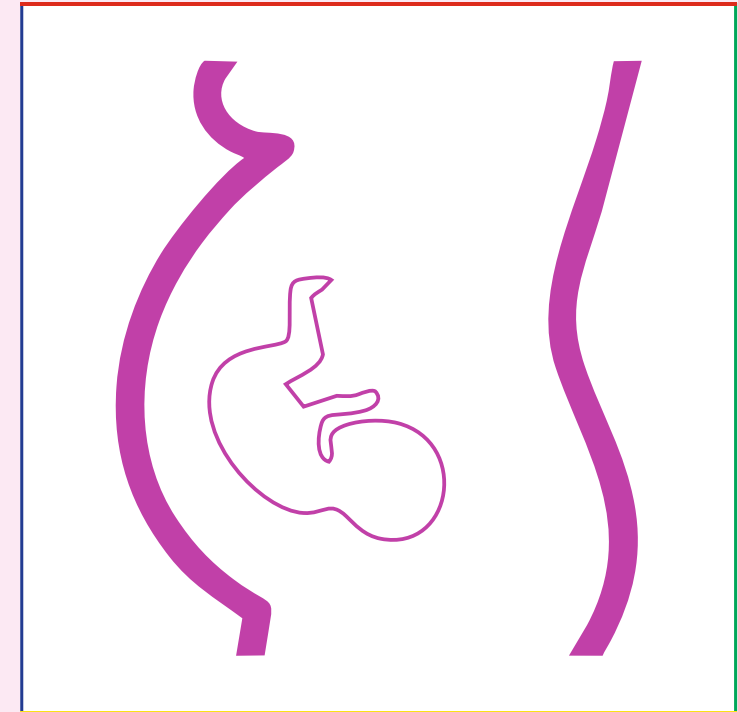




STANDARD TREATMENT GUIDELINES OBSTETRICS



DEPARTMENT OF HEALTH AND FAMILY WELFARE
GOVERNMENT OF KERALA

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STANDARD TREATMENT GUIDELINES
for
Obstetrics



Foreword

At the outset, I appreciate the work done by the respective thematic teams and coordination done by the DME. The Standard Treatment Guidelines (STG) were prepared and published in 2021 in the thick of the Covid pandemic. On the last page of these volumes the road map was mentioned. The few points are mentioned here for the recall.

“The Department of Health has been taking a systematic approach of creating and enabling multiple initiatives with a focus on prevention along with improving health care services. Health care service delivery is one of the most important services and is always seen as a barometer to assess the Governance. While it is important to develop infrastructure, an essential prerequisite is to develop systems and processes to bring in standardization in management of patient care.The foundation is laid and we take up the challenge to work on the unfinished agenda.”

It was mentioned in the road map to have institutional mechanism to ensure updation of Standard Treatment Guidelines. The next step that was suggested was to do analysis of Karunya Arogya Suraksha Padhati (KASP) and standard treatment guidelines to work on developing a Balance Score Card to give information regarding compliance from the Hospitals and to build a “feedback loop” to improve. These initiatives remained at concept level on the last page! But following detailed discussions with Dr Vishwanathan, Director Medical Education, some of the foundational things were prioritized and given an impetus to take it to finality. In this journey, many committed doctors from various Medical Colleges of respective specialties participated. The previous coordination team members and experts were also consulted and they also participated in discussions and these Standard Treatment Guidelines are prepared.

The standard treatment guidelines will be made available in the Kerala Health portal (health.kerala.gov.in). This will enable the resource book availability not only to people within the state but to all in the country and outside our borders as well. I am confident that it will be used by students and practicing doctors. We request inputs based on the research from the Specialists and Experts. The teams shall continue to update and make any required changes in the STG by doing periodic updates.

The most important thing we all need to internalize is to have a shared vision and

work as a team to reach to a state of 'excellence'. If we take a look at the preparation of the Directorate Medical Education Management Information System, documents of each Medical Colleges, it provides information regarding 'what we are, what we do and what we aspire to do', pandemic preparedness, AMR accreditation and many more such initiatives taken on scale, which are all outcomes of collective TEAM work. This has laid a foundation for involving all the stakeholders including undergraduate and postgraduate students. This should encourage the teams in Medical Colleges to believe in themselves and build future initiatives on such a sound platform.

I express my sincere thanks to Dr Vishwanathan for his patience and bearing with relentless follow ups! I also take this opportunity to thank each and every team and their members and everyone from Directorate Medical Education and Medical Colleges who supported these initiatives.

I would like to express my sincere gratitude to all those who have contributed to publish these Standard Treatment Guidelines.

I wish all the success to DME team to make Kerala MCH as a premier knowledge hub in Medical Science.

Dr Rajan Khobragade IAS

Additional Chief Secretary
Health & Family Welfare and
AYUSH Department
Govt of Kerala.



Message

Patient care today demands evidence-based, standardized, and contextually relevant clinical practice. In this regard, the publication of the **Second Edition of the Standard Treatment Guidelines** marks an important step forward in strengthening the quality, consistency, and accountability of healthcare delivery in Kerala.

The first edition laid a strong foundation for uniform clinical practice across specialties and super specialties. Since then, advances in medical knowledge, evolving treatment modalities, and the growing need for periodic updating have made it essential to revisit and refine these guidelines. The present edition reflects this commitment to continuous improvement and clinical excellence.

I am pleased to note that subject experts from various disciplines of Government Medical Colleges, private institutions and professional bodies have contributed as resource persons in the preparation of these guidelines. Their academic expertise, practical insight, and dedicated involvement have greatly enriched this edition. I deeply appreciate the sincere efforts of all the conveners, contributors, and coordinators whose collective commitment and teamwork made this publication possible.

These guidelines will serve as a valuable reference for clinicians, teachers, trainees, and healthcare institutions, helping to promote evidence-based decision-making and improve patient outcomes. I am confident that this edition will further support standardization of care and contribute to the advancement of medical education and clinical practice in the State.

I congratulate everyone involved in this commendable effort and commend this publication to all healthcare professionals.

Dr. K. V. Viswanathan

Director of Medical Education
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Section I
COMPREHENSIVE ANTENATAL CARE

SECTION 1**COMPREHENSIVE ANTENATAL CARE****1.1 GOAL:**

- For identification and surveillance of pregnant women and her expected child
- Recognition and management of pregnancy related complications
- Treatment of underlying or concurrent illnesses
- Preventive measures including immunisation, deworming and anemia prophylaxis
- Promote post natal Family planning /Birth spacing
- Health education on nutrition, danger signs of pregnancy
- Prediction ,detection and initial management of perinatal mental health

1.2. ANTENATAL VISITS (low risk)

- First visit as soon as the periods are missed.
- Monthly till 28 weeks
- Fortnightly till 36 weeks
- Weekly till 40 weeks

1.3. IMMUNISATION IN PREGNANCY:**1. Td Vaccine:**

First dose of Inj.Td to be administered at the first visit and second dose 4 weeks later.

If the previous pregnancy is less than 3 years only one booster dose is needed provided she is immunized previously.

Third dose can be given 6 months after the second dose to provide protection for 5 years (WHO)

FOGSI recommends Tdap vaccine at 28weeks

2. INFLUENZA VACCINE:

Safe during pregnancy

Dose: 0.5 ml IM single dose Deltoid

1.4. FIRST TRIMESTER

- History taking and risk stratification

High Risk

Medical comorbidities ART pregnancy

Bad obstetric history

Elderly and teenage pregnancies

Obesity

Short stature Previous

caesarean

Malpresentations

Antepartum hemorrhage
 Preeclampsia, eclampsia
 Gestational diabetes Multiple pregnancy

- General examination including CVS, BMI, Breast examination
- Folic acid 5mg to be started (ideally preconceptionally)

- **Blood Investigations :**

Hemoglobin, CBC, ESR (>60) is significant,

RFT, LFT

Urine Routine (to be done monthly)

GTT if patient tolerates or FBS/PPBS

Blood grouping and Rh typing, ICT in all trimesters

Viral markers (HIV, HCV, HBsAg), VDRL.

TSH every trimester

For Dating, Aneuploidy and preeclampsia screening between 11 – 13 +6 weeks

Earlier USG is indicated for assessing location of gestational sac in all previous CS and in high risk pregnancies for planning further management.

Screening for infections

1 Asymptomatic bacteriuria.

Pregnant women should be offered routine screening for asymptomatic bacteriuria by midstream urine culture. In settings where urine culture is not available, on-site midstream urine Gram-staining is recommended over the use of dipstick tests as the method for diagnosing asymptomatic bacteriuria in pregnancy. Identification and treatment of asymptomatic bacteriuria reduces the risk of preterm birth.

Urine culture should be repeated every trimester if there is history of recurrent urinary tract infection.

2 Hepatitis B virus

Serological screening for hepatitis B virus should be offered to pregnant women, so that effective postnatal intervention can be offered to infected women to decrease the risk of mother-to-child-transmission.

3 Human immunodeficiency virus

Pregnant women should be offered screening for HIV infection early in antenatal care because appropriate antenatal interventions and antiretroviral therapy (ART) can reduce mother-to-child transmission of HIV infection and counseling should be done³² (2015 WHO consolidated guidelines on HIV testing services) (the strength of the recommendation and the quality of the evidence were not stated).

4 Syphilis

Screening for syphilis should be offered to all pregnant women at an early stage in antenatal care because treatment of syphilis is beneficial to the mother and fetus

5 Bacterial vaginosis

Recurrent vaginal infections and a high incidence of preterm labor are interlinked, and hence whenever possible and feasible pregnant women should have a vaginal smear to rule out the possibility of bacterial vaginosis.

6 Trichomoniasis screening should be offered in women who have vaginal discharge and itching and redness along with vaginal discharge.

INDICATIONS FOR ECOSPIRIN:

Given in Annexure 1

How to Measure MAP

Sitting position with arms at heart level, using appropriately sized cuff (after 5-minute rest)

Measure BP in both arms simultaneously and: — Two sets of BP measurements at 1-minute intervals — Total of 4 sets are used in the calculator □ $MAP = DP + 1/3 (\text{Systolic Pressure} - \text{Diastolic Pressure})$.

1.5. SECOND TRIMESTER:

- Elemental Iron 100mg ,Tab.Calcium 1000mg daily
- Routine deworming
- Hemoglobin
- **Platelet count**
- ANOMALY USG :
Report to be ready by 18 weeks so as to decide on Second trimester MTP
- GTT at 24 – 28 weeks
- Growth charts to be plotted from second trimester in all pregnancies
- Fetal ECHO (indication see ANNEXUE 2)
- If ICT negative , Antenatal ANTI-D 300micrograms at 28 weeks in Rh negative at deltoid.

1.6. THIRD TRIMESTER:

HaemoglobinPI

atelet count

TSH, GTT

Growth scans based on clinical indication at 32 and 36
+WEEKS

Breast examination

1.7 ANNEXURE**1.7.1. ANNEXURE 1 INDICATIONS OF ECOSPRIN(FIGO)****MATERNAL RISK FACTOR**

HIGH RISK FACTORS

H/O PREECLAMPSIA IN
PREVIOUS PREGNANCY

MULTIPLE PREGNANCY

COLLAGEN VASCULR DISEASE
RENAL DISEASE

CHRONIC HYPERTENSION

TYPE1/2 DIABETES

BIOPHYSICAL PARAMETERS:

Increased uterine artery PI >p95

Mean arterial blood pressure >107 mmHg

BIOCHEMICAL PARAMETERS:

Low PAPP A <0.4 moM

Placental growth factor

Presence of **Two or more moderate maternal** risk factors or **Single high risk** factor, abnormal biophysical or biochemical parameters is an indication for starting **ECOSPIRIN 150 MG atleast by 16 weeks gestation. ECOSPIRIN** to be stopped at 36 weeks or at the onset of labour or Preeclampsia.

1.7.2. ANNEXURE 2

FETAL ECHO

INDICATIONS

- Pregestational diabetes
- Previous baby with congenital heart disease
- Mother father or siblings with congenital heart disease
- Collagen vascular disease
- Phenyl ketonuria
- Rubella exposure
- Chronic hypertension in mother
- Advanced maternal age
- Drug intake (Lithium, retinoids, anti convulsants)

SECTION II
HYPEREMESIS GRAVIDARUM

SECTION 2

HYPEREMESIS GRAVIDARUM

2.1 Definition:

It is a severe form of nausea and vomiting seen in 1-3% of pregnant women. It is characterised by severe, protracted nausea and vomiting associated with weight loss of more than 5% of pre-pregnancy weight, fluid loss or dehydration.

For most women, these symptoms improve or disappear by around week 14, although for some women it can last longer.

NVP is diagnosed when onset is prior to 16 weeks of gestation and other causes of nausea and vomiting have been excluded.

HG can be diagnosed when symptoms start in early pregnancy, nausea and/or vomiting are severe enough to cause an inability to eat and drink normally and strongly limits daily activities of living. Signs of dehydration are contributory to diagnose.

2.2. Pathogenesis:

Despite extensive research in the field, the pathogenesis of predisposition in addition to previously studied factors such as infections, psychiatric disturbances and hormonal causes.

2.3. Differential diagnosis:

Infections, metabolic, gastrointestinal, neurologic, and iatrogenic causes can cause similar symptoms.

2.4. Complications:

Maternal morbidity is due to clinical complications from nutritional deficiencies, gastrointestinal trauma and in rare cases, neurological damage. In addition, psychological effects & financial burden also add to the problem.

2.4.1. Maternal Complications

- Dehydration increases the risk of diabetic ketoacidosis in those with type 1 diabetes, immobilisation increases the risk of thromboembolism
- Electrolyte disturbances as seen in any patient with persistent vomiting – hypochloraemic alkalosis, hypokalaemia and hyponatraemia
- Protein-calorie malnutrition
- Vitamin/mineral deficiencies and accompanying problems –
e.g. thiamine deficiency can cause Wernicke's encephalopathy, a serious neurological disorder associated with acute mental confusion, short term memory loss, ataxia, ocular abnormalities such as nystagmus and peripheral neuropathy. Wernicke's encephalopathy can lead to irreversible neurological impairment.
- Folate & iron deficiency
- Thyroid dysfunction – e.g. "pseudo-thyrotoxicosis" – suppressed TSH with high free thyroxine resulting from thyroid stimulation by HCG

- Renal dysfunction – (reversible) elevated urea and creatinine
- Hepatic dysfunction – elevated ALT, AST, low albumin, elevated bilirubin, due to malnutrition and catabolic changes
- Ulcerative oesophagitis
- Psychological morbidity e.g. post-traumatic stress disorder
- Mallory–Weiss

2.4.2 Fetal Complications

- Fetal loss as a result of maternal Wernicke's encephalopathy
- Intrauterine growth restriction (IUGR) or small for gestational age infants associated with prolonged hyperemesis and loss of >5% body weight.
- Undernutrition in early intrauterine period increases risk of chronic illness in adult life.

2.5. Classification:

Recently, a classification system was created to categorize hyperemesis gravidarum called the PUQE (pregnancy-unique quantification of emesis and nausea) scoring index. This index accounts for the daily number of vomiting episodes, the length of nausea per day in hours, and the number of retching episodes per day

Modified 24-hour PUQE Score

1. On average in a day, for how long have you felt nauseated or sick to your stomach?

Symptom	Not at all	1 hour or less	2-3 hours	4-6 hours	> 6 hours
Score	(1)	(2)	(3)	(4)	(5)

2. On average in a day, have you vomited or thrown up...

Symptom	7+ times	5-6 times	3-4 times	1-2 times	Did not throw up
Score	(5)	(4)	(3)	(2)	(1)

3. On average in a day, how many times have you had retching or dry heaves without bringing anything up?

Symptom	Not at all	1 -2	3-4	5-6	7 or more
Score	(1)	(2)	(3)	(4)	(5)

Total Score questions 1-3: _____

Key: Mild ≤ 6
 Moderate 7 - 12
 Severe ≥ 13

On a scale of 0 to 10, how would you rate your well-being? _____
 (0 = worst possible, 10 = best you felt before pregnancy)

2.6. The Aim of Management

- Assess severity of the condition.
- Correct dehydration and electrolyte imbalance & ketosis.
- Intravenous administration vitamin solution as prophylaxis against Wernicke's encephalopathy (NICE 2010)
- Provide symptomatic relief to break the cycle of vomiting and prevent further vomiting (see treatment algorithm)
- Provide psychological support
- Complete assessment and management checklist for each treatment day and re-admission and place in chart

Inpatient management should be considered if there is at least one of the following:

1. Continued nausea and vomiting and inability to keep down oral antiemetics
2. Continued nausea and vomiting associated with ketonuria and/or weight loss (greater than 5% of body weight) despite oral antiemetics
3. Confirmed or suspected comorbidity (such as urinary tract infection and inability to tolerate oral antibiotics).

2.7. Investigations

- BLOOD –CBC, Blood urea c Creatinine,S. Electrolytes,LFT, Blood Glucose
- TFT
- Urine acetone every 12 hrs until negative
- USG to rule out multiple pregnancy & vesicular mole.
- SEVERE CASES- Serum Amylase , lipase, ABG

2.8. Management:

- IV fluid therapy for ketone positive women, with electrolyte monitoring
- Keep nil orally & give iv fluids depending on severity of dehydration.
- Normal saline or RL preferred
- N saline 2pints (each unit over 2hrs – 3 hrs depending on ketosis)
- RL or Hartmann's solution – 2 pints
- 5% Dextrose must be given with 100 mg of thiamine (to prevent Wernicke's encephalopathy)
- Thiamine supplementation (either oral 100 mg tds or intravenous as part of vitamin B complex).

Antiemetics

- First line – promethazine (12.5 – 25 mg iv / im 4hrly)
- Second line - Metoclopramide 10 mg / ondansetron 4mg Q8H
- Third line- Serotonin Receptor Antagonist (4-6 mg Q6-8H PO, 8mg 15 minutes 12 HRLY)
- If one drug fails a combination can be used
- If evidence of gastro esophageal reflux or gastritis -proton pump inhibitors or Methyl prednisolone may be used as last

resort.

- Thromboprophylaxis with heparin till patient is recovered

Resistant cases-

- Consultation with Endocrinologist , Gastro enterologist & Psychiatrist may be needed.
- Termination of pregnancy in exceptional situations where all medical measures fail.

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Section III
ANTIBIOTIC POLICY IN OBSTETRICS

SECTION 3

ANTIBIOTIC POLICY IN OBSTETRICS

	Routine per vaginal examination and induction of labour	No antibiotic
1.	ARM in active phase of labour [if delivery occurs in 6hrs]	No antibiotic
2.	ARM induction and if labour tends to prolong > 6 hrs	Inj. Ampicillin 1 gm 6hrly ATD
3.	Uncomplicated normal vaginal delivery	No antibiotics
4.	Deep episiotomy, vaginal lacerations	Inj. Cefazolin 1.5gms st ATD + InjMetrogyl 500mg iv Individualise the cases based on severity+/- Inj Amikacin In case of allergy to penicillin, clindamycin 600-900 mg iv and gentamycin 3mg /kg iv 1 hr prior to incision.)
5.	LSCS Prophylactic (Elective CS not in labour, intact membranes) Pre-operative skin cleansing before CS with chlorhexidine and vaginal cleaning with povidone iodine (especially in patients with ruptured membranes) If procedure > 3 hrs or blood loss > 1500 ml additional dose	Inj. Cefazolin 2 gm IV 30 mts before the procedure single dose Inj. Cefazolin 1 gm at 6 hrs- Second dose
6.	Emergency LSCS (with rupture of membranes <18 hrs)	Inj. Cefazolin 2 gm IV 30 mts to 60 min before the procedure
7.	Emergency LSCS in special situations (with rupture of membranes >18 hrs ,second stage CS , LSCS if fever > 100° F /or evidence of infection)	Add Inj.Amikacin 500 mg i/v BD /Inj Amikacin 750 mg in 100 ml of saline over 2 hrs OD and Inj Metrogyl 500 mg i/v 8 hrly * 5 days
8.	Post -operative - If clinical response is poor after 48 hrs ,change to higher antibiotic after discussing with a senior consultant. Culture and sensitivity to be sought before changing to higher antibiotic	Piperacillin Tazobactam 4.5 gm i/v 8 hrly / 3 rd or 4 th generation of Cephalosporins
9.	Induction of labour Foley EASI	Strict aseptic precautions

10	PROM term (not expected to deliver within 12 hrs)	Inj. Ampicillin 2 gm stat ATD & 1 gm 6 hrly
11	Preterm PROM	Inj. Ampicillin 2 gm stat ATD & 1 gm 6 hrs x 5 days ,Azithromycin 1 gm single dose OR Inj. Cefazolin 1 gm iv 6 th hrly Add Inj. Metrogl 500 mg iv 8 th hrly Tab Erythromycin 500 mg tid x 10 days. After 48 hrs change antibiotic according to C & S
12	Manual Removal of Placenta	Inj. Cefazolin 2 gm iv St and Inj Metrogl 500 mg IV 8 th hrly x 3 doses
13	Surgically induced abortion	Oral Amoxicillin 500mg 8 hrly to start ½ hr before procedure to continue OR Tab Doxycyclin 100 mg b d for 3 days
14	Prophylactic cervical cerclage	No Antibiotic
15	Emergency cerclage	Inj. Cefazolin 1 gm i/v ½ hr before procedure
16	UTI in pregnancy Asymptomatic bacteriuria Complicated UTI	Start Antibiotic after collection of urine for culture and sensitivity 1 st line :Tab: Nitrofurantoin 100 mg b d x 7 days(Avo id in first trimester) 2 nd line- Inj cefotaxime 1gm b d x 7 days / Inj ceftriaxone 1 gm q 24 h iv and/ Inj. Amikacin 500 mg I V BD or 750 mg OD for 7 days
17	Infective Endocarditis Prophylaxis	Inj. Ampicillin 2 gm iv 30-60min before the procedure or Oral Amoxicillin 2 gms if Pencillin Allergy Inj. Clindamycin 600mg iv. If enterococci suspects- inj vancomycin
18	LRTI	Inj Amoxicillin with clavulinic acid 1.2 gm q 8 h or oral Amoxicillin clavulanic acid 875 mg + 125 mg oral

	Severe cases	Individualise the cases and escalate /deescalate accordingly based on clinical response Inj Piperacillin -Tazobactam 4.5gms q8 h Plus Azithromycin 500 mg OD for 5-7 days Oseltamivir 75 mg BD for 5 days
19	SSI – Mild to moderate infections Severe infection For MRSA coverage	Cloxacillin 500 mg oral q6h Inj Piperacillin -Tazobactam 4.5gms q8 h Inj Vancomycin 15 mg/kg iv OR Linezolid 600 mg iv /oral
20	Family planning procedure Copper- T insertion Tubal sterilisation Vasectomy	No antibiotics Inj Cefazolin 1 gm iv stat 30 min prior to procedure Inj Cefazolin 1 gm iv stat 30 min prior to procedure
21	MTP Medical abortion Surgical abortion d	No antibiotics Amoxicillin - Clavulanic acid 1.2 gm iv stat 30 min before the procedure

If Cefazolin is not available We can use Cefotaxime depending on the availability.

References:

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2. Treatment Guidelines for Antimicrobial use in common Syndromes 2019 ICMR
3. <http://www.cdc.gov/std/treatment-guidelines>
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Section IV
ANEMIA IN PREGNANCY

SECTION 4

ANEMIA IN PREGNANCY

4.1. introduction:

- ◆ According to WHO, world wide 32.4 million pregnant women suffer from anemia.

4.2. definition:

- ◆ **Defined as Hb < 2SD below the median value for a healthy age matched population**
- ◆ Hb < 11 g% or Hct < 33% (WHO in all trimesters)
- ◆ 50% cases – Iron deficiency anemia (Most Common cause)
- ◆ Iron deficiency anemia during pregnancy increases the risk of Low Birth Weight, preterm birth, maternal and perinatal mortality and poor APGAR score.
- ◆ India has highest prevalence of anemia (57-96.2%) among South Asian countries.

ICMR CLASSIFICATION

ICMR Classification

	Normal (Hb in g/dl)	Mild (Hb in g/dl)	Moderate (Hb in g/dl)	Severe (Hb in g/dl)
1 st trimester	≥11	10-10.9	7 – 9.9	<7
2 nd trimester	≥ 10.5	10 – 10.4	7 – 9.9	<7
3 rd trimester	≥ 11	10-10.9	7 – 9.9	<7

4.3. Diagnosis:

Most Common symptom is fatigue

- ◆ Hb estimation at 1st antenatal visit:
- Signs
 - Pallor of palpebral conjunctiva , tongue, nail beds & palm

- Family history – anemia, thalassemia, and sickle cell anemia Suspect sickle cell anemia in tribal and certain geographical areas**

▲ Hb Complete Blood Count Mean Corpuscular Volume Mean Corpuscular

- <30mcg/dl –early iron depletion – initiate treatment More specific: S. Transferrin Receptor estimation for early iron deficiency anemia. Its level rises even before S. ferritin starts to fall.

- ◆ Nutritional supplementation/cooking in iron utensils
- ◆ Iron rich foods
 - Jaggery, Beetroot, Green Leafy vegetable, Pulses, Cereals, nuts, meat, liver, poultry, egg, legumes, dry beans and dry

fruits.

- Iron and calcium should not be taken together
- Along with iron ensure adequate protein, B₁₂ and folic acid haemoglobin synthesis.
- Avoid milk and milk products along with iron intake
- ◆ Trial of iron therapy- if doesn't respond within 2 weeks – detailed investigation
- ◆ **ORAL IRON THERAPY**

Iron preparations available: Ferrous sulphate, ferrous fumarate, ferrous ascorbate, ferric ammonium citrate,.

200mg Feso₄ tablet contains 60mg elemental Fe.

Response to oral Iron:

1. Reticulocyte count increases by 0.2% per day in 5-7 days.
2. Hb increases by 0.8-1g/ wk in 2-3 wks
3. By 6-8 weeks- Hb comes back to normal.

4.5.1. MoHFW recommendation

During Pregnancy		Post partum
Prophylaxis	Treatment	
Daily 100 mg iron + 500 mcg folic acid 6 months- atleast 100 days	Mild anemia 2 tab iron folic acid daily 100days	Daily 100 mg iron + 500 mcg folic acid 6 months
	Moderate Anemia Parenteral iron(IM) + oral folic acid	
	Severe anemia IV iron sucrose	
WHO recommendation During Pregnancy		Post partum
Prophylaxis	Treatment	
Daily 100 mg iron + 400 mcg folic acid till term	120mg Fe+ 400ug Folic Acid until term	Daily 60 mg iron + 400 mcg folic acid 3 months

4.5.2. Parenteral Iron

4.5.2.A. Indication

- Intolerance to oral iron
- Non compliance
- Need rapid restoration

- Suspected malabsorption

4.5.2.B. Contraindication

- History of anaphylactic reaction to parenteral iron therapy
- 1st trimester of pregnancy, chronic liver disease & active infection
- Evidence of iron overload (serum ferritin > 150 µg/l).
- Known case of hypersensitivity of iron preparations.
- Anemia is not caused by iron deficiency.
- Liver disorder, renal failure, acute cardiac failure.
- Known case of sickle cell anemia, hemolytic anemia or thalassemia.
- Oral iron should be stopped at least 24 hrs prior to therapy

4.5.2.C. Preparations Of Parenteral Iron:

Most commonly used – Iron sucrose – 200 mg in normal saline over a period of 20 – 30 minutes on alternative days

Other preparation : ferric carboxy maltose (FCM – 1 gm per day)

Hb rises by 1g/ week.

4.5.2.D. Recombinant human erythropoietin:

Adjunct to injectable Fe. Useful in Jehovah's witness to avoid blood transfusions, in patients with chronic renal disease. Used in severe anemia with poor response to parenteral Fe therapy in antepartum and postpartum periods. Dose: 50- 150U/kg s/c. It helps in rapid correction of anemia.

4.5.3. Indications for packed cell transfusion in pregnancy (RCOG)

4.5.3.A. Indications of Packed Red Cells in antepartum period:

<34 wks	–	Hb<5g/dl with or without signs of CCF/hypoxia Hb 5-7g/dl in presence of impending heart failure
>34 wks	-	Hb<7g/dl even without signs of CCF/hypoxia

severe anemia with decompensation

*Anemia not due to hematinic deficiency

*Hemoglobinopathy/bone marrow failure syndromes
after consultation with haematologist

*Acute hemorrhage

If Hb < 7g/dl

If patient becomes hemo dynamically unstable due to on going
hemorrhage

PRC TRANSFUSION IN ANTEPARTUM PERIOD



GESTATIONAL AGE

ANEMIA NOT
DUE TO
HAEMATINIC
DEFICIENCY

< 34 WEEKS

>34 WEEKS

ACUTE
HEMORRHAGE

HEMOGLOBIN:

<7 g/dl WITHOUT CCF

<5 g/dl with or without CCF

Severe anemia with decompensation

1.
PATHY

2.
FAILURE SYNDROMES

4.5.3.B. Indications of Packed Red Cells in intrapartum period

Hb<7g/dl (in labour)

Decision for blood transfusion depends on medical history or symptoms

4.5.3.C. Indications of Packed Red Cells in postpartum period

Anaemia with signs of shock/acute hemorrhage with signs of hemodynamic instability

Hb <7 g/dl (postpartum) –decision of blood transfusion depends on medical history or symptoms

4.6. Intrapartum Management Of Severe Anemia

1. Adequate cross matched blood
2. Administration of oxygen to decrease fetal hypoxia
3. Asepsis to be maintained strictly to avoid puerperal sepsis
4. Cut short second stage using forceps or vacuum
5. Active management of third stage of labour
6. Prompt management of PPH

4.7. Puerperium

- Continue oral Fe for atleast 6 Months
- Advice spacing and contraception
- Close monitoring for sepsis, DVT, cardiac failure

4.8. Deworming

- As an additional intervention to reduce anemia
- Single dose 400mg Albendazole after 1st in 2nd trimester preferably trimester

4.9. Treatment of malaria

- Chloroquine for Pl.vivax

4.10. Anaemia Mukd Bharat

MoHFW launched this programme in 2018 to reduce the prevalence of anemia. Its recommendation for Pregnant women and lactating mothers (0-6 months child) is:

- Daily, 1 Iron and Folic Acid tablet starting from the fourth month of pregnancy (that is from the second trimester), continued throughout pregnancy (minimum 180 days during pregnancy) and to be continued for 180 days, post-partum.
- Each tablet containing 60 mg elemental Iron + 500 mcg Folic Acid, sugar-coated, red color.

Universal Hb screening should be performed within 24–48 hours of delivery, prior to discharge.

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Abbreviations

1. **MoHFW**- Ministry of health and Family welfare
2. **WHO**- World Health Organization

Section V
DIABETES IN PREGNANCY

SECTION 5

DIABETES IN PREGNANCY

5.1. Introduction

Diabetes mellitus is a group of metabolic disorders of carbohydrate metabolism in which glucose is both underutilized as an energy source and overproduced due to inappropriate gluconeogenesis and glycogenolysis, resulting in hyperglycemia. Diabetes can be diagnosed by demonstrating increased concentrations of glucose in venous plasma or increased A1C in the blood. Diabetes is classified conventionally into several clinical categories .

A. Pre existing Diabetes

1. **Type 1** – Absolute insulin deficiency

2. **Type 2** – Defects in insulin secretion almost always from insulin resistance

B. Gestational diabetes

5.2. Gestational diabetes

Gestational diabetes mellitus is defined as carbohydrate intolerance with onset or first recognition during pregnancy

Early GDM is defined as hyperglycemia in early pregnancy, i.e., <20 weeks, which is not overt or pre-existing diabetes.

5.3. Risk of diabetes

To mother	To fetus
Miscarriage Recurrent infection – UTI/ vulvo vaginitis Hypertension/pre-eclampsia Hydramnios Retinopathy/Nephropathy Ketoacidosis Hypoglycaemia/hyperglycaemia Induction of labour/caesarean section (CS) Future diabetes	Congenital malformation Fetal macrosomia Shoulder dystocia Stillbirth/neonatal death Premature delivery Respiratory distress Birth trauma Neonatal hypoglycaemia Polycythaemia /metabolic problems Future obesity and diabetes

5.4 Screening and diagnosis

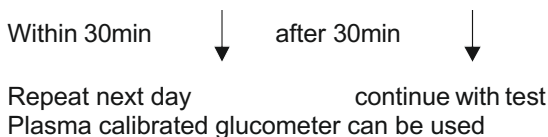
- ◆ Universal screening
- ◆ At 1st antenatal Visit -RBS/HBA1C/FBS/PPBS/GTT
- ◆ 2nd trimester - 75gm GTT irrespective of last meal
- ◆ Venous sample is collected 2 hrs after 75GTT.
- ◆ VALUE >140 mg/dl – diagnostic of GDM(National guidelines)

- ◆ If 1st test is negative,
for patients with risk factors repeat at 16 - 20 weeks

For low risk 2nd test:-24-28 weeks
If negative 3rd test:-32-34weeks (GTT)

5.5 .Methodology:

- ◆ 75gm glucose dissolved in 300ml of water and intake has to be completed within 5-10minutes
- ◆ If vomiting occurs

**Other Options for screening in first trimester**

Do FBS/PPBS RBS
HbA1C estimation

5.6.Pre gestational diabetes

- Pre pregnancy counselling and control of diabetes (HBA1C <6) and folic acid
- Evaluate for Retinopathy, Nephropathy and Hypertension
- Pregnancy confirmed
 - Folic acid supplementation
 - Aspirin 150 mg HS from 12 weeks
 - Review medication – change of antihypertensives and anti diabetic if required
 - End organ evaluation
 - If controlled with Metformin / Glyburide it can be contd.
 - Routine Antenatal investigations
 - Antenatal evaluation every two weeks / SOS

CARE IN DIABETIC ANTENATAL CLINIC – PREFERABLE JOINT OBSTETRIC DIABETIC CLINICS :

6 - 9 weeks - Confirm viability and gestational age Folic Acid

Dietician and dietary advice

Review Medications and change accordingly Control
of diabetes with insulin/Metformin Self monitoring of
glucose

11 – 14 weeks -
PAPPA < 0.4 MOM
Aspirin 150 mg HS

Prenatal aneuploidy if
screening, Uterine

Artery
Doppler

18 – 20 weeks - Targeted anomaly scan
with fetal echo 18
– 24 weeks - Fetal Echo

At each visit-

Assess for polyhydramnios HTN
Proteinuria

Other obstetric complication

28 weeks

32 – 34 weeks
weeks

Ultrasound monitoring of fetal growth 36
and amniotic fluid
Look for FGR in women WITH Vasculopathy

Antepartum Fetal Monitoring should start from 32 weeks or earlier if required
STEROIDS should be administered for usual indications Plan Time
and Mode of Delivery.

5.7 Timing of delivery

- Pre gestational diabetes well controlled no complications by 38 weeks
- Pre gestational diabetes with complication time accordingly
- Gestational diabetes on insulin well controlled without complication by 38 weeks.
- Gestational diabetes on MNT 39–40 weeks

5.8 management:

Pregnant women with GDM



Medical nutritional therapy and physical exercise

Target blood glucose level in mg/dL

FBS	95
1 hour PPBS	140
2 hour PPBS	120

MNT:

Carbohydrate controlled balanced meal plan

Individualization is important

Adjustment should be made based on the BMI and weight gain pattern

5.9. Energy requirement during pregnancy

Sedentary work	2250kcal/day
Moderate work	2580kcal/day
Heavy work	3200kcal/day

5.9.1. Energy requirement according to BMI in pregnancy with diabetes

Underweight	<18.5	40kcal/kg
Normal weight	18.5-22.9	30kcal/kg
Overweight	23-24.9	25kcal/kg
Obese	<u>>25</u>	12.5kcal/kg

Selection of diet:

Complex carbohydrate like whole grain cereals ,oats, ragi, pulses

Divided into 3 meals and 2-3small snacks

Carbohydrate < 40%

Protein 20%

Fat 30 - 40%

UNDER WEIGHT	<18.5	12.5-18
NORMAL WEIGHT	18.5-24.9	11.5-16
OVER WEIGHT	25-29.9	7-11.5
OBESE	>=30	5-9

Fiber rich food, control blood sugar by delaying blood sugar absorption

EXERCISE:

20 minutes of moderate exercise 3 days/week in 1st and 2nd trimester (minimum)
walking for 20 min

Upper arm exercises in 3rd trimester

Ketoacidosis during pregnancy may occur at lower blood glucose levels. Risk is more when there is vomiting / infection/ on steroids.

5.10. Medical management

MNT for two weeks



If blood sugar not achieved the target level then add metformin



METFORMIN

It is an option especially in women with conceive following infertility treatment and PCOS

Insulin therapy has traditionally been considered the standard therapy for patients with GDM not controlled by non pharmacologic treatment. Insulin does not cross the placental barrier and is recommended by the ADA for first-line treatment of GDM.

INSULIN

Indication —► Failure of MNT+ exercise

Pregnant women with GDM PPBS>120mg/dl

Start regular insulin/insulin short acting analogues/ Human Mixtard/ 30:70

Insulin analogues to be taken at the time of food intake.

Blood sugar	Dose
120-160	4 units
160-200	6 units
>200	8 units

Home monitoring of blood sugar should be encouraged. Ideal monitoring 7 point monitoring

Monitor at least 4 point GRBS & adjust Insulin

Once controlled, Repeat FBS/PPBS every 3rd day / more frequent

If insulin requirement >20units can add Metformin 500mg twice daily orally up to maximum 2g/day

Fasting hyperglycemia add NPH at 10 pm

Insulin analogues better control of post prandial hyperglycemia. Mixtard offers convenience to patients

5.11. Labour and delivery: Intrapartum

- ◆ Pregnant woman with diabetes require blood sugar monitoring during labour
- ◆ Morning dose of insulin should be skipped if in labour and should be started on hourly monitoring of blood sugar and insulin infusion
- ◆ If patient is induced continue insulin and diet till she gets in to active labour.

In Labor Glycemic Management

BI glucose <90 mg%	DNS -100ml/hr (16drops/min)	
90 -120	NS -100ml/hr	
120 -140	NS -100ml/hr	+4 units of regular insulin
140 -180	NS -100ml/hr	+6units of regular insulin
>180	NS -100ml/hr	+8units of regular insulin

Care during labour

Good Glycemic control Continuous fetal monitoring

Increased risk of CPD – be vigilant for delay and if occurring use oxytocin with caution

Check Ketone bodies 4th hourly and electrolytes 12th hourly Be vigilant for shoulder dystocia
3rd stage – active management

5.12. Neonatal management

Neonates of mothers with GDM are also at risk of complications. They should be closely monitored after delivery for respiratory distress. Capillary blood glucose should be monitored at 1,2 and 4 hours after birth and then again before feeding. Early breast feeding is actively encouraged. Hypoglycaemia:
normal B. Wt.: blood sugar - <45 mg % If IUGR - <55 mg %

5.13. Follow up of GDM

Women with GDM require follow up as they have an increased risk of developing type 2 diabetes in later life. Advise to be given to control weight gain
An OGTT with 75 gm glucose using WHO criteria for non-pregnant should be performed 6 weeks postnatally.

If normal, GTT is repeated every year to determine if glucose intolerance has returned to normal or progressed

They should be made aware of the symptoms of hyperglycaemia and advice given regarding the importance of healthy eating and exercise patterns

Contraception to be advised

Low dose COC –to be avoided in hypertension, coronary artery disease

Progesterone only pill may avoided in case of women with h/o GDM.

5.14. Prepregnancy counselling.

1. Tight glycemic control should be advised maintaining HBA1C - <6.5

2. In Type 1 Diabetes – must conceive after attaining Target HBA1C and After completion of CARDIO, NEPHRO, OPHTHAL Evaluation.

5.15 Management of dka during pregnancy

Box 1. Management of Diabetic Ketoacidosis During Pregnancy

Intravenous Fluids

Isotonic sodium chloride is used, with total replacement of 4–6 L in the first 12 hr.

- Insert intravenous catheters: Maintain hourly flow sheet for fluids and electrolytes, potassium, insulin, and laboratory results.
- Administer normal saline (0.9% NaCl) at 1–2 L/h for the first hour.
- Infuse normal saline at 250–500 mL/h depending on hydration state (8 hr). If serum sodium is elevated, use half-normal saline (0.45% NaCl).
- When plasma or serum glucose reaches 200 mg/dL, change to 5% dextrose with 0.45% NaCl at 150–250 mL/hr.
- After 8 hr, use half-normal saline at 125 mL/hr.

Potassium

Establish adequate renal function (urine output ~50 mL/hr).

- If serum potassium is <3.3 mEq/L, hold insulin and give 20–30 mEq K⁺/h until K⁺ is >3.3 mEq/L or is being corrected.
- If serum K⁺ is >3.3 mEq/L but <5.3 mEq/L, give 20–30 mEq K⁺ in each liter of IV fluid to keep serum K⁺ between 4 and 5 mEq/L.
- If serum K⁺ is >5.3 mEq/L, do not give K⁺ but check serum K⁺ every 2 hr.

Insulin

Use regular insulin intravenously.

- Consider a loading dose of 0.1–0.2 units/kg as an IV bolus depending on plasma glucose.
- Begin continuous insulin infusion at 0.1 units/kg/hr.
- If plasma or serum glucose does not fall by 50–70 mg/dL in the first hour, double the insulin infusion every hour until a steady glucose decline is achieved.
- When plasma or serum glucose reaches 200 mg/dL, reduce insulin infusion to 0.05–0.1 U/kg/hr.
- Keep plasma or serum glucose between 100 and 150 mg/dL until resolution of diabetic ketoacidosis.

Bikarbonate

Assess need, and provide based on pH.

- pH >7.0: No HCO₃⁻ is needed.
- pH is 6.9–7.0: Dilute NaHCO₃ (50 mmol) in 200 mL H₂O with 10 mEq KCl and infuse over 1 hr. Repeat NaHCO₃ administration every 2 hr until pH is 7.0. Monitor serum K⁺.
- pH <6.9–7.0: Dilute NaHCO₃ (100 mmol) in 400 mL H₂O with 20 mEq KCl and infuse for 2 hr. Repeat NaHCO₃ administration every 2 hr until pH is 7.0. Monitor serum K⁺.

Reprinted from Elsevier. Obstetrics: Normal and Problem Pregnancies. 7th edition. New York (NY): Churchill Livingstone; 2016. p. 885.

5.16. Action profile of commonly used insulin agents

Table 2. Action Profile of Commonly Used Insulin Agents ↩

Type	Onset of Action	Peak of Action (h)	Duration of Action (h)
Insulin lispro	1–15 min	1–2	4–5
Insulin aspart	1–15 min	1–2	4–5
Regular insulin	30–60 min	2–4	6–8
Isophane insulin suspension (NPH insulin)	1–3 h	5–7	13–18
Insulin glargine	1–2 h	No peak	24
Insulin detemir	1–3 h	Minimal peak at 8–10	18–26

Modified from Gabbe SG, Graves CR. Management of diabetes mellitus complicating pregnancy. *Obstet Gynecol* 2003;102:857–68.

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5. KFOG Management Protocol
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11. WHO guideline 2016

Section VI
PRETERM PRELABOUR RUPTURE OF
MEMBRANES

SECTION 6

PRETERM PRELABOUR RUPTURE OF MEMBRANES (PPROM)

6.1. Incidence

- Rupture of membranes before the onset of uterine contractions – 10%

6.2. Definition

- PPRM – PROM before 37 weeks – 2-3%
- PRE VIABLE PPRM – Before 26 weeks – 0.3% - 0.7%

6.3. Complications

6.3.1. Maternal

- Chorioamnionitis
- Placental abruption
- Retained placenta
- Puerperal sepsis
- Increased chances of operative vaginal delivery

6.3.2. Fetal

- Fetal infection
- Cord prolapse
- Prematurity
- RDS
- NEC
- IVH
- Pulmonary hypoplasia
- Long term sequelae, PVL, CP, Hearing and visual defects

6.4. Management – PPRM

- Initial Assessment – Detailed history and examination
- Confirmation of Diagnosis
- Management – decisions based on Maternal and fetal parameters and gestational age

6.4.1. Initial Assessment

- ADMISSION
- Detailed history
 - Gestational Age

- Gush of fluid/Watery discharge from vagina
- Duration
- Associated bleeding, pain, decreased fetal movement

Vitals

- * Pulse rate
- *
- *
- * Respiratory rate

Per abdomen

- * Fundal Height
- * Uterine tenderness/contractions /fetal presentations
- * Clinical assessment
- * Fetal Heart

Per Speculum

- * Confirm diagnosis
- * look for foul smelling discharge
- * Assess Cervical length and dilatation
- * Rule out cord prolapse
- * HVS

Cases of PPRM requiring conservative management only sterile per speculum examination, no vaginal examination Investigations

- HVS
 - TC,DC,CRP
 - CTG (AFTER 26 WEEKS)
 - USG–Assess Liquor Volume
- Estimated fetal weight and BPP

6.4.2. Management of PPRM

MANAGEMENT OF PPRM

EXPECTANT MANAGEMENT

IMMEDIATE DELIVERY

Chorioamnionitis IUD & FETAL ANOMALY
FETAL COMPROMISE CTG/DOPPLER
ABNORMALLY Antepartum haemorrhage
Active Labour

6.4.2.a. Expectant Management

22-24 Weeks – Individualize the case, termination may be preferred in view of high risk of infection

- Steroids (from 24 weeks)
 - Antibiotics, Magnesium sulphate for neuro protection
 - Tocolysis – Not Recommended
- Counsel the couple , explain the long term complication and take appropriate decision.

24-28 Weeks

- Counselling – Obstetrician and neonatologist
- Steroids
- Antibiotics
- Tocolysis for latency for steroid to act up till 48 hours
- Magnesium sulphate for neuro protection

28-32 Weeks

- Antibiotics
- Steroids
- Tocolysis- for obtaining latent period for steroids to act
- Magnesium sulphate for neuro protection

32-36 weeks

- give time for steroids to act and then delivery
- Antibiotics
- No magnesium sulphate

Steroids

- Advantages
- Decreases the incidence of RDS
- Reduces mortality by 50%
- Decreases IVH, NEC in first 48 hours of life
- Inj Dexamethasone 6 mg I.M. 4 doses 12 hour apart
- Caution : - blood sugar may increase

6.4.2.b. Antibiotics

- Erythromycin 250 mg qid orally for 10 days for a maximum

of 10 days or until the woman is in established labour (whichever is sooner) (RCOG guidelines PPRM)

- Other options
 - Azithromycin 1g oral stat dose plus
 - Inj Ampicillin 2 g iv and 1 gm 6th hrly for 48 hours followed by ampicillin 500mg qid for 5 days
 - Inj erythromycin 250 mg iv q6th for 48 hours
 - Followed by erythromycin 500 mg orally q8h for 7 days
- Allergic to penicillin

Inj cefazolin 1 g iv q8h followed by Cephalexin 500mg q6h orally for 5 days OR

Clindamycin 900mg iv q8th for 48 hrs + gentamycin 2.5 mg/kg for two doses 24 hour apart Followed by T clindamycin 300 mg tid for 5 days

Amoxicillin + clavulanic acid to be avoided near term – risk of NEC

6.4.2.c. Cervical encerclage

If there is cervical cerclage whether to remove or not – controversial
We would recommend removal if there is evidence of infection.

6.4.2.d. Tocolytic agent

Nifedipine – 30 mg loading followed by 20 mg tid

- Maximum dose 60 mg / day
- Advantages over other tocolysis – maternal adverse
- Effect comparatively less
- No reported human fetal side effect Other Agents
- Atosiban – expensive

Studies showing comparatively less side effect

6.5. MgSO₄ for neuro protection

When delivery anticipated in 24 hour due to

1. Preterm labour
2. PPROM
3. Elective preterm delivery for maternal/fetal indication for 24- 34 weeks

Commence infusion at least 4 hrs before delivery (may be beneficial even before 4 hrs)

Dose 4 g i/v loading dose followed by 1g/hr infusion for 24 hour. Monitor for clinical signs of magnesium toxicity at least every 4 hours by recording pulse, blood pressure, respiratory rate, urine output, deep tendon reflexes.

6.6. Mode of delivery

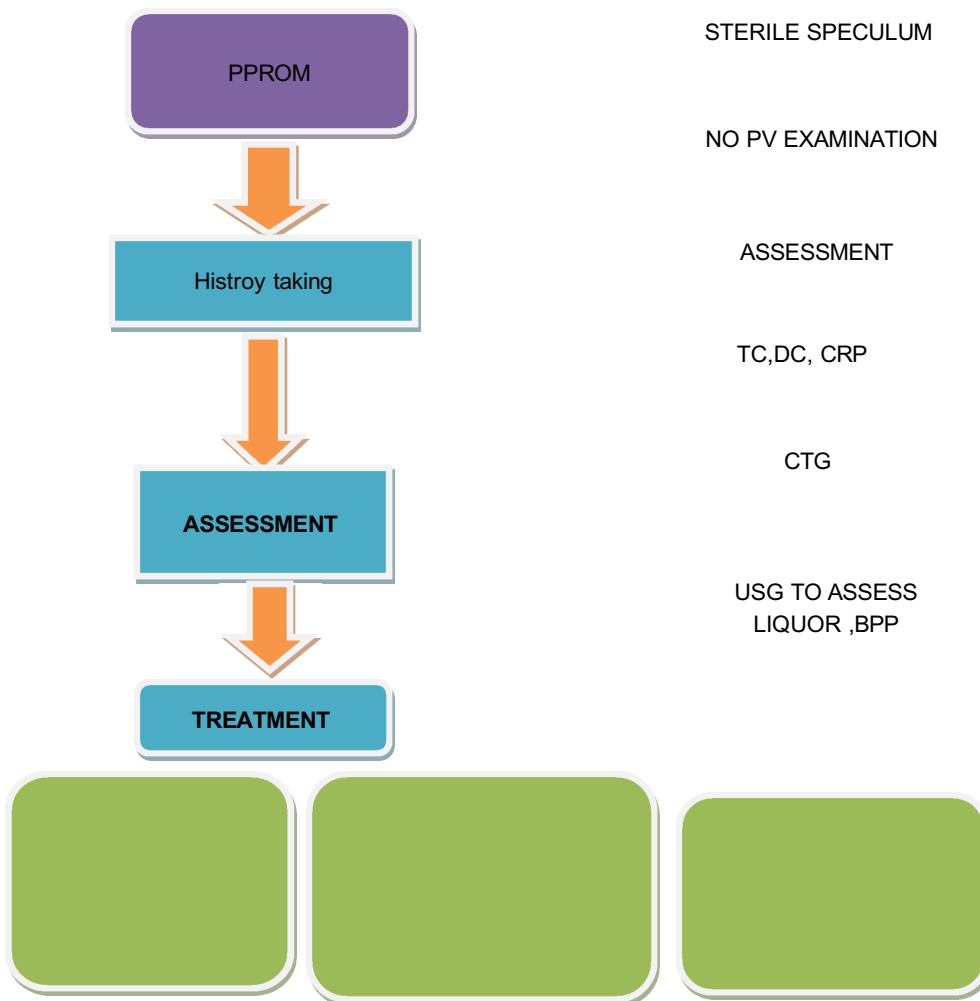
- The effect of planned CS – remain uncertain .CS should not routinely be offered (NICE guidelines)
- caesarean section for women with breech presentation.

Timing of cord clamping for preterm babies

Wait at least 30 seconds, but no longer than 3 minutes, before clamping the cord of preterm babies if the mother and baby are stable If a preterm baby needs to be moved away from the mother for resuscitation, or there is significant maternal bleeding

- Consider milking the cord and
- Clamp the cord as soon as possible
- Position the baby at or below the level of the Placenta before clamping the cord

Quick review guideline



Reference

1. ACOG practice bulletin No 188-2018
2. KFOG protocol 2018
3. ACOG committee opinion No 713 - 2017
4. RCOG 2010, 2011 Guidelines, green top guideline 44
5. ACOG practice bulletin No. 80-2007 Nice guideline 2015

Section VII
ANTEPARTUM HEMORRHAGE

Section 7

ANTEPARTUM HEMORRHAGE

7.1. Introduction

Definition – Bleeding from or in to the genital tract from 24 + 0 weeks of pregnancy and prior to the birth baby.

Complicates – 3-5 % of pregnancies

7.2. Obstetric Haemorrhage

Obstetric haemorrhage is the number one cause of maternal death About 1/3 of all haemorrhage is APH

APH may be placenta previa or abruption or unclassified USG will help in the differential diagnosis

In 10% of placenta previa bleeding abruption is also present

Rarely Vasa Previa is the cause of APH, but usually bleeding occurs only in labour

7.3. Clinical assessment

To establish the need for urgent intervention and triage Consider the following

- History taking

- Assess haemodynamic stability

- Coexisting symptoms – pain Extent of vaginal bleeding

- Fetal well being

- If hemodynamically unstable first resuscitate Remember initial Hb may not reflect blood loss

7.4. Examination

Abdominal palpation

- Tenderness/woody feel/fundal height-utrine contraction

Local Examination/per speculum

- Visualise lower genital tract / cervical dilatation/ altered or fresh bleed

- CTG

- No Vaginal Examination before placental location

7.5. Management

7.5.1. If patient is haemodynamically unstable

Call for help – team / ALERT OT / blood bank

Evaluate – A/B/C – KEEP patient WARM- acidosis – coagulopathy

Oxygen – 10– 15 L/min

2 IV cannula – 14/16 G

Take blood for full blood count/RFT/LFT, Bed side clotting test, Clotting screen, Cross match 6 units Blood and products Commence Fluids – up to 2L of 0.9% NS / RL fluid warmed,

O – ve blood (if condition critical) Cross matched blood as soon as possible,

Indwelling catheter

Vital Recording – Pulse/BP/CVP/SpO₂/Urine output/ continuous FHR/ fundal height / blood loss drugs administered (time / type/ dose) have to be documented.

4-6 hrly checking – Hb, platelet count and coagulation profile

Treatment goals after resuscitation

Rapid restoration of circulating blood volume and O₂ carrying capacity

HB > 8 gm / dl

Restoration / maintenance of normal coagulation platelet > 50000, PT and aPTT < 1.5 x mean control and fibrinogen > 200 mg

%

Vitals

Pulse < 100 / min SBP >

100 mm of HG

Confirmation of diagnosis

USG to diagnose placenta previa and to locate any retro placental clots

Abruption is a clinical diagnosis no reliable diagnostic tests available

USG – limited Sensitivity 24% speciality 96%.

7.5.2. If it is Placenta previa ?

Placenta is inserted wholly or in part into the lower segment

Grade 1 : placental edge in lower segment but does not reach the os (Low lying placenta) MINOR PP.

Grade 2 : Placental edge reaches but does not cover the internal os (marginal PP) – minor PP

Grade 3 : placenta covers the internal os and is asymmetrically situated (partial PP) MAJOR PP

Grade 4 : Placenta covers the internal os and is centrally situated (Total / central PP) MAJOR PP.

Plan of delivery

- Elective LSCS – type 2 posterior, type 3-4
- Informed consent – should include possibility of PPH and blood transfusion, hysterectomy if needed.
- Don't allow to go beyond 37 weeks
- CS can be lower segment transverse
- But if lower segment very vascular may consider vertical incision or underpinning vessels.
- Don't cut through the placenta
- During CS in case of placental sinus bleeding use purse string stitch.

7.5.3. If it is abruption placentae – revealed/concealed/mixed

- Amount of blood loss – often underestimated
- Blood from the introitus – may not represent the total blood loss – concealed abruption
- **Management strategy will depend on**
- **GRADE**
- **Effect on fetus**
- **Duration of gestation GRADES –**

BLEEDING IS MATERNAL

GRADE 0 : Asymptomatic retro placental clot seen after placental delivery

Grade 1 : bleeding and tenderness : visible retro placental clot after delivery – incidence 40%

GRADE 2: Revealed bleeding +/- significant maternal signs foetal compromise / death, incident – 15%

A – without coagulopathy

B – with coagulopathy (30% will have DIC)

Grade 1, preterm, self limited bleeding

Confirm with Ultra sound scan may consider conservative management, start steroids for lung maturation.

Grade 1 term, no effect on foetus, Try for vaginal delivery with continuous foetal monitoring. Grade 2 and Grade 3

If in labour and immediate delivery anticipated may consider vaginal delivery.

All other as sess, even with dead foetus, if immediate delivery not possible, consider CS.

Tube coagulation test –test for haemostasis Bed side test

Easy to do and not time consuming

Take 2 test tubes – 1 ml blood in each test tube and after 4 min, start tilting the first tube and let the second stand, after blood clots in the first tube start titling. Second tube every minute, note the time blood clots in the second tube – this is considered the clotting time.

Be vigilant if it crosses six minutes

If it is prolonged signifies – severe deficiency of cogulation factors

Vaginal Delivery

Favourable cervical status Amniotomy

Oxytocin augmentation Continuous CTG

Immediate CS if suspicious CTG – partial abruption can proceed rapidly to complete abruption.

AMTSL

Anticipate PPH – ergometrine in absence of hypertension

IF HAEMATOLOGICAL ABNORMALITIES PRESENT?

- Correction and planning for CS to proceed simultaneously
- After giving rapid infusion of FFP and platelets proceed with CS through midline vertical on abdomen and lower segment transverse incision on uterus
- Aggressive Replacement while accomplishing delivery
- Prophylactic steps like brace stitch may be used
- Four units PRBC, 4 FFP and 10 units cryoprecipitate (2 packs) empirically while waiting for reports
- Coagulopathy will only begin to resolve once the placenta is delivered
- Stored blood thromboplastin – exacerbates DIC after 6 Units transfused.

Post Delivery surveillance

Invasive monitoring with central lines

HDU/ICU

Continue uterotonics

Ensure adequate blood and clotting factors replacement Prevent further bleeding

Monitor – RFT and urine output Signs of impending lung involvement

Peripartum hysterectomy

Couvelaire uterus by itself is not an indication for hysterectomy If needed, consider subtotal

7.5.4. Vasa PRAEVIA

Fetal vessels cross or run within the membranes close to internal OS, 0.015 – 0.04 % of all pregnancies

High perinatal mortality, Bleeding at time of membrane rupture –

f/b foetal bradycardia

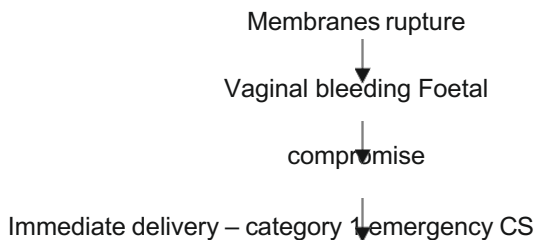
Type 1 – cord inserts directly into membranes

Type 2 – succenturiate lobe – vessels crossing over

Diagnosis and Management

- If antenatal diagnosis – Admission From 28 -32 Weeks – Delivery by elective CS – 35 – 37 Weeks after steroids

- High index of suspicion – feel something unusual – confirm diagnosis prior to membranes rupture color Doppler – TVS elective CS



7.6. Post natal issues

Thrombo prophylaxis : as soon as immediate risk of haemorrhage is reduced

Debriefing, clinical incident reporting and obstetric drills

With previous history of recurrent abruption , rule out APLA, if positive start aspirin prophylactically

Reference:

RCOG green top guidelines no 63 APH , Green top guidelines no 27 placenta previa

Section VII
POST PARTUM HAEMORRHAGE

Section 8

POST PARTUM HAEMORRHAGE

8.1. Introduction

- PPH is the most preventable but still the leading cause of maternal mortality !!PPH is an adverse event, not a diagnosis.
- There is no universally accepted definition for PPH. WHO defines PPH as blood loss more than 500ml after a vaginal delivery or more than 1000ml after a CS.
- ACOG defines postpartum hemorrhage as cumulative blood loss equal to **1000 mL or more** along with signs or symptoms of hypovolemia within 24 hours after delivery (including intrapartum loss), regardless of route of delivery. (ACOG practice bulletin 183 2017)
- Fallacies of this definition are that visual estimates of blood loss are notoriously low (often only one third of actual blood loss).
- Even smaller amounts of blood loss is critical in patients with anemia, dehydration and pre eclampsia. Also in postpartum patients abdominal or pelvic bleeding can be hidden.
- So any amount of blood loss that produces hemodynamic instability in the patient is to be considered as PPH.
- Although PPH is prone to happen in high risk patients, it can occur in any delivering patient irrespective of the risk.
- So anticipation of PPH in every patient and preparation to handle the situation if a need arises is the first step to prevent maternal morbidity and mortality due to PPH.
- Major PPH is defined as blood loss more than 1000ml . (UK)
- Massive haemorrhage- no universally accepted definition. , but blood loss >150ml/mt or >50% blood volume loss in 3 hours.

To reduce deaths due to PPH

1. Prevention
2. Risk factor assessment
3. Early detection
4. Timely intervention

8.2. Risk factors

Antenatal and Intrapartum risk factors for PPH

Etiology	Primary Problem	Risk Factors, Signs
Abnormalities of uterine contraction—atony	Atonic uterus	Prolonged use of oxytocin High parity Chorioamnionitis General anesthesia
	Over-distended uterus	Twins or multiple gestation Polyhydramnios Macrosomia
	Fibroid uterus	Multiple uterine fibroids
	Uterine inversion	Excessive umbilical cord traction Short umbilical cord Fundal implantation of the placenta
Genital tract trauma	Episiotomy Cervical, vaginal, and perineal lacerations Uterine rupture	Operative vaginal delivery Precipitous delivery
Retained placental tissue	Retained placenta	Succenturiate placenta
	Placenta accreta	Previous uterine surgery Incomplete placenta at delivery
Abnormalities of coagulation	Preeclampsia	Abnormal bruising
	Inherited clotting factor deficiency (von Willebrand, hemophilia)	Petechia
	Severe infection	Fetal death
	Amniotic fluid embolism	Placental abruption
	Excessive crystalloid replacement	Fever, sepsis
	Therapeutic anticoagulation	Hemorrhage
		Current thromboembolism treatment

Anticipate PPH in following cases - RISK FACTORS

Atonic PPH

- Grand multiparity
- Advanced maternal age
- Uterine overdistension (multiple pregnancy, polyhydramnios, macrosomia)
- Antepartum haemorrhage (Abruptio placenta and placenta previa)
- Previous atonic PPH
- Fibroid complicated pregnancy
- Prolonged labour, induced or augmented labour.
- Instrumental delivery
- Chorioamnionitis

Traumatic PPH

- Instrumental delivery
- ROP
- Assisted breech delivery
- Shoulder dystocia
- Vaginal birth after caesarean (VBAC)
- Macrosomia
- Precipitate Labour

- Obstructed Labour
CRMD (Confidential Review Of Maternal Death during 2010 -2020 shows that nearly 50% of the PPH deaths were due to atonic PPH CRMD.
Most of the women who develop PPH, do not have any identifiable risk factors.
Women with known risk factors for PPH should be delivered in centres with facilities for blood transfusion, laboratory work up and surgical procedures
Prevent PPH with Active Management of Third Stage of Labour (AMTSL).
- If PPH has already developed, prevent it from progressing to maternal death
- Active management of third stage of labour (AMTSL) should be routinely practiced in all women in labour including caesarean section and documented.
- Since PPH is not predictable in every case, all women in labour should have an intravenous (IV) line.

8.3. Prevention 8.3.1. Antenatal period

Regular ANC detection of anemia (Hb to be checked in each trimester)
Correction of anemia
Anticipation of PPH in high risk patients and early referral to a higher centre

8.3.2. Intra partum risk factors

- ◆ Induction & augmentation of labour
- ◆ Rapid and prolonged labour.
- ◆ Intra partum fever

8.3.3. In Labour

- Avoid dehydration & prolonged labour
 - All delivering patients should have 16/ 18G cannula
 - Monitoring labour with partogram
 - AMTSL (Active Management of Third Stage Of Labour) -3 steps
1. Administration of an uterotonic drug (oxytocin 5 units diluted up to 5 ml with saline) within 1 minute of delivery of baby for immediate action followed by 10units IM or 20 units IV infusion for sustained action the infusion should last for 2hrs. (KFOG protocol)

OR

WHO /ACOG Protocol 10 units of oxytocin IV/IM

2. Controlled cord traction
3. Gentle uterine massage

8.3.4. Postpartum

- ◆ Pulse rate , volume , Blood pressure monitoring
- ◆ Monitor for vaginal bleeding & uterine hardness
 - every 30 mts x first 2 hrs
 - every 60 mts x next 2 hrs
- ◆ Encourage the woman to keep her bladder empty & early breast feeding
- ◆ Teach the woman to massage her uterus & keep it firm

Postpartum stamp

Time of delivery	½ hr	1hr	1 ½ hr	2 hr
BP				
PR				
Fundal height				
Bleeding				

Monitoring in the fourth stage of labour

- Monitor vital signs every 5–10 minutes during the first 30 minutes,
- then every 15 minutes for the next 30 minutes,
- and then every 30 minutes for the next 2 hours
- Assess uterine tone ½ hourly and massage if tone is **decreased**
- Assess blood loss for 1-2 hours immediately after birth: **Alternative PPH presentation is a slow steady trickle after 3rd stage of labour**

8.3.5. Preventive Measures If The Patient Who Had A Previous Caesarean Section

- Placental site determined by ultrasound.
- MRI may be a useful tool to rule out the placenta accreta or percreta
- And Cesarean planned accordingly in a higher centre

8.4. Pitfall In The Diagnosis Of PPH

- Difficulty in the accurate assessment of blood loss
- Lower segment bleed
- The uterus and vagina may hold large clots not visible to the eye
- Women are more often young and healthy with good cardiac reserves and hence the vital signs may not show any changes until the blood loss equates to 2-litres

8.5. Early detection of PPH

- ◆ Pulse rate & blood pressure change significantly only when more than 30% of blood volume (1.5 L) is lost. So, PR & BP monitoring alone is not enough for detecting PPH early. Palpation of the postpartum uterus for its height and consistency is necessary. Local examination to look for excess vaginal bleeding / escape of collected clots or blood from the uterus or vagina while pressing down the uterus.
- ◆ Visual estimation of blood loss is always less than the actual loss. Quantitative measurement is the ideal way to accurately assess the blood loss.
- ◆ Blood loss measurement - using preweighed delivery kit provided through quality standards programme.

Correlation between blood loss, clinical features and transfusion requirement

Variable	Class I	Class 2	Class 3	Class 4
% of blood loss	15	20-25	30-35	40
Approx loss	750ml	1000ml	1500-1750ml	2000ml
PR	Normal	100	120	140
Syst BP	Normal	normal	70-80	60
Other symptoms	Nil	RR20-30/mt Cold clammy skin, mild anxiety	Pallor, anxiety, confusion, oliguria	severe pallor RR>35/mt, cold clammy skin, oligo/anuria
Blood & blood products	May not need	May need	Need transfusion	Initiate massive transfusion protocol

RULE OF 30

SBP falls by	30%
HR raises by	30 beats
RR	> 30
Hb drops by	30%

Urine output <30 ml

30% blood volume is lost moderate shock.

Excess bleeding before placental separation – look for

cervical & vaginal tears bleeding
from the episiotomy rupture uterus
(rare).

Early detection after delivery of placenta

- ◆ Inspect placenta & membranes to ensure completeness
- ◆ Uterus – fundus palpable or not , well contracted or not
- ◆ Check for retained products/clots
- ◆ Look for any tears in vulva , vagina , perineum & anus routinely

After any instrumental delivery

inspect cervix and vagina routinely with cervical inspection set which has
3or4 sponge holders and 2 long bladed speculums Evaluation
with

- ◆ Good light
- ◆ Good assistance
- ◆ Good relaxation

**PPH DRILL TO BE PRACTICED IN ALL INSTITUTIONS
PERIODICALLY**

**PPH BOX, OXYTOCICS, AND CERVICAL INSPECTION SET TO BE KEPT
READY AT ALL DELIVERY POINTS**

STEPWISE APPROACH TO THE MANAGEMENT OF PPH STEP I -

RESUSCITATION & INITIAL

ASSESSMENT

- | | | |
|-----|---|-------------------------|
| II | - | DIRECTED THERAPY |
| III | - | INTRACTABLE PPH |
| IV | - | SURGERY |
| V | - | POST HYSTERECTOMY BLEED |

8.6. I Resuscitation and initial assessment – Team work

- ◆ call for help (bell)
- ◆ large bore IV 16 grey/ 18 green cannula-2 no.
- ◆ blood-investigations (clotting time , bleeding time, Hb, PCV,

CBC, coagulation profile, RFT ,LFT, electrolytes, serum fibrinogen)

- ◆ blood grouping cross matching and arrange blood
- ◆ IVF – crystalloids NS or RL (3times estimated blood loss)
- ◆ O2 by mask (8-10 L/mt)
- ◆ monitor PR, BP, Urine output
- ◆ continuous bladder drainage
- ◆ oxygen saturation
- ◆ patients legs elevated to increase venous return
- ◆ if unconscious, head turned to one side to minimize aspiration
- ◆ keep the patient warm
- ◆ NASG (non pneumatic anti shock garment)
- ◆ Depending on the severity of PPH, patient may be managed in the same hospital or referred

8.7. Directed Therapy

along with resuscitative measures find the cause of bleeding Causes of PPH-

5Ts-Tone, Trauma, Tissue ,Thrombin abn,Traction **8.7.1.Atonic uterus-flabby**

uterus ensure uterine contraction

- ◆ Palpate fundus
- ◆ Uterine massage
- ◆ Bimanual compression
- ◆ Aortic compression
- ◆ Uterotonics
- ◆ Condom tamponade

- **The MOTIVE treatment bundle** for immediate first-response management once PPH is diagnosed:

- **M**assage of the uterus
- **O**xytocic drugs
- **T**ranexamic acid (TXA)
- **I**ntravenous fluids
- **V**aginal and genital tract **E**xamination
- **E**scalation of care if bleeding persists

DRUGS	DOSE & ROUTE	MAINTENANCE	MAX DOSE	PRECAUTIONS
OXYTOCIN	IV infusion 10-20U 500ml NS/R L 60dpm	IV infusion 10U/500 ml 40 dpm	Not >3L	Refrigerated
METHERGINE	IM/IV 0.2mg	0.2mg after 15 min	5 doses 1mg	Hypertension Heart disease
15methyl PGF2α	Im 250µg	250 µg after 15 min	8 doses 2mg	Asthma, Heart disease Refrigerated

The World Health Organization (WHO) recommends early use of intravenous tranexamic acid (TXA) within 3 hours of birth in addition to standard care for women with clinically diagnosed postpartum haemorrhage (PPH) following vaginal birth or caesarean section.

- Administration of TXA should be considered as part of the standard PPH treatment package and be administered as soon as possible after onset of bleeding and within 3 hours of birth. TXA for PPH treatment should not be initiated more than 3 hours after birth.
- TXA should be used in all cases of PPH, regardless of whether the bleeding is due to genital tract trauma or other causes.
- TXA should be administered at a fixed dose of 1 g in 10 mL (100 mg/mL) IV at 1 mL per minute (i.e., administered over 10 minutes), with a second dose of 1 g IV if bleeding continues after 30 minutes.
- TXA should be administered via an IV route only for treatment of PPH. Research on other routes of TXA administration is a priority.

Management of Atonic PPH not in shock

- Bimanual uterine compression

Abdominal Aortic Compression

- Suction Cannula- immediately insert suction canula with negative pressure of 650 mmHg maintained for 30 minutes ,after that we release the vacuum and see how the bleeding is .If there is further bleeding reapply and can keep it maximum upto 24hrs

Cannula can be removed with mild rotational movements. If you notice that decidua is plugging the cannula you can release with fingers.

Trans Vaginal Uterine Artery Clamp- Patient is bleeding excessively following vaginal delivery, with uterus contracted and no trauma, but lower segment is ballooned with clots it Is Lower Segment PPH Immediately apply TVUAC. Usually applied for 30-45 minutes. Once you apply the clamp and bleeding stops, you can suture the episiotomy and tears. After 30 minutes just release the clamps and see for a few minutes. If no excessive bleeding remove it.

Suction cannula also may help in lower segment PPH Do not use smooth muscle relaxants late in labour which can cause Lower Segment PPH

Uterine tamponade helpful if no suction canula or TVUAC available

Other measures simultaneously done to arrest bleeding include

Tranexamic acid injection -1g iv over 10mts within 3hrs of delivery and a second dose of 1gm if bleeding continues after 30 mts or bleeding restarts within 24 hrs.

Uterotonics:

- Oxytocin 20 u in 500ml saline infusion

- Methergine 0.2mg IM or iv repeat ever 15 -30 minutes maximum 5 doses(total- 1mg)

if no contraindication Prostodin 250mcg deep im in the gluteal region .Can be repeated every 15 mts upto 8 doses

PGE1- 800 mcg oral or sublingual. Rectal 800-1000mcg

If all these fail -----LAPAROTOMY

Intractable PPH

Get help (consultant, anaesthetist, transfusion medicine, theatre staff, icu)

- ◆ Maintain BP –crystalloids , blood & blood products
- ◆ Application of suction cannula inside uterine cavity
- ◆ Trans vaginal application uterine artery clamp

Condom tamponade- may be prepared before hand and ETO sterilized.

Otherwise it can be prepared within 1 or 2 mts under aseptic precautions.

How to prepare

- ◆ Take 2 condoms and put one over the other.
- ◆ A nelaton's catheter no 16 is inserted into 2 condoms(if single it can break)& tied on near their mouth with silk
- ◆ Condom inserted into uterine cavity
- ◆ Tight packing with gauze around the cervix
- ◆ 250-500ml saline infused through the catheter
- ◆ Oxytocin drip x 6hrs
- ◆ Antibiotics
- ◆ Continuous bladder drainage -
- ◆ Condom retained for 18-24 hrs
- ◆ after 12 hrs slow decompression of the catheter.

1. application of suction cannula inside uterine cavity
2. Trans vaginal application uterine artery clamp

SURGICAL METHOD

If on going bleeding, proceed with surgical methods with enough blood and blood products, informed consent including hysterectomy SOS, ventilator care. Emergency laparotomy and

- ◆ Stepwise devascularisation
- ◆ Uterine compression sutures
- ◆ Obstetric hysterectomy

Stepwise devascularisation

- ◆ Exteriorise uterus, ligate vessels one by one
- ◆ Uterine artery & vein through myometrium

- ◆ Utero-ovarian anastomoses
- ◆ Descending cervical

Internal iliac artery ligation

Internal iliac ligation converts pelvic circulation to venous system-

- Artery ligated 2.5 cm below its origin
 - ◆ Tied with absorbable suture
 - ◆ Femoral pulse must be checked
 - ◆ Risk of injury to vein
 - ◆ Requires surgical expertise
 - ◆ Don't overdo –septicaemia

Burchell, ascertained that ligating the hypogastric artery turned the pelvic circulation like a venous system, thereby aiding clotting and controlling PPH.

It is effective in Uterine atony,

Midline perforation,

Large broad ligament or lateral pelvic wall haematoma, Multiple cervical tears and

Lower segment bleeding

Uterine compression sutures

- ◆ B-Lynch suture(75%success)
- ◆ modified B– Lynch
- ◆ Cho square sutures
- ◆ Haymann suture -preferred

Obstetric hysterectomy

Decision for hysterectomy should not be delayed especially in multipara and patients with fibroid.

coagulation failure must be simultaneously corrected

- ◆ Last resort in severe PPH
- ◆ Vertical incision
- ◆ Exteriorise uterus
- ◆ Retain ovaries
- ◆ Clamp, cut & drop technique
- ◆ Only subtotal hysterectomy. Unless placenta previa ,cervical , forniceal tears

- ◆ Edges of vagina/cervix over sewed
- ◆ Leave drain or keep vault open

8.7.2. Tissue (Retained products)

- ◆ retained blood clots, placental bits, membranes- evacuate
- ◆ retained placenta-empty the bladder, 20 units IV oxytocin drip, manual removal under GA

8.7.3. Trauma

- ◆ Examination using cervical inspection set-minimum 2 long bladed speculum and 3 sponge holding forceps.
- ◆ Proper visualisation
- ◆ Good lighting & assistance
- ◆ Careful repair-lacerations (cx, vag., perineum)-
- ◆ If apex of cervical tear not seen, lower uterine extension cannot be ruled, so laparotomy may be necessary.

8.7.4. Thrombin-(abnormalities of coagulation)

- ◆ Replace clotting factors
- ◆ FFP (pt inr >1.5- 15 ml/ kg)
- ◆ Cryo precipitate
- ◆ Platelet transfusion
- ◆ Recombinant factor VII a

8.7.5. Traction (Inversion uterus)

- ◆ Complete or partial due to mismanaged 3rd stage of labour causing shock and haemorrhage
- ◆ Prevention by controlled cord traction
- ◆ Per abdomen- fundus of uterus not palpable
- ◆ Vaginal examination-soft globular swelling in the vagina

Management

Resuscitation and immediate replacement of the inverted uterus under GA

The part that came out first –fundus should be the last part to be reverted

Placental removal after repositioning only

Oxytocics after repositioning to ensure uterine contraction

If manual repositioning fails- hydrostatic method using warm

saline

If that also fail ,surgical methods- laparotomy and Huntington's method or Haultain's method

8.8. Hidden bleeding –be vigilant when

- ◆ Pallor ,tachycardia and tachypnoea is out of proportion to the external bleeding
- ◆ Episiotomy pain, urinary retention, sense of defecation after delivery haematoma(vulval, vaginal) -<3cm close observation
>3cm - evacuate , catch bleeder, occlude cavity , tightly pack the vagina, catheterise and antibiotics.

Broad ligament haematoma- uterus not in the midline, tender adnexal mass laparotomy & haematoma evacuation

Rupture uterus—signs of intra peritoneal bleeding and patient going for hemodynamic stability

Laparotomy - rent repair if possible or hysterectomy

Post LSCS bleeding

Causes inferior epigastric artery injury during CS Uterine angle bleeding following CS Sterilization stump bleeding

- **The cornerstones of resuscitation during PPH are restoration of both blood volume and oxygen-carrying capacity.** (Glover, 2003; Toledo et al, 2007; Patel et al, 2006).
- Oxygen by mask at 10–15 litres/minute
- Intravenous access (large gauge cannula x 2)
- Position flat
- Keep the woman warm
- Until blood is available, infuse up to 3.5 litres of warmed fluid solution, crystalloid (2 litres) and/or colloid (1–2 litres), rapidly as required
- **Apply clinical judgement in each situation**
- **Take blood for cross matching, and obtain a CBC count, coagulation screen, urea level, creatinine value, and electrolyte status.**
- Begin immediate rapid fluid replacement with NS or Ringer lactate

solution.

- Transfuse with PRBCs as available and appropriate.
- Order coagulation screen (International Normalized Ratio, activated partial thrombo plastin time) if fibrinogen, thrombin time, blood film, and D-dimer results are abnormal
- Mortality is increased when **hypothermia** and **acidosis** occur with **coagulopathy**– the '**Lethal Triad**'.
- **Avoid hypothermia**

Warmed saline

Use fluid warmers and forced air warmers

Minimise exposure

Remove wet linen Provide

warm blankets

Temporizing measures recommended for intractable atonic and non-atonic PPH include:

1. External aortic compression
2. Bimanual uterine compression
3. Non-pneumatic anti-shock garment (NASG)

8.9. When to transfuse?

- ◆ Any bleeding more than 1000ml
- ◆ Any hemodynamic instability
- ◆ Ongoing bleeding
- ◆ Previously anemic without even the stipulated loss

WHEN TO INITIATE MASSIVE TRANSFUSION PROTOCOL?

- ◆ Rapid blood loss >150ml/mt
- ◆ More than 50% blood loss in 3 hours
- ◆ Risk is that of DIC
- ◆ Packed cell:FFP :platelet – 1:1:1 ratio

8.10. Uterine artery embolisation

- ◆ 95% success
- ◆ Done in stable patient
- ◆ Angiographic facility needed
- ◆ Takes 1-2hrs
- ◆ Temporary – gel foam –better
- ◆ Permanent- microspheres

- ◆ Internal iliac artery ligation should not be done if uae needed

Post hysterectomy bleeding

- ◆ Abdominal packing which is removed 24 hrs later after correction of DIC
- ◆ Angiographic embolization

After managing PPH

- ◆ Closely monitor in ICU/ LR x 24hrs
- ◆ Correction of anemia & coagln. Abnlty-blood & blood products
- ◆ Assessment of complications.

8.11. Referral –whom, when and how?

Antenatal reference

- ◆ High risk women for PPH
- ◆ Previous cesarean patients with placenta previa referred early at least by 32 weeks of pregnancy

Intrapartum reference

- ◆ In properly equipped ambulance
- ◆ Accompanied by paramedical or other competent staff
- ◆ Two iv cannulas with crystalloids
- ◆ Oxygen
- ◆ NASG (Non Pneumatic Anti Shock Garment)
- ◆ Condom tamponade and urinary catheter in situ
- ◆ Properly labeled sample of patient's blood
- ◆ Need for blood and blood products explained and extra people for blood donation
- ◆ Inform the referring hospital staff

PPH BOX

1. Green and gray cannula
2. Vacutainers
3. Blood bank request form
4. Lab investigation form
5. Spirit swab
6. Adhesive
7. Scissors for cutting
8. IV set
9. Blood set

10. Normal Saline
11. Ringer Lactate
12. Haemacel
13. Foleys Catheter no.14, Uro bag
14. O2 mask
15. PPH drugs Oxytocin, Methergine, PGF2 α , PGE1
16. Syringes
17. Gloves

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Section IX
PLACENA ACCRETA SPECTRUM

Section 9

PLACENTA ACCRETA SPECTRUM

1.1. Introduction

Placenta accreta spectrum (PAS) is one of the most morbid conditions encountered during pregnancy. It is associated with hemorrhage, often massive, and associated problems such as multiorgan failure and even death. In addition, most cases require a difficult hysterectomy with high rates of complications including bladder and ureteral injury and rectovaginal fistula as well as loss of fertility. The rate of the condition has dramatically increased over the past 30 years owing to a concomitant increase in the rate of cesarean delivery.

Three grades of abnormal placental attachment are defined according to the depth of invasion:

Accreta: Placenta implants totally/partially/focally through the decidua basalis. Chorionic villi attach to the myometrium, rather than being restricted within the decidua basalis.

Increta: Chorionic villi invade into the myometrium.

Percreta: Chorionic villi invade fully through the myometrium. It may breach the serosa and invade surrounding structures.

1.2. Risk factors:

An important risk factor for placenta accreta is placenta praevia in the presence of a uterine scar.

Placenta praevia is an independent risk factor for placenta accreta. The frequency of placenta accreta relates directly to number of cesarean deliveries and presence or absence of placenta previa.

Additional reported risk factors for placenta accreta include

- Advanced maternal age
- Multiparity
- Prior uterine surgery
- Prior uterine curettage
- Uterine irradiation/Endometrial ablation
- Asherman syndrome
- Uterine leiomyomata

- Uterine anomalies
- IVF pregnancies
- Smoking.

1.3. Diagnosis

Morbidly adherent placentation may be suspected when there is a placenta praevia in a woman with a history of caesarean section or other uterine surgery. The diagnosis is usually established by **ultrasonography and occasionally supplemented by magnetic resonance imaging (MRI)**

Prenatal diagnosis is a key factor in optimizing the counselling, treatment, and outcome of patients with placenta accrete

Features contributing to the diagnosis of placenta accreta include:

1.3.1. Biochemistry

Increased AFP and hCG in second trimester

1.3.2. Ultrasound

- **First trimester**

Gestational sac in LUS

Irregular vascular spaces in placental bed CS scar implantation

- **Second trimester**

The presence of placental vascular lacunae is the most sensitive of all diagnostic markers (80-90% in second trimester).

- **Third trimester**

Sonographic findings that have been associated with placenta accreta

- Loss of normal hypoechoic retroplacental zone
- Multiple vascular lacunae (irregular vascular spaces) within placenta, giving "Swisscheese" appearance
- Blood vessels or placental tissue bridging uterine- placental margin, myometrial-bladder interface, or crossing uterine serosa
- Retroplacental myometrial thickness of <1mm

- Numerous coherent vessels visualized with 3-dimensional power Doppler in basal view
- Multiple, complex placental vascular lacunae
- Serosa-bladder interface: disruption, irregularity, vascularity

DOPPLER:

- Turbulent lacunar blood flow
- Peak systolic flow > 15 cm/s
- Disruption of continuous blood flow in myometrium
- Distorted bladder wall with increased vascularity
- Dilated vascular channels with pulsatile venous flow over cervix

1.3.3. MRI

Magnetic resonance imaging may be useful for diagnosis of difficult cases, such as posterior placenta praevia, and to assess depth of invasion in suspected percreta

FINDINGS:

- Uterine bulging
- Heterogeneous signal intensity within placenta
- Dark intra-placental bands
- Abnormal placental vascularity
- Focal interruptions in myometrium
- Tenting of bladder
- Direction visualisation of invasion of adjacent organs

1.4. Relevant considerations for case optimization in planned placenta accreta spectrum needs multidisciplinary approach**Preoperative**

- Maximization of preoperative hemoglobin values
- Verification of specific timing of planned delivery
- Identification of exact location of delivery (surgical suite and its associated capabilities)
- Verification that necessary preoperative consultations have occurred
- Consideration of patient and family needs given temporary

relocation

Intraoperative

- Verification of appropriate complement of surgical expertise involved or available, or both
- Verification of availability of related services as necessary (eg, interventional radiology)
- Coordination of blood bank with scheduling or timing of case

Postoperative

- Assurance that critical care services are engaged and available for postoperative care

1.5. Management

9.5.1 Antepartum considerations

As with all women at risk of major obstetric hemorrhage, those with suspected placenta accreta should be encouraged to remain close to hospital of confinement for the duration of the third trimester of pregnancy.

A proper well documented plan should be there for all diagnosed case of placenta accrete.

Timing of elective caesarean delivery

This should be individualized and the decision should be made jointly with the woman, the Obstetrician and Neonatologist Although the evidence does not support any particular gestation for elective delivery, combined maternal and neonatal outcome is optimized in stable patients with a planned delivery from **34 weeks GESTATION to 36 WEEKS GESTATION**

The gestation for elective delivery should balance the neonatal risks of prematurity against the maternal risks of emergent delivery. In the absence of clear evidence to guide this decision, a plan should be made tailored to the individual patient, taking into account the ultrasound findings, history of bleeding, medical comorbidities, surgeon availability and patient preferences.

In general, features of placenta percreta would warrant consideration of earlier delivery (i.e.32-34 weeks)

Antenatal corticosteroids as well as magnesium sulphate for neuro-protection should be administered prior to delivery at all gestations less than 34 weeks

Among women with suspected placenta accreta, emergency caesarean section is mostly performed in:

- The presence of vaginal bleeding
- PPRM and/or uterine contractions

Preoperative Patient Counseling:

This is to be carried out by the Consultant Obstetrician and should include

The following risk factors

- Potential need for hysterectomy, in case of fertility sparing the option of retaining placenta in situ and chemotherapy and its consequences.
- Risks of profuse hemorrhage
- Prolonged surgery, injury to bowel, bladder, ureter
- Need of prolonged hospitalization, need of continuous bladder drainage, post operative ventilation and ICU care
- Real risk of mortality
- Involve the family in all discussions for medico-legal reasons

A consent form should be completed including all possible treatments including hysterectomy, interventional radiological procedures and conservative management, elective ventilation, injury to viscera, torrential hemorrhage and regarding mortality.

9.5.2. Intra-operative considerations:

- Anaesthesia: General anaesthesia preferred in most centres
- Skin incision: Midline vertical
- Uterine incision: Classical Caesarean. /Fundal transverse
- Uterine incision be located to **avoid the placenta** during entry into the uterine cavity.
- After delivery of baby, Wait for spontaneous separation, if

not, cut the cord close to placenta and suture the uterine incision by running stitch.

- Prophylactic tranexamic acid given at the time of delivery after cord clamping may reduce the risk of hemorrhage with placenta accreta spectrum.
- To reduce bleeding common iliac clamp / aortic clamp can be applied aortic compression can be tried to save time and blood loss.
- If accreta classical caesarean with obstetric hysterectomy is the method of choice.
- If the decision for hysterectomy is made devascularise the pelvis by applying tourniquet to infundibulo pelvic ligament and uterine artery ligation/application of common iliac clamp/ aortic clamp (release every 5 minutes) if not available for bilateral internal iliac ligation.
- Proceed with obstetric hysterectomy till the uterine artery pedicle.
- Sharp dissection of lower segment from bladder if necessary/deliberate cystotomy or do a subtotal hysterectomy if you have reached below placenta.
- Avoid unnecessary dissection of bladder/vagina
- Double ligate the pedicles
- Remove tourniquet and ensure lower limb circulation
- Always check for bladder injury
- Close the abdomen after putting a wide bore intraperitoneal drain
- Transfer the mother for close monitoring.

9.5.3. Postoperative care after hysterectomy for placenta accrete

Specific attention should be paid to frequent evaluation of vital signs (blood pressure, heart and respiratory rate).

Urine output should be measured via an indwelling urinary catheter. Renal function should be evaluated and serum electrolyte abnormalities should be treated as needed until the patient is stabilized.

Early blood product replacement

If large volumes of crystalloids and blood products are given intra operatively, the patient is also at risk for

1. pulmonary edema,
2. transfusion-related acute lung injury
3. acute respiratory distress syndrome.

Early ambulation, intermittent compression devices , prophylactic heparin can reduce the risk of thromboembolic complications.

1.6. Checklist

Multidisciplinary Checklist for Suspected Placenta Accreta Date:

Patient's name:		Age:	IP Number:
Husbands name and contact number			
Pertinent clinical history:			
Obstetric score:			
LMP:		EDD(corrected):	BMI:
Plan date for surgery			
Blood type and antibody screen:			
Blood arranged:			
Number of prior CS:			
Type of other prior uterine surgery:			
Concerned for future fertility:			
Number of APH episodes to date:			

ULTRASOUND

Details of placentation:	Present	Absent
Anterior		
Posterior		
Low lying Placenta or praevia		
Loss of echolucency between uterus and placenta Lacunae		
Interruption of bladder–uterine interface		
Placental mass protrudes into bladder		
Suspected accreta by colour Doppler		

DESIGNATED DELIVERY CENTRE:

NICU team	To do	Pending	Done
Anaesthesia			
Interventional radiology			
Most experienced surgeons - oncology/CTVS			
Urology			
Neonatal ICU			

LABORATORY Most recent date:

2 to 4 units PRBCs currently on hold	
Coagulation profile	

INTRAOPERATIVE PLANS

	To do	Pending	Done
Notification of the main OT			
Consent form and risk form			
4 units PRBC o			
Hysterectomy tray available including common ilac clam			
Cystoscopy set available/urology team			
CCU/Ventilator availability			
Neonatal team present			
Position Incision			
Experienced surgeons on site			

Name of the Resident, signature and Date.

Consultant Name:

1.7. “Unexpected” and unplanned intraoperative recognition of placenta accreta spectrum

If placenta accreta spectrum is suspected based on uterine appearance and there are no extenuating circumstances mandating immediate delivery, the case should be temporarily paused, closure

of abdomen and consider transfer to a higher centre if facilities not available. Sometimes placenta accreta spectrum is unexpectedly recognized at the time of cesarean delivery or after the uterus is opened, the fetus is delivered and attempts to remove the placenta have failed. Uterine closure and proceed with hysterectomy and mobilize the multidisciplinary team.

In addition, the anesthesia team should be alerted and consideration given to general anesthesia, additional intravenous access should be obtained, blood products should be ordered, and critical care personnel should be alerted.

1.8. Uterine preservation and expectant management

Expectant management is defined as leaving the placenta either partially or totally in situ in exceptional situations. Life threatening complications like hemorrhage and sepsis may follow.

1.9. Triple-p procedure

- Perioperative placental localisation of superior edge of placenta
- Pelvic devascularisation including interarterial balloon catheter
- no attempt to remove the entire placenta with large myometrial excision and uterine repair

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Section X

.MANAGEMENT OF HYPERTENSIVE DISORDERS IN PREGNANCY

Section 10

MANAGEMENT OF HYPERTENSIVE DISORDERS IN PREGNANCY

The hypertensive disorders of pregnancy remain leading causes of maternal and perinatal morbidity and mortality. This protocol summarizes the quality of the relevant existing evidence and provides a reasonable approach to the diagnosis, evaluation, and treatment of hypertensive disorders of pregnancy.

10.1 Hypertension in pregnancy

Definition

GHTN: New onset hypertension systolic ≥ 140 mmHg and or diastolic ≥ 90 mmHg at least 4 hrs apart developing after 20 weeks of gestation without proteinuria and resolving within 12 weeks postpartum.

- Hypertensive disorders of pregnancy is classified as :
 - Chronic Hypertension
 - Gestational Hypertension
 - Preeclampsia
 - Eclampsia
 - Chronic hypertension with superimposed preeclampsia

10.2. Preeclampsia

- **The terms mild and severe preeclampsia have been eliminated.**
- New categories are preeclampsia with and without severe features.

The change is to emphasize those severe features may develop at any time in women with preeclampsia and to emphasize vigilance in looking for these features.

Pre eclampsia Diagnosis

- BP $\geq 140/90$ on two occasions four hours apart, (or single recording of BP $\geq 160/110$) after 20 weeks

AND

- ≥ 300 mg on 24 hours protein OR . 0.3 protein/ creatinine ratio OR dipstick of +1 protein (if other two methods are not available)

OR

- Any of the following feature in the absence of proteinuria (non proteinuric hypertension with any of the below mentioned features.
 - Platelets $< 100,000$
 - Creatinine > 1.1 OR doubling of creatinine in absence of other renal disease
 - Doubling of AST or ALT

10.3. Screening methods that are useful to identify women at risk of developing hypertensive disorders of pregnancy

First trimester of pregnancy, it has been reported that a combination of

1. low maternal serum concentrations of PIGF,
2. high uterine artery pulsatility index,
3. Low PAPPa, identified patients who would develop preeclampsia requiring delivery before 34 weeks of gestation

The calculated positive predictive value was only 21.2%, indicating that approximately 79% of the women in the screen-positive group would not develop hypertensive disorders during pregnancy

10.4. Prevention strategies for reducing the risk of hypertensive disorders of pregnancy

Strategies to prevent preeclampsia have been studied extensively over the past 30 years. To date, no intervention has been proved unequivocally effective at eliminating the risk of preeclampsia

1. A meta-analysis of 13 trials (15,730 women) reported a significant reduction in preeclampsia with calcium supplementation, with the greatest effect among women with low-baseline calcium intake
2. In a recent meta-analysis of aggregate data from 45 randomized trials, only a modest reduction in preeclampsia was noted when low-dose aspirin was started after 16 weeks of gestation (relative risk [RR], 0.81; 95% CI, 0.66–0.99) but a more significant reduction in severe preeclampsia (RR, 0.47; 95% CI, 0.26–0.83) and fetal growth restriction (RR, 0.56; 95% CI, 0.44–0.70) was

demonstrated when low-dose aspirin was started before 16 weeks of gestation

In a recent multicenter, double blind, placebo controlled trial, pregnant women at increased risk of preterm preeclampsia (less than 37 weeks of gestation) were randomly assigned to receive aspirin, at dose **(150 mg/day)**, or placebo from 11 weeks to 14 weeks of gestation until 36 weeks of gestation low-dose aspirin in women at high risk of preeclampsia was associated with a lower incidence for preterm preeclampsia. However, there were no differences in the rates of term preeclampsia between study groups.

10.5. Clinical Risk Factors and Aspirin Use*

10.5.1.High risk

- History of preeclampsia, especially when accompanied by an adverse outcome
- Multifetal gestation
- Chronic hypertension
- Type 1 or 2 diabetes
- Renal disease
- Autoimmune disease (ie, systemic lupus erythematosus, the antiphospholipid syndrome)

Recommend low-dose aspirin 150 mg /day if the patient has one or more of these high-risk factors

10.5.2.moderate risk

- Nulliparity
- Obesity (body mass index greater than 30)
- Family history of preeclampsia (mother or sister)
- Sociodemographic characteristics (African American race, low socioeconomic status)
- Age 35 years or older
- Personal history factors (eg, low birth weight or small for gestational age, previous adverse pregnancy outcome, more than 10-year pregnancy interval)

Consider low-dose aspirin if the patient has more than one of these moderate-risk

10.5.3.Low risk

Previous uncomplicated full term delivery:

Do not recommend low dose aspirin

10.6.Recommendations for measuring proteinuria

- All pregnant women should be assessed for proteinuria and at each visit
- Significant proteinuria should be defined as ≥ 0.3 g/dl.
- 300mg or more per 24hour urine collection.or ≥ 30 mg/mmol urinary creatinine in a spot (random) urine sample
- More definitive testing for proteinuria (by urinary protein : creatinine ratio of 0.3 or more this is encouraged when there is a suspicion of preeclampsia, including: $\geq 1+$ dipstick proteinuria, in the setting of hypertension with rising BP, or when BP is normal but women have symptoms or signs suggestive of preeclampsia
- **Proteinuria testing need not be repeated once the significant proteinuria of preeclampsia has been confirmed**

10.6. Definition of Preeclampsia with severe features:

- BP $\geq 160/110$
- Platelets $< 100,000$ /micro litre
- Doubling AST or ALT AND /Or severe right upper quadrant pain not explained by other pathology
- Creatinine > 1.1 OR doubling of creatinine in absence of renal disease
- Pulmonary edema
- New cerebral or visual disturbances

Intrauterine growth restriction and $>5g$ on 24 hour proteinuria is no longer part of severe preeclampsia

10.7 Management

10.7.1 Preeclampsia and gestational hypertension

Preterm management non-severe preeclampsia and gestational hypertension

- Daily self – assessment preeclampsia symptoms and fetal kick count

- BP measurement twice weekly, at least one in the office
- Platelets, liver enzymes, **twice** weekly
- **Protein assessment weekly in women with gestational hypertension but no need to repeat once diagnostic proteinuria is present**
- Antenatal testing · Serial growth ultrasounds with Doppler studies 2 weekly, more frequently in presence of FGR
- Do not recommend bed rest
- **Delivery recommended at 37 weeks**

10.7.2. Severe pre-eclampsia

Severe preeclampsia at ≥ 34 weeks or if unstable woman or fetus

Stabilization and delivery

Severe preeclampsia at ≤ 34 weeks and stable woman and fetus

The expectant management of preeclampsia with severe features before 34 weeks of gestation is based on strict selection criteria of those appropriate candidates and is best accomplished in a setting with resources appropriate for maternal and neonatal care. Because expectant management is intended to provide neonatal benefit at the expense of maternal risk, expectant management is not advised when neonatal survival is not anticipated. During expectant management, delivery is recommended at any time in the case of deterioration of maternal or fetal condition

- Antihypertensives according to BP
- Give steroids and try to delay delivery for 48 hours

If severe preeclampsia, viable fetus at < 34 weeks immediate termination indicated if

- Preterm premature rupture of membranes\
- Platelets < 100000
- Persistent elevated AST or ALT (over twice upper limit normal)
- Growth restriction ($< 3\%$ EFW for EGA)

- Reverse end diastolic flow on umbilical Doppler
- New or worsening renal dysfunction

Give steroids but don't delay delivery if severe preeclampsia fetus at < 34 weeks

- Uncontrollable severe HTN
- Eclampsia
- Pulmonary edema
- Placental abruption
- DIC
- Category III fetal tracing

Severe pre eclampsia termination at 34 weeks

10.8.Magnesium Sulphate

- Recommended for eclampsia or preeclampsia with severe features
- If magnesium indicated, continue magnesium after delivery usually for 24 hours
- Not recommended for non –severe preeclampsia or gestational hypertension
- Magnesium sulphate neuroprotection to be given if <32 weeks of gestation.

10.9.HELLP Syndrome

- Deliver after stabilization

10.10 Post-partum

- Monitor closely for 72 hours in hospital (or outpatient equivalent)
- Follow up with antihypertensive
- If women develop new hypertension with headache or blurred vision or pre-eclampsia with severe features, magnesium is recommended
- $\geq 160/110$ should be started on antihypertensive

10.11Chronic hypertension

- Home blood pressure monitoring is recommended for women chronic hypertension

- Recommended antihypertensives : labetalol, nifedipine, methyldopa
- Not recommended: ACE, ARB, renin inhibitor, mineral corticoid receptor antagonist
- Target blood pressure for those on antihypertensive is 110 to 140/80 to 85mmHg
- Assess fetal growth from 26 weeks and with serial growth ultrasounds 2-4 weekly when
 - On antihypertensive
 - Superimposed preeclampsia
 - IUGR
- If chronic hypertension and no other maternal or fetal complications delivery is not recommended until ≥ 38 weeks

10.12.Chronic hypertension with superimposed preeclampsia

- Watch carefully for signs and symptoms of superimposed preeclampsia which occurs in about 20% of chronic hypertensive
- If need to increase antihypertensive medication in any trimester consider admission to monitor blood pressure and rule out superimposed preeclampsia
- **Decision to deliver is similar to other preeclamptic women based on gestational age and presence of severe feature**

10.13.Emergent Therapy for Acute-Onset, Severe Hypertension During Pregnancy and the Postpartum Period

- Introducing standardized, evidence-based clinical guidelines for the management of patients with preeclampsia and eclampsia has been demonstrated to reduce the incidence of adverse maternal outcomes.
- Pregnant women or women in the postpartum period with acute- onset, severe systolic hypertension; severe diastolic hypertension; or both require urgent antihypertensive therapy.
- Close maternal and fetal monitoring by a physician and nursing staff are advised during the treatment of acute-onset, severe hypertension.
- After initial stabilization, the team should monitor blood pressure closely and institute maintenance therapy as needed.

- Intravenous (IV) labetalol and hydralazine have long been considered first-line medications for the management of acute-onset, severe hypertension in pregnant women and women in the postpartum period.
- **Immediate release oral Nifedipine also may be considered as a first-line therapy, particularly when IV access is not available.**
- The use of IV labetalol, IV hydralazine, or immediate release oral nifedipine for the treatment of acute-onset, severe hypertension for pregnant or postpartum patients does not require cardiac monitoring.
- In the rare circumstance that IV bolus labetalol, hydralazine, or immediate release oral nifedipine fails to relieve acute-onset, severe hypertension and is given in successive appropriate doses, emergent consultation with an anesthesiologist, maternal–fetal medicine subspecialist, or critical care subspecialist to discuss second-line intervention is recommended.
- Acute-onset, severe hypertension that is accurately measured using standard techniques and is persistent for 15 minutes or more is considered a hypertensive emergency. It is well known that severe hypertension can cause central nervous system injury
- Accurate measurement of blood pressure is necessary to optimally manage hypertension in pregnancy. Standardized protocols to measure BP in pregnant patients facilitate accuracy and ensure that appropriate steps are followed across all units regardless of patient arm size or shape.

10.13. Measurement of blood Pressure:

- Mercury sphygmomanometer is the gold standard; however, validated equivalent automated equipment also can be used. It is necessary to obtain the correct cuff size (a range of cuff sizes with directions to determine appropriate cuff size based on arm shape should be available) and patients should be positioned in a sitting or semireclining position with the back supported.



ACOG RECOMMENDATIONS 2019 FEBRUARY NO 764 TIMING OF DELIVERY

1. Chronic Hypertension with No Medication – **38 0/7-39 6/7**
2. Chronic Hypertension on Medication -- **37 0/7-39 6/7**
3. Chronic Hypertension Difficult to Control -- **36 0/7-37 6/7**
4. Gestational Hypertension - **37 0/7**
5. Preeclampsia Without Severe Features – **37 0/7**
6. Preeclampsia With Severe Features – **34 0/7**

Risk of subsequent cardiovascular disease among women with hypertensive disorders of pregnancy and prevention strategies Women with a history of preeclampsia continue to have an elevated risk of cardiovascular disease in subsequent years.

Several systematic reviews and meta analyses have linked preeclampsia with an increased risk of cardiovascular disease like

- Hypertension,

- Myocardial Infarction,
- Congestive Heart Failure),
- Cerebrovascular Events (Stroke),
- Peripheral Arterial Disease,

and cardiovascular mortality later in life, with an estimated doubling of odds compared with women unaffected by preeclampsia

Preventive strategies to be considered by patients and health care providers may warrant closer long-term follow-up and lifestyle modifications to better manage risk factors for cardiovascular disease (eg, achieving healthful weight, exercise, diet, smoking cessation), for which women and their primary care providers may maintain ongoing care and vigilance.

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Section XI

Eclampsia

Section 11.

Eclampsia

11.1 Definition

Occurrence of convulsions in a women after second half of pregnancy not attributable to other causes.

11.2 Diagnosis

When convulsions occur in a pregnant women or within 6 weeks postpartum in the absence of previous known seizure disorders, the diagnosis is eclampsia unless proved otherwise. Post partum eclampsia is unlikely after 4 days but has been reported up to 4 weeks postpartum (ACOG 2011).

11.3 Differential diagnosis

- Epilepsy – most common differential diagnosis
- CVT-cortical venous thrombosis – especially in postpartum seizures.
- Hypertensive encephalopathy – without focal neurological signs
- PRES – Posterior reversible encephalopathy syndrome presents with headache, visual disturbances, seizures
- Intracranial tumors – significant papilledema present
- Intracranial haemorrhage
- Meningitis / Encephalitis

Patients with eclampsia should be transferred to a tertiary care center – after initiating antihypertensive and anti convulsant treatment. Loading dose of Magsulf 4 gms 20% IV and 4 gms 50% IM and oral Nifedipine 10 – 20 mg to be administered prior to transfer.

11.4. Initial patient assessment and stabilization

11.4.1 General assessment

Maternal

Level of consciousness
Vitals –HR,BP,RR,SP O2 by
pulse oximetry
Lung bases for fine crepitations
Gross neurological evaluation

Fetal

Evidence of IUGR

Fetal Heart + NST

Obstetric evaluation

GA in weeks
Contractions
Features of abruption +/-
USG with Doppler

11.4.2 Initial investigations

- CBC with platelet count / peripheral smear
- Urine RE
- LFT / LDH
- RFT
- Coagulation profile

11.4.3 Stabilizing patient

- General supportive measures
- Stabilizing convulsions (Anti convulsant therapy)
- Stabilizing hypertension (Anti Hypertensive Therapy)
- Obstetric management

11.4.4 General Supportive measures

- 1 Patient in left lateral position
- 2 Padded mouth gag – to prevent injury to tongue
- 3 Railed cot
- 4 Mouth suction – to remove secretions and vomitus
- 5 Oxygen by mask
- 6 Start IV line – Restrict IVF to 75 – 80 ml per hr
- 7 CBD – after loading dose of Magsulf is administered

11.5 Anticonvulsant Therapy

- Drug of choice : is Magnesium sulfate

11.5.1 Dosage schedule**Loading dose – 4 gm IV + 4 gm IM**

1. 4 gm IV as 20 ml of 20% solution over 10 minutes
2. 4 gm Deep IM as 50 % solution 2 gm in each buttocks Loading dose
MgSo₄ is given regardless of urine output and renal function test

Maintenance dose

4 gm of 50% Magsulf in 100 ml normal saline run at rate of 25 ml/hr - that is 1 gm / hr
If convulsions recur after loading dose, additional 2 gm of 20% solutions IV is given over 3 to 5 minutes

11.5.2 Monitoring of toxicity

1. Patellar reflex

2. Respiratory rate < 14/mt

3. SPO₂ > 96%

4. Urine output > 30 ml

MgSO₄ to be continued till 24 hrs after delivery or 24 hrs after the last seizure, which even occurs later

Serum Magnesium to be checked if

- Signs of toxicity +
- Renal impairment – to adjust dosage of MgSO₄

11.5.3 Management of Toxicity of MgSO₄

1. Absent patellar reflex - skip MgSO₄
 - Can restart MgSO₄ when reflex returns
2. Respiratory depression or fall in SPO₂
 - Skip MgSO₄
 - IV Calcium Gluconate 10 ml of 10% solution over 10 mts
 - Oxygen by mask
 - Still hypoxic – endotracheal intubation
3. Decreased urine output < 20 ml/hr
 - Stop MgSO₄
 - Immediate termination by delivery / CS

11.5.4 Absolute Contra indication for MgSO₄

- Myasthenia gravis
- Recent myocardial infarction/pulmonary edema /CCF
- Renal failure

11.6 Anti hypertensive Management

BP must be controlled immediately – systolic BP should be maintained at 140-150 and diastolic at 90-100 mmHg. Antihypertensive drugs used are listed below

1. **Labetalol IV bolus** — 20 mg over 2min (after 10 mts) ➡ 40 mg
over 2min (after 10 mts) ➡ 80 mg (after 2 mts)
Maximum 220 mg / 24hrs
2. **Labetalol infusion**
1 amp - 4 ml – 20 mgm
1 amp in 100 ml NS - Run at 26 drops/min in 1 hour dose is 20 mgm/hr

For continuous IV use

10 ampoules (40 ml = 200 mg) in 250 ml NS run at 30 ml/hr (20mg/ml). Check BP every 15 mts till stabilized, thereafter every 30 mts.

3. **Tab Nifedipine** - 10 mg stat (after 20 mts)
 BP not controlled 20 mg orally (after 20 mts)
 BP not controlled repeat same dose Maximum 3 doses
 (10mg,20mg,20mg)
4. **IV hydralazine** 5 mg bolus can be considered

11.7. Obstetric Management

Once the patient is stabilized, convulsions controlled and anti-hypertensive are administered, steps taken to deliver the fetus.

Decision regarding mode of delivery should be based on

- Gestational age
- Fetal wellbeing – FH + NST
- Cervical Bishops score
- Maternal complications

If gestational age < 34 weeks - A-N Corticosteroids for fetal lung maturity

- ❖ Inj. Dexamethasone 6 mg I.M. 4 doses 12 hour apart

How to terminate

In labour		Not in labour
Pitocin/ ARM	No maternal complication	Maternal Complication
4 – 6 hrs re assess	No fetal compromise	Fetal compromise
	Favorable Bishops score	Poor Bishops score
	Pitocin/ ARM	LSCS

Intrapartum Management

- Restrict IV fluids to 80 ml/hr
- Continue Magsulf
- Continuous CTG monitoring
- Partogram for progress of labour
- No prolonged labour
- Cut short second stage of labor by vacuum or forceps
- AMTSL – Methergine should not be used
- Oxytocin 5 units IV bolus diluted in 5ml saline followed by 20 units I V infusion

11.8. Postpartum Management

- Continue MgSo4 for 24 hrs after delivery or 24 hrs after last seizure whichever is later
- Continue antihypertensives – Tab Nifedipine or Tab labetalol / atenolol and taper and withdraw gradually.
- Thromboprophylaxis is – with Inj. LMWH 0.4 or 0.6 ml s/c OD
- Monitor BP 4th hourly
- Retain in labour room for 24 to 48 hours till BP settles

11.9. Indication of LSCS

1. Unfavorable cervix
2. Severe fetal growth restriction
3. Fetal compromise – abnormal NST/ oligamnios / abnormal doppler
4. Maternal complications
 - a. Pulmonary edema
 - b. Renal failure
 - c. Placental abruption
 - d. Cerebral haemorrhage
5. Obstetric Indications
 - a. Malpresentation
 - b. CPD
 - c. Intrapartum fetal distress
 - d. Failed induction

11.10. Anaesthesia

Epidural analgesia/anesthesia is recommended for labour or LSCS. Combined spinal epidural may also be used.

General anesthesia is associated with risk of difficult intubation and acute rise of BP during intubation.

11.11. Indication for imaging in eclampsia

- 1 patient with focal neurological deficit.
- 2 Patient in coma.
- 3 Suspected i/c haemorrhage.
- 4 Atypical presentation <20wks, >48hrs after delivery.
- 5 Eclampsia refractory to Mg sulphate therapy.

11.12. Puerperal care

- Continue anti hypertensives – till BP becomes normal
- If BP elevated at two weeks post partum – evaluate for chronic hypertension, thrombophilia, chronic kidney disease
- Contraceptive advice - IUCD, progesterone only contraception, injectable progesterone's are safe
- Combined oral contraceptive may be started after BP returns to normal.

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Section XII
FETAL GROWTH RESTRICTION (FGR)

Section 12.

FETAL GROWTH RESTRICTION (FGR)

12.1 Introduction

After prematurity, FGR is the second leading cause of prenatal morbidity and mortality. It is widely accepted that there are 2 types of FGR: early onset and late onset. This classification not only describes timing of the problem, but also points to the etiology of the disease.

12.2. Defining FGR

Most national societies agree on the tenth percentile for the EFW as a diagnostic cutoff for small for gestational age (SGA). The disadvantage of this cutoff is the inclusion of a variable number of normal constitutionally small fetuses that do not require surveillance. Using an EFW less than the third percentile or a decreased AC growth rate is more likely to identify "true FGR but has the disadvantage that less severe forms of FGR at risk for deterioration are missed and therefore their risk for stillbirth remains high. Combining an EFW less than the third percentile with either an abnormal UA, MCA, UtA or cerebro placental ratio (CPR, defined as UA/MCA index), increases the identification of the small fetus at risk for adverse outcome. Although UA Doppler velocimetry is sufficient for the diagnosis of FGR before 32 weeks gestation, thereafter MCA Doppler is also required to represent the whole clinical spectrum found in early-onset and late-onset placental disease

More recently, the definition of FGR has been readdressed by an international consensus

- **Early onset (gestational age <32wk):**
EFW/AC < 3rd centile and/or UA-AEDF;
or EFW/AC < 10th centile combined with UtA-PI > 95th centile and/or UA-PI > 95th centile;
- **Late onset (gestational age >32wk):**
EFW/AC < 3rd centile
or at least 2 of 3 of the following

- (1) EFW/AC<10thcentile;
- (2) EFW/AC crossing centiles>2 quartiles on growth centiles;
- (3) A cerebroplacental ratio <5th or UA-PI>95th centile.

12.3 Etiology of Fetal Growth Restriction Maternal

medical conditions

- Pregestational diabetes mellitus
- Renal insufficiency
 - Autoimmune disease (eg, systemic lupus erythematosus)
 - Cyanotic cardiac disease
 - Pregnancy-related hypertensive diseases of pregnancy (eg, chronic hypertension, gestational hypertension, or preeclampsia)
 - Antiphospholipid antibody syndrome
 - Substance use and abuse (eg, tobacco, alcohol, cocaine, or narcotics)
 - Multiple gestation
 - Teratogen exposure (eg, cyclophosphamide, valproic acid, or antithrombotic drugs)
 - Infectious diseases (eg, malaria, cytomegalovirus, rubella, toxoplasmosis, or syphilis)
 - Genetic and structural disorders (eg, trisomy 13, trisomy congenital heart disease, or gastroschisis)
 - Placental disorders and umbilical cord abnormalities

12.4. Screening for Fetal Growth Restriction

Physical Examination or History

12.4.1 Abdominal examination

- The predictive value of abdominal palpation and symphysial- fundal height (SFH) measurements as the primary surveillance method for estimating fetal weight in the third trimester is limited
- SFH measurement must be taken from the top of the fundus to the fixed point at the upper edge of the pubic symphysis. Measure along the fetal axis, using a non-elastic tape measure (Figueras & Gardosi 2011)

- Serial measurement of fundal height and plotting on a growth chart is a useful screening tool and is recommended

12.4.2 First trimester biomarkers

Low **PAPP-A** may be considered as a biomarker in predicting IUGR

12.4.3 Ultrasound with doppler

Arterial and venous Doppler techniques provide detailed information on the development of the maternal-fetal-placental unit. The characteristics of the Doppler waveform depend on the vascular bed that is being examined.

Doppler indices in clinical practice are semi quantitative measurements, such as pulsatility index (PI), resistance index, and systolic/diastolic ratio. Among these indices, PI has a smaller measurement error and narrower reference limit and is therefore the preferred index.

12.4.3.A.UtA Doppler

Ut A Doppler assessment provides information regarding the maternal side of the placenta, and is an effective evaluation method for assessing the degree of trophoblastic invasion. Placental infarcts and inadequate trophoblast invasion may be depicted in the Ut A flow by increased resistance and/or the prolonged persistence of a diastolic notch. Can be done as early as 12 weeks with NT scan.

12.4.3.B.UA Doppler

UA Doppler reflects villous branching in the fetal side of the placenta. Like uterine artery development, high resistance is seen in the UA due to incomplete invasion of the villous branching.

If the umbilical artery Doppler demonstrates increased resistance (Pulsatility Index >95th centile), the sonographic surveillance should be increased to weekly intervals or more frequently if deemed necessary by the managing clinician.

12.4.3.C.MCA Doppler

As gestational age advances, normal development leads to an increase in the peak systolic velocity (PSV) and average diastolic velocity in the MCA. As both values increase contingently, this allows indices of cerebral vascular resistance to remain high throughout fetal life

It is therefore not surprising to measure high-resistance flow during normal development throughout pregnancy, and low resistance during FGR due to the brain sparing effect in the fetus. The resistance of this vessel can be measured with the PI, which is used in the management of FGR, and the absolute velocity in the MCA can be used in assessing fetal anemia.

12.4.3.D.Aortic Isthmus Doppler

The aortic isthmus (Aol) Doppler is associated with increased fetal mortality and neurological morbidity in early-onset FGR. This vessel reflects the balance between the impedance of the brain and systemic vascular systems. Reverse Aol flow is a sign of advanced deterioration and a further step in the sequence starting with the UA and MCA Dopplers Aol has a strong association with both adverse perinatal and neurological outcome.

12.4.4.E.Venous Doppler Assessment Ductus

Venosus

The DV is an important connection between the UV and the inferior venacava. The role of this vessel is to regulate the amount of umbilical venous return that can flow directly to the heart. In normal fetal development, 20% of UV return flow goes through the DV and to the right side of the heart. The remaining volume is diverted to the low-resistance hepatic circulation. As a result, the DV delivers a high-velocity jet of blood and keeps the foramen ovale open. DV indices is an appropriate way of assessing forward cardiac function

12.5. Role of corticosteroids and Magnesium sulfate

Antenatal corticosteroids are recommended if delivery is anticipated before 33 6/7 weeks of gestation because they are associated with improved preterm neonatal outcomes. In addition, antenatal corticosteroids are recommended for women in whom delivery is anticipated between 34 0/7 and 36 6/7 weeks of gestation, who are at risk of preterm delivery within 7 days, and who have not received a previous course of antenatal corticosteroids

(ACOG PB NO 204 Fetal Growth Restriction FEB 2019)

Magnesium sulfate for fetal neuroprotection should be administered in gestations prior to 32 weeks

Table 1 Implications of diagnostic cutoffs for management of fetal growth restriction		
Diagnostic Cutoff	Advantage	Disadvantage
AC <10th percentile	Highest sensitivity for FGR	Lowest specificity for FGR
SEFW <10th percentile	Acceptable sensitivity for FGR	Unnecessary monitoring of normal fetuses
SEFW <3rd percentile	Greater specificity for FGR	Less severe FGR is missed
SEFW <10th percentile & abnormal UA Doppler	Greatest specificity for FGR at risk for adverse outcome	Misses term FGR with normal UA Doppler
SEFW <10th percentile with abnormal UA or MCA	Greatest specificity for FGR at risk for adverse outcome across all gestational ages	Requires interpretation of umbilical and cerebral Doppler studies

12.6 Monitoring

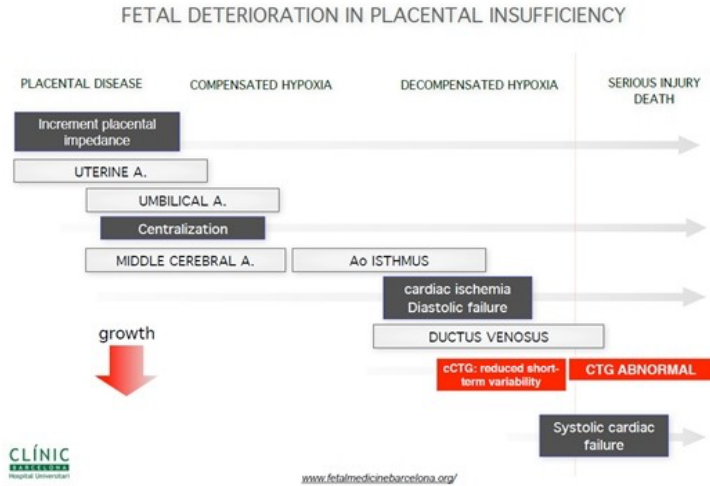
12.6.1 Early-onset fetal growth restriction

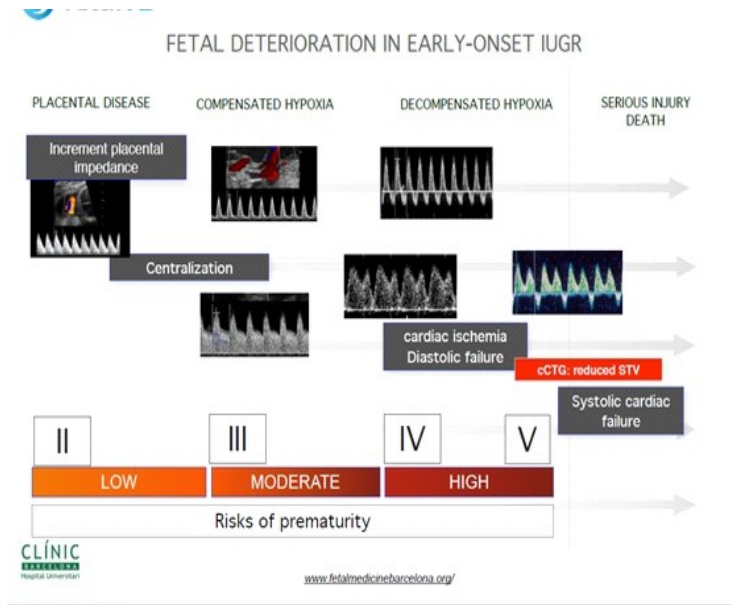
- Elevated UA Doppler flow PI (≥ 2 SDs greater than the mean for gestational age), no other abnormality: weekly Doppler, weekly BPS
- Low MCA or CPR: weekly Doppler and BPS
- UA absent end-diastolic velocity (AEDV): consider admission, 2 times per week Doppler and BPS
- UA reversed end-diastolic velocity (REDV), increased DV Doppler indices, and/or oligohydramnios (maximum vertical pocket of fluid <2 cm): admission, 3 times per week Doppler and BPS, daily CTG
- Absent/reversed DV a-wave: admission, daily Doppler and BPS, prepare for delivery

12.6.2.Late-onset fetal growth restriction (>34 weeks)

Individualised care

- Elevated UA Doppler flow PI (≥ 2 SDs greater than mean for gestational age), no other abnormality: weekly Doppler 1 BPP
- Low MCA or abnormal CPR: 2 to 3 times per week Doppler 1 BPS



**Table 2.** Stage-based classification and management of FGR

Stage	Pathophysiological correlate	Criteria (any of)	Monitoring*	GA/mode of delivery
I	Severe smallness or mild placental insufficiency	EFW <3rd centile CPR <p5 UA PI >p95 MCA PI <p5 UtA PI >p95	Weekly	37 weeks LI
II	Severe placental insufficiency	UA AEDV Reverse AoI	Biweekly	34 weeks CS
III	Low-suspicion fetal acidosis	UA REDV DV-PI >p95	1–2 days	30 weeks CS
IV	High-suspicion fetal acidosis	DV reverse a flow cCTG <3 ms FHR decelerations	12 h	26 weeks** CS

All Doppler signs described above should be confirmed at least twice, ideally at least 12 h apart. GA = Gestational age; LI = labor induction; CS = cesarean section. * Recommended intervals in the absence of severe preeclampsia. If FGR is accompanied by this complication, strict fetal monitoring is warranted regardless of the stage. ** Lower GA threshold recommended according to current literature figures reporting at least 50% intact survival. Threshold could be tailored according to parents' wishes or adjusted according to local statistics of intact survival.

12.7 Quick reference

Confirm diagnosis by USG and Doppler velocimetry

Growth < 10 centile with normal Doppler (SGA) Periodic monitoring If Doppler normal termination after 38 wks	<10 centile with abnormal Doppler Or growth < 3rd centile with normal Doppler (FGR) Stage 1 MCA PI < 5TH centile Or UA PI > 95 centile Or CPR < 5th centile UtA PI > 95th centile	Follow up Weekly till 37 weeks Termination by IOL
	Stage 2 UA AEDV Or Reverse Aol	Follow up every 2 days Repeat Doppler every 3rd day and termination by 34 weeks by LSCS
	Stage 3 UA REDV DVPI > 95th centile	Follow up every 24 hrs CS by 30 weeks
	Stage 4 DV reverse flow CTG abnormal Or FHR deceleration	Follow up ever 12 hr CS by 26 weeks

12.8 Complications of Growth Restricted Babies

Small for dates fetuses are at increased risk of:

- ↳ Reduction in maternal perception of fetal movements
- ↳ Meconium stained liquor

- ↗ Abnormal heart rate patterns intrapartum
- ↗ Intrauterine fetal death
- ↗ Hypoxic ischaemic encephalopathy
- ↗ Poor neurological development
- ↗ Delay in cognitive development
- ↗ Sudden infant death syndrome

In adult life

Type 2 diabetes and hypertension (RCOG 2002)

NB: Good catch up growth in the first few months of life may predict a healthy outcome

Patients with previous history of IUGR should be started on Ecospirin 150mg not later than 16 weeks of gestation.

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Section XIII
INDUCTION OF LABOUR

Section 13.

INDUCTION OF LABOUR

13.1 Definition:

The process of artificially stimulating uterine contraction before the spontaneous onset of labour, with or without ruptured membranes in order to achieve vaginal delivery.

13.2 Introduction

Several large cohort studies, including a study from the National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units Network, reported that early-term delivery (37 0/7–38 6/7 weeks of gestation) was associated with increased neonatal and infant morbidity and mortality compared with deliveries at 39 weeks of gestation or more and that more than one third of non medically indicated cesarean deliveries occurred at less than 39 weeks of gestation

13.3 Perinatal Outcomes

The risk of adverse outcomes is greater for neonates delivered in the early-term period (37 0/7–38 6/7 weeks of gestation) compared with neonates delivered at 39 weeks of gestation . Because pulmonary development continues well into early childhood, respiratory morbidity is relatively common in neonates delivered in the early- term period.

13.4 Adverse Long-Term Infant Outcomes

In addition to immediate adverse perinatal outcomes, multiple studies have shown increased rates of adverse long-term infant outcomes associated with late-preterm and early-term delivery compared with full-term delivery. Studies have reported that compared with children born full term, children born late preterm and early term experience additional long-term adverse consequences

13.5 GENERAL PRINCIPLES related to the practice of induction of labour:

- Induction of labour should be performed only when there is a clear indication for it – maternal or fetal.
- Informed written consent should be taken before induction.
- Induction of labour should be performed with caution since the procedure carries the risk of uterine hyper stimulation, rupture and fetal distress.
- Wherever induction of labour is carried out, facilities should be available for assessing maternal and fetal well-being and for emergency caesarean section.
- Women receiving oxytocin, misoprostol or other prostaglandins should never be left unattended.

13.6 Indications for termination(IOL/LSCS)**13.6.1 Medical Indications for Late-Preterm or Early-Term Deliveries***

- Preeclampsia, eclampsia, gestational hypertension or complicated chronic hypertension
- Pregestational diabetes with vascular disease
- Pregestational or gestational diabetes—poorly controlled
- Cholestasis of pregnancy
- Alloimmunization of pregnancy with known or suspected fetal effects

13.6.2 Placental/Uterine Conditions(timing of delivery)

- Placenta previa - Late preterm/early term 36 –38 weeks of gestation
- Suspected accreta, increta, or percreta - Late preterm 34–36 weeks of gestation
- Vasa previa Late preterm/early term - 34 –37 weeks of gestation
- Prior classical cesarean Late preterm/early term - 36 –37weeks of gestation
- Prior myomectomy requiring cesarean delivery (individualize) 37 –39 weeks of gestation
- Previous uterine rupture Late preterm/early term (individualize) 36 –37 weeks gestation

13.6.3 Fetal Conditions (timing of delivery)

- **Polyhydramnios Full term----- 39 0/7–39 6/7 weeks of gestation**
- Oligamnios depending upon fetal doppler
- SGA (singleton) Otherwise uncomplicated, no concurrent findings Early term/full term 38 0/7–39 6/7 weeks of gestation
- FGR with Abnormal umbilical artery dopplers: elevated S/D ratio with diastolic flow Early term Consider at 37 0/7 weeks of gestation or at diagnosis if diagnosed later
- Abnormal umbilical artery dopplers: absent end diastolic flow Late preterm Consider at 34 0/7 weeks of gestation or at diagnosis if diagnosed later
- Concurrent conditions (oligohydramnios, maternal comorbidity [eg, preeclampsia, chronic hypertension]) Late preterm/early term 34 0/7–37 6/7 weeks of gestation
- Multiple gestations—uncomplicated Dichorionic-diamniotic twins Early term 37 weeks of gestation
- Monochorionic-diamniotic twins Late preterm/early term 36 weeks of gestation
- Monochorionic-monoamniotic twins Preterm/late preterm 32 0/7–33 0/6 weeks of gestation
- Triplet and higher order Preterm/late preterm Individualized
- Multiple gestations with complications individualized decision
- Alloimmunization: At-risk pregnancy not requiring intrauterine transfusion Early term 37 0/7–38 6/7 weeks of gestation
- Requiring intrauterine transfusion late preterm or early term Individualize

13.6.4 Maternal Conditions (timing of delivery)

- Hypertensive disorders of pregnancy Chronic hypertension: isolated, uncomplicated, controlled, not requiring medications **Early term/full term 38 0/7–39 6/7 weeks of gestations**
- ·Chronic hypertension: isolated, uncomplicated, controlled on medications Early term/full term **37 0/7–39 6/7 weeks of gestations**
- ·Chronic hypertension: difficult to control (requiring frequent medication adjustments) Late preterm/early **term 36 0/7–37 6/7 weeks of gestation**
- ·Gestational hypertension, without severe-range blood pressure Early term **37 0/7 weeks** or at diagnosis if diagnosed later
- Gestational hypertension with severe-range blood pressures Late preterm 34 0/7 weeks of gestation or at diagnosis if diagnosed later
- Preeclampsia without severe features Early term 37 0/7 weeks of gestation or at diagnosis if diagnosed later
- Preeclampsia with severe features, stable maternal and fetal conditions, after fetal viability (includes superimposed) Late preterm 34 0/7 weeks of gestation or at diagnosis if diagnosed later
- Preeclampsia with severe features, unstable or complicated, after fetal viability (includes superimposed and HELLP) Soon after maternal stabilization
- Preeclampsia with severe features, before viability Soon after maternal stabilization
- Diabetes Pregestational diabetes well-controlled by Full term 38 weeks of gestation
- Pregestational diabetes with vascular complications, poor glucose control, or prior stillbirth time accordingly
- Gestational diabetes: well controlled on diet and exercise Full term 39 0/7–40 0/7 weeks of gestation
- Gestational diabetes: well controlled on medications Full term 39 0/7–39 6/7 weeks of gestation
- Gestational diabetes: poorly controlled Late preterm/early term Individualized
- Intrahepatic cholestasis of pregnancy Late preterm/early term 36 0/7–37 0/7 weeks of gestation or at diagnosis if diagnosed late

13.6.5 Obstetric Conditions

- Preterm PROM Late preterm 34 0/7 weeks of gestation or at diagnosis if diagnosed later
- PROM (37 0/7 weeks of gestation and beyond) Generally, at diagnosis Generally, at diagnosis
- Previous stillbirth Full term (early term birth not routinely recommended)

Individualized

For low risk cases

Induction 40 wk – 40 wk 6 days

13.7. Contraindications for induction

Placenta previa or vasa previa Abnormal lie

Previous classical CS or previous significant uterine surgery

Active genital herpes

Pelvic structural abnormality. Cervical carcinoma

13.8 Pre-induction Assessment:

- Confirmation of dating
- Cervical scoring systems

Modified Bishop's score (calder score)

Cervical Feature	0	1	2	3
Dilatation (cm)	<1	1-2	2-4	>4
Length of cervix (cm)	>4	2-4	1-2	<1
Station	-3	-2	-1/0	+1/+2
Consistency	Firm	medium	Soft	-
Position	Posterior	Mid; Anterior		

13.9 Overview of cervical ripening methods

Successful induction of labor is affected by a multitude of factors, some modifiable and some with greater impact than others. Parity, maternal age, body habitus, comorbidities, gestational age, and cervical status are all influencing elements.

- Induction of labour should be performed with caution since the procedure carries the risk of uterine hyperstimulation and rupture and fetal distress.
- Wherever induction of labour is carried out, facilities should be available for assessing maternal and fetal well-being.
- Women receiving oxytocin, misoprostol or other prostaglandins should never be left unattended.
- Failed induction of labour does not necessarily indicate caesarean section.
- Wherever possible, induction of labour should be carried out in facilities where caesarean section can be performed.

Vaginal examination & sweeping the membranes reduces the need for induction
NST should be done prior to initiation of induction.

≤

≥

- ❖ **MBS <6 requires cervical ripening**
- ❖ **MBS ≥7 Oxytocin ±ARM**

13.10 Monitoring during induction

- Maternal vitals
- Fetal heart – intermittent auscultation & by CTG when contraction starts especially in high risk cases
- Uterine contraction – duration & frequency / Relaxing well in between contraction
- Descent of fetal head
- When in active labour – monitor by partogram

13.11 Complication –

- Tachy systole- more than 5 contraction in 10 mts over an observation period of 30 mts
- Hypertonus – contraction lasting for more than 120sec
- Hyper stimulation- is any of the two with FH abnormalities

Management

Stop oxytocin / removal of vaginal PG

Left lateral positioning of mother

IV fluid – RL

O2 by mask 6L / mt

S/C terbutaline 1 amp

13.12 Failed induction,

If regular contractions and cervical changes do not occur after at least 12 hours of oxytocin administration(membranes ruptured) If membranes are intact, induction is considered a failure if regular contractions are not generated or cervical changes do not occur after 24 hours of oxytocin (up to date)

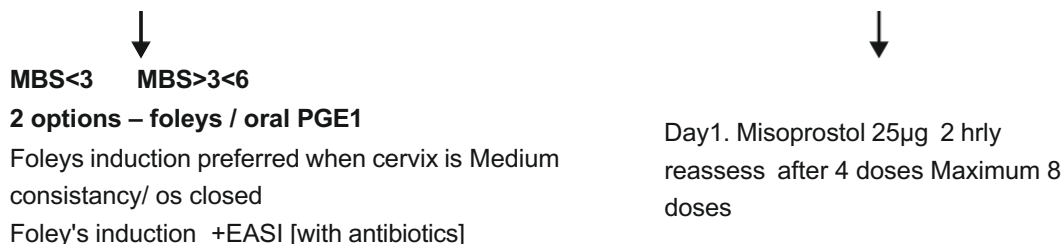
13.12.1 Management Options in failed induction

- ❖ A further attempt to induce labour
- ❖ Caesarean section

Cervical status is a good predictor of likelihood of vaginal delivery when labour is induced.

If the cervix is unfavourable ripening process is employed prior to induction,

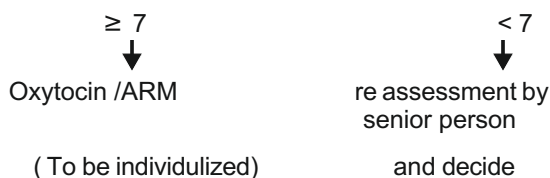
If modified bishop score ≤ 3 – 2 options misoprostol or mechanical induction



After 12 to 18 hours reassess

Day 2 Assess MBS

If MBS > 3 < 6



Mechanical

- using No 18 Foleys catheter .
- Under strict aseptic precaution catheter introduced trans cervically into the extra amniotic space and bulb inflated with 30ml of sterile water , bulb is then retracted to rest against the internal os.
- Extra amniotic saline 250 ml is instilled.
- The Foleys is removed after 12 to 24 hrs if not spontaneously expelled.

Other options for cervical ripening available PGE2 intracervical gel

PGE1 tablets orally 25 microgram 2 hrly x 8 doses

Misoprostol has advantages in being cheap and stable at room temperature and widely available also in most resource-poor settings.

13.13 Special situations for induction of labour in previous caesarean

Induction not preferred wait for spontaneous onset of labour Can use mechanical methods and later controlled oxytocin PGE2 can be used with caution (NICE Guidelines)

13.14 Oxytocin in labour

AUGMENTATION OF LABOUR will be done when there is delay of progress of labour in partogram

Augmentation is given with 5units oxytocin in 500ml of RL Start with 4 drops/ mt

Increasing dosage every 30mts titrating against uterine contraction & FH

Uterine contraction may last for 45 sec /.ensure relaxation in between

FH should be reassuring – ideal by continuous CTG Max

dosage is 60drops / mt

If required a second infusion with 5 units in 500ml of RL is given starting with half the infusion rate reached in the first infusion

When parturient reaches second stage maintain oxytocin infusion in the same concentration & rate

AMTSL should be strictly adhered to. Preparation of infusion

5 units in 500ml of RL

= 10 milliunits in 1 ml

1 ml = 16 drops 4drops/mt

= 2.5 mu/mt Max - 60

drops / mt

13.15.Vaginal examination in labour

- First vaginal examination of a woman with symptoms suggestive of labour will be done when she has contractions lasting for more than 20 sec occurring at least once in 4 minutes
- Active labour is diagnosed when cervical dilatation reaches 5 cm (WHO)
- Partogram to be initiated.
- Repeat vaginal examination is done after 4 hours in active labour.
- Repeat vaginal examination if woman is in latent phase or false labour is not warranted.
- Vaginal examination may be done earlier if there is FH abnormality.
- If vaginal examination was not done on admission and there are no contractions after an observation period of 6 hours woman may be shifted from labour ward.

13.16 ANNEXURE

ANNEXURE 1

CHECK LIST

Method used for the patient

Name of the patient.....w/o..... Id
 No.....Date.....Time..... Age
 (date of birth.....years/gravida and
 parity.....

Last Menstrual period.....Expected
 date of delivery.....

Gestational age by LMP..... Gestational age by
 first ultrasound (done before 20 weeks of
 gestation).....

History of any allergies, medical condition, special need : yes/No High risk
 review : yes/No

Planned method of induction : yes/No

Consent form signed by the patient and her attendant : yes/No Foetal heart
 rate assessment : yes/No

Pre induction modified bishop's score

Score	Cervical dilatation (cm)	Position of cervix	Cervical consistency	Cervical length cm	Station
0	Closed	Posterior	Firm	>4	-3
1	1-2	Central	Medium	3-4	-2
2	3-4	Anterior	Soft	1-2	-1-0
3	5-6			<1	+1 +2

Total score of the patient...(favorable score: 6-13 & unfavorable score : 0-5) Signature of the
 doctorDate and time..... Name of the
 doctor.....

ANNEXURE 2
CONSENT FORM

1 (name of the patient) wife of sh. (name of the husband) ID

No.....

Have read the above document and have understood the need for the proposal procedure. The indication, possible complications and need for further procedure in case of failure of the induction of labour has been explained to us by our doctor (Name of the doctor). I have been given the opportunity to ask questions and clarify my doubts.

I here by give my full consent to undergo the procedure. I understand the risk involved.

Procedure (specify the method of induction of labor)

Induction:

Time

Date & place

Name & signature of the patient

Name & signature of the doctor

name and signature of the witness

Reference

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Section XIV
CAESAREAN SECTION

Section14 CAESAREAN SECTION

Caesarean section is one of most commonly performed major operations in women throughout the world. There are many possible approaches to performing a caesarean section, the aim being to achieve safe delivery of the infant with a minimum maternal morbidity.

14.1 Categories of cesarean section

Category 1:EMERGENCY:immediate threat to the life of the woman or foetus(within 30 mts)

Category 2:URGENT:maternal or foetal compromise which is not immediately life-threatening(within 75 mts) Category3:SCHEDULED:no maternal or foetal compromise but needs early delivery

Category 4:ELECTIVE:delivery timed to suit woman or staff(elective caesarean section to be planned at 39 weeks.If planned before 39 weeks steroids recommended.

14.2.Pre requisites for caesarean section

- Offer pregnant women information and support.
- This information should include indications for CS, what the procedure involves, associated risks and benefits, and implications for future pregnancies and birth after CS.
- Communication and information should be provided in a form that is accessible.
- Consent for CS should be requested after providing pregnant women with evidence-based information.

14.3 Preoperative testing & preparation of CS

- Blood routine which includes haemoglobin, packed cell volume, total count, Platelet count.
- Blood grouping & Rh typing
- Screening - HbsAg, HIV, VDRL, Anti HCV, Platelet, BT,CT, Electrolytes, Na and K

aspiration pneumonia

- Women who are having induction of regional anaesthesia for CS should be cared for in theatre because this does not increase the woman's anxiety.
- Cardiac patients – cardiac anesthesia according to their lesion and pathology
- Women having a CS should be offered antiemetics to reduce nausea and vomiting during CS.
- The operating table for CS should have a lateral tilt of 15°, because this reduces maternal hypotension.

14.5. Surgical technique

General recommendations for safe surgical practice to ensure strict aspects should be followed at CS to reduce the risk of HIV infection of staff.

- Vaginal cleansing with povidone iodine solution immediately prior to caesarean birth may reduce post op endometritis especially when membranes ruptured or early in labour.(WHO)

14.5.1. Skin Incision:

Abdomen should be cleaned using chlorhexidine. CS should be performed using a transverse abdominal incision because this is associated with less postoperative pain and an improved cosmetic effect compared with a midline incision. **Vertical incision in situations like complete placenta praevia ,accreta and lower segment fibroids**

14.5.3 Uterine incision:

Low transverse incision(Kerr incision)When there is a well formed lower uterine segment, blunt rather than sharp extension of the uterine incision should be used because it reduces blood loss incidence of postpartum haemorrhage and the need for transfusion at CS.

Vertical incision:

Placenta accreta

Anterior leiomyoma obstructing the lower uterine segment

SURGICAL SAFETY CHECKLIST:

Emergency cases such as 'crash CS' will require a modified approach that is centre and situation dependent.

Good communication is essential for safer surgical care as communication failure is common in operating room. Hence the need for surgical safety check list to decrease complications and mortality.

- Clip hair, do not shave just before surgery.

WHO Surgical Safety Checklist:
for maternity cases ONLY
(adapted from the WHO Surgical Checklist)

Class: 1 ☐ 2 ☐ 3 ☐ 4 ☐
Other: _____

Procedure: _____

Anaesthetic Specialty Form: 

SIGN IN (say out loud after the arrival of the woman & the midwife)	TIME OUT (say out loud before skin incision)	SIGN OUT (say out loud before the woman leaves theatre)
☐ Has the woman confirmed her identity, procedure and consent? ☐ Is the anaesthetic machine and medication check complete? ☐ Does the woman have a known allergy? ☐ Is there a difficult airway risk? ☐ Are blood products available? ☐ Has the appropriate/recent antacid prophylaxis been given? ☐ Is the resuscitator checked and ready? ☐ Has the neonatal team been called, if needed?	☐ Have all team members introduced themselves by name and role? ☐ What is the woman's name? Obstetrician: ☐ What additional procedure(s) are planned? ☐ Are there any critical or unusual steps you want the team to know about? ☐ Are there any concerns about the placental site? Anaesthetist: ☐ Are there any specific concerns? ☐ Have antibiotics been given? Scrub practitioner: ☐ Has the sterility of instruments been confirmed? ☐ Are there any equipment issues or concerns? Midwife: ☐ Are cord blood samples needed? ☐ Is the urinary catheter draining? ☐ Has the FSF been removed? ☐ Has VTE prophylaxis been undertaken?	Practitioner verbally confirms with the team: ☐ Has the name of the procedure and any additional procedures been recorded? ☐ Has it been confirmed that instruments, swabs and sharp counts are correct? ☐ Have specimens been labeled? ☐ Has blood loss been recorded? Obstetrician, Anaesthetist and Midwife: ☐ Have the key concerns for recovery and management been discussed? ☐ Has post-operative VTE prophylaxis been prescribed? Anaesthetist and theatre team: ☐ Have any equipment problems been identified that need to be addressed? Midwife: ☐ Has the baby/babies been labelled? ☐ Have relevant cord bloods been taken, if relevant? ☐ Have cord gases been recorded, if required?

Patient Details:
After patient barcode sticker here

County Durham and Darlington 
and Foundation Trust

Name: _____
Signature: _____
Date: _____ Time: _____

- Indwelling urinary catheter to prevent over-distension of the bladder because the anaesthetic block interferes with normal bladder function. Also prevents injury to bladder while entering the peritoneal cavity.

14.4 Anaesthesia

- Decided by obstetric anaesthetist
- Women who are having a CS should be offered regional anaesthesia because it is safer and results in less maternal and neonatal morbidity than general anaesthesia & also reduces

Fetus in a backdown transverse lie

Complete placenta previa

- Women who are having a CS should be informed that the risk of fetal lacerations is about 2%.
- Forceps should only be used at CS if there is difficulty delivering the baby's head. The effect on neonatal morbidity of the routine use of forceps at CS remains uncertain.
- Delayed cord clamping (by 30-120 sec)
- Oxytocin 5 IU by slow intravenous injection should be used at CS to encourage contraction of the uterus and to decrease blood loss
- At CS, the placenta should be removed using controlled cord traction and not manual removal as this reduces the risk of endometritis.
- Intraperitoneal repair of the uterus at CS should be undertaken. Routine exteriorisation of the uterus is not recommended because it is associated with more pain and does not improve operative outcomes such as haemorrhage and infection.

14.5.4 Uterine closure:

The effectiveness and safety of single layer closure of the uterine incision is uncertain. Except within a research context, the uterine incision should be closed in two layers with no.1vicryl. Separate sutures for uterine angles 1 cm from the edge before continuous suturing is recommended.

14.5.5 : Closure of abdomen:

The visceral and parietal peritoneum need not be approximated at CS.

Rectus sheath with continuous sutures with prolene, placement of sutures minimum 1 cm from margin and at about 1 cm intervals

In the rare circumstances that a midline abdominal incision is used at CS, mass closure with slowly absorbable continuous sutures should be used because this results in fewer incisional hernias and less dehiscence than layered closure.

●

Routine closure of the subcutaneous tissue space should not be used, unless the woman has more than 2 cm subcutaneous fat, because it does not reduce the incidence of wound infection.

- C- section wounds are better closed with subcuticular sutures than staples to avoid postoperative wound complications which are higher with staples.

14.6 Antibiotic use

- Offer women prophylactic antibiotics at CS before skin incision. Inform them that this reduces the risk of maternal infection more than prophylactic antibiotics given after skin incision, and that no effect on the baby has been demonstrated.
- Prophylactic antibiotics at CS reduces the risk of postoperative infections.
- In Cefazolin 1gm IV/ Cefazolin + Azithromycin (for non elective CS) is the preferred choice .
- If the length of surgery exceeds 4 hours or blood loss is > 1500 ml, an additional intra op dose of same antibiotic given for pre incision prophylaxis is administered.

14.7 Thromboprophylaxis for CS

- Low molecular weight heparin to be given prophylactically after risk stratification.
- For the women who are low risk for thrombosis early ambulation is recommended.

14.8 Postoperative care

After CS, women should be observed on a one-to-one basis by a properly trained member of staff until they have regained airway control and cardiorespiratory stability and are able to communicate. Early maternal skin to skin contact with baby & breast feeding to be initiated (within 1 hour)

- After recovery from anaesthesia, observations (respiratory rate, heart rate, blood pressure, pain and sedation) should be continued every half hour for 2 hours, and hourly thereafter
- Provided that the observations are stable or satisfactory. If these observations are not stable, more frequent observations and medical review are recommended.
- Postoperative analgesia given.
- Providing there is no contraindication, non-steroidal anti- inflammatory drugs should be offered post-CS as an adjunct to other analgesics, because they reduce the need for opioids.
- Women who are recovering well after CS and who do not have complications can eat and drink when they feel hungry or thirsty.
- Removal of the urinary bladder catheter should be carried out once a woman is mobile after a regional anaesthetic and not sooner than 12 hours after the last epidural “top up” dose.

14.9.CS wound care should include:

- removing the dressing 24 hours after the CS
- specific monitoring for fever
- assessing the wound for signs of infection (such as increasing pain, redness or discharge), separation or dehiscence
- encouraging the woman to wear loose, comfortable clothes and cotton underwear, gently cleaning and drying the wound daily, if needed, planning the removal of sutures.

14.10 Complications of CS:

- Increased likelihood of blood transfusions
- Risk of anaesthesia
- Organ injury
- Infection
- Thromboembolic diseases
- Neonatal respiratory distress Long

term:

- Placenta accreta
- Uterine rupture
- Infertility
- Intraabdominal adhesions

Non clinical interventions to reduce unnecessary primary CS:

- Educational interventions for woman
- Evidence based clinical guidelines and second opinion
- Clinical guidelines, audit and feedback to health care professional
- Decision to delivery interval to be used as audit standards. Primary section rate to be kept around 20%

Reference :

1. *NICE guideline 2019.*
2. *WHO recommendations 2018.*
3. *ACOG practice bulletin September 2018.*