GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Bae Abertawe
Swansea Bay University Health Board

Guideline for management of severe pre-eclampsia

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Contents

1. Introduction

This guideline is written to aid health professionals in the management of women and birthing people who develop severe pre-eclampsia and eclampsia. The guidance encompasses the principles within the NICE clinical guidance (NG133) “Hypertension in pregnancy: diagnosis and management”

2. Definitions used in the guideline

Pre-eclampsia

New onset of hypertension (over 140 mmHg systolic **or** over 90 mmHg diastolic) after 20 weeks of pregnancy and the coexistence of 1 or more of the following new-onset conditions:

- proteinuria (urine protein: creatinine ratio of 30 mg/mmol or at least 1 g/litre [1+] on dipstick testing)
- other maternal organ dysfunction:
    - renal insufficiency (creatinine ≥90 micromol/litre)
    - liver involvement (ALT or AST over 40 IU/litre with or without right upper quadrant or epigastric abdominal pain)
    - neurological complications (eclampsia, altered mental status, blindness, stroke, clonus 3 beats, severe headaches or persistent visual scotomata)
    - haematological complications such as thrombocytopenia (platelet count below 150,000/microlitre), disseminated intravascular coagulation or haemolysis
- uteroplacental dysfunction such as fetal growth restriction, abnormal umbilical artery doppler waveform analysis, or stillbirth.

Severe pre-eclampsia

Pre-eclampsia with severe hypertension (≥160/110) that does not respond to treatment or is associated with ongoing or recurring severe headaches, visual disturbances, nausea and/or vomiting, epigastric pain, oliguria and severe hypertension, as well as progressive deterioration in laboratory blood tests such as rising creatinine or liver transaminases or falling platelet count, or failure of fetal growth or abnormal doppler findings.

Eclampsia

A convulsive condition associated with pre-eclampsia.

HELLP syndrome

Haemolysis, Elevated Liver enzymes and Low Platelet count.

3. Initial assessment of severe pre-eclampsia

Diagnosis of Severe Pre-Eclampsia:

1. Absolute BP ≥160mmHg systolic or ≥110mmHg diastolic with significant proteinuria.
2. Absolute BP ≥140/90 with significant proteinuria and one of the following:
    a. Headaches, visual disturbances, dypsnoea, chest or epigastric pain.
    b. Clonus ≥ 3 beats.
    c. Platelets <100 x 109 /lL or ALT or AST >70 u/L.
    d. Creatinine greater than 100 umol/L.
    e. Papilloedema
3. Eclampsia – a seizure occurring in a patient with PET.
4. H.E.L.L.P. syndrome.

5. Clinical discretion should be used to include any other women who present with atypical symptoms.

Initial management of severe pre-eclampsia (See Appendix 1 and 2)

1. Transfer patient to HDU on Delivery Suite. Commence 1:1 care and HDU Chart.
    a. Record BP and pulse every 15 minutes for a period of 4 hours or until BP stabilized and then half hourly thereafter. The aim should be to stabilise the BP to < 150/100 mmHg. If blood pressure is resistant to treatment, contact Anaesthetist to consider an invasive arterial line.
    b. Measure oxygen saturations continually and record hourly. Administer oxygen if saturations fall below 95% on room air and immediately contact Anaesthetist.
2. Insert a large bore IV cannula into dorsal hand or forearm vein
3. Insert an indwelling urinary catheter for hourly urine measurements.
4. Detailed input/ output fluid charting is required
5. Maintain a minimum urine output of 100mLs/4 hours
6. Initial maternal investigations: Full blood count, Urea and electrolytes, Liver function tests, Group and save, Clotting screen if platelets < 100 x 109/L. Consider blood film and LDH to exclude HELLP. Repeat blood testing as necessary.
7. Give prophylactic PPI (proton pump inhibitor- Omeprazole 20mg BD orally)
8. Ensure TED stockings applied
9. Continuous CTG monitoring (for auscultation if <26/40)
10. Notify:
    a. Delivery Suite Coordinator.
    b. Duty Consultant Obstetrician.
    c. Obstetric Anaesthetist.
    d. NICU

Point of Care Placental Growth Factor (POC PlGF) Testing
(Not currently available in SBUHB. Awaiting approval)

PlGF testing should be used if <37 weeks and diagnosis of pre-eclampsia is not confirmed in the following situations:

- Isolated new hypertension >140/90 mmHg
- Borderline proteinuria
- Worsening chronic hypertension, or proteinuria in pre-existing renal disease/ diabetes
- Suspected placental disease (SGA, oligohydramnios, UAD PI >95th centile)

Interpretation of results

- >100 pg/mL : PET/ Placental disease excluded for next 7 days
    - High sensitivity (96%) and high negative predictive value (98%) for pre-eclampsia
    - Women with high PlGF values whose blood pressure is adequately controlled can therefore be managed as outpatients.
- Between 12 and 100 pg/mL : Does not confirm a diagnosis of pre-eclampsia and routine care (i.e. outpatient BP measurement and urinalysis) can be instigated. If the patient has overt symptoms and signs of pre-eclampsia, she should be managed as an inpatient as usual.
- <12 pg/mL : Diagnosis of PET/ Placental disease confirmed. Consider close surveillance and consider inpatient management.

4. Recognition of HELLP

HELLP syndrome is a severe form of pre-eclampsia characterised by haemolysis (H), elevated liver enzymes (EL), and low platelets (LP). Incidence in pre-eclampsia pregnancies is 5 – 20%.

Clinical features:

- Epigastric or right upper quadrant pain (65%)
- Nausea and vomiting (35%)
- Tenderness in the right upper quadrant
- Hypotension with or without proteinuria
- Other features of pre-eclampsia- such as headache or visual disturbances
- Acute kidney injury AKI (7%)
- Placental abruption (16%). This may be the presenting feature and should always prompt investigation for HELLP syndrome or pre-eclampsia as underlying causes
- Metabolic acidosis

Complications:

- Risk of DIC, liver haematoma and liver rupture
- Increased risk of developing PET in future pregnancies, however, risk of recurrent HELLP syndrome is low

Diagnostic criteria:

- Low grade haemolysis (on peripheral blood smear, rarely enough to cause severe anaemia)
- Low or falling platelets (usually <100 x 109/L). Some women may develop DIC.
- Elevated transaminases.
- Elevated lactate dehydrogenase (LDH) (indicative of haemolysis).
- Raised bilirubin (unconjugated, reflecting the extent of haemolysis)

5. Antihypertensive treatment (see Appendix 3)

Hydralazine (intravenous) should be used as first line even in women on Labetalol unless the woman is tachycardic ≥ 120bpm

Hydralazine (1st line)

Loading:

- IV Hydralazine 10 mg IV over 5 min (mix 20mg of hydralazine with 20mls of normal saline. 1mg of hydralazine per ml).
- Give 250 ml of crystalloid IV with first dose (if patient hasn't had fluids already).
- Check BP every 5 minutes after bolus dose. If SBP ≥ 160 after 20 minutes – give further 5-10mg over 5 minutes

Maintenance (if BP controlled on hydralazine):

- Infusion of 2 mg/hr, increasing by increments of 0.5 mg/hr (0.5 ml/hr) every 15-20 mins to a maximum dose of 18 mg/hr (mix 40mg of hydralazine with 40mls of normal saline to 40mls in a 50ml syringe. 1mg hydralazine per ml)
- Titrate to Systolic BP of 140 – 150 mmHg
- Usual rate: 2 – 3 ml/hr Max infusion rate: 18 ml/hr
- **Reduce rate /stop infusion if significant side effect or maternal pulse ≥120/min**

Common side effect: <u>Can cause precipitate hypotension</u>

Labetalol
Avoid in women with severe asthma and if pulse rate is below 60 beats/min

Dosage-

- Initially orally 200mg before venous access. Should lead to reduction in BP in about half an hour. Second dose if needed after one hour.
    - Needs to be given at least TDS- usual starting dose 100-200mg TDS
    - Can be titrated in 100-200mg dose increments to a maximum daily dose of 2400mg/day
    - Over 50% of women can be controlled with oral therapy.
    - Only effective in around 50% of women of Afro Caribbean ethnicity
- IV: if no initial response or oral not tolerated.
    - Bolus 50mg (10ml of ampoule 5mg/ml) over 2 minutes. Should have effect by 5 min. Repeat every 5 min to maximum of 200mg labetalol until BP controlled.
    - Maintenance: infusion rate of 5mg/ml Labetalol at rate of 4ml/hr (20mg/hr) via syringe pump– should be doubled every 30 min if necessary to maximum of 32 ml/hr (160 mg/hr) until BP has dropped and stabilised at acceptable level

Advise women that Labetalol may cause hypoglycaemia in infants immediately after birth and will require monitoring of their glucose levels for 24 hours.
Common side effects: Dizziness and tiredness

Nifedipine (oral)
If tachycardic ≥ 120 beats/ minute and asthmatic or women with African or Caribbean family origin:

- Consider Nifedipine (MR) 10 mg orally (not sublingual)
- Recheck BP every 10 minutes for the first 30 minutes
- Repeat Nifedipine (MR) 10mg orally if BP not below threshold
- If BP controlled: dosing regimen is 10mg BD; 20mg BD; 30mg BD; 40mg BD maximum dose.

Common side effects: Headaches which usually resolve within 48 hours. Ankle oedema is also common

6. Seizure prophylaxis and management of eclamptic seizures *(See Appendix 4 and 5)*

Magnesium sulphate should be commenced in women with severe preeclampsia in whom there is concern about the risk of eclampsia.

Dosage
Loading dose:

- **Pre-filled syringe** – 4g of MgSO4 in 20ml of Normal Saline (0.2g in 1ml) given slowly over 5 minutes i.e. set pump rate to 240ml/hr

Maintenance dose:

- **Pre-filled syringe –** 5g of MgSO4 in 50ml of Normal Saline (0.1g in 1ml) to be administered via syringe pump, set pump rate to 10ml/hr

Important observations:

- Continuous pulse oximetry,
- Hourly urine output
- Hourly respiratory rate

- 4-hourly Deep tendon reflexes

Stop magnesium sulphate if:
- Urine output less than 100 ml in 4 hrs
- Patellar reflexes are absent after 5 hrs (assuming not due to regional block)
- Respiratory rate less than 12 breaths per min
- Oxygen saturation less than 90 %

Antidote:
10ml calcium gluconate slowly IV over 10 min

If oliguric:
Give 4g IV loading dose over 5min. Maintenance dose should be omitted until urine output normalizes.

Management of eclamptic seizures: See appendix

7. Fluid management principles *(See Fluid Flowchart in Appendix 6)*

- For an average sized woman or birthing person, total fluid (IV + oral) input should be limited to 80ml/hr.
- The hourly fluid volume should include all drugs given (e.g. magnesium sulphate and syntocinon)
- If a syntocinon drip is used, it should be at a high concentration via a syringe driver (40iu syntocinon made up to 40ml with 0.9% Saline @ 10ml/hr)
- Maintenance fluids should be Hartmann's solution
- Blood loss is replaced as clinically required
- Most women and birthing people will have a brief period (up to 6 hours) of oliguria following birth due to glomerular endotheliosis (which will resolve spontaneously). 100ml of urine over 4 hours is acceptable
- Hypovolaemia should be excluded as a cause of oliguria as per flow chart
- The risk of death from pulmonary oedema is much greater than that from oliguric renal failure. Avoid excessive use of crystalloid solutions, and never >2 litres/day unless replacing measured losses. Discuss with the Anaesthetist prior to using diuretics in pulmonary oedema. **See appendix 7 for management of pulmonary oedema**

8. Antenatal steroids

Give two doses of Betamethasone 12 mg intramuscularly, 24 hours apart in women between 24 and 36 weeks. Could be given 12 hours apart if earlier delivery anticipated, however if expedition of birth is indicated, this should not be delayed to complete course of steroids.

9. Mode and timing of delivery

Indication thresholds for considering expedition of birth:
- uncontrolled maternal blood pressure despite appropriate antihypertensive management
- maternal pulse oximetry less than 90%, evidence of pulmonary oedema
- progressive deterioration in liver function, renal function, haemolysis, or platelet count
- ongoing neurological features, such as severe headache, repeated visual disturbances, or eclampsia

- placental abruption
- reversed end-diastolic flow in the umbilical artery doppler

Timing of delivery

- Decisions to offer expedition of birth before 37/40 weeks gestations should be made by an Obstetric Consultant in discussion with the woman or birthing person.
- Urgent / emergency birth (if indicated due to maternal or fetal reasons) should not be delayed to facilitate optimal antenatal steroid administration

Weeks of pregnancy	Timing of delivery
Before 34 weeks	Continue surveillance unless there are indications (see above) Offer intravenous magnesium sulfate and a course of antenatal corticosteroids
34 – 36+6 weeks	NICE recommends to continue surveillance unless there are indications (see above) but can consider planned early birth. Discuss the findings of the PHOENIX trial (Chappell et al, Lancet 2019) prior to deciding on timing of birth. • The risk of severe maternal complications is increased with expectant management beyond 34 weeks (severe hypertension, emergency caesarean section and likelihood of needing magnesium sulphate). The median increase in gestation in women managed expectantly in the PHOENIX trial was 5 days; 55% of women developed a complication requiring birth before 37 weeks. • Incidence of neonatal admissions are increased by around 25% with planned early delivery, mainly due to prematurity. There is no difference in short term respiratory or neurological complications with planned early birth versus expectant management. More babies in the expectant group were growth restricted and required treatment for hypoglycaemia • More women achieved vaginal birth in the group allocated to planned early birth compared with expectant management Consider a course of antenatal corticosteroids
37 weeks onwards	Recommend birth within 24 to 48 hours Offer induction of labour if stable, and if appropriate

10. Intrapartum care

Monitoring in labour

- Continuous electronic fetal monitoring is advised throughout labour
- Measure blood pressure hourly during established labour, or every 15minutes until blood pressure is less than 160/110 mmHg
- Do not limit the duration of the second stage of labour in women with controlled hypertension. Consider operative birth where there is severe hypertension which has not responded to treatment.
- Avoid Syntometrine and Ergometrine for management of third stage (use Oxytocin 10 units IM).

Analgesia in labour

- Epidural analgesia can be helpful in preventing any further rise in BP and, if required, can be used additionally as an anaesthetic for theatre, thus avoiding the risks associated with general anaesthetics.
- Discuss with a senior Anaesthetist before proceeding with regional anaesthesia if platelets < 100 x 109 /L. If platelet count is > 70 x 10^9 /L, and the clotting screen is normal, regional anaesthesia is usually acceptable.

Considerations in intra-operative anaesthesia

- Recommend regional anaesthesia over general anaesthesia, where possible.
- If a general anaesthetic is used, care should be taken to prevent the hypertensive response to intubation and extubation, and the problems of laryngeal oedema
- Consider potential ways to desensitise the hypertensive response to intubation.
  - IV opiates (most commonly Alfentanil 1.0 – 2.0 mg)- ensure neonatal team is aware
  - IV magnesium bolus 40 mg/kg; this should be reduced to 30 mg/kg if the patient is already receiving magnesium. In cases of severe PET, magnesium and alfentanil can be used together.
  - Lignocaine
  - Beta blockers
- Cautions with NSAIDs and avoid if any signs of renal impairment.

11. Postpartum care

Clinicians should be aware that up to 44% of eclampsia occurs during the postpartum period, especially where birth occurs at term. Therefore, women and birthing people with signs or symptoms should be carefully assessed.

Immediate postnatal care

- Remain on CDS for at least 24 hours post delivery
- Continue fluid restriction as necessary
- Continue Magnesium Sulphate infusion for at least 24 hours post delivery
- Consider thromboprophylaxis – apply TEDS and commence pro phylactic dose low molecular weight heparin, provided platelet count > 100
- Ongoing anti-hypertensive treatment with oral therapy should be reviewed by a consultant

Blood pressure monitoring

- Measure BP at least 4 times a day whilst an inpatient.
- Measure BP every 1-2 days for up to 2 weeks after transferring to community care until woman or birthing person is off treatment and has no hypertension. If hypertension persists after this time, referral to the GP will be required and a joint management plan made.

Antihypertensive treatment management

- Continue current antihypertensives if blood pressure is well controlled. If a woman or birthing person is taking Methyldopa, stop this within 2 days after birth and change to an alternative treatment
- Avoid stopping antihypertensives completely due to risk of rebound hypertension. Consider titrating down antihypertensive treatment according to the blood pressure (if their blood pressure falls below 130/80 mmHg)
- Consider omitting dose if BP falls below 110/70 mmHg
- Consider a combination with Enalapril (or Amlodipine in women of black African or Caribbean family origin) if current antihypertensives ineffective or previously used to this.

Breastfeeding on antihypertensives

- Avoid diuretic treatment
- Most antihypertensive medicines taken while breastfeeding only lead to very low levels in breast milk, so the amounts taken in by babies are very small and would be unlikely to have any clinical effect
- However, consider monitoring the blood pressure of babies, especially those born preterm, who have symptoms of low blood pressure for the first few weeks
- When discharged home, advise women to monitor their babies for drowsiness, lethargy, pallor, cold peripheries or poor feeding.

Discharge requirements

- No symptoms of pre-eclampsia
- Blood pressure, with or without treatment, is 150/100 mmHg or less
- Blood test results are stable or improving

Care plan post discharge

- Arrange BP monitoring by community midwife and to offer readmission if BP >150/100
- Inform the GP on discharge of the pre-eclampsia/eclampsia and advise which medications including dosage have been prescribed on discharge
- Arrange medical review with GP 2 weeks after discharge and 6-8 weeks after birth
- If abnormal platelets, liver function or serum creatinine, repeat as clinically indicated until results return to normal.
- Offer urine dip 6-8 weeks after birth. If persistent proteinuria, assess kidney function and refer to nephrology if abnormal.
- Offer postnatal debrief

12. Long term advice and follow up in community

- Overall risk of recurrence in future pregnancies is approximately 1 in 5, which increases if inter-pregnancy interval is greater than 10 years
- Women and birthing people who have had a hypertensive disorder of pregnancy are associated with an increased risk of essential hypertension and cardiovascular disease later in life.
- Women who have no proteinuria and no hypertension at the 6-8 week postnatal review with the GP should be advised that although the relative risk of end-stage kidney disease is increased, the absolute risk is low and no further follow-up is necessary.
- Advise healthy diet, exercise, stop smoking and offer smoking cessation services

13. References

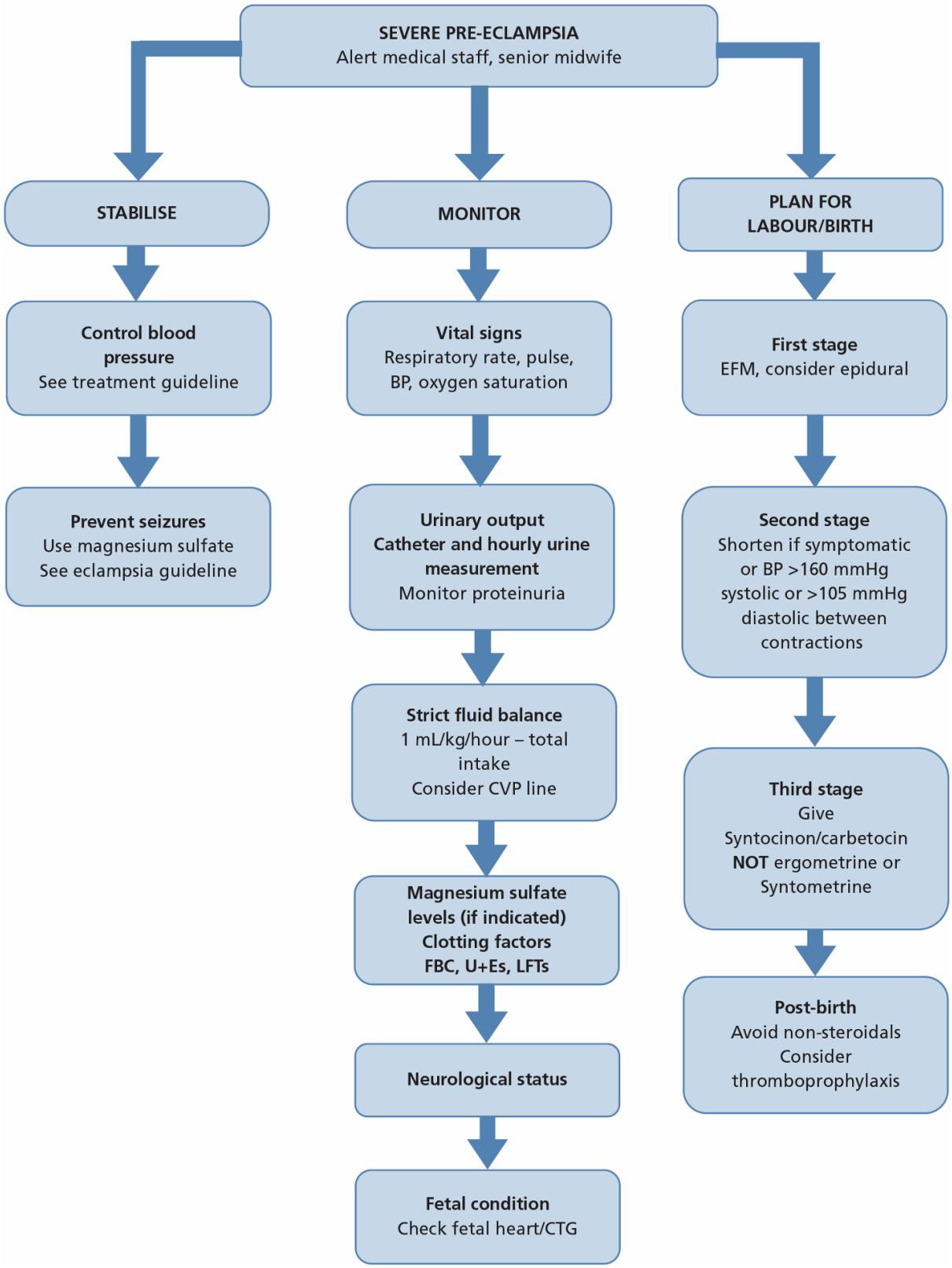
NICE guidelines on Hypertension in Pregnancy

PHOENIX trial (Chappell et al, Lancet 2019)

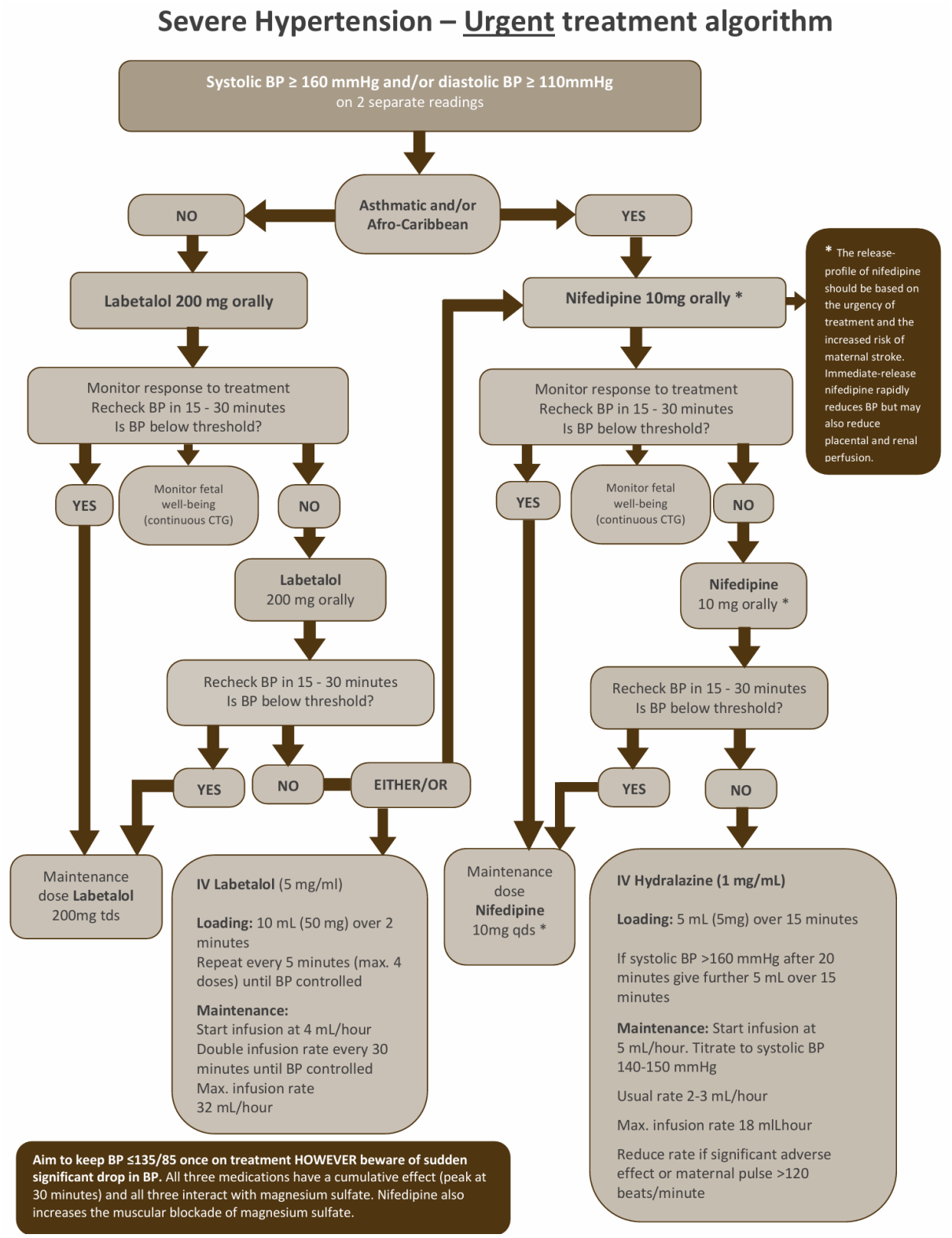
PROMPT

14. Appendices

Appendix 1: Outline management of severe pre-eclampsia (PROMPT)



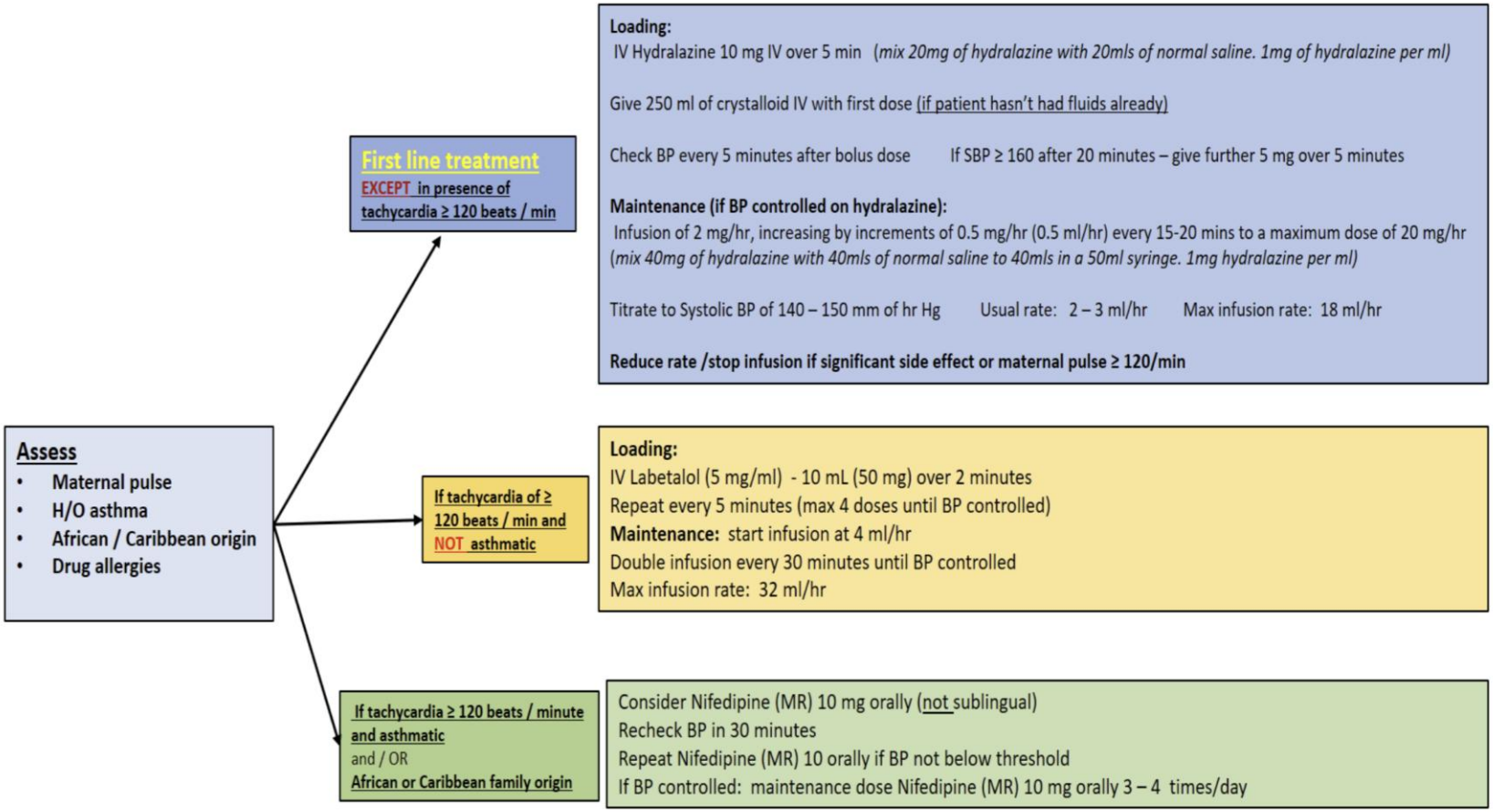
Appendix 2: Management of severe hypertension- urgent treatment algorithm (PROMPT)



Management of severe hypertension not controlled by oral antihypertensive

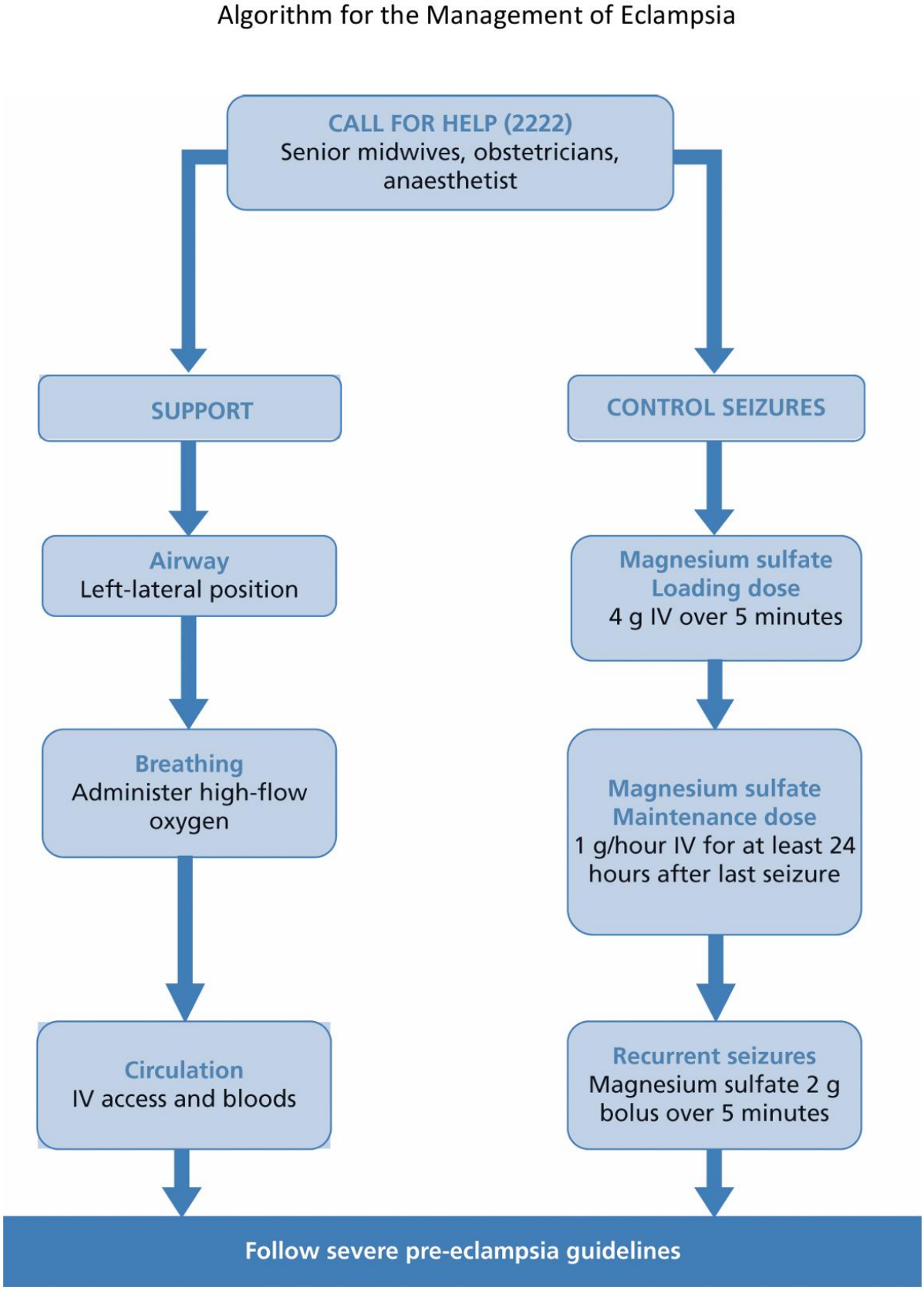
Systolic BP ≥ 160 mm of Hg and /or Diastolic BP ≥ 110 mm of Hg

(should be managed on delivery suite)



If BP not adequately controlled with one antihypertensive, consider additional antihypertensives (if no contraindication)

Appendix 4: Management of eclamptic seizures (PROMPT Flow Chart)



Appendix 5: PROMPT Eclampsia documentation proforma

Attach Patient ID:

ECLAMPSIA DOCUMENTATION PRO FORMA

DATE: ..... TIME OF SEIZURE: ..... DURATION OF SEIZURE: .....

PERSONS PRESENT AT ONSET OF SEIZURE.....

.....

EMERGENCY BELL ACTIVATED YES / NO TIME.....

If emergency bell not activated, please give reason.....

	NAME	ALREADY PRESENT (✓)	TIME INFORMED	TIME ARRIVED
EXPERIENCED OBSTETRICIAN				
MIDWIFE COORDINATOR				
ANAESTHETIST				
JUNIOR OBSTETRICIAN				
MATERNITY HEALTHCARE ASSISTANT				
OTHER PERSONS ASSISTING				

CONSULTANT OBSTETRICIAN INFORMED YES / NO Name.....

If no, give reason.....

Time attended (if attended).....

TREATMENT

LEFT-LATERAL POSITION YES / NO TIME..... If no, other position.....

HIGH FLOW 0_2 YES / NO TIME..... If no, give reason.....

IV ACCESS YES / NO TIME..... If no, give reason.....

BLOODS – GROUP + SAVE
FBC, CLOTTING, U+Es, LFTs
URATE YES / NO TIME..... If no, give reason.....

MAGNESIUM SULFATE INFUSION (see laminated regimen for dosages)	TIME COMMENCED
LOADING DOSE	
MAINTENANCE DOSE	

INITIAL POST SEIZURE OBSERVATIONS TIME.....

RESP RATE..... PULSE RATE..... BP.....mm/Hg 02 sats.....% TEMP.....°C

URINARY CATHETER INSERTED YES / NO TIME..... If no, give reason.....

(Commence Maternity Critical Care Chart)

HYPERTENSIVE TREATMENT ADMINISTERED YES/NO TIME.....

If yes, please document medication given and dosage .....

.....

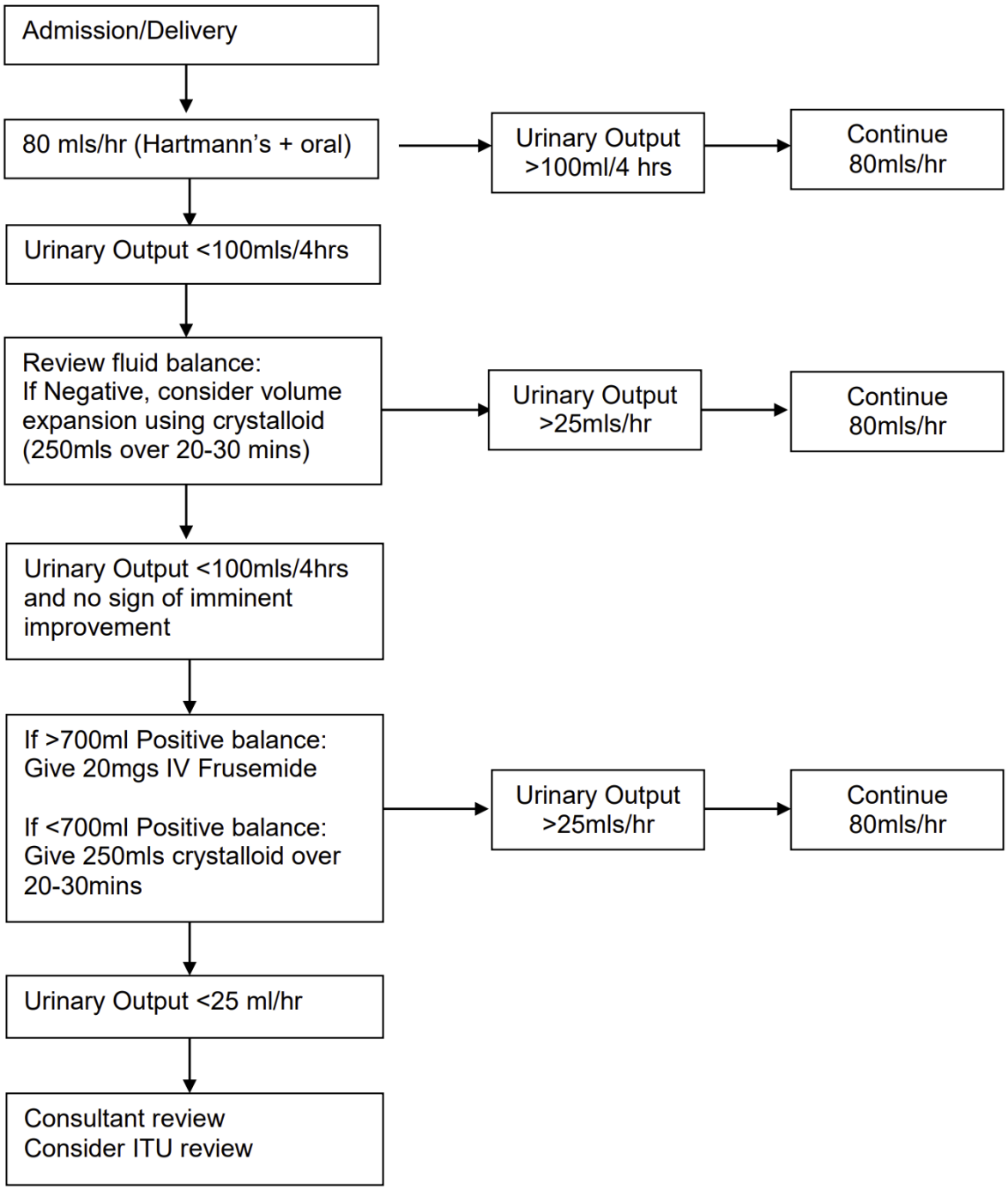
FETAL WELLBEING (if appropriate) FETAL HEART RATE.....bpm TIME.....

POST SEIZURE CTG PERFORMED YES / NO NORMAL / SUSPICIOUS / PATHOLOGICAL

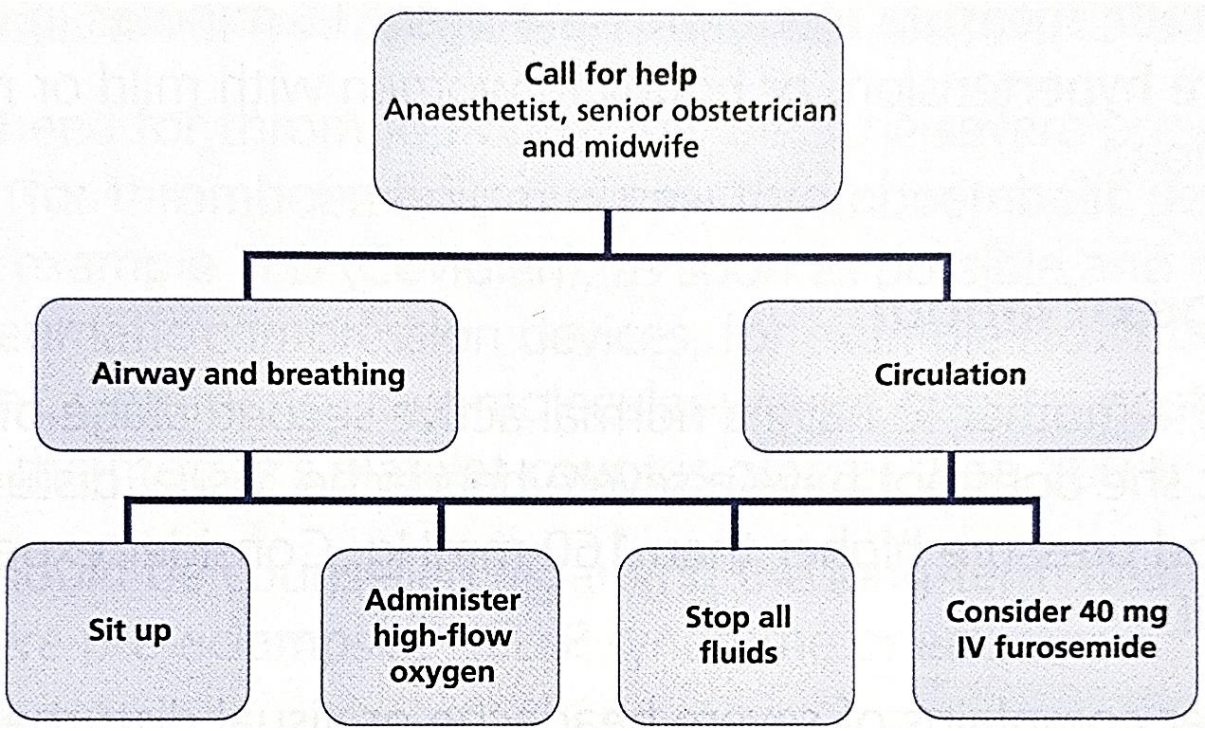
If CTG not performed, give reason.....

Please complete Risk Management Reporting Form and attach copy of this pro forma – Thank you.

Appendix 6: Management of fluid balance in severe or fulminating pre-eclampsia



Appendix 7: Management of pulmonary oedema (PROMPT)



Maternity Services

Title of Guideline:	Guidelines for Management of severe pre-eclampsia
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Details of persons included in consultation process:	Labour Ward Forum
Brief outline giving reasons for document being submitted for ratification	Review time - Policies need to be reviewed every 3 years
Name of Pharmacist (mandatory if drugs involved):	N/A
Please list any policies/guidelines this document will supercede:	Guidelines for Management of Severe or Fulminating Preeclampsia 2020
Please indicate key words you wish to be linked to document	Pre-eclampsia, fulminating, severe, magnesium, eclampsia, fit
Date approved by labour ward forum:	July 2025
File Name: Used to locate where file is stores on hard drive	