Management Protocols of Main Causes of Maternal Death

2016

Introduction

It is a great pleasure to present "Management protocols of direct and indirect causes of maternal deaths' to be implemented by all health facilities offering maternal health service including private ones as part of its policy to reduce maternal deaths, standardize patient care delivery and making pregnancy safer according to the best current available evidence that is applicable to our settings. This edition is considered a fundamental resource book that manages the top five causes of maternal death in Sudan to assist healthcare professionals to provide suitable care to patients. We hope that these protocols will be helpful and practical in applications for reducing maternal mortality in Sudan.

In conclusion, I would like to extend my deepest thanks and appreciation to the dedicated and hardworking reproductive health program' team and protocol development committee members for their work in these protocols.

Your comments and suggestions about this work are highly welcomed to improve the next edition, to be sent at the following address:

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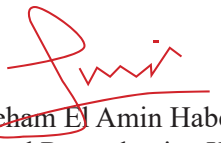

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Exective Summary

According to Sudan household survey 2010, the Maternal Mortality Ratio was 216 per 100,000 live births. Regrettably, nearly 70 percent of these deaths are preventable and could be eliminated with comprehensive, focused and collaborative efforts.

In April 2009, the FMOH developed proposal for the establishment of facility-based and community-based Maternal Death Reviews (MDR) aiming to reduce the maternal mortality and improving the quality of maternal care through implementation of maternal death reviews in referral facilities and communities. Then toward the end of the year 2009 the MDR system was approved and started to be implemented at the national level. In 2011, after implementation of Maternal Deaths Review (MDR) system, the main results showed the most common causes of death are; postpartum haemorrhage, complications of hypertension disorders, puerperal sepsis, liver diseases and acute venousthromboembolism. Therefore the NRHP in collaboration with Obstetrics and gynecology council nominate National Committee including a wide range of health professionals; Obstetricians, gynecologists, haematologists, internal medicine specialists and microbiologists who sat together to develop this management protocols aiming to tackle those five causes of the Maternal Deaths in the country. This management protocols manual is an important step towards reducing maternal deaths in the next few years. The consultation process was extensive and draft guidelines were circulated, revised many times, and re-circulated to all protocol development committee members. A special effort has been made to make these protocols applicable to the situation in Sudan.

The management protocols presented here are not casting stones, and as new developments occur and proven to be of benefit, they will be included in revised versions. However, these protocols are drawn from the best current available evidence and are the most suitable to Sudan' settings. Before dissemination of these protocols, training on appropriate implementation to all staff will be carried out, periodic audit will occurs at regular intervals and its feedback will lead to updates in the protocols and further improvements in clinical practice. The National Department of Health therefore intends to inspect institutions periodically, to ensure that protocols are available at all sites of maternity care in the country.

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Table Of Content

Part A: Postpartum Haemorrhage

Part B: Puerperal Sepsis

Part C: Hypertensive Dissorders with Pregnancy

Part D: venousthromboembolism

Part E: jaundice

List of Abbreviation

ACE	Angiotensin Converting Enzyme
APH	Antepartum Haemorrhage
ARM	Artificial Rupture of Membrane
BPP	Bio-Physical Profile
DVT	Deep Venous Thrombosis
FBC	Full Blood Count
HCG	Human Chorionic Gonadotropin
HEELP	Hemolysis. Elevated Liver enzymes. Low Platelet Level
LFT	Liver Function Test
MOH	Ministry of Health
PE	Pre-eclampsia
PPH	Postpartum Haemorrhage
PTE	Pulmonary Thrombo-embolism
RH	Reproductive Health
RFT	Renal Function Test
VTE	Venous Thromboembolism

Part A:
Post-partum Haemorrhage

Postpartum haemorrhage (PPH) can be classified into:

1. Primary postpartum haemorrhage: It is the loss of 500ml of blood or more from the birth canal within 24 hours of delivery. Primary postpartum haemorrhage can be minor (500-1000ml) without any sign of shock OR major (more than 1000ml) or any clinical signs of shock.
2. Secondary postpartum haemorrhage: It is defined as abnormal or excessive bleeding from the birth canal between 24 hours and 6 weeks postnatal.

1. Prediction and Prevention of PPH:

1. Identify high risk patients:
   - Multiple pregnancy
   - Previous history of PPH
   - Current anti-partum heamorrhage (APH).
   - Prolonged labour.
   - Polyhydramnios
   - Grand multipara
   - Sizeable baby.
2. Do active management of the 3rd stage of labour
3. In high risk cases commence oxytocin 30 units in 500 mls normal saline for three hours (40 drops /minute) following the third stage or misoprostol 600 mcg per rectum.
4. For women who delivered vaginally: give carbetocin IV bolus dose over 1 hour immediately after delivery of the fetus and before delivery of placenta.
5. For women with high risk for PPH: give carbetocin IM (100 mg) immediately after delivery of the fetus and before delivery of placenta.

2. Management of primary PPH

2.1 Management of Minor primary PPH:

1. Palpate the uterus and attempt to rub up contraction if the uterus is lax
2. Insert two wide-bore cannulas and give crystalloids.

- Cross-match at least two units of blood.
- Do full blood count (FBC).
- Commence oxytocin 30 IU in 500 ml saline, 40 drops/min.
- Monitor pulse and Blood Pressure (BP).

3. Catheterize the bladder, measure UOP.
4. If the uterus is still not well contracted give 10 IU oxytocin IV slowly or ergometrine 0.5 mg IM.
5. Exclude birth canal injuries.
6. Check whether the placenta is complete and proceed for manual removal if retained placenta is suspected.

2.2 Management of major primary PPH:

1. Call for help.
2. Assess breathing and maintain airway.
3. Position flat head down tilt.
4. Evaluate circulation, BP, pulse.
5. Insert two wide-bore cannulae.
6. Perform FBC & coagulation screen.
7. Cross match 6 units of blood and transfuse blood as soon as possible.
8. Until cross-matched blood is available infuse 3.5L of crystalloids and/or 1-2L of colloid.as rapid as required, give standby O negative blood.
9. Keep woman warm using appropriate available method.
10. Fresh Frozen Plasma 4 units for every 6 units of packed red cells.
11. Give platelet concentrate if platelet count <50,000.
12. Give Cryoprecipitate if fibrinogen level < 1g/L.
13. Documentation of fluid balance, blood, blood products and procedure.

2.3 Arresting the bleeding:

1. The commonest cause of major postpartum haemorrhage is uterine atony. However the clinical examination must be undertaken to exclude:

a) Retained product

b) Vulval, vaginal or cervical laceration or haematoma

c) Ruptured uterus

d) Broad Ligament haematoma

e) Uterine Inversion

f) Coagulation failure

g) Extra genital bleeding (sub capsular rupture)

2. When uterine atony is perceived to be the cause of the bleeding, the following mechanical and pharmacological measures should be instituted, in turn, until the bleeding stops:

a) Rubbing up the fundus to stimulate contraction

b) Bimanual uterine compression

c) Ensure bladder is empty (Foley's catheter in place)

d) Oxytocin 10 units by slow IV

e) Ergometrine 0.25 mg slowly IV or 0.5 IM injection (contraindicated in women with hypertension and heart disease)

f) Oxytocin infusion 40 units in 500ml normal saline at 125ml/hr

g) Misoprostol 600 mcg per/rectum

h) Carboprost (haemabate) 0.25mg IM injection repeated at interval not less than 15 minutes to a maximum of 8 doses (contraindicated in women with asthma)

i) Direct intramyometrial injection of carboprost 0.5mg

j) Intra-uterine Tamponade (Balloon or uterine pack).

3. If the mechanical and pharmacological measures fail to control the bleeding initiate surgical homeostasis sooner rather than later. The following surgical intervention may be attempted

depending on clinical circumstances and available expertise:

a) Laparotomy and heamostatic brace suturing (such as B-Lynch or modified compression sutures)

b) Bilateral ligation of uterine arteries

c) Bilateral ligation of internal iliac arteries.

d) Resort hysterectomy, sooner rather than later especially in case of placenta accreta or uterine rupture. Involve second consultant clinician in the decision for hysterectomy.

2.4 Intensive and high dependency unit:

Once the bleeding has been controlled and resuscitation has been completed continuous close observation in intensive care is required for early identification of continuous bleeding.

- Give prophylaxis antibiotics
- Give thromboprophylaxis

3. Management of Secondary PPH

1. Secondary PPH could be due to endometritis, retained placental products and choriocarcinoma.
2. For endometritis give:
   - Imipenum 500mg/8hrs (cheaper option) or Meropenum 1g/8hr plus Gentamicin 160mg IV once daily.

OR

- Augmentin 1.2 g//8hrs IV plus Gentamicin 160 mg IV once daily.

3. Surgical measure should be undertaken if there is excessive or continuing bleeding, irrespective of ultrasound findings. Senior obstetrician should be involved in decision and performance.
4. Do beta-HCG and treat accordingly.

Management of Postpartum Hemorrhage

Suspect	• Vaginal bleeding ٥٠٠ml or more after delivery of the baby.						
Assess	• Excess bleeding or shock soon after delivery • Uterus soft or contracted	• Excess bleeding or shock soon after delivery. • Uterus contracted	• Excess bleeding or shock soon after delivery. • Placenta not delivered • Uterus soft or contracted	• Position of maternal surface of placenta missing to torn membranes. • Sometimes immediate PPH. • Uterus contracted.	• Uterine fund not felt on abdominal palpation. • Slight or sever pain • Inverted uterus seen at vulva. • Immediate PPH&/or shock.	• Bleeding occurs more than ٢٤ hrs after delivery • Uterus softer and longer than expect for elapsed time since delivery. • Variable bleeding. • Foul smelling discharge. • Anaemia	• Excess bleeding or shock after delivery • Tender abdomen with free fluid. • Had uterine scar, prolonged labour or difficult vaginal delivery. • Immediate PPH or intra abdominal bleeding. • Shock, tender, abdomen, rapid maternal pulse
Classify	Atonic uterus	Tears of cervix or perineum	Retained placenta	Retinal placental bits	Inverted uterus	Delayed uterus	Ruptured uterus
Treat	• Resuscitate with IV fluid • Give uterine massage • Give oxytocin 20units in L IV fluid (60drops/m)&/ or ergometrine 0.2 mg IM or IV .Repeat after 15 min &if required every 4hrs(maximum dose -5) &/ or methyl prostaglandin F2 0.25 IM every 15 min if required (maximum dose -8) • Assess clotting status &give blood transfusion • Bimanual compression of uterus &/or abdominal compression of aorta. • If bleeding does not stop refer. Continue compression &resuscitation during	• Resuscitate with IV fluid • Repair the tear • Give blood transfusion if indicate	• Resuscitate with IV fluids &blood • Catheterize bladder. • Give oxytocin ١٠ units IM • Try delivery by controlled cord • If it failed attempt manual removal of the placenta under anesthesia • Consider placenta accrete if the placenta does not separate easily	• Resuscitate with IV fluid & blood. • Explore & remove the bits. (Think about placenta accrete if the placenta does not separate easily).	• Resuscitate with IV fluid & blood • In case of recent inversion, reposition the uterus after giving pethidine ١mg/kg IM & prophylactic antibiotics. • Refer to higher center if easy repositioning is not possible	• Resuscitate with IV fluid & blood according to severity. • Treat infection with appropriate antibiotics. • Give oxygen as infusion. • Explore uterus &remove placental bits if any	• Restore blood volume. • Normal saline or Ringer lactates. • When stable • Laparotomy should be performed immediately provided there are facilities to do a rrequired. • Otherwise refer the patient to tertiary centre after stabilization her condition.
Especial Note	Practice active management of third stage of labour in All cases. • Give oxytocin 10units IM on delivery of the fetus after ruling out twins. • Deliver placenta by controlled cord traction • Massage the uterus after delivery of the placenta to ensure contractions.			Prevention is better than cure Closely observe the patient after delivery at least two hours			

Part B:
Puerperal Sepsis

1. Introduction

Definition: Puerperal sepsis is any bacterial infection of the genital tract which occurs after the birth of a baby. It is usually more than 24 hours after delivery before the symptoms and signs appear. If, however, the woman has had prolonged rupture of membranes or a prolonged labour without prophylactic antibiotics, then the disease may become evident earlier.
Signs and symptoms usually include a fever greater than 38.0 °C or lesser than 36.0 °C, chills, lower abdominal pain, tender uterus, general malaise and possibly purulent, bad-smelling vaginal discharge and rarely light vaginal bleeding / and shock

Bacteria which cause puerperal sepsis:

Some of the most common bacteria are:

- streptococci
- staphylococci
- Escherichia coli (E.coli)
- clostridium tetani
- clostridium welchii
- chlamydia
- Klebsiellapneumoniae
- Gonococci (bacteria which cause sexually transmitted diseases).

2. Risk factors:

Some women are more vulnerable to puerperal sepsis, including:

- Protracted labour,
- Prolonged rupture of the membranes,
- Frequent vaginal examinations,
- A traumatic delivery,
- Caesarean section and
- Retained placental fragments.
- Those who are anemic and/or malnourished.

2. Management of puerperal sepsis:

- Suspect if temp of ≥38 °C or low ≤36 °C, Pulse Rate ≥ 120, RR ≥20, low BP (hypotension).
- Exclude foreign bodies from birth canal
- Check episiotomy site.

- Do FBC; WBC >12< 4
- Urine Analysis.
- High Vaginal swap
- Blood culture
- Assess other site of infection (breast, loin, perineal, calf).
- U/S
- Abdominal Scan (Retained product of conception).
- Start IV Antibiotic treatment for 72 hrs with:
- Imipenum 500mg/8hrs (more cheaper) or Meropenum 1g/8hr

Plus

Gentamicin single 160mg IV once daily

OR

AUGMENTIN 1.2 g//8hrs IV

Plus

Gentamicin single 160mg IV once daily.

- IV fluids.
- Drain any collection and remove any product.
- Treat anemia correctly.

Review after 72 hrs:

If the condition improving:

- Modify antibiotic treatment according to culture result and continue treatment for 7 days.

If the condition getting worse or no improvement:

- Reassess and **REFER** to higher centers.

Management of Puerperal Sepsis

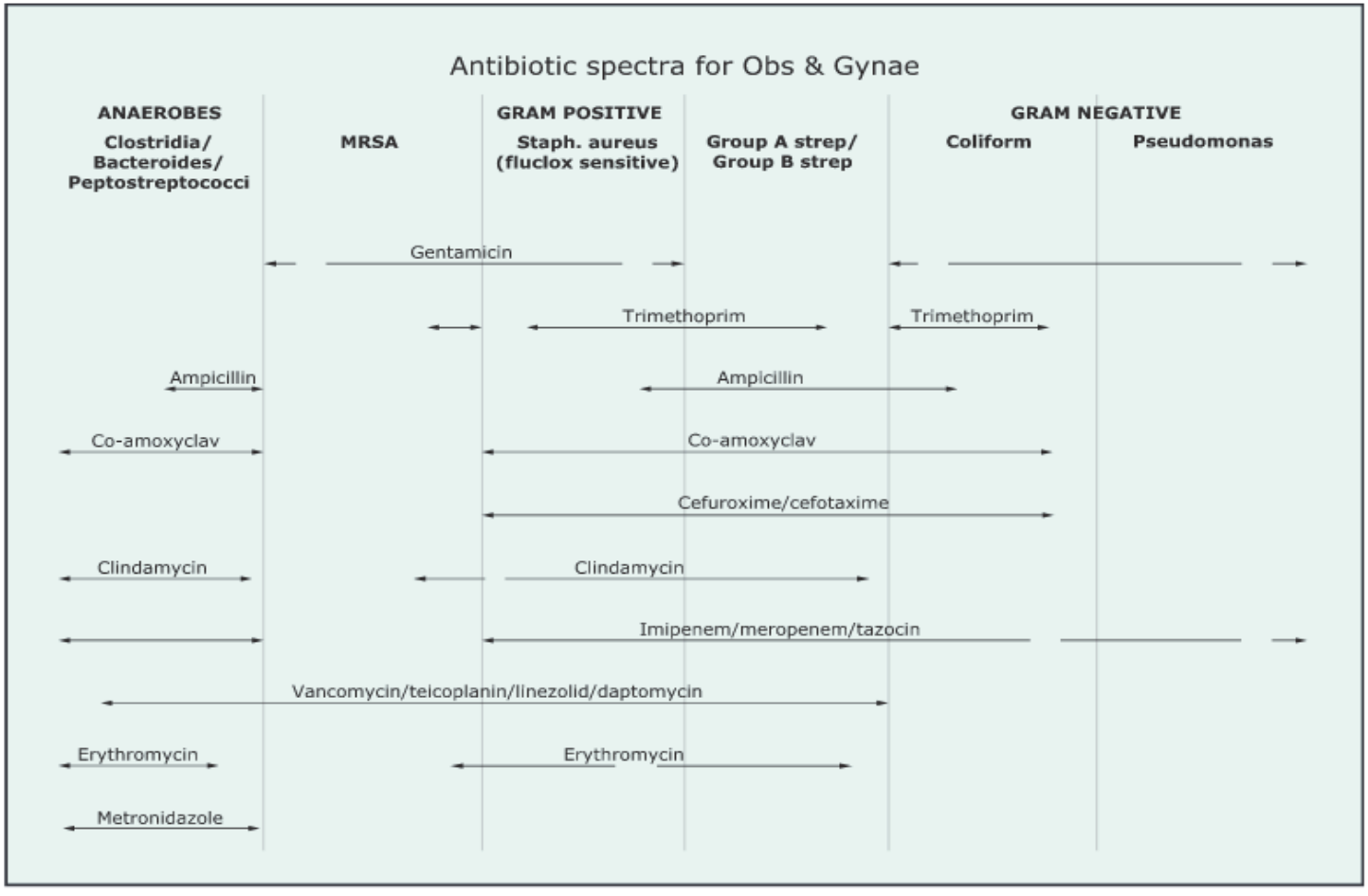
SUSPECT	Temperature: High ≥38 c or low ≤36 c on any day after the first post-delivery day	
ASSESS	Complete the general assessment that includes: • PR, RR 20, temp <38>36, BP (hypotension) systematic inflammatory response syndrome. • Urine output. • Uterine & Abdominal tenderness (painful &hard abdomen). • Foul smelling vaginal discharge. • Septic shock	• Fever 24 hrs or more after delivery. • Normal lochia with non-tender uterus. • Other focus of infection.
Classify	Puerperal Endometritis	Puerperal Sepsis due to other infections
Treat	• Give antibiotics. ◊ Option 1 • Imipenum 500mg/8hrs (cheaper) or Meropenum 1g/8hr Plus Gentamicin OD 160mg IV. ◊ Option 2 Augmentin 1.2 g//8hrs IV plus Gentamicin od 160mg IV once daily • Give IV fluids. • Drained any collection and remove any product. • Review 72 hrs, if improving continues for 7 days. • Modify the treatment according to the culture result or clinical assessment	• Identify cause for fever by examining : ◊ For breast tenderness ◊ For loin tenderness. ◊ For infection of perineal or abdominal wound. ◊ For respiratory infection. ◊ For malaria and other infectious diseases. ◊ For calf tenderness. • Give appropriate treatment for cause of fever.

Antibiotic protocol .3			
Chorioamionitis	Organisms	Antibiotic Choices / Options	Notes
Chorioamionitis	Mycoplasmataceae, Enterobacteriaceae, group B streptococcus, Staphylococcus aureus, Gardnerellavaginalis, Neisseria gonorrhoeae, Klebsiellapneumoniaeand Chlamydia trachomatis	Amoxicillin/Clavulanic 1.2 gm q12h + Gentamicin 1.5mg/kg IV q8-12h + Metronidazole 500mg IV q8h	
		Ampicillin 2 gr IV 6 hrly + Ciprofloxacin 200 mg IV q8-12h + Metronidazole 500mg IV q8h	
		Meropenum 1 gm IV q8h Or Imipenum 500mg/8hrs (cheaper option)	
Endomyometritis	Mycoplasmataceae, Enterobacteriaceae, group B streptococcus, Staphylococcus aureus, Gardnerellavaginalis, Neisseria gonorrhoeae, and Chlamydia trachomatis	Same as above	
Pyelonephritis & Urosepsis	Escherichia coli, Enterobacteriaceae, Enterococcus species, group B streptococcus, and Staphylococcus saprophyticus	Amoxicillin/Clavulanic 1.2 gm q12h +	
		Ciprofloxacillin200mgIV q8-12h Or Meropenum 1gmIV q8h Or Imipenum 500mg/8hrs (cheaper option)	

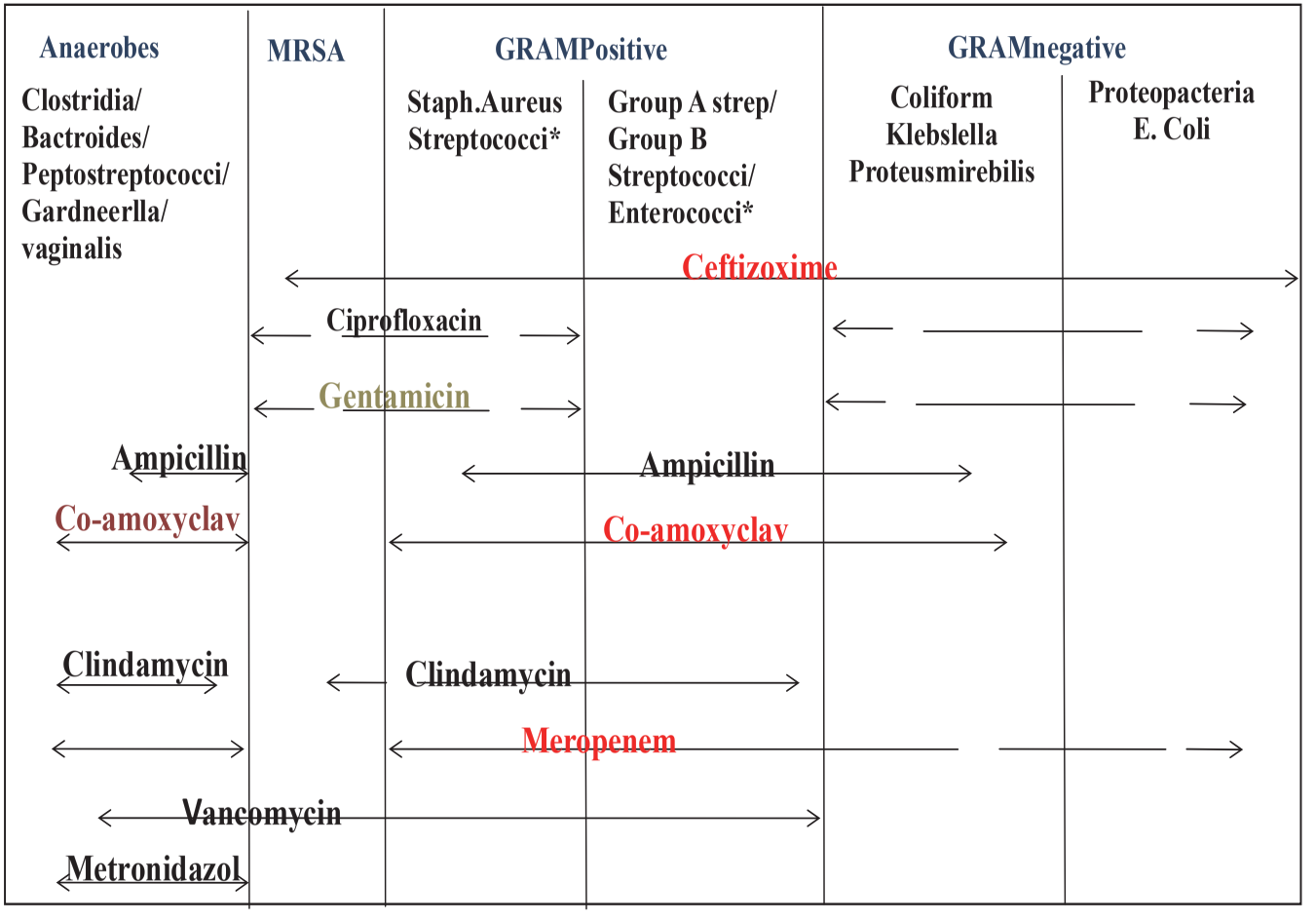
Antibiotic protocol .3			
Chorioamionitis	Organisms	Antibiotic Choices / Options	Notes
Peritonitis		Ciprofloxacillin 200mg IV q8-12h + Metronidazole 500mg IV q 8 h Or Meropenum 1 gmIVq 12h Or Imipenum 500mg/8hrs (cheaper option)	Assess for Laparotomy
Septic miscarriage/ Abortion	Bacteroides and Clostridium species, C trachomatis, N gonorrhoeae, Enterobacteriaceae, S aureus, and group A and group B streptococcus	Amoxicillin/Clavulanic 1.2 gm q12h + Gentamicin 1.5 mg/kg IV q 8hr + Metronidazole 500 mg IV q 8 h Or Cefurexime 750 mg IV 8 hr + Metronidazole 500 mg IV q 8 h OR Meropenum 1gm IV q 12 h Or Imipenum 500mg/8hrs (cheaper option)	

Antibiotic protocol .3			
Chorioamionitis	Organisms	Antibiotic Choices / Options	Notes
Infected Episiotomy/ Hematoma	Group A streptococcus, S aureus, Bacteroides and Clostridium species, and Enterobacteriaceae	Cloxacillin 500mg/6hrs PO -/+ Clindamycin 300 mg PO q 8 h	Surgical Drainage + Dressing
Mastitis/ Breast Abscess	MSSA, MRSA, Streptococci	Cloxacillin 500mg/6hrs PO if necessary	Drain the abscess
Unknown	MRSA, streptococci, Gram-negatives, (including ESBL + Pseudomonas), and anaerobes	Ciprofloxacin 200 mg IV q 12 hr + Metronidazole 500 mg IV q 8 hr Or Meropenem 1 g IV q 8 h Or Imipenum 500mg/8hrs (cheaper (option	If septic
Ucomplicated urinary tract infections (cystitis)		Nitrofurantoin 100mg q 8hr orally / 5 days	
Listoriosis (Listeria monocytogenes)	: Pregnant women Screening vaginal swab :Blood culture Isolation of gram negative bacillus Tumbling motility at 22c :Neonate Blood culture CSF culture	:Adult Ampicillin 1-2gm q 4-6hrly + Gentamycin 15mg/kg q8 hr :Neonate Ampicillin 400mg/kg q8-12 hr + Gentamycin 4-5mg/kg q 24-48 hrs	

4.1 Antibiotic Spectra for Obstetric Sepsis (RCOG protocol)



4.2 Antibiotic Spectra for Obstetric Sepsis (RCOG protocol)



Part C:
Hypertensive Disorders with Pregnancy

1. Introduction

The primary aims in the management of pre-eclampsia (PE) are to treat maternal hypertension, avoid eclampsia and deliver the fetus in optimal condition.
Mild to moderate pre-eclampsia where the woman is asymptomatic with a diastolic BP ≤ 110 mmhg diastolic and + or ++ proteinuria. It should be assessed and managed as follows:

2. Assessment of pre-eclampsia:

2.1 Assess the mother:

a. four hourly BP chart.
b. Strict fluid input – output chart
c. FBC If platelet is < 100,000 consider clotting profile. Clotting studies are not required if platelet count is over 100,000.
d. Bladder catheterization
e. Biochemistry: urate, renal profile including serum creatinine level, LFT,
f. 24 hours collection of urine for protein (++ or more).
g. Avoid ergometrine all through.
h. Plan delivery after stabilization.

2.2 Assess the fetus:

a. Ultrasounds scan for biometry, BPP and Doppler.
b. Fetal wellbeing test.

3. Timing and mode of delivery

This should be decided following discussion with the consultant. Depending on the gestational age it may be necessary to consider administering Antihypertensive and Dexamethasone before delivery.
NB: always considers delivery at 37 / 40 wks for moderate pre-eclampsia.

4. Severe Pre-Eclampsia (Fulminating Pre- Eclampsia) and Eclampsia

i. Diastolic ≤ 110, Systolic BP > 160 mmhg.
ii. > ++ proteinuria, > 3 g. protein in 24 hours or
iii. Disturbed hematological and biochemical indices.

Fulminating pre-eclampsia is characterized by hyperreflexia, epigastric pain, frontal headache, vomiting, flashing lights and clonus.

5. Management

5.1 Treatment and Prevention of Seizures

a) Call for help, turn woman onto left lateral position, secure airway and administer oxygen,
b) Insert two wide-bore cannula.
c) Insert Foley's catheter.
d) Give Magnesium Sulphate intravenously: loading dose of 4 gram over 5-10 minutes followed by a maintenance infusion of 1 g/h continued for at least 24 hours after the last seizure. If Magnesium Sulphate is not available administer IV Diazepam 10 mg slowly over one to two minutes. If no IV access: diazepam 10 mg PR.
e) If the seizures recur, give Magnesium Sulphate bolus dose IV of 2 g. If repeated seizures occur despite Magnesium Sulphate, consider Diazepam (10 mg. I.V.) or Thiopentone (50 mgs. I.V.). Diazepam should be used only as once, since prolong use of diazepam is associated with increase maternal death.
f) Intubation may become necessary.
g) In fulminating pre-eclampsia prophylactic Magnesium Sulphate would be administered as above.
h) Magnesium Sulphate therapy should be monitored by:-
i. Hourly oxygen saturation. (Alert anesthetist if it is below 95%).
ii. Hourly respiratory rate.
iii. Hourly knee jerk response.
iv. Hourly urine output.
v. Serum level should be checked in woman with oliguria (urine output < 100 mls/4 hour). Therapeutic range believed to be between 2-4 mmol/L.
i) Cessation / reduction of magnesium sulphate infusion should be considered if:
i. The biceps reflex is not present
ii. The respiratory rate is < 12 / minute
iii. Urine output < 25 mls/hour.

MgSo4 Antidote:

If loss of knee jerk response does not return within one hour of reducing or stopping infusion and there is respiratory depression, administer 1 gram Calcium Gluconate over 10 minutes.

5.2. Treatment of Hypertension

1. If When systolic BP is > 160 and diastolic BP > 110 or

2. Other markers of severe disease may indicate antihypertensive medication at lower degree of hypertension.
3. Give IV Hydralazine 5 mg bolus slowly repeated every 5-10 minutes if required to a maximum cumulative dose of 20 mg. For BP maintenance (to keep diastolic BP between 90 to100 mm Hg.) use infusion of 40 mg hydralazine in 40 mls saline, which should be run at 1-5ml/hr (1-5mg/hr). Hydralazine may cause fetal distress so continuous fetal heart monitoring is required and preload the circulation with acrystalloid.
4. If hyderalazine is not available give oral nifedipine, avoid sublingual administration, Atenolol, angiotensin converting enzyme inhibitor (ACE) and diuretics.

Any difficulty to control the blood pressure contact the anesthetist on call or the physician.

5.3. Fluid Therapy

Close monitoring of fluid intake and urine output is mandatory. Fluid therapy should be limited to maintenance crystalloid (85 ml/hr. or urine output in preceding hour plus 30 ml.).

5.4. Time of Delivery:

a. Delivery should be attempted only after seizures are controlled, severe hypertension controlled and hypoxia corrected.
b. If the patient is near term, the cervix is favorable and there is no contraindication to vaginal delivery. Induce the patient by ARM and oxytocin.
c. If the patient is far from term, and the cervix is unripe then caesarean section is mandatory.
d. If vaginal delivery is planned then the 2nd stage should be shortened by elective instrumental vaginal delivery.
e. The third Stage should be managed with 10 units of IV oxytocin not ergometrine

6. Complication:

Eclampsia is usually part of a multi-system disorder. Associated complications include:

- Heamolysis,
- Elevated liver enzymes and low platelets (H.E.L.L.P. syndrome),
- Disseminated intravascular coagulation,
- Renal failure.
- Adult respiratory distress syndrome.

7. Investigation:

a) Frequent blood tests to monitor haemoglobin, platelet count, transaminases, serum urate, urea and creatinine plus oxygen saturations are therefore necessary.
b) All findings should be recorded on 24 hour charts.
c) Insert two wide bore cannula and should be maintained at all times.
d) Blood pressure and pulse recorded every 15 minutes until stable and then half hourly then 2 hourly & then 4 hourly.
e) An indwelling Foley's catheter should be inserted and urine output monitored hourly. Urine should be checked for protein.
f) Oxygen saturation measured continuously and respiratory rate measured at least hourly.
g) Temperature 4 hourly.
h) Cerebral imaging (CT or MRI) is necessary to exclude haemorrhage and other serious abnormalities in women with focal neurological defects or prolonged coma.
i) High dependency unit (HDU) or intensive care unit with multidisciplinary team involvement.

8. Postnatal Management:

- Remember 45% of eclampsia occurs postpartum.
- Antihypertensive medication should be continued after delivery as dictated by blood pressure measurement.
- Continue on magnesium sulphate as mentioned before.
- Consider 6 wks Postnatal checkup.
- Persistent hypertension and proteinuria suggest renal disease and consider referral to physician.
- Do patient counseling.

Management of Pre-eclampsia/ Eclampsia

Suspect

- Blood pressure is 140/90mmg or greater or.
- The woman has pre-eclamptic symptoms convulsions or is found unconscious.

Assess

Mild to Moderate Pre-eclampsia	Sever Pre-eclampsia	Eclampsia
• Diastolic BP 90-110mm Hg. • Proteinuria ++. • No convulsions.	• Diastolic BP >110mm Hg. • Proteinuria +++ or more. • Headache blurred of vision, epigastric pain.	• Diastolic BP > 90 mm Hg. • Proteinuria ++. • Convulsions/coma.

Classify

Treat

Mild to Moderate Pre-eclampsia

- Advise rest &normal diet.
- No salt restriction
- Monitor BP & Proteinuria.
- Do not give diuretics.
- Prescribe methyldopa if diastolic BP>100 mm hg to lower between 90-100 mmHg.
- Monitor fetal growth by symphysis-fundal height measurement.
- Plan delivery at term or earlier if
  - Proteinuria worsens
  - There is significant IUGR.
  - BP control is unsatisfactory

Sever Pre-eclampsia

- Plan to delivery within 24 hr after stabilization.
- There is no place for expectant care in sever Pre-eclampsia.
- Reduce BP& prevent convulsions with magnesium sulfate as eclampsia.
- Watch for HELLP syndrome (H. Haemolysis, EL, Elevated liver enzymes, LP, Low platelet count..If detected refer to tertiary center)

Eclampsia

- Delivery must occur within 24 hr of onset of convulsion
- Monitor airway
  Give oxygen at 4-6L/minute
  Give oxygen at 4-6L/minute
- Protect the woman from injury
- Place the woman on her side
- Magnesium sulfate is drug of choice Anti convulsion
- If diastolic BP is above 100 mmHg give anti-hypertensive
- Do not reduce diastolic BP to less than 90mm Hg.
- Start *IV infusion* (Ringer lactate)do not give more than 60-90 ml /hrs
- Catheterize the bladder & monitor the fluid chart
- If urine output is less than 30 ml per hour withhold magnesium sulfate and infuse normal saline or ringer lactate.

- Watch for pulmonary oedema
- Never leave woman alone
- watch for aspiration following convulsion
- Observe vital signs, reflexes & fetal heart rate hourly
- Watch for coagulopathy using bed side clotting test failure of clot to form after 7 min &soft clot that breaks easily suggest coagulopathy
- Watch for HELLP syndrome

ANTI HYPERTENSIVE

- Give anti-hypertensive for pre-eclamsia when the diastolic BP>100 mmHg. For quicker onset of action give tablet nifedipine 10mg orally, avoid sublingual medication.
- If response is inadequate after 10 min, repeat the dose.
- Watch for possible interaction when nifidipine and magnesium sulfate are used together.

MAGNESIUM SULFATE SOLUTION

Loading dose:
Give magnesium sulfate 20%solution, 4 g IV over10-15 15 minute
Flow with 10g of 50%magnesium sulfate solution, 5g in each buttock deep IM with 1 ml of 2% xylocaine in the same syringe.
If convulsions recur after 15 minutes give 2 g magnesium sulfate (50% solution) IV over 10-15 minutes.

Maintenance dose:
5 g magnesium sulfate (50% solution) with 1 ml with 2%ligocine IM every 4hrs n alternate buttock
Continue treatment for 24hrs after delivery or after the last convulsion.
Watch respiratory rate .patellar reflex &urinary output.
Withhold the drug if the respiratory rate is below 16/min .patellar reflexes are absent .urinary Output is less than 30ml /hrs for the proceeding 4 hours
In case of respiratory arrest assist ventilation & dive calcium gluconate 1g (10ml of 10% solution IV slowly until respiration begins &the effects of magnesium sulfate are antagonized.

Key Points

Postpartum care

- Maintain anti convulsion therapy for 24 hr after delivery or at least convulsion whichever is later.
- Continue anti-hypertensive till diastolic BP reduced to 90 mmHg.

- Do not use ketamine in women with pre-eclampsia/ eclampsia
- Avoid Ergometrin all through.

Consider referral to tertiary center

- Oliguria persisting 48hrs after delivery ,Coagulopathy
- HELLP syndrome , Persistent coma more than 24hrs after convulsion

Part D:
Acute Venous Thromboembolism (VTE) in Pregnancy and the Puerperium

1. Introduction

The subjective, clinical assessment of deep venous thrombosis (DVT) and pulmonary thromboembolism (PTE) is particularly unreliable in pregnancy and minority of women with clinically suspected VTE has the diagnosis confirmed when objective testing is employed. However, VTE is up to ten times more common in pregnant women than in non-pregnant women of the same age and can occur at any stage of pregnancy but the puerperium is the time of highest risk.
Acute VTE should be suspected during pregnancy in women with symptoms and signs consistent with possible VTE, particularly if there are other risk factors for VTE.

The symptoms and signs of VTE include:

- Leg pain and swelling (usually unilateral, with calf circumference difference of 1.5cm is significant),
- lower abdominal pain,
- low-grade pyrexia,
- dyspnea,
- chest pain,
- Haemoptysis and collapse.

Diagnosis of acute VTE: Any woman with signs and symptoms suggestive of VTE should have objective testing performed expeditiously and treatment with low-molecular-weight heparin (LMWH) or unfractionated heparin (UH) until the diagnosis is excluded by objective testing, unless treatment is strongly contraindicated.
The involvement of obstetrician, physician, hematologist and radiologist is recommended for the objective diagnosis of suspected VTE.

2. Investigation:

2.1 Baseline blood investigations

Before anticoagulant therapy is commenced, blood should be taken for:

- Full blood count.
- Coagulation screen.
- RFTs & LFTs (as can influence anticoagulant therapy).
- Thrombophilia screen is not routinely recommended.
- D-dimer testing should not be performed to diagnose acute VTE in pregnancy.

2.2 Objective testing

VTE	PTE
Compression Doppler ultrasound: (The primary diagnostic test) • If confirmed: Continue anticoagulant treatment • If negative and low clinical suspicion: Stop treatment • If negative and high clinical suspicion exist: Continue treatment and repeat ultrasound In one week (if negative, stop treatment) When iliac vein thrombosis is suspected (back pain and swelling of the entire limb), contrast venography may be considered.	Chest x-ray: * May identify other pulmonary disease (pneumonia, pneumothorax or lobar collapse) * It is normal in >50% of those with PTE. * Abnormal features of PTE (atelectasis, effusion, focal opacities, regional oligaemia or pulmonary oedema). * Radiation dose to the fetus is negligible. • If x-ray abnormal with high clinical suspicion of PTE: V/Q (ventilation-perfusion lung scan). Or CTPA (computed tomography pulmonary angiogram) should be done. • If x-ray normal: Bilateral Doppler ultrasound leg studies should be done (a diagnosis of DVT indirectly confirm a diagnosis of PTE and, since anticoagulant therapy is the same, further investigations may not be necessary. This limit radiation doses to mother & baby) • If x-ray and Doppler both normal with persistent clinical suspicion: V/Q scan or CTPA should be done. • If V/Q scan or CTPA & Doppler both normal but clinical suspicion is high: • A repeat testing should be done & anticoagulant should be continued until PTE is definitively excluded.

3. Treatment

Initial anticoagulant treatment of DVT & PTE in pregnancy
In clinically suspected DVT or PTE, treatment with LMWH or UH should be given until the diagnosis is excluded by objective testing, unless treatment is strongly contraindicated.
(LMWH has equivalent efficacy to UH in the initial treatment of PTE)

Advantages of LMWH compared with unfractionated heparin:

- Lower risk of bleeding
- Heparin-induced thrombocytopenia (no cases of associated thrombosis reported).
- Heparin-induced osteoporosis.

Calculation of unfractionated Heparin (UH):

- I.V loading dose = 5000 I.U (80 units/kg) over 20 minutes, followed by either:
  - Continuous IV. infusion = 15 – 25units/kg/hr (average 18 units/kg/hr)
  - OR intermittent subcutaneous injections = 15000 units / 12 hourly Or 250 units/kg/12 hourly
- It is mandatory to measure activated partial thromboplastin time (APTT)
  - 4-6 hours after the loading dose,
  - 6 hours after any dose change
  - Then at least daily when in the therapeutic range.
- The infusion rate should be adjusted according to the APTT as shown in table (1)

(The therapeutic target APTT ratio 1.5-2.5 times the control)

Table (1): Infusion rates according to APTT:

APTT ratio	Dose change u/kg/hour	Additional action	Next APTT (hours)
< 1.2	+ 4	Re-bolus 80 u/kg	6
1.2 – 1.5	+ 2	Re-bolus 40 u/kg	6
1.5 – 2.5	No change		24
2.5 – 3.0	- 2		6
> 3.0	- 3	Stop infusion 1 hour	6

Table (2): Calculation of initial doses of LMWH for treatment during pregnancy

Initial dose	**Weight (kg)**			
	< 50	**50–69**	**70–89**	**> 90**
Enoxaparin (Clexane)	40 mg Bd	60 mg bd	80 mg bd	100 mg bd
Tinzaparin (Innohep)	175 units/kg once daily (all weights)			

Routine measurement of peak anti- Xa activity for LMWH is not recommended, except:

- At extremes of body weight: <50 kg and >90 kg
- Other complicating factors (e.g. renal impairment or recurrent VTE) putting them at high risk.

(Aim to achieve a peak anti-Xa 3 hours post injection, of 0.5-1.2 u/ml)

In the initial management of DVT:

- Elevate the leg and apply a graduated elastic compression stocking to reduce edema.
- Mobilization with graduated elastic compression stockings should be encouraged (this reduces pain & swelling faster and can prevent post-thrombotic syndrome).
- Stockings should be taken off at night and no need to be worn on the unaffected leg.

Consider the use of a temporary inferior vena cava filter in the perinatal period:

- For women with iliac vein VTE, to reduce the risk of PTE
- Or, in women with proven DVT and who have continuing PTE despite adequate anticoagulant.

Consider surgical embolectomy or thrombolytic therapy if DVT threatens leg viability through venous gangrene.

Protamine sulfate (heparin antidote):

- The 5ml ampule contains 50mg (10mg/ml)
- 1ml (10mg) neutralizes 1400 units of unfractionated heparin.
- 1ml (10mg) neutralizes 1000 units of Tinazaparin (innohep).
- 4. Thromboprophylaxis during Pregnancy &the Puerperium

4.1 Introduction

- Pregnancy is a risk factor for VTE (10 fold increase compared with non-pregnant).
- Some women are at even higher risk because they have one or more additional risk factors.
- Regardless of their risk of VTE, immobilisation of women during pregnancy, labour, & the puerperium should be minimised & dehydration should be avoided.

All women should undergo an assessment for risk factors:

- Ideally in early pregnancy or before pregnancy.
- Repeat assessment if she is admitted to hospital or develops other inter-current problems.
- Reassess before or during labour.

4.2 Risk factors for prophylaxis

1. Individual risk factors
2. Previous VTE and/or Thrombophilia (inherited or acquired).

Inherited & Acquired Thrombophilia	
Inherited	Acquired
Protein C deficiency Protein S deficiency Anti-thrombin deficiency Factor V Leiden Prothrombin (PT) gene variant	Lupus anticoagulant (LA) Anticardiolipin antibodies (aCL)

- Women with previous VTE should be screened for inherited and acquired thrombophilia, ideally before pregnancy.
- The diagnosis of a past VTE can be assumed if the woman gives a good history & received prolonged (6-12 wks) therapeutic anticoagulation.

4.3 Management

4.3.1 Management of Anti- Phospholipids Syndrome (APS)

Is defined as the presence of "Lupus anticoagulant" (LA) and/or anticardiolipin antibodies (ACL) and/or β2-glycoprotein antibodies of medium-high titre at 2 occasions12wks apart, found in association with a H/O thrombosis (arterial or venous) or adverse pregnancy Outcome:

- Recurrent miscarriage before 10 wks gestation.
- A fetal death after 10 wks gestation.
- Or a premature (<35 wks) birth due to severe PET or IUGR.

<table>
<tr><th colspan="4">4.3.2 Antenatal Assessment and Management (assess at booking & repeat if admitted)</th></tr>
<tr><td>High Risk</td><td>• Single previous VTE +
• Thrombophilia or family history
• Unprovoked / estrogen-related
• Previous recurrent VTE (>1)</td><td colspan="2">Require antenatal heparin prophylaxis</td></tr>
<tr><td>Intermediate Risk</td><td>• Single previous VTE with no thrombophilia or family history.
• Thrombophilia + no VTE
• Medical co-morbidity
(e.g. heart or lung disease, SLE, cancer, inflammatory conditions, nephritic synd., sickle cell dis., I.V. drug users, surgical procedures as appendicectomy)</td><td colspan="2">Consider antenatal heparin prophylaxis</td></tr>
<tr><td rowspan="2"></td><td rowspan="2">• Age >35 years
• BMI >30 (booking weight)
• Parity ≥ 3
• Smoker
• Gross varicose veins
• Current systemic infection
• Immobility ≥3 days (e.g. paraplegia, SPD, long-distance travel >4 hours)
• Pre-eclampsia
• Dehydration/hyperemesis/OHSS
• Multiple pregnancy or ART
• Gross varicose veins: symptomatic, above knee or associated with phlebitis/ odema/ skin changes.
• ART: assisted reproductive therapy
• SPD: symphysis pubis dysfunction with reduced mobility.
• Thrombophilia: inherited or acquired.</td><td>Intermediate Risk
≥3 risk factors
≥2 if admitted</td><td>Consider antenatal heparin prophylaxis</td></tr>
<tr><td>Lower Risk

< 3 risk factors</td><td>Mobilization & hydration</td></tr>
<tr><th colspan="4">4.3.3 Postnatal Assessment and Management (assess in delivery suite)</th></tr>
<tr><td>High Risk</td><td>• Previous VTE + anyone requiring antenatal heparin.</td><td colspan="2">At least 6wks postnatal prophylactic heparin</td></tr>
<tr><td>Intermediate Risk</td><td>• Emergency C.S.
• Asymptomatic thrombophilia (inherited or acquired).
• BMI > 40
• Prolonged hospital admission.
• Medical co-morbidity
(e.g heart or lung disease, SLE, cancer, inflammatory conditions, nephrotic synd., sickle cell dis., I.V. drug users, surgical procedures as appendicectomy).</td><td colspan="2">At least 7 days postnatal prophylactic heparin.

(note: if persisting or >3 risk factors, consider extending prophylactic heparin)</td></tr>
</table>

	• Age >35 yrs • BMI >30 (booking weight) • Parity ≥ 3 • Smoker • Elective C.S. • Any surgical procedure in preg. • Gross varicose veins • Current systemic infection • Immobility ≥3 days (e.g paraplegia, SPD, long-distance travel >4 hours) • Pre-eclampsia • Mid-cavity rotation operative delivery. • Prolonged labour >24 hours. • PPH > 1 litre or blood transfusion.	**Intermediate Risk** **≥2 risk factors** **Lower Risk** **One risk factor**	At least 7 days postnatal prophylactic heparin. (note: if persisting or >3 risk factors, consider extending prophylactic heparin) Mobilization &hydration

4.4 Protocol for Thromboprophylaxis in Women with Previous VTE and/or Thrombophilia

Risk	Previous VTE &/or thrombophilia status	Prophylaxis
Very high	• Previous VTE on long-term warfarin. • Antithrombin deficiency • APS with previous VTE	Antenatal high prophylactic dose Heparin& at least six wks of postnatal heparin/ warfarin.
High	• Previous recurrent VTE or unprovoked VTE. • Previous estrogen-provoked (pill or preg.) VTE • Previous VTE + thrombophilia. • Previous VTE + family history of VTE. • Asymptomatic thrombophilia (combined defects, homozygous Factor VLeiden).	Antenatal and sixwks postnatal prophylactic Heparin
Intermediate	• Single previous VTE (associated with transient risk factor no longer present) without thrombophilia, family history or other risk factors	Consider antenatal heparin (but not routinely recommended). Six wks of postnatal prophylactic Heparin recommended.
Low	• Asymptomatic thrombophilia (except Anti-thrombin deficiency, combined defects, homozygous Factor V Leiden)	7 days postnatal prophylactic heparin (or 6 wks if other risk factors)

» Low-dose aspirin improve preg. Outcome in APS & is recommended for all women with APS.
» The presence of antiphospholipid antibodies with no previous APS (thrombosis or preg. loss) doesnot requires antenatal Heparin or low-dose aspirin, but 7 days postnatal prophylactic heparin.
» Women with APS identified because of recurrent miscarriage may not require Heparin for 6 wks postpartum but should receive Heparin for 7 days.

Contra-indications for LMWH:

1. Active antenatal or postpartum bleeding.
2. Women at increased risk of major haemorrhage (placenta praevia)
3. Bleeding diathesis (e.g. Von Willebrand dis., haemophilia or acquired coagulopathy)
4. Thrombocytopenia (< 75)
5. Acute stroke in last 4 wks (ischemic or haemorrhagic)
6. Severe renal dis. (GFR<30ml/min/1.73sq.m.)
7. Severe liver dis. (prothrombin time above normal range or known varices)
8. Uncontrolled hypertension (diastolic >120 or systolic >200)

Antenatal Prophylactic and Therapeutic doses of LMWH		
Prophylaxis	Enoxaparin(100 u/mg)	Tinzaparin
Wt< 50 kg	20 mg daily	3500 units daily
Normal body wt (50-90 kg)	40 mg daily	4500 units daily
Wt> 91 - 130 kg	60 mg/day*	7000 units/day*
131 – 170 kg	80 m/day*	9000 u./day*
>170 kg	0.6 mg/kg/day*	75 u./kg/day*
High prophylactic dose for weight 50-90 kg	40 mg 12-hrly	4500 units 12-hrly
Therapeutic dose	1 mg/kg/12-hrly antenatal	
1.5 mg/kg/day postnatal	175	its/kg/day

*May be given in two divided doses.

LMWHs are the agents of choice for antenatal thromboprophylaxis. They are as effective as and safer than unfractionated heparin in pregnancy (prophylactic dose 5000 u. 12 hourly – no APTT monitoring required).

4.5 Timing & Duration of Thromboprophylaxis

4.5.1 Antepartum:

- VTE during pregnancy has an equal distribution throughout gestation.
- Prophylaxis should begin as early in pregnancy as routine practic.

4.5.2. During Labour and Delivery

- Continue prophylactic heparin dose during labour or delivery.
- Withhold high prophylactic or therapeutic doses of Heparin if she goes into labour or reduce to prophylactic dose on the day before IOL or EL.C.S and continue in this dose during labour.
- If the woman is of normal weight, the dose of unfractionated heparin is 5000 units 12 hourly.
- Regional anaesthesia should not be used until at least 12 hours after the previous prophylactic dose of LMWH (24 hours if on therapeutic LMWH)& 8 hrs if prophylactic unfractionated heparn.
- For delivery by elective C.S., prophylactic dose of LMWH should be given on the day before delivery. On the day of delivery, omit the morning dose and the operation performed that morning and the prophylactic LMWH should be given by 3 hours post-operatively (or 4 hrs after insertion of or removal of epidural catheter)

4.5.3 Postpartum

- Women on postpartum 7days heparin should complete the course at home if discharged early.

4.6 Graduated Elastic Compression Stockings:

- Recommended for all women with previous VTE or thrombophilia throughout pregnancy. & for 6-12 wks postpartum (below knee).

Part E:
Jaundice in Pregnancy

1. Introduction

This occurs in about 1 in 1,000 pregnancies and is most common due to viral hepatitis.

- Etiology: Classification is traditionally into the following categories: Hemolytic, Hepatocellular, and Obstructive.
- Causes: may be consequential to, or independent of, the pregnancy.

Hemolytic: septicemia, malaria& Incompatible blood transfusion
Hepatocellular: Viral hepatitis, severe preeclampsia, acute fatty liver of pregnancy, Alcohol and drugs (e.g. halothane), autoimmune chronic active hepatitis
Obstructive: Cholestasis of pregnancy, Cholelithiasis, Drugs (e.g. Chlorpromazine), Primary biliary cirrhosis and pancreatic carcinoma.

2. Clinical approach to diagnosis

Careful history and examination

2.1 History:-

- Duration of illness
- Recent outbreak of jaundice.
- Blood transfusion &drugs taken.
- Travel history.
- Family history.
- Pruritus.
- Fever or rigors.
- Obstetrical history, gestational age. Previous history of jaundice especially during pregnancy, HELLP syndrome, acute fatty liver &intra hepatic cholestasis.

2.2 Examination: -

- General examination include pallor ,degree of jaundice & blood pressure
- Looking for the signs of chronic liver disease
- Hepatomegaly.
- Splenomegaly.
  Ascites.
- looking for signs of encephalopathy
- Palpable gall bladder
- Obstetric examination including fundal level and viability.

2.3 Laboratory Tests;

- Total serum bilirubin level (direct & indirect)
- Liver enzymes
- Urine for bilirubin, urobilinogen & proteins
- CBC
- Coagulation profile
- Blood film for malaria
- HB electrophoresis
- Blood sugar
- Renal function tests
- Viral screen
- U/S liver& gallbladder ,gestational age and fetal well being

3. Principals Of Management

1. Hospitalization and nursing care (ICU/ HDU nurse role).
2. Special nutrition and diet (dietician role)
3. Medical care (Hepatologist/ Physician role)
4. Neonatology care for the neonate (neonatologist)
5. Obstetric care (Obstetrician role) .Termination of Pregnancy is indicated for HELLP syndrome, acute fatty liver irrespective to gestational age while termination of pregnancy in acute viral hepatitis of no benefit and it may even harm the patient.

4. Acute Viral Hepatitis

Is the most common cause of jaundice in pregnancy:

- Hepatitis viruses A.B,C.D or E
- Cytomegalovirus (CMV)
- Epistein-Barr virus (EBV)
- Herpes simplex virus (HSV)

Incidence of hepatitis varies greatly around the world: from 0.1% in developed countries upto 20% in developing countries.

4.1 Hepatitis A:

- Transmission through oro-fecal route, usually adult females in developing countries are immune to virus A because of previous infection in childhood.

- Disease usually lasts 2-3 weeks with death in <1% of patients and no chronic form.
- Pregnant women exposed to the virus can be given immune globulin within 2 weeks of exposure together with vaccine.
- Not clear if virus transmitted from mother to baby and if IgM is present in mother during third trimester, prophylactic treatment of the neonate is probably unnecessary.

4.2 Hepatitis B:

- Blood borne, sexual and vertical transmission
- The presence of HBeAg is associated with a very high risk of neonatal infection.
- Infants of HBsAg+ve women should receive hepatitis B immune-globulin immune-prophylaxis at birth AND hepatitis B vaccine at one week, one month and six months old. This regime reduces the incidence of hepatitis B vertical transmission to <3%.
- The prevalence of neonatal infection depends on the time during gestation that maternal infection takes place: rare in first trimester, 10% in second trimester and 70-85% of those in the third trimester.

4.3 Hepatitis C:

- No therapy has been shown to influence the neonatal transmission of hepatitis C virus
- Interferon should not be used during pregnancy because of possible adverse effects on the fetus
- Transmission is increased in mothers with higher viral load (upto 33% in those with viral load >1019 copies per mL
- Blood-borne, sexual and vertical transmission.

4.4 Hepatitis D:

- Blood-borne, sexual and vertical transmission.
- When present with hepatitis B it increases the incidence of acute hepatic failure.

4.5 Hepatitis E:

- It is a waterborne virus spreading through oro-fecal transmission, always in epidemic form.
- Rare in the developed world but in developing world's where it is more common, responsible for high level of fulminant hepatic failure and mortality in pregnant women (20%).

5. Mangement:

5.1 Management of acute jaundice

Pregnant women with acute jaundice should be admitted to hospital for evaluation before deciding to treat her as outpatient case. Isolation of the patient is not necessary but we have to be careful regarding needle stick in cases of hepatitis B & C

Treat the patients with hepatitis as in patient if there is;

- Intractable vomiting, with significant electrolyte or fluid disturbances.
- Signs or symptoms suggestive of severe complications.
- Evidence of hepatic encephalopathy (altered mental status, agitation, behavior or personality changes, or changes in sleep-wake cycle).
- Laboratory findings suggestive of severe disease (prothrombin time (PT) longer than 3 seconds, a bilirubin level greater than 30 mg/dl, hypoglycemia).

NOTE:

◊ Avoid use of any potential hepato-toxins and NISAD (GIT bleeding).
◊ Advice patients to avoid prolonged or vigorous physical exertion until their symptoms improve.
◊ IV fluid to avoid hypoglycemia and hypernatremia.
◊ Antiemetic like metoclopramide can be used safely.
◊ Ranitidine for protection against peptic ulcer
◊ Lactulose should be used for sterilization of the bowel and as laxative
◊ Treat any suspected infection vigorously, repeated blood culture is advisable
◊ Prophylactic antibiotics routinely used in impending liver failure.
◊ Universal precaution should be implemented all the time
◊ Staffs have to be careful regarding needle stick in cases of hepatitis B, C & D
◊ Infection control measures in hepatitis A and E (hand washing/reverse barrier nursing)

Neonatal care:

◊ Immune-globulin and vaccination for the neonates of pregnant women with viral hepatitis
◊ Breast feeding is not contraindicated
◊ hepatitis B. vaccination for the husband if not infected

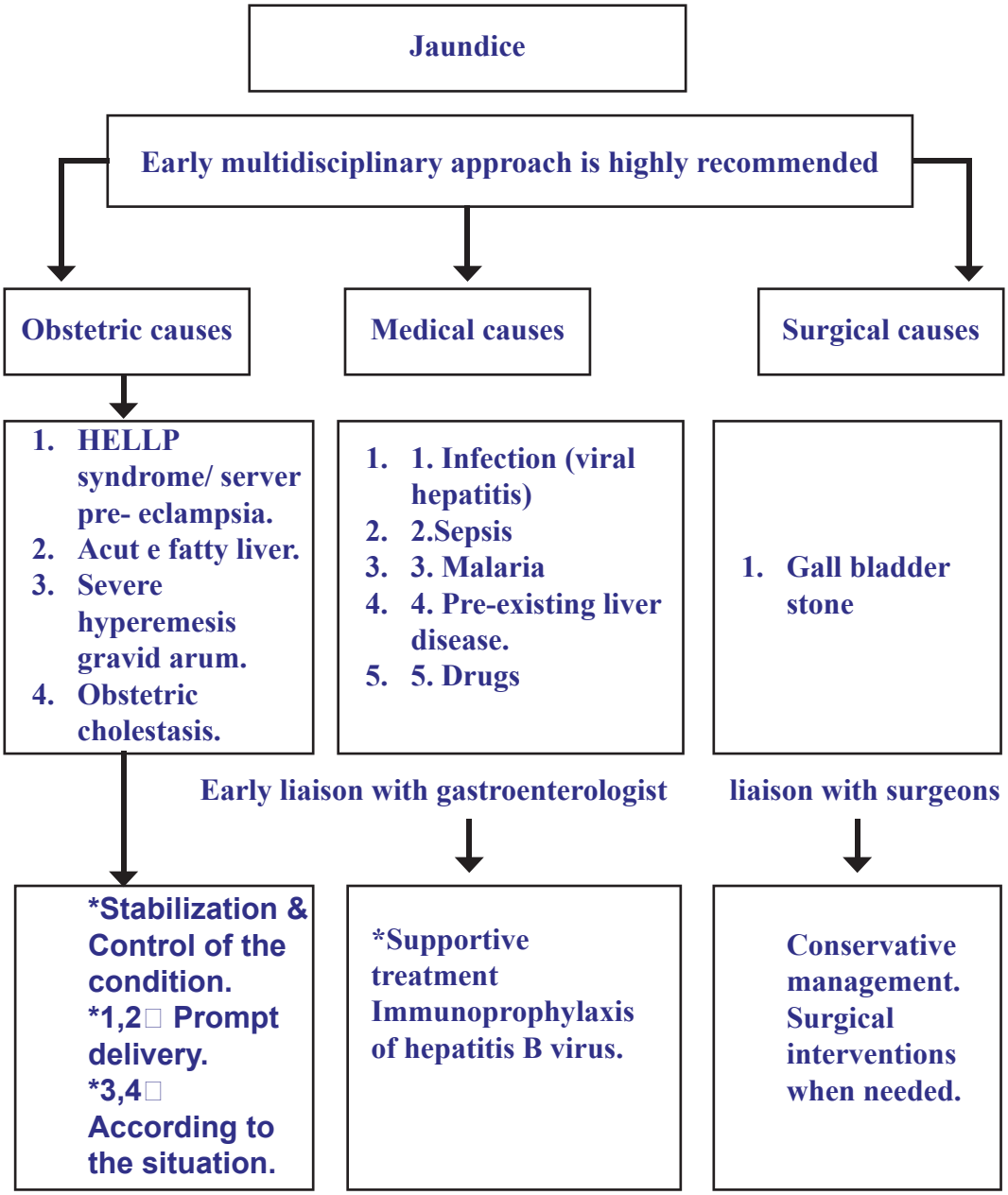
5.2 Management of Acute liver failure (physician involvement is important):

- The most important aspect of treatment in patients with acute liver failure is to provide good intensive care support
- Coagulation parameters, complete blood cell count, and metabolic panel should be checked frequently.

- Serum aminotransferases and bilirubin are generally measured daily to follow the course of infection.
- Patients with grade I encephalopathy may sometimes be safely managed in a medical ward. Frequent mental status checks should be performed, and transfer to an ICU is warranted with progression to grade II encephalopathy.
- Patients with grade II encephalopathy – or more - should be managed in the intensive care unit (ICU) for monitoring. As encephalopathy progresses, protection of the airway becomes increasingly important
- Patients in the advanced stages of encephalopathy require close follow-up care. Monitoring and management of hemodynamic and renal parameters, as well as glucose, electrolytes, and acid/base status, become critical.
- Frequent neurologic evaluation for signs of elevated ICP should be conducted.
- If there clinical signs of elevated intracranial pressure (ICP), including hypertension, bradycardia, irregular respirations, papillary dilatation or signs of decerebration, Mannitol should be started to decrease cerebral edema. IV Mannitol (in a bolus dose of 0.5-1 g/kg or 50-100 g) is recommended. The dose may be repeated once or twice, as needed, provided that serum osmolality has not exceeded 320 mOsm/L.
- If life-threatening ICP is not controlled with Mannitol infusion and other general management as outlined above, hyperventilation may be instituted.
- Other therapies used to decrease ICP but not routinely recommended .include hypertonic saline, barbiturates, and hypothermia
- Volume overload and acute renal impairment may necessitate dialysis
- Patients with acute liver failure are, by necessity, on nothing by mouth (NPO) status. They may require large amounts of IV glucose to avoid hypoglycemia.
- When enteral feeding via a feeding tube is not feasible (eg, as in a patient with paralytic ileus), institute total parenteral nutrition (TPN), but severe restriction of protein may not be necessary.
- Patients with known or suspected herpes virus or varicella zoster as the cause of acute liver failure should be treated with acyclovir
- Patients with acute liver failure due to autoimmune hepatitis should be treated with corticosteroids (prednisone, 40-60 mg/day)
- Sedation should be avoided if possible. Unmanageable agitation may be treated with short-acting benzodiazepines in low doses .Seizure might be treated with low-dose benzodiazepines or phenytoin
- Causes of death are sepsis, coagulopathy, hypoglycemia, & hepato-renal failure.

Pathway of Diagnosis and Management of Jaundice in Obstetric Patients

Care pathway for jaundice in pregnancy



Pathway of Diagnosis and Management of Jaundice in Obstetric Patients

Topics Covered:		Target Audience:
• Hyperemesis Gravidarum (1st trimester) • Acute viral hepatitis • HELLP (3rd trim.) • Acute fatty liver(3rd) • Obstetric cholestasis (3rd) • Drug induced hepatitis • Sepsis/malaria/	○ Early multidisciplinary approach is highly recommended including, obstetric, Medical, neonatal care, intensivist and dietician. ○ Patient should always be admitted to hospital for evaluation, observation and establishment of a consensus plan of management before considering outpatient treatment ○ Causes of death: Coagulopathy, Hypoglycemia , Hepato-Renal Failure and Sepsis,	• House officers, Registrars & Consultants **Health Care Setting:** • Emergency Departments. • Labor Room • Obstetric Wards • ICU.

❑ A- history: Obstetrical history: Gestational age at presentation

- First trimester.
- Second trimester
- third trimester
- jaundice during Previous pregnancy

❑ Yes ❑ No

If answer is yes, what was the diagnosis

- HELLP Syndrome/Severe Preeclampsia
- Acute fatty liver
- Obstetric cholestasis.

- **Medical History: Space for the detailed information**
- Duration of illness in weeks
- Recent outbreak of jaundice/contact.
- Blood transfusion
- drugs usage
- Family history of jaundice.
- Pruritus
- Fever or rigors.
- History of pre-existing liver disease
- Travel.

Examination: refer to manual in details

- Pallor
- Jaundice
- Blood pressure/Vital signs
- Hepatomegaly.
- Splenomegaly.
- Signs of chronic liver disease
- Signs of encephalopathy
- Palpable gall bladder
- Ascites.

Obstetric examination

- fundal level (wks)
- viability of fetus

Investigations :

Laboratory Tests

- CBC
- Renal profile
- Uric acid level
- Blood sugar
- Urine Chemisrty proteins, casts, ketones& suga,r, bilirubin , urobilinogen, pus cells,RBCs,
- LFT : bilirubin.
- Coagulation profile
- B.F.For Malaria
- Viral screen (A,B,C,E,EBV & CMV,HIV)

Imaging

- **U/S abdomen for:**
- liver & gallbladder
- Gestational age and fetal well being.

Workup and management plan for obstetric causes of jaundice

Hyperemesis G.	**HELLP**	**Acute Fatty Liver**	**OB Cholestasis**
Diagnosis Confirmation Clinically and Ketonuria	Diagnosis Confirmation Clinically & laboratory	Diagnosis Confirmation Clinically. laboratory	Diagnosis Confirmation Clinically. Laboratory*
Admission	Admission	Admission	Consider admission
Organs Functions test, CBC,, ,, RFT..LFT, TFT	Organs Functions test,, CBC,,coagulation profiles,,, ,,RFT..LFT	Organs Functions test,, CBC,,coagulation profiles,,, ,,RFT..LFT	Symptomatic treatment for itching
Rehydration RL , 9% NS **Avoid Dextrose**	Blood pressure control - Hydralazine	**Hypoglycemia management (Dextrose 50%)**	Fetal surveillance reasonable maturity & fetal death is expected
Electrolytes correction	Fit prophylaxis $MgSO_4$	**Vit. K+FFP (Coagulopathy management)**	Nutritional support Vit. K
.Antiemetic& H2 blockers	Thrombocytopenia management	Management of associated Preeclampsia	Liver enzymes may be normal or mildly elevated
Nutrition/B6	Termination of Pregnancy	Termination of Pregnancy	Dexamethazone inj 12mg 12 hrly at least 24 hrs
H. Pylori screening	Fluids management	Fluids management	
Psychological support	Guard against PPH	Guard against PPH	Consider delivery.
Thromboprophylaxis	**Dexamethazone 12 mg 12 hourly aims improvement of hepatocelluar functions**		*10% of Obstetric Jaundice(LFT mildly elevated)+high bile acids
Steroids			
Termination of pregnancy			Induction of labor

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