV q8h.
- If MRSA is suspected: add vancomycin 15-20 mg/kg q8h-q12h / or clindamycin 900 mg IV q8h.

Chorioamnionitis /Intraamniotic infection:

- Ampicillin 2 g IV q6h or Cefazolin 2 g IV q8h +Gentamicin 2 mg/kg IV load, then 5 mg/kg every 24h.
- Alternate therapy: Pipracillin_tazobactam 4.5 g IV q6h or Meropenem 1 g IV q8h.
- If **cesarean delivery**: add anerobic coverage with clindamycin 900mg IV q8h or metronidazole 500 mg IV q8h.
- **Post vaginal delivery**: No doses addition required, but if doses given, clindamycin not indicated.
- Duration: Continue until afebrile for 24 h

Endometritis

- Ampicillin 2 g IV q6h or Cefazolin 2 g IV q8h + Gentamicin 5 mg/kg IV q24h + metronidazole 500 mg IV q8h (or Clindamycin 900 mg IV q8h).
- Alternative: may use Ceftriaxone 1gIV q12h or Cefotaxime 1gIV q8h) + Metronidazole 500 mg IV q8h.

Community-acquired pneumonia

- Ceftriaxone 1gIV q12h OR Cefotaxime 1gIV q8h (No need of Meropenem or Ampicillin)

Hospital- acquired pneumonia

- Low risk patients: Meropenem 1g IV q8h or Piperacillin/tazobactam 4.5 g IV q6h OR Ceftriaxone 1gIV q12h OR Ceftazidime 1gIV q8h.

High mortality risk patients

- Double coverage for pseudomonas (beta lactam + an aminoglycoside or a quinolone)
- MRSA coverage with vancomycin Meropenem 1 g IV q8h, Piperacillin/tazobactam 4.5 g IV q6h, OR Ceftazidime 2 g IV q8h + Gentamicin 5 mg/kg IV q24h + Vancomycin 15-20 mg/kg q8h-q12h Or Ceftriaxone 1gIV q12h

Septic abortion /retained products of conception

- Cefuroxime 750 mg IV q8h + Doxycycline 100 mg PO q12h + Gentamicin 3 to 5 mg/kg IV daily
- OR Meropenem 1 g IV q8h + Doxycycline 100 mg PO q12h

Unknown source of infection:

- Piperacillin, tazobactam 4.5 g IV q 6 h (Extended infusion) Meropenem 1g q 8h Ceftazidime 2g q 8h.
- Alternative: + metronidazole 500mg IV q8h
- For penicillin allergy: Gentamicin 5 mg/kg IV q24h + metronidazole 500g IV q8h (or + Clindamycin 900 mg IV q8h) + Vancomycin 15-20mg IV q8-12h (or linezolid 600mg IV/PO for sever vancomycin allergy or resistance).

Obstetric considerations

Key Principles:

- The timing and mode of delivery in a pregnant woman who is septic should be individualized, taking into consideration gestational age and maternal-fetal status.
- In critical cases, decision should be shared with MDT.
- A careful assessment individualized to patient should be made for use of neuraxial procedures e.g. spinal and epidural.
- Corticosteroids for fetal lung maturity are not contraindicated.

Discharge education

Key Principles:

- Every woman and at least one support person should receive discharge instructions on the danger signs of sepsis.
- Instructions at every point of care should include ways to decrease infection risk, such as frequent hand washing.
- For women who have had sepsis, planned follow-up contact should be made within 3-4 days.

3.4	**Shoulder dystocia**

- Identify women at risk such as women with:

Pre-labor

- History of previous shoulder dystocia
- Macrosomia
- Gestational diabetes
- Maternal BMI >30
- Induction of labor

Intrapartum

- Prolonged second stage.
- Instrumental delivery.
- Slow progress of labor.
- Oxytocin Augmentation
- Secondary labor arrest

- If shoulder dystocia is anticipated, a senior physician should be available in labor ward.
- **Recognize shoulder dystocia when:**
  - Fetal head retracts against perineum “turtle sign”.
  - Gentle traction does not affect delivery.

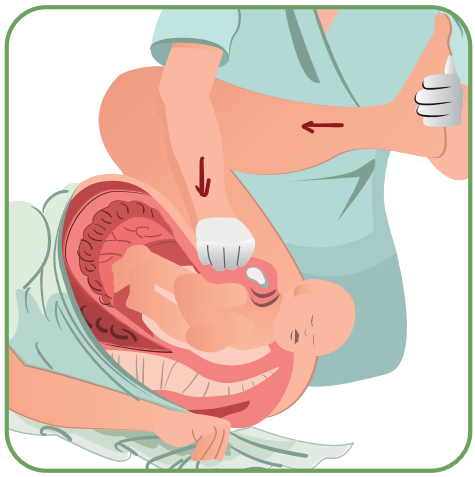
CAUTION

Avoid these maneuvers

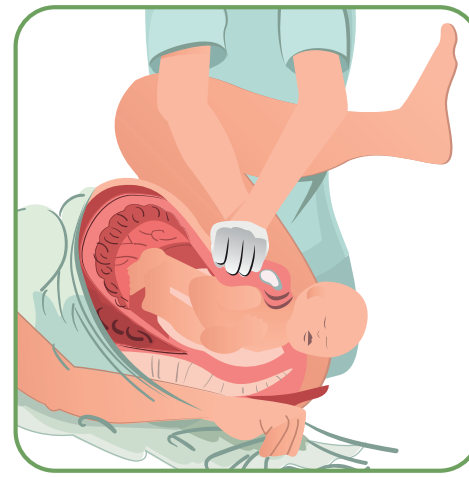
- Do not pull the head
- Do not push on uterine fundus
- Do not rotate the head
- Do not exert suprapubic pressure vertically

If shoulder dystocia is diagnosed: proceed to HELPERR

- **H:** Call for **help**, obstetrician, and additional midwife to help, pediatrician, and anesthesia.
- **E: Evaluate** for the need for episiotomy to add additional room for maneuvers.
- **L: "Legs"** Perform McRoberts maneuver by flexing the woman's hips sharply so that the thighs are on the abdomen and attempt delivery.
- **P: Apply** suprapubic **pressure** by an assistant using CPR-style hand position with continuous then rocking motion for 30-60 seconds (**Rubin I**) and attempt delivery.



McRoberts maneuver & Rubin I



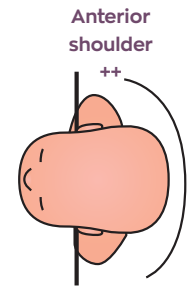
Suprapubic pressure (Robin I)

- **E I: Enter** the vagina to approach the anterior fetal shoulder from behind & exert pressure on the Anterior shoulder to rotate to oblique position (**Rubin II** maneuver) while continuing McRoberts maneuver.

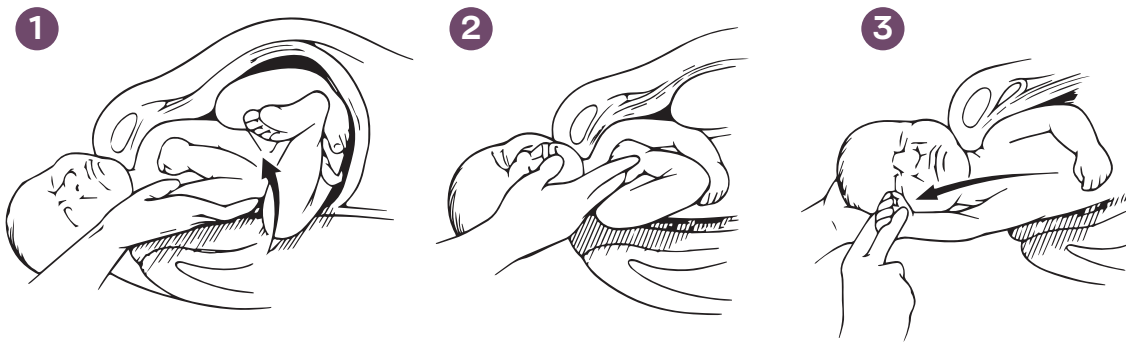
Rubin II maneuver

Rubin II maneuver

- If fetal head LOT, insert index and middle fingers of the right hand through introitus at 5 o'clock.
- Swing fingers up and apply pressure with finger tips from behind the anterior shoulder
- If shoulders move into the oblique diameter- attempt delivery
- If ROT, insert fingers of the left hand at 7 o'clock.



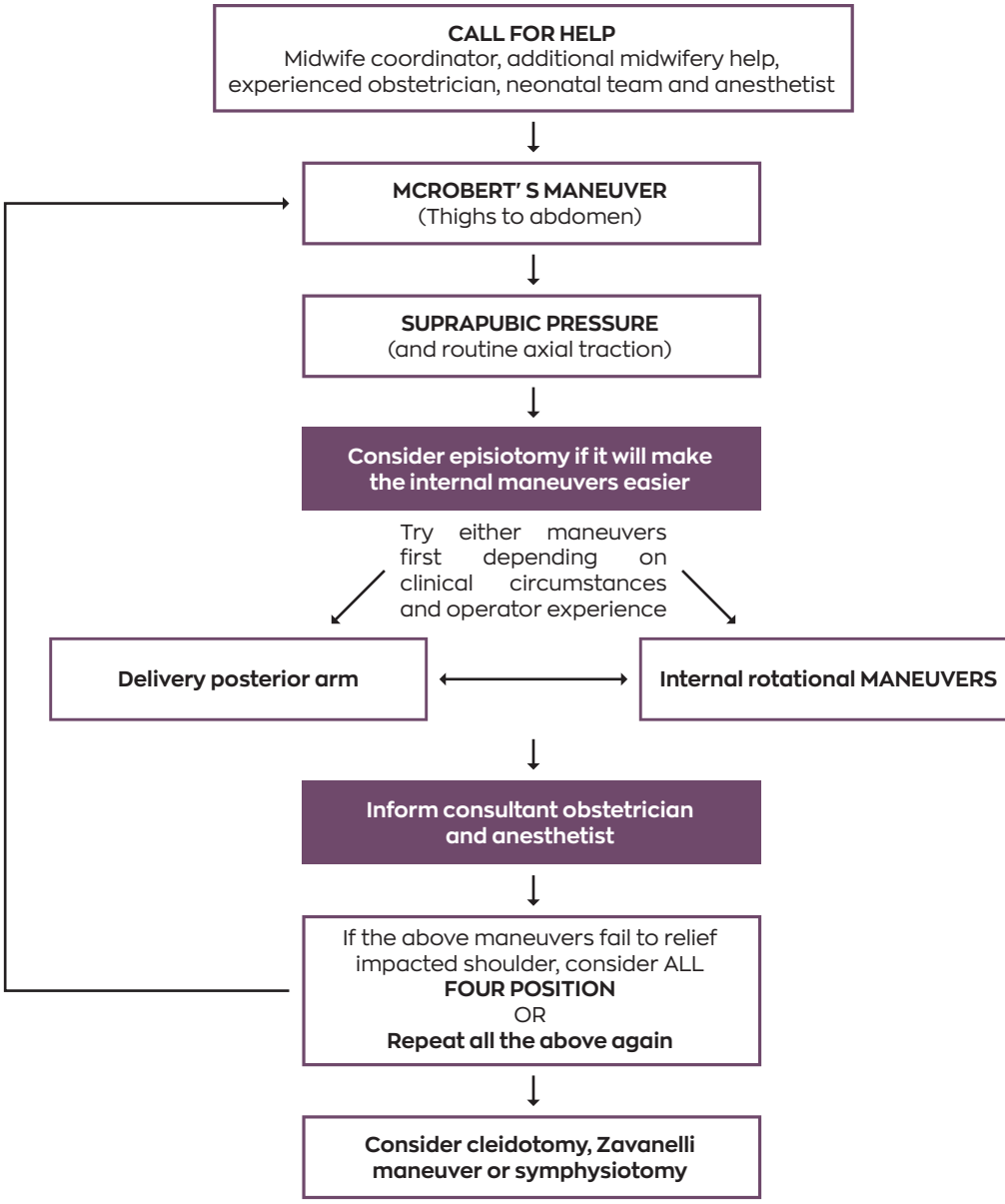
- **E II: Enter** the vagina to approach posterior fetal shoulder and rotate shoulder towards symphysis combining with Rubin II maneuver (Woods Screw maneuver).
- **E III: Enter** vagina to reverse Woods Screw maneuvers by approaching posterior shoulder from behind & rotate fetus in opposite direction form (Rubin II or Woods Screw maneuvers.)
- **R: Remove** (deliver) the posterior arm first by flexing arm at the elbow & sweeping forearm across fetal chest (figure 3).
- **R: Roll** the woman to "all four" position & deliver the posterior shoulder with gentle downward traction.



R. Remove: Delivery of posterior arm

Figure 29 summarizes management of shoulder dystocia.

- **If still undelivered, consultant may use the following maneuvers as a last resort:**
  - Posterior sling
  - Deliberate clavicle fracture (cleidotomy).
  - Zavanelli maneuver. NB: Zavanelli includes CS
  - Muscle relaxation
  - Symphysiotomy
  - Abdominal rescue



Baby to be reviewed by neonatologist after birth and referred if any concern
Document all actions and complete clinical incident report form

Figure 30 Algorithm for management of shoulder dystocia

3.5	**Cord prolapse**

- Cord prolapsed is defined as the descent of the umbilical cord through the cervix alongside (occult) or past the presenting part (overt) in the presence of rupture membranes.

CAUTION

- Be aware of cord presentation before performing ARM.
- Do not rupture the membranes if the head is not engaged
- Vaginal examination should be routinely performed following spontaneous rupture of membranes to exclude the presence of cord prolapse and if cord felt note whether the cord is pulsating

- Place the patient in left lateral position, knee chest position or Trendelenburg position.

- When cord prolapse is diagnosed before full dilatation, assistance should be immediately called and preparations made for immediate birth in theatre.
- Keep your consultant/Senior Doctor informed, inform anesthetist, OR staff and Neonatal unit officer.

- Cesarean section is the recommended mode of delivery in cases of cord prolapse when vaginal birth is not imminent in order to prevent hypoxic acidosis.

- **A category 1 caesarean section** should be performed with the aim of achieving birth within 30 minutes or less if the cord prolapse is associated with a suspicious or pathological fetal heart rate pattern but without compromising maternal safety.

- **Category 2 cesarean birth** can be considered for women in whom the fetal heart rate pattern is normal, but continuous assessment of the fetal heart trace is essential. If the CTG becomes abnormal, re-categorization to category 1 CS should immediately be considered.

- Formal consent for CS should be obtained after short counseling, full explanation should be given to the woman and her husband all the time.

- Replace the cord into the vagina in case of **frank prolapse** with minimal manipulation to avoid cord spasm. **A warm saline soaked pack might be inserted at the introits** (before transfer to OR for CS).

- To prevent vasospasm, there should be minimal handling of loops of cord lying outside the vagina.

- **Check fetal heart.**

- To prevent cord compression:
  - It is recommended that the presenting part be elevated either manually or by filling the urinary bladder.
  - Cord compression can be further reduced by the mother adopting the knee-chest or left lateral position (preferably with head down and pillow under the left hip).
  - Tocolysis can be considered while preparing for cesarean section if there are persistent fetal heart rate abnormalities after attempts to prevent compression mechanically, particularly when birth is likely to be delayed.

- **If the cervix is fully dilated and the fetus is in cephalic presentation**, and delivery is feasible, deliver vaginally immediately (Vacuum/Forceps may be used to expedite delivery).

- **If delivery is not imminent**, there are insufficient data to evaluate manual replacement of the prolapsed cord above the presenting part to allow continuation of labor. **This practice is not recommended.**

3.6	Ruptured uterus

- Defined as complete disruption of all uterine layers, including the serosa, leading to changes in maternal or fetal status.

CAUTION

Any oxytocin drug via any rout should be given without written physician prescription

- **Act to prevent rupture uterus by:**
  - Initiating Oxytocin drugs only after proper risk assessment of the patient by a senior doctor.
  - Initiating Oxytocin drugs using dropper machine following the unit protocols & guidelines.

- **Monitor with extra care and keep a high suspicious index for uterine rupture in patients:**
  - Previous uterine scar.
  - Multiparous with or without oxytocin.
  - Over stimulation of uterus with or without oxytocin.
  - Presence of cephalo-pelvic disproportion (CPD) or malpresentation.
  - Post administration of prostaglandin.
  - Obstructed labor.
  - Instrumental deliveries and intrauterine manipulation.

- **Be aware of signs / symptoms of uterine rupture:**
  Uterine rupture is difficult to diagnose, but the following symptoms (especially in the high-risk group) may raise the suspicious index:

  - Pain,
  - Bleeding,
  - Signs of shock- (tachycardia precedes hypotension),
  - Fetal heart abnormalities,
  - Cessation of contractions
  - Hematuria,
  - Change in fetal position or presentation

- **If uterine rupture is suspected:**
  - **Call for help** from medical and midwifery staff immediately, including Anesthetist and Obstetric Consultant/ Specialist/SHO
  - Maternal resuscitation while arranging for urgent laparotomy
  - Anticipate massive hemorrhage management.
  - Continuously **monitor fetal heart** (if still present)
  - **Record**
    - Maternal BP.
    - Pulse.
    - Oxygen saturation.
  - Record appropriately.
  - **Ensure IV access** with two (14-16g) cannulas.
  - Be prepared to follow the massive hemorrhage protocol.
  - **Take blood** for
    - CBC.
    - clotting profile.
    - cross match of 6 units of blood.
  - Make arrangement **for immediate transfer to theatre**.
  - The diagnosis of uterine rupture is typically made at laparotomy.
  - The decision to perform hysterectomy or repair the defect is based on a combination of factors, including:
    - patient's desire for future pregnancy
    - the extent of uterine damage from the rupture
    - patient's intraoperative hemodynamic
    - skill of the surgeon for repairing a complicated rupture
  - Keep **relative fully informed** of the situation, ask them to stay around for possible consent for further surgical management (Hysterectomy).
  - Ensure **accurate recording**.

- **Postnatal care:**
  - All women need extra assistance and support.
  - In the event of Hysterectomy/fetal loss, appropriate management and follow up counselling should be given.

3.7	Amniotic fluid embolism

- Amniotic fluid embolism (AFE) is a rare and often catastrophic condition, resulting from exposure to an unknown inciting antigen, possibly related to amniotic fluid contents, that typically occurs during labor or within 30 minutes, resulting in acute cardio-respiratory arrest and coagulation failure.
- AFE should be suspected if the woman experiences the sudden onset of severe chest discomfort and difficulty breathing.
- She may become pale, cyanosed and have signs of cardio-vascular collapse.

AIM To maintain airways and initiate cardiopulmonary resuscitation with circulatory support.

DIAGNOSIS:

Use the Society for Maternal-Fetal Medicine (SMFM) and the Amniotic Fluid Embolism Foundation proposed Criteria for AFE.

Criteria for AFE (all must be present):

1. Sudden onset of cardiorespiratory arrest OR hypotension (systolic blood pressure <90 mmHg) with evidence of respiratory compromise (e.g. dyspnea, cyanosis, or peripheral oxygen saturation <90 percent).
2. Documentation of overt DIC (consumptive intravascular coagulopathy).
3. Clinical onset during labor or within 30 minutes of placental delivery.
4. Absence of fever (≥38°C) during labor.

Investigations:

- CBC
- Coagulation profile
- ABG
- KFT
- LFT
- Electrolytes
- Chest radiograph
- ECG
- Echocardiograph

ACTION:

- This is a top obstetric emergency, a multidisciplinary, team-based approach urgently **call all extra staff** required including Obstetric Consultant, Senior resident, Senior Midwife, Midwives, Consultant Anesthetists and alert hematologist and hematology lab (Rapid response team).

- Administer 40% **Oxygen** 8 liters by face mask.
- Set up two **peripheral IV lines** using (16 gauge - grey), collect and send blood for CBC, coagulation profile, cross match at least 6 unit of blood.
- **Monitor and record** BP, pulse, oxygen saturation levels at 5 minute-intervals, under instruction of anesthetist.
- **Intubation** may be required. Low threshold for intubation.
- **Tracheal aspirate** for evidence of amniotic fluid/fetal cells.

- If patient has cardiac arrest: commence CPR with left uterinedisplacement.
- If massive hemorrhage ensues: follow the guidelines for management of severe hemorrhage.
- **Deliver the fetus** if the fetus is alive and beyond the gestational age of viability or if delivery will aid in maternal resuscitation.
- Keep relatives informed.
- If resuscitation is successful, **transfer to ICU** to maintain circulation with digoxin and dopamine and other supportive measures.

3.8	**Shock in obstetrics**

- Shock is a life-threatening condition that require immediate and intensive treatment
- It is characterized by failure of circulating system to maintain adequate perfusion of the vital organs.
- The three major pathophysiologic mechanism in production of shock: hypovolemia, cardiac insufficiency, and altered vascular resistance. **In obstetric patient: hypovolemia is the main cause.**

ACTION:

- **Start the immediate management measure:**
  - Call for help
  - Establish a clear **airway.**
  - Give 100% **oxygen** by face mask.
  - Establish **intravenous access** with two wide bore cannulas.
  - **Take blood for**: blood grouping, Rh typing, x-match blood, CBC, LFT. KFT, electrolytes, RBS, coagulation profile and Blood Culture (if sepsis is suspected).
  - Set up IV fluids rapidly – First line IV fluids are crystalloids
  - Insert a **Foley's catheter** to monitor the urine output.
  - Perform a quick **general examination** and **record vital signs.**
  - **Check for** any
  - Vaginal bleeding.
  - Abnormal discharge.
  - Draining liquor and/or meconium.
  - **Call anesthetist** to put in a **CVP line**.
  - Give **IV colloid**- this is continued until the CVP is +5 to +10 cm H20.

- **Take a brief history from the patient/family. Especially events preceding shock.**

- **Keep consultant informed.**

- **Specify the underlying cause of shock:**
  - Hypovolemia.
  - Sepsis.
  - Neurogenic.
  - Anaphylactic.
  - and others.

- **And treat accordingly:**

  - If shock is associated with **signs of infection** without significant bleeding → refer to protocol for septic shock.
  - If not yet delivered and associated with **significant bleeding** → refer to the protocol for antepartum hemorrhage.
  - If not yet delivered and associated with either significant bleeding or/clinical features of infection suspect concealed hemorrhage or **rupture uterus** → refer to the related protocol.
  - If shock occurs after delivery and associated with significant bleeding → refer to the protocol for **postpartum hemorrhage**.
  - If shock occurs after delivery and associated with no significant bleeding à exclude **inversion of uterus** and treat accordingly.
  - If **amniotic fluid embolism** is suspected → refer to the specific protocol.

CHAPTER III THROMBOPROPHYLAXIS IN OBSTETRICS

This chapter covers risk assessment for VTE, prophylaxis measures based on risk assessment score, prophylaxis for women with thrombophilia, and methods of prophylaxis.

1. **Definitions of terms**
2. **Risk assessment**
3. **Thromboprophylaxis in women with thrombophilia**
4. **Method of thromboprophylaxis**
5. **Dosage of anticoagulant**
6. **Heparin antidote (reversal)**

1.	**Thromboprophylaxis in obstetrics**
Care group	All pregnant women and pregnant women at increased risk for venous thromboembolism (VTE)
Standard statement	All pregnant women should be carefully assessed for risk of VTE and provided with appropriate thromboprophylaxis accordingly

- Pregnancy is associated with 5-10 folds increase in VTE risk.
- VTE is one of the top leading causes of maternal death.
- Thromboprophylaxis is the most readily implementable means of reducing the maternal death rate.
- VTE includes Pulmonary embolism (PE) and deep vein thrombosis (DVT).
- When DVT occurs during pregnancy, it is more likely to involve the left lower extremity and to be more proximal, involving the iliac and iliofemoral veins, in comparison with the nonpregnant populations.

1.1	**Definition of terms**

Family history of VTE	Family history is considered positive if one or more first degree relatives are affected.
Immobility	Includes: • Long distance travel of four hours or more. • Most of time on bedrest—24 hours or more. • Other issue significantly affecting mobility (e.g. paralysis).
Unprovoked VTE 'idiopathic' VTE	VTE occurring where there are no identified risk factors (transient or persistent).
Provoked VTE	**Major transient risk factors (during 3 months before diagnosis of VTE):** • Surgery with general anesthesia over 30 minutes duration. • Confined to hospital bedrest (bathroom privileges only) for at least 3 days with an acute illness. • Cesarean section.
	Minor transient risk factors (during 2 months before diagnosis of VTE): • Surgery with general anesthesia less than 30 minutes. • Hospital admission for less than 3 days with acute illness. • Estrogen therapy. • Pregnancy or puerperium. • Confined to bed out of hospital for 3 or more days with acute illness. • Leg injury associated with reduced mobility for 3 or more days.
	Persistent risk factor • Active cancer, inflammatory bowel disease
Recurrent VTE	Two or more VTE.
Thromboprophylaxis	In this guideline: • **Standard prophylaxis** refers to pharmacological management with the lowest recommended dose. • **High prophylaxis (Intermediate dose)** refers to pharmacological management at doses between standard prophylaxis and therapeutic anticoagulation.

Thrombophilia	**High risk thrombophilia (any of)** Presence of more than one laboratory thrombophilia, antithrombin deficiency, antiphospholipid syndrome, deficiency, homozygous factor V Leiden, homozygous prothrombin mutation, compound heterozygous factor V Leiden/prothrombin mutation.
	Low risk thrombophilia (any of) Heterozygous factor V Leiden, heterozygous prothrombin mutation, antiphospholipid antibodies, protein C deficiency, protein S deficiency.

1.2	**Risk assessment**

The majority of the women who died from PE had identifiable risk factors for VTE.

I. Risk factors for VTE

Antenatal risk factors	Postnatal risk factors	Transient risk factors
1. Age > 35 years 2. Parity≥ 3 3. Smoking 4. Gross varicose veins 5. Current BMI≥ 30kg/m2 6. IVF/ART 7. Multiple pregnancy 8. Preeclampsia in current pregnancy 9. Pre-existing diabetes	1. Cesarean section 2. Prolonged labor >24 hours 3. Operative vaginal delivery 4. Preterm birth 5. PPH >1 L or transfusion 6. Stillbirth in current pregnancy 7. Cesarean hysterectomy	1. Immobility 2. Dehydration 3. Current systemic infection

II. Standardized VTE risk assessment tool

- Use the standardized tool to all patients to assess VTE risk and identify appropriate patients for antenatal and postnatal thromboprophylaxis.

- The risk profile may change in the course of pregnancy and the early postpartum period. Therefore, risk assessment by the tool should be performed multiple times early in the first trimester and repeated at any hospital admission, immediately after delivery and before patient's discharge from hospital to identify women at increased risk of VTE timely.

- Method of thromboprophylaxis is based on sum of risk assessment score as shown in the figure below.

High Risk

1	**ANY One OF** • Pre-pregnancy therapuetic anticoagulation (any reason) • Any previous VTE plus high-risk thrombophilia or APS* • Recurrent unprovoked VTE (2 or more) • VTE in current pregnancy (seeks expert advice)	**Therapeutic anticoagulation** • Continue/commence antenatal • Continue till 6 weeks postpartum
2	**ANY One OF** • Any single previous VTE not provoked by surgery ** • Recurrent provoked VTE by surgery (2 or more) • Active autoimmune or inflammatory disorder*** • Medical co-morbidity (e.g. cancer, nephrotic syndrome, heart failure, sickle cell, type I DM with nephropathy)	**MWH standard prophylaxis** • From first trimester • Continue till 6 weeks postpartum
3	**IF THROMBOPHILIA** • High or low-risk throbophilia (no personal history of VTE)	**Refer to figure "prophylaxis for thrombophilia"** Prophylaxis while in hospital or until resolves
4	**ANY One OF** • Antenatal hospital admission **** • Ovarian hyperstimulation syndrome (first trimester only) • Any surgery (pregnancy or postpartum) • Severe hyperemesis or dehydration requiring IV fluid	**MWH standard prophylaxis** Prophylaxis while in hospital or until resolves

*Antiphospholipid syndrome with low-dose Aspirin
** including unprovoked, hormonal provoked VTE, and VTE with low-risk thrombiphilia
***SLE, inflammatory bowel disease, and Bahchet's syndrome
****all antepartum patients hospitalized for at least 72 hours who are at high-risk for bleeding or imminent childbirth

All Risks

5

SELECT ALL THAT APPLY At every assessment (antenatal or postnatal)	**Risk score**
☐ Family history (1st degree relative) of unprovoked, estrogen provoked VTE	1
☐ Single VTE provoked by surgery	3
☐ Age> 35 years	1
☐ Parity≥ 3	1
☐ Smoking (any current)	1
☐ Gross varicose veins	1
☐ Current BMI 35-30 kg/m2	1
☐ Current BMI ≥ 40 kg/m2	2
☐ IVF/ART	1
☐ Multiple pregnancy	1
☐ Preeclampsia in current pregnancy	1
☐ Immobility	1
☐ Current systemic infection	1
☐ Pre-existing diabetes	1

☐ Cesarean section in labor	3
☐ Elective cesarean section	1
☐ Prolonged labor > 24 hours	1
☐ Operative vaginal delivery	1
☐ Preterm birth	1
☐ PPH >1 L or transfusion	1
☐ Stillbirth in current pregnancy	1
☐ Cesarean hysterectomy	3
Sum all risk scores	____

Antenatal risk score	
1-2 ALL	**Mobilize, avoid dehydration**
3	**LMWH standard prophylaxis** • From 28 weeks
≥ 4	**LMWH standard prophylaxis** • From time of assessment

Postnatal risk score	
1 ALL	**Mobilize, avoid dehydration**
2	**LMWH standard prophylaxis**
≥ 3	**LMWH standard prophylaxis** 10 days or longer if ongoing risk

1.3	Thromboprophylaxis in women with thrombophilia

Assess women on individual basis Consult with or refer to expert as required		
I. **Family history but no personal history of VTE**	**ANTENATAL**	**POSTNATAL**
EITHER OF • > 1 laboratory thrombophilia* • APS**	**Therapeutic anticoagulation**	**Therapeutic anticoagulation** **6 weeks or longer**

ANY One OF
• **Homozygous**
  • Factor V leiden
  • Prothrombin mutation
• **Compund heterozygous**
  • Factor V leiden/
• **Prothrombin mutation**
• **Antithrombin deficiency**
	Standard prophylaxis	**Standard prophylaxis**
		6 weeks

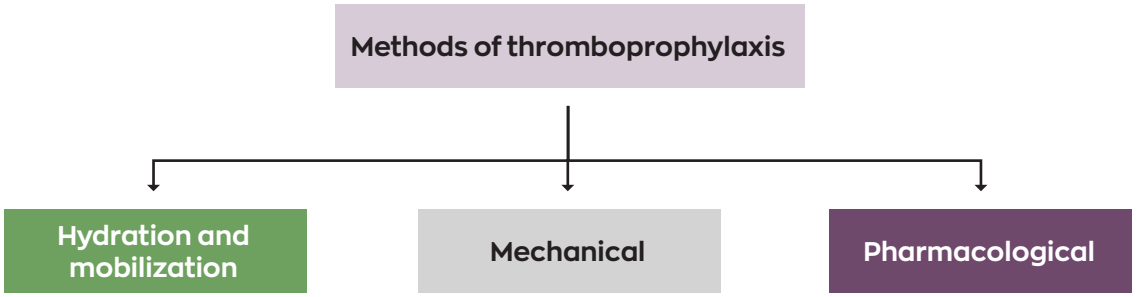
ANY One OF
• **Antiphsopholipid antibodies**
• **Heterozygous**
  • Factor V leiden
  Prothrombin mutation
• **Protein C or S deficiency** (confirmed outside pregnancy)
	Clinical surveillance
	If ≥ 2 other risk factors
	Standard prophylaxis
		Standard prophylaxis
		6 weeks

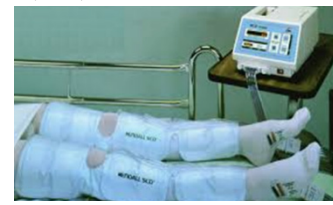
*High-risk thrombophilia> 1 laboratory thrombophilia, homozygous FVL, homozygous prothrombin mutation, compound heterozygous FVL/prothrombin mutation, antithrombin deficiency, APS. Low-risk thrombophilia: heterozygous FVL, heterozygous prothrombin mutation, protein C deficiency, protein S deficiency ** APS based on laboratory criteria and APS-defining pregnancy morbidity and no personal or family history of VTE require antepartum and postpartum (for 6 weeks) Standard prophylaxis and low-dose Aspirin.		
II. **No family history and no personal history of VTE**	**ANTENATAL**	**POSTNATAL**

ANY One OF
• **> 1 laboratory thrombophilia**
• **Homozygous**
  • Factor V leiden
  • Prothrombin mutation
• **Antithrombin deficiency**
	Consider Standard prophylaxis	**Consider standard prophylaxis**
		6 weeks

ANY One OF
• **Antiphsopholipid antibodies**
• **Heterozygous**
  • Factor V leiden
  Prothrombin mutation
• **Protein C or S deficiency**
	Clinical surveillance
	If ≥ 2 other risk factors
	Standard prophylaxis
		Clinical surveillance
		If ≥ 1 other risk factors
		Standard prophylaxis

1.4	**Methods of thromboprophylaxis**



Mechanical Methods of thromboprophylaxis		
Recommend if receiving pharmacological thromboprophylaxis is contraindicated		
1. **Compression devices**	• Intermittent pneumatic compression (IPC). 	• Sequential compression devices (SCD). 
2. **Lower extremity stockings**	• Graduated compression stockings (GCS) Primarily for ambulatory patients.	• Thromboembolic deterrent stockings (TED) Primarily for non-ambulatory patients or immediately post-surgery.

Pharmacological Agents of thromboprophylaxis	
1. LMWH	Agent of choice for antenatal and postnatal thromboprophylaxis.
2. Unfractionated heparin UFH	Preservative-free vials: Prefilled, single dose syringes are generally preservative-free. NB: The multi-dose vials of LMWH and unfractionated heparin contain benzyl alcohol and/or other preservatives. **Confirmation of the absence of preservatives from the product label is advised.**
3. Warfarin	Consider **postnatal** only except for those with protein C or S deficiency who are at risk for **developing warfarin-induced skin necrosis**
4. Aspirin	The American College of Physicians **recommend against** the use of aspirin as **sole agent for VTE prophylaxis** in any pregnancy.

1.5	**Dosage of anticoagulant**

- There is limited data about the optimal dosage regimen. A variety of regimens are used.
- Use clinical judgement and consult with an expert as required. Recommended dosage based on **actual (current or last recorded**) weight in kilograms, including current postnatal weight.

I. Standard prophylactic dosage

Weight based Current weight (kg)	**Administer via subcutaneous route**			
	Enoxaparin (Clexane)	**Dalteparin (Fragmin)**	**Tinzaparin (Inohep)**	**Unfractionated heparin (UFH)**
Less than 50	20 mg daily	2500 units daily	3500 units daily	Consider reduced dose
50-90	40 mg daily	5000 units daily	4500 units daily	5000 units daily
91-130	60 mg daily	7500 units daily	7000 units daily	7500 units daily
131-170	80 mg daily	10,000 units daily	9000 units daily	
171 or more	0.6 mg/kg/day*	75 units/kg/day*	75 units/kg/day*	
*Maybe administered in divided doses				

II. High prophylactic dose

(Usually between the prophylactic and therapeutic dose)

Weight based Current weight (kg)	**Administer via subcutaneous route**			
	Enoxaparin (Clexane)	**Dalteparin (Fragmin)**	**Tinzaparin (Inohep)**	**Unfractionated heparin (UFH)**
Less than 50*	20 mg 12-hourly **OR** 40mg daily	2500 units 12-hourly	3500 units 12-hourly	Consider reduced dose (5000 units 12-hourly)
50-130	40 mg 12-hourly **OR** 80mg daily	5000 units 12-hourly	4500 units 12-hourly	7500 units 12-hourly
131 or more*	60mg 12-hourly	7500 units 12-hourly	7500 units 12-hourly	7500 units Three times daily
*Suggested regimen is not evidence-based. If weight < 50kg or 130kg seek expert advice.				

III. Therapeutic anticoagulation

If weight greater than 100kg, verify with expert regarding dose.

Drug	Dosage
Enoxaparin (Clexane)	**(Antenatal)** 1 mg/kg 12-hourly
	(Postnatal) 1.5 mg/kg daily
Dalteparin (Fragmin)	**(Antenatal)** 100 u /kg 12-hourly
	(Postnatal) 200 u/kg daily
Tinzaparin (Inohep)	**(Antenatal)** 175 u/kg daily
	(Postnatal) 175 u/kg daily
Unfractionated heparin (UFH) Adjusted dose (SC)	10,000 units or more SC 12-hourly in doses adjusted to target aPTT in the therapeutic range (1.5-2.5 control) six hours after injection
Unfractionated heparin (UFH) Adjusted dose (IV)	• **Loading dose:** 80 units/kg IV stat • **Infusion rate:** 18 units/kg/hour IV infusion • **Monitor aPTT**
Warfarin	Variable oral dose Aim for INR 2-23 times normal unless otherwise specified

1.6	**Heparin antidote (reversal)**

- Discuss management with consultant Physician and / or Hematologist
- If anticoagulation with heparin needs to be discontinued for clinical reasons, termination of the heparin infusion within 4-6 hours is usually sufficient.
- If an immediate effect is required, the heparin antidote protamine sulphate may be considered.
- Protamine sulphate neutralizes heparin by the feature of its positive charge and will take effect within 5 minutes of IV administration. aPTT and Prothrombin Time should be checked 15mins after the administration of protamine sulphate.
- Protamine (in ampoules containing 50mg in 5mL) can be given **without dilution**, **but as slow administration (over 10mins) is recommended. Alternatively, dilution in either 0.9% Sodium Chloride or 5% Glucose** is advised.
- The rate of protamine administration should not exceed **5mg protamine / minut**e; rapid administration can cause circulatory compromise with hypotension, bradycardia, systemic and pulmonary hypertension and dyspnea, as well as anaphylaxis, flushing and fever.
- Women with known hypersensitivity reactions to fish (especially salmon), and those who have received previous protamine therapy, including protamine-containing insulins (NPH, protaphane – intermediate-acting insulins) may be at risk of hypersensitivity reactions.
- **Dosage:** give up to 1mg protamine for every 100 units of heparin received in the preceding 2 hours, to a maximum of 50mg of protamine. Reduce dose of protamine according to time elapsed since last administration of heparin (see table below).

Time since last heparin dose	**Protamine dose (mg) per 100units heparin received in the previous 2 hours**
Less than 30 mins	1 mg
30-60 mins	0.5-0.75 mg
60-120 mins	0.375-0.5 mg
More than 120 mins	0.25-0.375 mg

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