Management of Pre-Eclampsia and Eclampsia - Full Clinical Guideline

Reference no.: UHDB/Obs/04:21/E1

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1. Introduction

Pre eclampsia is a disease specific to pregnancy recognised clinically by the presence of pregnancy induced hypertension occurring after 20 weeks gestation with proteinuria.
It is potentially a lethal disease for both the fetus and the mother and is one of the highest direct causes of maternal death in the UK.

2. Purpose and Outcomes

The pathogenesis of pre eclampsia is complex and remains incompletely understood. It is essentially a diffuse circulatory disorder secondary to placental disease i.e. it is a pregnancy specific syndrome which improves after removal of the placenta
It is therefore essential that early warning signs are detected and referral to specialist care takes place to ensure diagnosis and treatment are instigated as soon as possible.

3. Key Responsibilities and Duties

Effective treatment of both severe pre eclampsia and eclampsia is imperative for a good outcome. This relies on clear lines of communication between the senior members of the team. The obstetric consultant on call must be informed as soon as possible by the labour ward co-ordinator or registrar. A senior anaesthetist should also be called to attend and if appropriate a paediatrician.

4. Abbreviations and definitions

AN	–	Antenatal
BMI	–	Body Mass Index
BP	–	Blood Pressure
CTG	–	Cardiotocograph
DSP	–	Diastolic Blood Pressure
FBC	–	Full Blood Count
HDU	–	High Dependency Hnit
LFTs	–	Liver Function Tests
MAU	–	Maternity Assessment Unit
PAU	–	Pregnancy Assessment Unit
PCR	–	Protein Creatinine Ratio
PET	–	Pre-eclampsia
Plgf/ SfLT-1	-	Placental Growth Factor / Soluble Tyrosine Ratio
PO	–	Per Oral
SBP	–	Systolic Blood Pressure
SFH	–	Symphysis Fundal Height
U&Es	–	Urea and Electrolytes

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 more; OR albumin:creatinine ratio of 8 mg/mmol or more; OR at least 1 g/litre (2+ on dipstick)
- Other maternal organ dysfunction:
    - Renal insufficiency (creatinine 90 micromol/litre)
    - Liver involvement (elevated transaminases [alanine aminotransferase or aspartate aminotransferase over 40IU/litre] with or without right upper quadrant or epigastric abdominal pain)
    - Neurological complications such as eclampsia, altered mental status, blindness, stroke, clonus, severe headaches or persistent visual scrotomata
    - Haematological complications such as throbocytopenia (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

5. Main guideline

5.1 Reducing the risk of hypertensive disorders in pregnancy

Advise pregnant women at high risk of pre-eclampsia and more than 1 moderate risk to take **150 mg of aspirin daily from 12 weeks until the birth of the baby.**

Women at high risk are those with any of the following:

- hypertensive disease during a previous pregnancy
- chronic kidney disease
- autoimmune disease such as systemic lupus erythematosus or antiphospholipid syndrome
- type 1 or type 2 diabetes
- chronic hypertension
- confirmed uteroplacental dysfunction in previous pregnancy

Factors indicating moderate risk are:

- first pregnancy
- age 40 years or older
- pregnancy interval of more than 10 years
- body mass index (BMI) of 35 kg/m^2or more at first visit
- family history of pre-eclampsia
- multi-fetal pregnancy

5.2 Hypertension/mild pre-eclampsia

- Hypertension
- An absolute systolic blood pressure (SBP) of at least 140 mmHg and a diastolic blood

pressure (DBP) of at least 90 mmHg, on two occasions.
- Mild Hypertension: DBP: 90 – 99mm Hg or SBP :140 – 149mm Hg
- Proteinuria
  - Urine Protein-Creatinine Ratio (PCR) A spot PCR of greater than 30mg/mmol can predict 24-urine protein excretion of more than 0.3g/24h
  - Proteinuria ++ using automatic analyser (if not available use urine dipstick) on two consecutive urine samples in the absence of urinary Protein-Creatinine Ratio (PCR)

5.3 Mild Pre-eclampsia

Upon diagnosis of pre-eclampsia initial assessment is recommended to differentiate mild disease from moderate or severe forms. It is important to recognize the progressive nature of the disease. It is estimated that around 30% of mild cases would progress to severe pre-eclampsia with advancing gestational age, this percentage is likely to increase the earlier the presentation of pre-eclampsia.

Initial Assessment of Newly Diagnosed Pre-eclampsia
Women diagnosed with pre-eclampsia according to the above criteria should undergo the following assessment to determine the degree of severity and hence the proposed management option.

5.3.1 Clinical Assessment

Initial assessment could be carried out in the Pregnancy Assessment Unit / Maternity Aaaessment Unit (PAU /MAU) or on admission to AN ward
History taking: Specific questions on symptoms like headache, visual disturbance or epigastric pain.
Examination:
- SFH (to identify possible IUGR/oligohydramnios)
- BP Profile: at least three readings 15 minutes apart.

5.3.2 Investigations

- FBC,LFTs,U&Es, urates, coagulation profile
- Quantification of proteinuria: via PCR (if initial diagnosis was based on dipsticks)
- PlGF based testing (see appendix A)

5.3.3 Fetal Assessment

- CTG
- USS: Growth/liquor volume, UA Dopplers.

5.3.4 Criteria for Diagnosis Mild to Moderate PET

- Asymptomatic (e.g. lack of visual disturbances / epigastric pain etc)
- Normal reflexes
- BP range: DBP of 90 – 109mm Hg or SBP of 140 – 159mm Hg
- Normal haematological and biochemical investigations
- Normal CTG
- USS: Normal growth, LV and present EDF on UA Dopplers

Once assessment confirmed mild PET, expectant management is recommended.

5.3.5 Expectant Management of mild PET

Mild PET diagnosed before 36weeks of gestation can be safely managed on an outpatient basis. Monitor regularly to detect signs and symptoms of disease progression.

5.3.6 Proposed Expectant Management Regimen

- Weekly BP review
- Clinical assessment, enquiry about symptoms.
- BP profile, minimum 3 reading 15 min apart at least.
- Dipstick protein check /Automated analysis
- Repeat biochemical investigations.
- Fetal CTG
- Consider steroids

If during the assessment signs and symptoms of disease progression is identified, expectant management is no longer appropriate and immediate admission to hospital is recommended.

5.3.7 Criteria for admission:

- Symptomatic patient.
- SBP>150mmHg, DBP>100 mmHg
- Thrombocytopenia, deranged liver or kidney functions.
- Abnormal CTG patterns

5.3.8 Long Term Management of Hypertension

- Do not treat patients with BP up to SBP 149, DBP 99 mmHg
- Higher levels of BP warrant antihypertensive treatment
- Aim to prevent peaks of SBP that might provoke cerebrovascular accidents
- The target BP should be a SBP<140-149 and DBP <90-99 mmHg

5.3.9 Choice of Agents for BP Management

- A stepwise approach to treatment with gradually increasing the dosage.
- Combining agents should only be resorted to after sufficiently increasing the therapeutic dose of the initial agent to its maximum limit.
- There is no clear evidence to recommend one agent over the other.
- As long as no other criteria of severity are identified on the weekly visits, antihypertensive medication can be administered on an outpatient basis.

Antihypertensive agent	Starting dose	Maximum dose
Labetalol	100-200mg PO BD	1200 mg/day in up to 4 doses
Methyldopa	250-500mg PO BD	2000 mg/day in up to 4 doses
Long Acting Nifedipine	10-30mg PO OD	120 mg/day in up to 4 doses

5.3.10 Delivery planning

- Delivery is the ultimate cure for pre-eclampsia.
- Provided that regular monitoring confirms no signs of disease progression, an early planned delivery is recommended following discussion with the consultant and the woman.

5.4 Severe pre-eclampsia

Criteria for inclusion

- Severe hypertension: systolic BP > 160 or diastolic BP > 110mmHg and proteinuria +++ (>0.5g/24hrs)

OR

- Mild to moderate hypertension and proteinuria with at least one of the following:-
- Severe headache
- Visual disturbances
- Severe epigastric pain or vomiting
- Papilloedema
- Clonus
- Liver tenderness
- HELLP syndrome
- Platelet count <100 x 10 9/l
- Proteinuria > +++ (0.5g / 24hrs)
- Abnormal liver enzymes (esp ALS/AST >70 iu/l)

5.4.1 Scheme of management for severe pre-eclampsia:

The initial purpose of management in pre-eclampsia is:

i. Assess the clinical situation and test results
ii. Stabilise
iii. Consider management of pregnancy

- Inform consultant obstetrician & anaesthetic consultant, labour ward co-ordinator,

paediatrician if clinically indicated
- Admit, assess and stabilise
- Establish IV access, commence IV infusion of Hartman's
- Manage as multidisciplinary team
- Control Blood pressure (BP), keeping systolic BP<160 mmHg and diastolic 90mmHg- record every 15 mins
- Control fluid balance – avoiding overload - maintenance of 80mls /hour
- Prevent Eclampsia with appropriate magnesium sulphate and with BPcontrol
- Assess renal, liver and haematology function (FBC, G&S, U&E, and LFTs+/- clotting screen)
- Consider cross matching if there are low platelets or coagulopathy
- Women with severe pre eclampsia will require transfer to labour ward HDU
- Delivery if mature > 36 weeks (can be induced)
- If < 34 weeks delay for steroids if possible and deliver by CS if necessary
- Document all findings and plan of care
- Commence HDU Chart,
- BP monitoring every 15 minutes until considered stable (check BP manually if particularly high or low)
- Pulse / Respiratory Rate / O2 Saturation half hourly until considered stable
- Insert indwelling urinary catheter
- Start fluid balance recordings hourly
- Continuous fetal monitoring

After initial assessment a plan will be made by the reviewing team for frequency of observations depending on the clinical situation.

5.4.2 Clinical assessment

The woman should be asked about headache, visual disturbance, epigastric pain, and nausea and vomiting which are symptoms of a rapidly deteriorating disease.

The following should be assessed:-

Maternal assessment
- Blood pressure (remember: automated machines can underestimate the reading)
- Urinalysis (protein, blood products and urobilinogen)
- Oedema
- Pulse rate
- Auscultation of the heart and lungs looking for pulmonary oedema
- Examination of the fundus
- Test for clonus
- Tendon reflexes
- Abdominal palpation for epigastric and liver tenderness
- Respiratory Rate
- O2 Saturation

Fetal assessment
- The fetal size and liquor volume should be clinically estimated using palpation and symphysis-fundal height measurement.
- Enquire regarding fetal movements
- Commence CTG if ≥26 weeks (if less than 26 weeks gestation, perform intermittent auscultation in the assessment period).
- Obstetric ultrasound assessment and Doppler of the fetus may be appropriate.

Results of investigations should be checked: the following are particularly important
- platelet (Pl) count less than 150x10g/L
- clotting study values Ñ one and a half times that of control
- If Pl <100 or falling rapidly: clotting screen should be checked
- ALT/ AST over 70 iu/L are deemed significant. Levels over 150 are associated with increased maternal morbidity.
- Blood film microscopy and lactate dehydrogenase (LDH) levels should be requested if haemoglobin is low or falling (possible hemolysis).

5.4.3 Intrapartum Care/ Labour Management

The mainstay of treatment therefore is delivery of the baby.
All other measures used in the treatment are essentially supportive measures until safe delivery can be achieved and the condition has had time to regress in the post natal period.
There are few indications for prolonging pregnancy once steroids have been given, when severe pre eclampsia has been diagnosed. The exceptions are those women who have developed the disease prior to 28 weeks gestation.

Prior to delivery it is necessary to have:

- controlled the blood pressure
- Considered MgSO4 if symptomatic
- measured the degree of maternal systemic disturbance and instigated appropriate management of any problem
- assessed fetal well being
- notified the senior midwife co-ordinating the Labour Ward, the obstetric consultant on call, the duty anaesthetist, theatre team, paediatric SpR and NICU staff (if maturity less than 36 weeks gestation or if growth restriction is suspected).

The mode of delivery should be determined after considering

- Presentation of the fetus
- Fetal condition
- Likelihood of successful Induction of Labour (IOL) after cervical assessment. Vaginal delivery is the safer option for the woman if stable and favourable for induction.

1st stage

- Consider epidural analgesia / anaesthesia as long as platelets and clotting screen are normal
- Continuous fetal heart rate monitoring ≥ 26 weeks gestational age
- Avoid IV fluid overload (remember additional fluid being given for oxytocin infusion and epidural)
- Observe urine output and test for presence of protein
- Record fluid input and urine output (and any other losses such as vomiting) hourly on a fluid balance chart.
- BP monitoring
- If using oxytocin use reduced regime in IOL guideline

2nd stage

- Do not routinely limit the duration of the second stage of labour: in women with stable mild or moderate hypertension or if blood pressure is controlled within target ranges in women with severe hypertension.
- Recommend assisted vaginal birth in the second stage of labour for women with severe hypertension whose hypertension has not responded to initial treatment.

3rd stage

- Syntocinon 10 units IM should be given with delivery of the anterior shoulder
- syntometrine and ergometrine are CONTRAINDICATED
- If Syntocinon infusion required for uterine atony, consider 40 units syntocinon in 0.9% saline made up to a total of 40mls to be infused at 10ml/hr.

5.4.4 Anti-hypertensive therapy (acute & long term day to day management)

Below is NOT for postnatal therapy purposes, click here for postnatal hypertension guidelines

If conservative management is chosen

In case a conservative management is adopted to prolong pregnancy. Blood pressure control could be achieved by oral antihypertensive. A reasonable target blood pressure would be 140/90.

Agents used for day to day long term management of Blood pressure are Labetalol, Mathyldopa

and long acting Nifedipine (dose as mentioned above)

Labetalol:
Labetalol is a non-selective b-blocker with vascular _1-blocking capabilities; it is well tolerated with no significant maternal toxicity. Beta blockers are contraindicated in severe asthmatics.

Methyl Dopa
Methyldopa is a centrally acting a adrenergic agonist, which brings about reduced systemic vascular resistance via decreased sympathetic vascular tone. Its use in pregnancy is well established.
Dose needs to be adjusted in patient with significant renal impairment because this will reduce the renal clearance of the drug.
Known side effects include: fatigue, depression and poor sleep.
Dose-independent side effects include elevated transaminases (in 5% of cases).

Nifedipine
A calcium channel blocker. The agent is supplied pharmacologically as long acting agents(XL), which has peak plasma concentrations at 4 hours. Therefore it is inappropriate for the STAT use for high BP.
A step wise approach using one agent at a time is recommended with increased dosage before adding other agent.
Very high blood pressure is dangerous and risks cerebro-vascular accident.
Sustained blood pressure levels of greater than or equal to 150 systolic / 100 diastolic require treatment, the aim being to reduce and keep the diastolic blood pressure between 80-100mmHg and Systolic blood pressure below 150 mmHg.

Non conservative management
Labetalol (1st line)
Dose:-
Oral : 200mg PO stat repeated if necessary in 1 hour
If the woman can tolerate oral therapy, an initial 200mg dose of Labetalol can be given.
This can be done immediately before venous access and so can achieve as quick a result as an initial intravenous dose. This should lead to a reduction in blood pressure in about half an hour.
A second oral dose can be given if needed in one hour.
Overall 50% of women requiring antihypertensive treatment can be controlled with oral therapy.
If there is no initial response to oral Labetalol therapy, control should be followed by Labetalol infusion.
Over 90% of women can be controlled with Labetalol oral or IV alone.
Bolus dose is 50mg (10mL of Labetalol 5mg/mL) given manually over at least one minute.This should have an effect by 5 minutes.
Following this, or as an initial treatment in moderate hypertension, follow pre-set protocol on pump. The infusion rate should be doubled every half hour to a maximum of 32mL (i.e. 160mg) per hour until the blood pressure has decreased and then stabilized at an acceptable level.
Aim to reduce and keep the diastolic blood pressure between 80 -100 mmHg and Systolic blood pressure below 150 mmHg.
The maternal pulse rate should remain over 60 beats per min.
Side effects of Labetalol include postural hypotension, tiredness, weakness, headache, rashes, scalp tingling, difficulty in micturition, epigastric pain, nausea and vomiting. It should be avoided in women with known severe or poorly controlled asthma.

Labetalol (1st line)
Dose: 50mg IV Bolus over 1 min
Maintenance infusion start with 4ml/hr (=20mg/hr)
Double infusion rate every 30 minutes, with the aim to reduce and keep the diastolic BP between 80-100 mmHg and systolic BP below 150 mmHg.
Do not exceed the maximum of 32ml/hr.

Alternative treatment
Hydralazine

Slow IV injection bolus

- Reconstitute a 20mg ampoule with 1mL water for injections to produce

20mg in 1mL.
- Dilute with 9ml of sodium chloride 0.9% to produce 20mg in 10ml

Give IV Hydralazine 10mg in a 10ml syringe. Inject 2.5ml (=5 mg) slowly over a 10 minute period and repeat after 20 minutes if blood pressure not controlled.

The onset of the action is delayed by about 15-20 minutes and it only lasts 2-3 hours.
Side effects are common and include tachycardia, feeling hot with a stuffy nose, tightness in the chest, hyper-reflexia, abdominal pain, nausea and vomiting, and headache which can be severe.

Maintenance:
- Reconstitute a 20mg ampoule with 1mL water for injections to produce 20mg in 1mL.
- Dilute with 49ml of sodium chloride 0.9% to produce 20mg in 50ml (=0.4mg/ml)

Use pre-set protocol on the pump: 1mg/hr = 2.5ml/hr increasing
by 1mg/hr (2.5ml/hr) every 30 min aiming to keep BP 140/90

If the blood pressure falls and remains below 140/90 mmHg, no maintenance is required.Whilst on maintenance, if the blood pressure rises rapidly, additional boluses of IV Hydralazine will need to be given. It must be stressed again that maintenance therapy is not for long term use but to control blood pressure during delivery. Hydralazine should probably not be used for more than a 24 hour period post partum.
BP checks should be carried out every 15 minutes.

5.4.5 Prevention of seizures

If there are significant signs of clonus or increasing hyper reflexia, indicating possible Eclampsia, the prophylactic use of magnesium sulphate may be indicated, after discussion with the consultant on call.

5.4.6 Regional anaesthesia / analgesia

Epidural analgesia is indicated in pre-eclampsia, offering as it does excellent analgesia and sympathetic blockade which helps reduce blood pressure..

- Epidural analgesia should be instituted early in the management of pre-eclampsia (particularly in severe pre-eclampsia). It is safe to institute epidural analgesia whilst there are no signs of bleeding, the platelet count is > 100x109/L (or not falling precipately) and there is no evidence of coagulopathy.

Below this level of platelets Consultant Anaesthetist's opinion should be sought.

5.5 Fluid management

- Women are hypovolaemic with fluid overload.
- There is little need for fluid replacement routinely.
- The majority of women should be run dry by using a minimum of IV fluids and/or oral fluids.
- Accurate fluid balance charts must be maintained.
- The aim is to achieve an input of fluid from all sources (including postpartum syntocinon and oral intake etc) at a rate of **85mL/hr (2 litres/24hrs**) - particularly if oliguric. More fluid may be necessary if there is good diuresis.

The majority of women will get extra fluid from oxytocin infusion and post delivery orally.
Care must be taken particularly with oral intake in those delivered by caesarean section as a paralytic ileus may easily develop.

- It is essential to replace operative blood loss with blood or colloid solution
- Renal failure is rare and full recovery is usual. The dangers of fluid overload are far greater potentially resulting in pulmonary oedema, cardiac failure, and cerebral oedema.
- Oliguria itself is not proof of renal failure, particularly in the presence of normal urea and creatinine levels. In the short term it requires no treatment. Diuretics in this situation will further deplete fluid in the vascular tree and will cause greater electrolyte disturbance. It is however important, particularly in the oliguric woman, to watch out for signs of pulmonary oedema and cardiac failure, namely:
- Tachycardia
- Tachypnea
- dyspnoea
- raised JVP
- crepitations on auscultation of the chest

- low oxygen saturations

In this situation diuretics may be required and should be discussed with the consultant on call.

5.6. Treatment of Pulmonary Oedema

- Frusemide 20-40 mg IV should be considered by a senior obstetrician depending on the severity of the clinical situation and the dose repeated after half an hour if no response. There are defined indications for the use of mannitol or fluid challenges which should be discussed with the consultant.
- Central Venous Pressure (CVP) lines – managed collaboratively with anaesthetists (on discussion)
- If a CVP line is used, the aim is to keep the level between 2 and 5 cm H20 in a non-ventilated patient
- If elevated, signs of pulmonary oedema must be sought and frusemide should be given if these are found, or if the level reaches 10cm H20 or above Do not treat an isolated raised CVP reading in the absence of any other clinical signs of fluid overload).

5.7 ECLAMPSIA

- The incidence of eclampsia is rare in the UK (4.9/10,000 maternity's). The pathophysiology of eclampsia is thought to involve cerebral vasospasm leading to ischaemia, disruption of the blood brain barrier and cerebral oedema. Cerebrovascular hemorrhage is a complicating factor in 1 – 2%.

Assessment and diagnosis of Eclampsia

- Eclampsia is defined as the occurrence of one or more convulsions superimposed on Pre-eclampsia. It can occur with no warning signs of raised BP or proteinurea.
- DATIX (IR 1) form to be completed in any incidence of Eclampsia

Immediate Management of an 'Eclamptic Fit'

- Summon immediate assistance obstetric and anaesthetic team (+/- neonatal team if relevant)
- The woman should be placed in a left lateral position and the airway secured.
- Oxygen should be administered by face mask.
- Give Magnesium sulphate immediately.
- Eclampsia packs are available on Labour Ward and Maternity Wards
- **Magnesium Sulphate**
  Dose: 4g IV Bolus over 15 min
  Maintenance infusion 1g/hr IV for 24 - 48 hours
- Method of administration - **see appendix B**

5.7.1 Recurrent seizures

- Recurrent seizures should be treated with either a further bolus of 2 g magnesium sulphate (4 mls of 50% MGSO4) OR an increase in the infusion rate to 1.5 or 2g/hr (7.5-10ml/hr)

5.7.2 Monitoring and management of patient taking Magnesium Sulphate

In addition to usual monitoring the following must be checked:

- Respiratory rate before treatment and every hour thereafter
- Patellar reflexes before treatment, 30 mins after loading dose and hourly thereafter
- (biceps tendon reflex should be used if epidural block established)
- Routine checking of magnesium levels is not necessary unless:
  - Urine output is low <100mls over 4 hours
  - Absent reflexes
  - Urea is > 10 mmol / l

- Signs of Magnesium toxicity include:
  - Weakness
  - Nausea
  - Flushing
  - Double vision
  - Slurred speech
  - Loss of reflexes

- Muscle paralysis,
- Respiratory arrest and finally cardiac arrest.

- Stop MgSO4 and consider Calcium gluconate
- Do Mg SO4 levels
- Therapeutic levels 2 –4 mmol / l

5.7.3 Contraindication and cautions for magnesium use

- Concurrent use of digoxin is contraindicated
- Neuromuscular blocking agents are potentiated by magnesium sulphate and should be used in lower doses.
- When GA is used, neuromuscular function monitoring is mandatory.
- Stop magnesium sulphate infusion if:
  Urine output is less than 100mL in 4 hours
  or Reflexes are absent
  or Respiratory rate is less than 16 breaths / minute
  or Oxygen saturation is less than 90%

- **MgSO4 Toxicity:**
  Reverse with Calcium Gluconate
  Dose: 1g IV over 10 min
  10 l of calcium gluconate (10%) – slow IV
- RESPIRATORY DEPRESSION CAN BE REVERSED BY GIVING CALCIUM GLUCONATE 10-20 ML OF 10% SOLUTION IV (1G IV) OVER 10 MINUTES).

5.8 Treatment of hypertension and fluid balance

- Manage as per the severe pre-eclampsia guideline.
- Eclampsia is usually part of a multi-system disorder including HELLP syndrome, (3%) DIC(3%), renal failure (4%) and adult RDS (3%).

5.9 Fetal Assessment and Delivery Planning

- If eclampsia occurs antenatally the definitive treatment of eclampsia is delivery of the fetus. Attempts to prolong pregnancy to improve fetal maturity are likely to be of little value. However, it is inappropriate to deliver an unstable mother even if there is fetal distress.
- Once seizures are controlled, severe hypertension treated and hypoxia corrected, Expedite delivery.
- Vaginal delivery should be considered, but caesarean section is likely to be required in primigravidae, remote from term with an unfavourable cervix.
- Monitoring of the woman on HDU/ICU needs to continue for at least 24 hours after delivery.
- Cerebral imaging (MRI or CT) is **not** indicated in uncomplicated eclampsia. However, imaging is necessary to exclude haemorrhage and other serious abnormalities in women with focal neurological deficit or prolonged coma.

5.10 Eclampsia prophylaxis

- Treatment with Mg SO4 in the same regime as for eclampsia
- Even for women with severe pre-eclampsia, the risk of eclampsia is low, at around 1%.
- The MAGPIE trial has shown that women treated with magnesium sulphate had a 58% lower risk of seizures. There was a trend toward a reduction in mortality with a relative risk of 0.55 (95% CI 0.26-1.14). Overall, the number needed to treat (NNT) to prevent a seizure was 63 (range 38-181) with severe pre-eclampsia.

5.11 Post delivery

- If BP is still a problem post-delivery, refer to **post natal hypertension guideline**
- It may be necessary to continue therapy for as long as 3-4 weeks post deliver

5.11.1 Postnatal Follow up

- Women who have had **severe pre eclampsia** or eclampsia should be offered the opportunity to discuss with their own medical team the event and the implications for future pregnancies. This discussion should be clearly documented in the maternity notes. Risk of recurrence: 10% for mild PET and up to 40 % in severe PET.

6. Monitoring Compliance and Effectiveness

As per agreed business unit audit forward programme

7. References

Hypertension in Pregnancy guideline NG133. NICE Last reviewed June 2019.

Flow Chart for initial management of severe pre- eclampsia

Labetalol 200mg PO if tolerated

↓

Repeat Labetalol 200mg PO if needed in 1 hour

↓

Labetalol 50mg bolus dose IV given over 1 minute

↓

Labetalol IV infusion of 5mg/ml at 4ml/hr on pump doubled every 30 mins to a max of 160mgs/hr = 32mls/hr

Hydralazine IV 20mg in 10ml syringe
inject 2.5ml (5mg) slowly over 10 mins and repeat 20 mins later if needed

↓

Hydralazine IV infusion 20mg (1ml) made up to a total of 50 ml with sodium chloride 0.9% on pump

- Titrate to 2.5ml /hr
- Increase by 2.5ml (1mg) every 20 mins to maintain BP around 140/90
- Discontinue once BP <140/90
- Consider bolus if BP raises rapidly
- Record BP every 15 mins

Immediate management of an Eclamptic Fit

- Magnesium Sulphate 4g iv / 15 min followed by maintenance dose of 1 g/hr using pump
- Recurrent seizures further bolus dose of 2g iv /5 mins
- In event og MgSO4 overdose give Calcium Gluconate 10 of 10% iv over 10 mins

The proposed algorithm is a real world example and is adapted from the NICE diagnostic guidance—adoption support resource toolkit for PlGF based testing to help diagnose suspected pre eclampsia

NEW onset BP

This does not replace guidelines for management of hypertensive disorders in pregnancy

1	2	3
Normotensive or Mild Hypertension **BP upto 149/99 mm Hg** **Do not admit** **Do not treat** **Community midwife BP and protein no more than 1x week**	**Moderate hypertension** **BP 150/100—159/109 mm Hg** **Do not admit** **Treat hypertension (aim for BP < 150/ 90-100 mm Hg** **PAU followup - for BP and proteinuria** **If PCR > 30 - Please don't repeat** **Blood tests : UE/ LFTs / FBC**	**Severe Hypertension** **BP ≥160/110** **Admit until evaluated and stable .** **Treat hypertension** **Inpatient Management—for BP and proteinuria** **If PCR > 30 - Please don't repeat** **Blood tests : UE/ LFTs / FBC**

1		2		3	
SfLT—PlGF ratio test	**SfLT—PlGF ratio test**	**SfLT—PlGF ratio test**	**SfLT—PlGF ratio test**	**SfLT—PlGF ratio test**	**SfLT—PlGF ratio test**
High Ratio ≥85 (99.5% specificity of PET)	Low Ratio ≤38 (99.3% NPV ie NOT PET)	High Ratio ≥85 (99.5% specificity of PET)	Low Ratio ≤38 (99.3% NPV ie NOT PET)	High Ratio ≥85 (99.5% specificity of PET)	Low Ratio ≤38 (99.3% NPV ie NOT PET)
Assess and review by medical staff	Continue with CM As 1	Assess and review by medical staff Consider USS for fetal assessment	Continue as 1 when BP stable	Admit Assess and review by medical staff Consider USS for fetal assessment	Admit to manage BP Assess and review by medical staff If BP settles consider management as 2

Appendix B

Method of Administration

Magnesium Sulphate

Dose: 4g IV Bolus over 10 min
Maintenance infusion 1g/hr IV for 24 - 48 hours

For RDH
To give both loading dose and maintenance infusion:

Make up 20ml (10g) of 50% MgSO4 diluted with 30ml of 5% Dextrose (to make 10g in 50ml) in a 50ml syringe

Use pre-set protocol on syringe pump to administer both initial loading dose and initiate maintenance dose.
Confirm pre-set loading of 4g MgSO4 over 15 minutes and confirm start rate of 1g/hr (5mls/hr).

For QHB

Bolus:

Make up 8ml (4g) of 50% MgSO4 diluted with 12ml of 5% Dextrose (to make 4g in 20ml) and give via a syringe driver over 15mins at 80mls per hour

Maintenance dose:

Make up 20ml (10g) of 50% MgSO4 diluted with 30ml of 5% Dextrose (to make 10g in 50ml) in a 50ml syringe. Give at 5ml/hr (1g/hr) until 24 hours after birth.

Documentation Control

Reference Number: UHDB/Obs/04:21/E1	**Version:** **UHDB Version 1**		**Status: FINAL**	
	Royal Derby prior to merged document:			
Version / Amendment	Version	Date	Author	Reason
	5	Aug 2016	Miss S Raouf – Consultant Obstetrician	Review
	Burton Trust prior to merged document:			
WC/OG/03	10	July 2016	Mrs K Anwar - Obstetric Consultant Louise Baxendale – Consultant Anaesthetist	Amendment to page 11 section 6, point 4, bullet point 1
Version control for UHDB merged document:				
	1	Jan 2021	Miss S Rajendran – Consultant Obstetrician (RDH) Miss A Hatti – O&G Consultant (QHB)	Review / merge
	1.1	May 2021	Miss S Rajendran – Consultant Obstetrician (RDH) Miss A Hatti – O&G Consultant (QHB)	MgSO4 amended
	1.2	Aug 2021	Miss S Rajendran agreed by Pharmacy	MgSO4 bolus dose timing aligned throughout document to 15 min
Intended Recipients:				
Training and Dissemination: Cascaded electronically through lead sisters/midwives/doctors via NHS.net, Published on Intranet, Article in Business unit newsletter;				
To be read in conjunction with:				
Keywords:				
Consultation with:	Obstetrians, Maternity Staff			
Business Unit sign off:	06/04/2021: Maternity Guidelines Group: Miss S Rajendran – Chair 15/04/2021: Maternity Governance Committee/CD - Mrs K Dent			
Divisional sign off:	27/04/2021			
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Key Contact:	Cindy Meijer			