HYPERTENSION IN PREGNANCY, PRE-ECLAMPSIA AND ECLAMPSIA GUIDELINE

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Target Audience: All midwives, and medical staff employed by Hull and East Yorkshire Hospitals NHS Trust to care for women with hypertension in pregnancy, pre-eclampsia and eclampsia

Distribution: Intranet

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CHANGE RECORD

<table>
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<tr>
<th>Date</th>
<th>Author</th>
<th>Nature of Change</th>
<th>Reference</th>
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<tbody>
<tr>
<td>August 2012</td>
<td>Sue Sallis</td>
<td>Minor Template Changes and update</td>
<td>V2</td>
</tr>
<tr>
<td>November 2012</td>
<td>Sue Sallis</td>
<td>Changes to section 5</td>
<td>V3</td>
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<tr>
<td>November 2013</td>
<td>Sue Sallis</td>
<td>Changes and update</td>
<td>V4</td>
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<tr>
<td>May 2014</td>
<td>Obstetric Guidelines Group</td>
<td>Amendment to monitoring form – frequency of audit</td>
<td>V4.1</td>
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1 INTRODUCTION
Hypertensive disorders during pregnancy carry risks for the woman and the baby and is one of the leading causes of maternal death in the UK. In the last reported triennium of Saving Mothers’ Lives 19 maternal deaths were the result of eclampsia or pre-eclampsia (CMACE 2011). The risks to the baby are higher rates of perinatal mortality, preterm labour and low birth weight.

Most hypertensive disorders that occur during pregnancy develop for the first time in the second half of pregnancy. New hypertension can occur without significant proteinuria (gestational hypertension) or with significant proteinuria (pre-eclampsia). Hypertensive disorders can occur in women with chronic hypertension (pre-existing hypertension) (NICE 2010).

Pre-eclampsia is a multi-systemic disorder unique to pregnancy which is usually associated with hypertension and proteinuria. It rarely presents before 20 weeks.

Eclampsia: One or more generalised seizures in association with pre-eclampsia. It can occur even if the blood pressure is normal.

Gestational hypertension (previously Pregnancy Induced Hypertension) a new onset of raised blood pressure without maternal or fetal signs of pre-eclampsia

Pre-existing hypertension (chronic hypertension) present at booking or before 20 weeks. Can be primary or secondary aetiology.

<table>
<thead>
<tr>
<th>Degrees of Hypertension</th>
<th>Diastolic blood pressure</th>
<th>Systolic blood pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>90-99mmHg</td>
<td>140-149mmHg</td>
</tr>
<tr>
<td>Moderate</td>
<td>100-109mmHg</td>
<td>150-159mmHg</td>
</tr>
<tr>
<td>Severe</td>
<td>≥110mmHg</td>
<td>≥160mmHg</td>
</tr>
</tbody>
</table>

2 PURPOSE
All women with hypertension in pregnancy, pre-eclampsia and eclampsia will be managed as per this guideline.

3 SCOPE
This guideline applies to all midwives and medical staff employed by the Hull and East Yorkshire NHS Trust who care for women with hypertension in pregnancy, pre-eclampsia and eclampsia

4 DUTIES
The following section details staff duties and responsibilities for the implementation of this guideline. The following list is a guide only and is not exhaustive:

4.1 Obstetric Consultant
- Clinical lead for the management of women with hypertension, pre-eclampsia/eclampsia throughout pregnancy and birth
- Develops a management care plan which is documented in the woman’s hospital maternity records and/or the handheld records
- Attend in person in the event of the clinical situation of eclampsia
4.2 Obstetric Registrar
- Supports the Consultant Obstetrician with the woman’s management plan
- Is the lead for each maternity episode in the absence of the Consultant Obstetrician

4.3 Senior House Officer
- Provides medical review of women presenting with hypertension and pre-eclampsia
- Refers to the Obstetric Registrar to discuss the woman’s management plan

4.4 Consultant Anaesthetist
Will be available to assist at the request of obstetric and midwifery staff

4.5 Labour Ward Coordinator
Responsible to coordinate the management and communication between the multidisciplinary team

4.6 Midwife
- Refers to a Consultant Obstetrician all woman identified in the antenatal period with a hypertension disorder
- Refers to a Consultant Obstetrician/Obstetric Registrar if women present with a hypertension disorder in labour
- Coordinates and supports the woman with a multidisciplinary care plan including communication and documentation of discussions in the maternity hospital or/and the woman’s handheld records

4.7 Porters
Responsible for the expedited collection and delivery of blood samples for biochemistry, and assist with the transfer of the woman on a bed/trolley and the equipment to HDU/ICU.

4.8 Identified Scribe
Responsible for documenting all events and management decisions as they occur in cases of eclampsia.

5 CONTENT
Severe Pre-Eclampsia and Eclampsia
5.1 Risks Factors
Some women are more at risk of developing pre-eclampsia. 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 or more at first visit
- Family history of pre-eclampsia
- Multiple pregnancy

Factors indicating high risk are:
- Hypertensive disease during previous pregnancy
- Chronic kidney disease
- Autoimmune disease such as systemic lupus erythematosis or antiphospholipid syndrome
- Type 1 or Type 2 diabetes
- Chronic hypertension
Midwife/Obstetrician to advise women with two moderate or one high risk factors for pre-eclampsia to take 75 mg of aspirin* daily from 12 weeks (or at booking if later) until delivery. Importance of attending antenatal reviews to monitor for hypertension disorders will be discussed by the community midwife. See Appendix 2 for GP referral letter.

5.2 Assessment and diagnosis of pre-eclampsia and eclampsia

5.2.1 Assessment and diagnosis of pre-eclampsia
Assessment by Community Midwives or GP

During any appointment or presentation at the GP or with a community midwife with a gestation greater than 16 weeks the following assessment and action is required:

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Proteinuria / Symptoms</th>
<th>Investigation</th>
<th>Management/Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic ≥150 Diastolic ≥100</td>
<td>+ or - Proteinuria or *Symptoms</td>
<td>Refer to ADU</td>
<td></td>
</tr>
<tr>
<td>No hypertension</td>
<td>&gt; 1+ Proteinuria and symptoms</td>
<td>Refer to ADU</td>
<td></td>
</tr>
<tr>
<td>No hypertension</td>
<td>2+ Proteinuria No symptoms</td>
<td>MSU</td>
<td>Refer to ADU in 48hrs</td>
</tr>
<tr>
<td>No hypertension</td>
<td>1+ Proteinuria No symptoms</td>
<td>MSU</td>
<td>CMW see once weekly</td>
</tr>
<tr>
<td>Systolic 140-149 Dyastolic 90-99</td>
<td>No Proteinuria and No Symptoms</td>
<td>Full blood count &amp; Biochemical profile</td>
<td>Results normal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Results actioned in 3 days</td>
<td>CMW see once weekly</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If no further symptoms or ↑BP</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>bloods not to be repeated</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Platelets &lt;100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ADU referral within 24hrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ALT ≥ 45</td>
</tr>
</tbody>
</table>

If less than 16 weeks and the BP is uncontrollable following a GP review. Refer to the multidisciplinary team.

* Epigastric pain, vomiting, headache, visual disturbances, reduced fetal movements, small for gestational age fetus
Criteria for Antenatal Day Unit Assessment and Management
During any appointment or presentation at the Antenatal Day Unit the following assessment and action is required:

<table>
<thead>
<tr>
<th>Blood Pressure after x 3 BP</th>
<th>Proteinuria/Symptoms</th>
<th>Investigation</th>
<th>Management/Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;150</td>
<td>+ or - Proteinuria or Symptoms</td>
<td>• FBC • BCP • MSSU • PCR • &lt;36 weeks Liquor Volume &amp; Doppler</td>
<td>Medical review- Repeat treatment with Labetalol</td>
</tr>
<tr>
<td>&gt;100</td>
<td></td>
<td></td>
<td>Reg review to discuss with Consultant on call if woman requires admission</td>
</tr>
<tr>
<td>&lt;150</td>
<td>&gt;1+ Proteinuria or Symptoms</td>
<td></td>
<td>Normal Results MW's Discharge home weekly review</td>
</tr>
<tr>
<td>&lt;100</td>
<td>≤1+ Proteinuria Not symptomatic</td>
<td></td>
<td>Abnormal results Discuss with on call SpR</td>
</tr>
</tbody>
</table>

Assessment of proteinuria in pre eclampsia

- 1+ protein and above on dipstick - send MSU to exclude UTI and a urinary Protein Creatinine Ratio (PCR) to estimate proteinuria
- Diagnose significant proteinuria if urinary Protein Creatinine Ratio (PCR) > 30 mg/mmol

Once significant proteinuria diagnosed NO NEED to repeat PCR, just monitor renal function with BCP (creatinine, potassium, albumin)

As part of all antenatal reviews, the midwife/obstetrician will assess for pre-eclampsia.

Severe pre-eclampsia is identified by severe hypertension with proteinuria or mild or moderate hypertension with proteinuria with at least one of the following:
- Severe headache
- Problems with vision such as blurring or flashing
- Severe pain just below ribs or vomiting
- Papilloedema
- Signs of clonus (> 3 beats)
- Liver tenderness
- HELLP syndrome
- Platelet count falls to < 100 x 10⁹/litre
- Abnormal liver enzymes (ALT or AST rises to > 70iu/litre)

As part of the assessment where pre-eclampsia is suspected basic blood investigations are undertaken by obtaining a Full Blood Count (FBC) and a Biochemical Profile (BCP) which will include kidney function, full blood count, electrolytes, transaminases, bilirubin (NICE 2010). The frequency of blood investigations are in relation to the defined blood pressure recording as follows:-
A diagnosis of pre-eclampsia will be ascertained by the results of the above assessment.

Blood tests are repeated more frequently if abnormal. All results will be recorded on the results flow chart within the woman’s maternity hospital records unless on the Critical Care Pathway where they will be recorded on the Intensive Care Protocol document.

### 5.2.2 Assessment and Diagnosis of Eclampsia

All seizures in pregnancy/pueperium are to be treated as Eclampsia until proven otherwise. Further assessments to ensure accurate diagnosis would be basic blood investigations and clinical assessment as required for pre-eclampsia.

### 5.3 Communication between Professionals

#### 5.3.1 Pre-eclampsia

Where a woman has severe pre-eclampsia the midwife caring for the woman will inform the labour ward coordinator who will liaise with the Obstetric Registrar.

The Obstetric Registrar will assess the woman and decide if commencement of the Critical Care Pathway is required.

The Obstetric Registrar or an allocated member of the team will contact the Consultant Obstetrician and the Consultant Anaesthetist to discuss commencement of the Critical Care Pathway.

Where delivery is required the Registrar / Obstetric Consultant will contact the on call Paediatrician to discuss optimum timing of the delivery to improve best possible outcome.

Documentation of these discussions will be in the Intensive Care Protocol document or antenatal care plan.

#### 5.3.2 Eclampsia

The communication plan to be followed for eclampsia is detailed at Appendix 4.
5.4 Critical Care Pathway of severe Pre-eclampsia & Eclampsia

**Severe Pre-eclampsia without severe Hypertension**
Discuss with on call consultant

**Severe Pre-eclampsia with Severe Hypertension**
- Commence oral Labetolol 200mgs
- Repeated after 30 minutes if no response. Discuss with on call consultant

**Immediate Care**
- IV access x2 16g cannula
- Bloods taken for: BCP, FBC, Clotting, Group and save serum
- 25mls Magnesium Sulphate 20% IV over 25mins (Run at 60mls/hr via syringe pump) = 5g Loading dose
- IV Diazepam 5-10mgs if status epilepticus
- Monitor BP and oxygen Saturation
- If BP elevated commence IV Labetolol 50mgs over 1 minute (Concentration 5 mg/1 ml).
- Repeat BP every 5mins followed by repeat dose of Labetolol up to 200mgs/(20mins) unless diastolic blood pressure is reduced by 10mmHg in the first instance.
- Once stable transfer to Labour Ward using the Obstetric team

**Maintenance Care**
- 50mls Magnesium sulphate 20% I.V. over 24 hours (run at 5mls/hr via syringe pump) =1g/hr maintenance dose
- Catheterise measure and test hourly
- If BP is still not controlled after 4 stat does IV of Labetalol given every 5mins
  Continue with I.V. labetalol infusion (5 mg/ml) at 4 ml/hr via syringe pump.
  Double dose ½ hourly until satisfactory B.P. response up to Maximum 32mls/ hour (160mg/hr)
- Total I.V input limited to 80 ml/hr total via volumetric pump
- Compression stockings and boots to be applied
- Fetal monitoring applied if required
- Team discussion to Consider delivery

**Eclampsia**
All seizures in pregnancy/pueperium are to be treated as Eclampsia until proven otherwise

**Maintain Safety**
Assessment: ABC (Airway, Breathing, Circulation)
Left lateral tilt
O₂ 15litres/min
Consider nasopharageal airway
Obtain Emergency trolley

Tel 2222 declare an Obstetric Emergency stating location
Ask to speak to Consultant Obstetrician
5.5 Inpatient Management – Antenatal, Labour and Postnatal Wards

Monitoring on the Antenatal / Postnatal Ward- Mild to Moderate Pre-Eclampsia
- BP/Pulse 15-minute intervals until stabilised/reviewed on the ANC, then 4 times a day unless scoring red on the MEOWS chart
- Initially check BP manually with the **CORRECT SIZE CUFF** on both arms and act on higher reading, compare to automated readings, (as there can be a difference between the two, when using an automated machine ensure this is documented and trends noted)
- Urinalysis daily
- **Bloods** if not taken in the ANC - Full blood count, Biochemical Profile, Group and save, **Clotting** (PT, KCCT + fibrinogen, FDP’s) only if platelets <100,
- **Fetal Well-being** – CTG, Doppler, liquor volume as clinically indicated
- **Daily obstetric review** Inc. Deep Tendon reflexes,
- **Accurate fluid Balance** totalled daily

All results will be recorded on the results flowchart within the woman’s maternity hospital records. Abnormal results/findings to be discussed with the on call SpR/Consultant

Monitoring on the Labour Ward – severe pre-eclampsia
- **Temperature** 4 hourly
- **Continuous pulse oximetry** recorded hourly (If less than 95% ® medical review).
- **BP/Pulse** 15-minute intervals for a minimum of 4 hours until stabilised then every 30 minutes. Initially check BP as above
- **Respiration rate** 1 hourly.
- **Indwelling catheter** -urine measured and tested hourly.
- **Accurate input** (includes all IV fluids and drug diluent)
- **C.V.P.** if sited measured continuously and charted every hour
- **Fetal well-being** and **CTG**. (Liquor Volume + Doppler as indicated)

This will be documented on the Intensive Care Chart

Monitoring specific to Magnesium Sulphate* Infusion
This infusion requires **intensive care** and the following close observations to prevent Magnesium Sulphate Toxicity :-

**Observations**
- Continuous pulse oximetry (If less than 95% ® medical review).
- Urine output is more than 80mls in previous 4 hours.
- Hourly respiratory rate >12
- Deep tendon reflexes, after the first hour, then 4 hourly (Biceps if epidural in situ) and before each syringe is changed.
- **If the above criteria are not met then further administration of magnesium sulphate should be withheld.**

Every 4 hours and prior to starting a new syringe the following observations should be made: General review by the Obstetric staff including
- Biceps reflex is present
- Respiration rate is more than 12/min.
- Urine output is more than 80mls in previous 4 hours. (Beware of pulmonary oedema)

The Antidote to Magnesium Sulphate Toxicity is 10ml 10% calcium gluconate given slowly intravenously over 1 minute.
97% of magnesium is excreted in the urine and therefore the presence of oliguria can lead to toxic levels. If the above criteria are not met then further administration of magnesium sulphate should be withheld. Magnesium should be re-introduced if urine output improves.

Side Effects: - Motor paralysis, absent tendon reflexes, respiratory depression and cardiac arrhythmia (increased conduction time), respiratory/cardiac arrest, can all occur but will be at a minimum if Magnesium is administered slowly and the patient observed as above.

**THERE IS NO NEED TO MEASURE MAGNESIUM LEVELS WITH THE ABOVE**

To be recorded on the Intensive Care Chart

* The medical staff are responsible for the assessment of the women and the decision to commence and discontinue magnesium sulphate administration.

### 5.6 Prevention of Eclamptic seizures using Magnesium Sulphate on Pre-Eclampsia/Eclampsia Intensive Care Protocol:
- Discussion between Consultant Obstetrician and Consultant Anaesthetist may elect for preventative therapy.
- Magnesium sulphate (MgSO4) Protocol-pre diluted 20% vials
- Magnesium sulphate is given as a loading dose followed by a continuous infusion for 24 hours or until 24 hours after delivery - whichever is the later.
- Each syringe should last 10 hours. This regime administers 1g/hour
- Monitoring on the Labour Ward see point 5.5
- Fetal well-being and CTG. (Biophysical + Doppler as indicated) referring to the Hull And East Yorkshire Hospitals NHS Trust guideline for intrapartum assessment of fetal wellbeing available at: [http://intranet/guidelines/guidelines/180.pdf](http://intranet/guidelines/guidelines/180.pdf)

### 5.7 Management of Recurrent Seizures
- Consider repeating the loading dose of Magnesium Sulphate
- Increase infusion of magnesium sulphate to 1.5 g/hr.
- Continue observations and consider the need for ventilation. (If the woman is known to have epileptic fits, refer to guideline, The management of pregnancy in women with epilepsy, available at: [http://intranet/guidelines/guidelines/155.pdf](http://intranet/guidelines/guidelines/155.pdf)
- IV Diazepam 5-10mgs slowly

### 5.8 Blood Pressure Control
The following flowchart on page 10 describes the procedure for management and treatment of blood pressure.
Blood Pressure Control (BP)

Eclampsia

Pre-eclampsia

NO Pre-eclampsia

Gestational Hypertension / Essential Hypertension

Labetalol 200 mgs orally (Where Labetolol is contraindicated see NB below)

Repeat Labetalol 200mgs orally after 30 minutes If no response Inform the Consultant Obstetrician on duty after a further 30 minutes

If BP elevated/unresponsive transfer to labour ward and commence Intensive Care Chart (Option 2 for hypertension)

Commence IV Labetalol bolus 50mgs (concentration 5mg/1ml) over 1 minute If NO response with in 5min repeat up to a max of 200mgs

Monitor BP before each dose increase.

Commence a IV infusion of Labetalol (5mg /ml) at 4ml/hr via syringe pump. Double the dose every ½ hourly until Maximum of 32mls /hour (160mg/hr.) or a satisfactory BP response ≤140/90.

If Antenatal continuous CTG monitoring >26weeks during IV Labetalol infusion

Responsive

Responsive

Unresponsive

Once Blood pressure has reduced and stabilised for 2 hours. Decrease the infusion by ½ once every 30 minutes

Once complete, commence oral antihypertensive and discontinue ICU chart

Blood pressure to be taken 4 times a day whilst in hospital and daily urinalysis

Pre-eclampsia

Note. BP ≥ 150/100mmHg requires prompt medical treatment

If still no response, OPTION 1 consider SECOND LINE antihypertensive, Nifedipine

10mgs orally (not a slow release tablet) or

OPTION 2 commence IV Labetalol

Commence CTG monitoring. Choice of treatment, option 1 or option 2 will be on Consultant Obstetrician decision.

OPTION 1

BP should be taken every 10mins in the first ½hr after treatment as there can be a marked drop in BP following Nifedipine

Once Blood pressure has reduced and stabilised for 2 hours.

Decrease the infusion by ½ once every 30 minutes

Once complete, commence oral antihypertensive and discontinue ICU chart

Blood pressure to be taken 4 times a day whilst in hospital and daily urinalysis

If responsive it should be repeated 6hrly.

Postnatally then changed to a slow release tablet which last 12 hourly

NB If Labetalol fails to control BP once the maximum dose achieved OR if labetolol is contraindicated the Second Choice is Nifedipine 10mgs orally as above (not slow or modified release)

Consider Hydralazine if no response to labetolol or Nifedipine

If 2 antihypertensive required to control BP. Consultant review required within 24 hours

If responsive should be repeated 6hrly.

Blood pressure to be taken 4 times a day whilst in hospital and daily urinalysis
Blood Pressure control of pre-eclampsia / eclampsia, gestational hypertension / pre-existing hypertension is to treat hypertension (and especially systolic hypertension) quickly and effectively.

**NOTE. BP ≥ 150/100mmHg requires prompt medical treatment**

As a guide with Pre-eclampsia/ Eclampsia in the Antepartum / Intrapartum period Management for stabilization of BP is to reduce diastolic BP by 10mmHg in the first instance and maintain the blood pressure between 130/80 and 140/90

**Blood pressure to be monitored 4 times a day whilst in hospital and daily urinalysis as a minimum**

### 5.9 Fluid Balance For Pre-Eclampsia and Eclampsia

Careful fluid balance is aimed at avoiding fluid overload. The procedure for avoiding fluid overload antenatally is the following:

- Total IV input limited to 80 ml/hr total.
- If syntocinon is used it should be at high concentration and the volume of fluid included in the total input.
- Oliguria - no action except encourage early delivery.
- Oral fluids should be limited.

Postnatal woman should be fluid restricted in order to wait for the natural diuresis which occurs sometime around 36-48 hours post-delivery.

- Total 80 ml I.V. fluid hourly.
- After delivery oral fluids can be given in a relatively unrestricted way.
- Urine output hourly - Each four-hour block should be totalled and charted. Aim for at least 80 ml in 4 hours (refer to YOCCG 24 hour high dependency chart).
- If 2 x 4 hour blocks less than 80 mls each then there are two possible courses of action:

**Action 1** – If the total INPUT LESS than TOTAL (output +750mls) the following action to be taken:

- Px Gelofusine 250 mls. over 20 minutes.
- Watch output over 4 hours
- If less than 80 mls px 20 mgs I.V. furosemide
- If greater than 250 mls in 1 hour after the Frusemide, then give extra 250 mls Gelofusine on top of baseline fluids

**Action 2** – If the total INPUT GREATER than Total (OUTPUT + 750mls) the following action to be taken:

- Px IV Frusemide 20mgs
- Watch output over the next 4 hours
- If greater than 250mll in 1 hour after the Frusemide then give extra 250mls of Gelofusine on top of the baseline fluids

See Appendix 5 for examples.

Points to consider for management

- Persisting oliguria requiring fluid challenge or furosemide requires the electrolytes to be assessed and checked six-hourly.
• Concern over a rising creatinine and or potassium will be discussed with a Consultant.
• Reduction in oxygen saturation is most likely due to fluid overload. Input and output should be assessed together with either clinical or invasive assessment of the fluid balance. The most appropriate treatment is likely to be furosemide and oxygen.
• If no diuresis and the oxygen saturation does not increase referral to the medical renal team will be considered.
• Large volumes of colloid such as fresh frozen plasma, blood or platelets can lead to fluid overload.
• Significant haemorrhage or HELLP will be managed by a Consultant Obstetrician and Anaesthetist

5.10 Thromboprophylaxis
All women should have compression stockings and boots whilst immobile, in the antenatal, Intrapartum and postnatal period if a Low Molecular Weight Heparin (LMWH) is not prescribed.

If a (LMWH) is to be given with an epidural or spinal already in-situ, discuss with anaesthetist on call. The same consideration is to be given after spinal or general anaesthesia (Ref guideline for Thromboprophylaxis) http://intranet/guidelines/guidelines/111.pdf Any woman on LMWH in the Antenatal period cannot have regional analgesia 12 hour from the last does of prophylactic heparin, or 24 hours from the last does of therapeutic LMWH.

AN EPIDURAL CATHETER SHOULD BE LEFT IN PLACE UNTIL 12 HOURS AFTER LOW MOLECULAR WEIGHT HEPARIN HAS BEEN GIVEN

In the case of severe pre-eclampsia where the platelet levels are less than 50-109/l and coagulation screen abnormal;
• Increase D Dimer
• Fibrinogen below 2g unit
• PT and APPT abnormal

Prophylactic thromboprophylaxis should be provided with compression stockings and compression boots. FRAGMIN SHOULD BE WITHHELD

The coagulation screen including FBC/PT/APTT should be assessed on a daily basis and once the platelets are stable above 50 with PT and APTT within normal limits and fibrinogen more than 2g prophylactic Fragmin can be initiate.

5.11 Fetal assessment and delivery planning
During the assessment for pre-eclampsia and eclampsia an assessment of the fetus will also take place via ultrasound and/or CTG monitoring where gestation is over 26 weeks. If results of any fetal monitoring abnormal the consultant obstetrician will be informed.

Delivery planning will be as follows:

Timing of Delivery
• Delivery will be well planned, done on the best day, performed in the best place, by the best route and with the best support team.
• Once stabilised with antihypertensive drugs and magnesium sulphate a decision will be made. In the absence of convulsions, prolonging the pregnancy may be
possible to improve the outcome of a premature fetus. If mother unstable then
delivery is inappropriate and increases risk.
- Achieve delivery particularly of premature infants, during normal working hours.
- If the pregnancy can be prolonged in excess of 48 hours, steroids help mature
the fetal lungs.
- In all situations a planned elective delivery suit ing all professionals is
appropriate.
- Delivery is not necessarily by caesarean section but if gestation is under 32
weeks it is preferable. After 34 weeks vaginal delivery should be considered in a
cephalic presentation.
- Delivery timing will be facilitated by Consultant level discussion between
Obstetrician, Paediatrician and Anaesthetist.
- The mode of delivery should be discussed with the Consultant Obstetrician.

NB when a women is eclamptic a clinical decision may be made that will require
delivery at an earlier opportunity.

Vaginal Delivery
- Vaginal prostaglandins will increase the chance of success.
- Anti-hypertensive treatment will be continued throughout assessment and labour.
- If vaginal delivery is planned then the second stage should be short with
consideration given to elective operative vaginal delivery.
- An epidural is recommended

The third stage should be managed with 5 units of I.V. SYNOTOCINON NOT
Ergometrine or Syntometrine in any form.

- If a decision to deliver at another hospital, the Consultant Obstetrician will
discuss and agree transfer with the Consultant Obstetrician at the receiving
hospital
- Follow the guideline for transferring a woman to another unit Ref guidelines for
transfer in to the Women & Children's Hospital

Postnatal Management
Prior to discharge.
- BP to be routinely monitored or more frequently as clinically indicated until
discharge.
- BP to be recorded on day of discharge.
- Antihypertensive medication to continue unless diastolic \( \leq 80 \text{mmHg} \) (as BP likely
to rise again at 48 to 72 hours postnatal).

On discharge
Discharge requires an obstetric review, care will not be transferred to midwifery led.
Take home antihypertensive medication will be given unless diastolic \( \leq 80 \text{mmHg} \).

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>Blood results</th>
<th>Obstetric discharge management</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;150/100</td>
<td>Normal</td>
<td>1. Discharge completed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Take-home antihypertensive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>medication given</td>
</tr>
<tr>
<td>( \geq 150/100 )</td>
<td>1. Abnormal with an improving trend &amp; 2. Asymptomatic</td>
<td>Discuss with SpR/Con re-discharge and antihypertensive take home medication</td>
</tr>
<tr>
<td>≥150/100</td>
<td>1. Abnormal remaining stable or deteriorating.</td>
<td>For SpR/Con review Continue antihypertensive</td>
</tr>
<tr>
<td>---------</td>
<td>---------------------------------</td>
<td>---------------------------------</td>
</tr>
</tbody>
</table>

5.12 Postnatal Follow-up
In all cases of severe pre-eclampsia or eclampsia and individualised follow-up plan will be communicated to the GP.

6 PROCESS FOR MONITORING COMPLIANCE
The monitoring of this policy is delivered by the methods as stated in the Monitoring Table contained at Appendix 1.

7 REFERENCES / ASSOCIATED DOCUMENTS
• NICE Guideline: Hypertension in Pregnancy 2010
• CMACE report 2006-2008 Saving Mothers Lives
• Collins R, Duley L. Labetolol vs hydralazine in severe pregnancy-induced hypertension. In :

8 APPENDICES
Appendix 1 – Monitoring Overview
Appendix 2 – Referral to GP
Appendix 3 – Guidelines for Anaesthetists
Appendix 4 – Lines of communication
Appendix 5 – Fluid balance
## Monitoring Overview

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Lead</th>
<th>Tool</th>
<th>Frequency</th>
<th>Reporting arrangements</th>
<th>Acting on recommendations and Lead(s)</th>
<th>Change in practice and lessons to be shared</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. assessment and diagnosis of severe pre-eclampsia/eclampsia</td>
<td>Multidisciplinary Team</td>
<td>All women with severe pre-eclampsia/eclampsia requiring Intensive Care will be reported through Datix</td>
<td>Once within the cycle of the guideline or as required following an identified reason from a risk management episode.</td>
<td>All cases of severe and confirmed eclampsia will be discussed at the MDT case review weekly meeting; any issues will be escalated to the obstetric and gynaecology risk management group. This information to be reported on a 6 monthly basis to the Labour Ward Forum. Cases of Eclamptic Fits are reported via the DATIX Web incident system. Labour Ward Forum will receive reports from MDT meetings with regards to severe pre-eclampsia and confirmed eclampsia; action plans following these reports will be monitored via this forum and the integrated governance reports.</td>
<td>The Gynaecology and Obstetric Risk Management Group will undertake subsequent recommendations with action planning on a monthly basis. Report to the family and Women’s Health Governance Group. Significant risk issues raised by clinical director to the OGC committee.</td>
<td>Required changes to practice will be identified and auctioned within the time frame through the Gynaecology and Obstetric Risk Management Group meeting and will be disseminated to the staff. A lead member of the team will be identified to take each change forward where appropriate. Lessons learned will be shared with all the relevant stakeholders.</td>
</tr>
<tr>
<td>b. clear lines of communication between the consultant obstetrician, consultant anaesthetist, paediatrician and labour ward coordinator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. blood pressure control and fluid balance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. prevention and control of eclamptic seizures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. fetal assessment and delivery planning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. postnatal follow up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dear Dr

The above patient of yours has booked for her antenatal care today. She has an increased risk of developing pre-eclampsia in this pregnancy as she has

**One** of the following high risk factors

(please tick)
- Hypertensive disease during previous pregnancy
- Chronic kidney disease
- Autoimmune disease such as systemic lupus erythematosus or antiphospholipid syndrome
- Type 1 or Type 2 diabetes
- Chronic hypertension

**Two or more** of the following moderate risk factors:
- First pregnancy
- Age 40 years or older
- Pregnancy interval of more than 10 years
- Body mass index (BMI) of 35 or more at first visit
- Family history of pre-eclampsia
- Multiple pregnancy

NICE clinical guideline 107 – Hypertension in pregnancy recommends **Asprin 75mgs** daily for her **from 12 weeks of pregnancy until the birth of the baby** to reduce the risk of developing pre-eclampsia.

I should be grateful if you could kindly consider Asprin for her, subject to the usual contraindications.

Thank you

Midwife
GUIDELINES FOR ANAESTHETISTS

Analgesia for Labour
Regional Anaesthesia is the preferred method of analgesia. However consultant advice is required if:
• Platelet count under 80 x 10^9/l
• Abnormal clotting (PTT or TT)

Opiate infusion or PCAS would need to be considered if epidural was contra-indicated.

Anaesthesia for caesarean section
• Epidural anaesthesia is the preferred method of anaesthesia if already in situ.
• Spinal anaesthesia should be used if no epidural in place or if epidural in labour has failed.
• General anaesthesia should only be used if regional block is impossible or contraindicated.

Management of General Anaesthesia
General anaesthesia can add to the risks of delivery since intubation and extubation can lead to increases in systolic and diastolic blood pressure, as well as heart rate, so should be avoided where possible.

In addition to standard procedures, alfentanil 2 mgm. and labetolol 15 mgm. should be given prior to intubation to obtund hypertensive reflexes.

DO NOT give a non-depolarising muscle relaxant until there is evidence or recovery from suxamethonium. Give only small doses of atracurium thereafter - for example, 5-10 mgm, with nerve stimulator control, if available, since the effect of muscle relaxants is usually prolonged in the presence of therapeutic levels of magnesium sulphate.

Regional blockade and fluids - Genuine pre-eclamptics tend to maintain their blood pressure, despite regional blockade. When this happens, fluid load is unnecessary and may complicate fluid balance. For this reason, fluid loading in pre-eclampsia should never be done prophylactically or routinely, and should always be considered and controlled. Vasopressors such as ephedrine, phenylephrine or metaraminol should not be given prophylactically. If hypotension does occur, a small dose of ephedrine is usually effective. In women with pre-eclampsia fluid requirements at caesarean section should be carefully considered and use of more than 500mls of fluid, unless to replace blood loss, should be exceptional.

Indications for central venous pressure monitoring a CVP may be indicated:
- if excessive blood loss occurs
- if oliguria fails to respond to the measures described above
- if the patient becomes hypotensive
APPENDIX 4

LINES OF COMMUNICATION

Identified Eclampsia in either the Community, Midwifery Led Unit, Antenatal/Postnatal Ward or Labour Ward

If Community based. To ring Labour Ward Tel 01482 604490 who will arrange an ambulance Tel 01904 666026 and scribe for the midwife if required.

If Hospital based (not on labour ward) to ring Labour Ward of impending transfer to call porters to assist Tel 4021

On Labour Ward the Labour Ward Co-ordinator or delegated individual will Tel 2222 declare an Obstetric Emergency

The agreed clinical lead or Labour Ward co-ordinator will co-ordinate the management and communication between the following:

- Identify Scribe
- Member of staff delegated to ensure woman’s physical safety, if enough staff someone to support the partner
- Midwives/Doctors sitting venflons taking Bloods starting the Magnesium Sulphate infusion, and any other drugs that may be required.
- The Discussion with Paediatricians Re correct place for delivery and consider steroids if preterm
- Anaesthetist or delegated individual will maintain the woman’s airway; give oxygen/suction as required
- Inform the Obstetric/AAnaesthetic Consultants via operator and liaise regarding further management and delivery
- Neonatal Intensive Care

Communication may also take place with the following during the management of this case with the Consultant or delegated individual. For example The Intensive Care Unit Consultant, Outreach team, Theatres
## FLUID BALANCE

If 2 x 4 hour blocks less than 80 mls each then there are two possible courses of action:

### Action 1 – WHEN INPUT IS LESS GIVE GELOFUSINE 250MLS

If the total INPUT LESS than TOTAL (output +750mls) see Box 1 for example

- Px Gelofusine 250 mls. over 20 minutes.
- Watch output over 4 hours
- If less than 80 mls px 20 mgs I.V. furosemide
- If greater than 250 mls in 1 hour after the Frusemide, then give extra 250 mls Gelofusine on top of baseline fluids

### OUTPUT

<table>
<thead>
<tr>
<th>Urinalysis</th>
<th>BOX 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hourly urine</td>
<td>5</td>
</tr>
<tr>
<td>4hrly rolling total</td>
<td>57</td>
</tr>
<tr>
<td>TOTAL OUTPUT</td>
<td>33</td>
</tr>
</tbody>
</table>

### INPUT

<table>
<thead>
<tr>
<th>IV(1) Ringers Sol</th>
<th>0</th>
<th>64</th>
<th>56</th>
<th>52</th>
<th>36</th>
<th>16</th>
<th>12</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV(2) Mag Sulph</td>
<td>30+7</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
</tr>
<tr>
<td>IV(3) Labetolol</td>
<td>2</td>
<td>4</td>
<td>12</td>
<td>16</td>
<td>32</td>
<td>32</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>CVP Line Oral</td>
<td>79</td>
<td>80.5</td>
<td>80.5</td>
<td>80.5</td>
<td>80.5</td>
<td>80.5</td>
<td>80.5</td>
<td></td>
</tr>
<tr>
<td>Hourly Total</td>
<td>159.5</td>
<td>240</td>
<td>320.5</td>
<td>401</td>
<td>481.5</td>
<td>562</td>
<td>642.5</td>
<td>642.5</td>
</tr>
<tr>
<td>TOTAL INPUT</td>
<td>605.5</td>
<td>882</td>
<td>962.5</td>
<td>1043</td>
<td>1123.5</td>
<td>1204</td>
<td>1284.5</td>
<td>1284.5</td>
</tr>
</tbody>
</table>

### DRUGS

- Labetolol Oral | 200+200 |
- Labetolol IV | 50+50+50+50 |

### Action 2 – WHEN INPUT IS GREATER GIVE IV FRUSEMIDE 20MGS

If the total INPUT GREATER than Total (OUTPUT + 750mls) see Box 2 for example

- Rx IV Frusemide 20mgs
- Watch output over the next 4 hours
- If greater than 250ml in 1 hour after the Frusemide then give extra 250mls of Gelofusine on top of the baseline fluids

### OUTPUT

<table>
<thead>
<tr>
<th>Urinalysis</th>
<th>BOX 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hourly urine</td>
<td>18</td>
</tr>
<tr>
<td>4hrly rolling total</td>
<td>70</td>
</tr>
<tr>
<td>TOTAL OUTPUT</td>
<td>39</td>
</tr>
</tbody>
</table>

### INPUT

<table>
<thead>
<tr>
<th>IV(1) Ringers Sol</th>
<th>80</th>
<th>80</th>
<th>260</th>
<th>64</th>
<th>44</th>
<th>4</th>
<th>64</th>
<th>64</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV(2) Mag Sulph</td>
<td>30+7</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
<td>12.5</td>
</tr>
<tr>
<td>IV(3) Labetolol</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>CVP Line Oral</td>
<td>200</td>
<td>150</td>
<td>20</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hourly Total</td>
<td>359</td>
<td>246.5</td>
<td>80.5</td>
<td>80.5</td>
<td>80.5</td>
<td>80.5</td>
<td>80.5</td>
<td>80.5</td>
</tr>
<tr>
<td>TOTAL INPUT</td>
<td>605.5</td>
<td>882</td>
<td>962.5</td>
<td>1043</td>
<td>1123.5</td>
<td>1204</td>
<td>1284.5</td>
<td>1284.5</td>
</tr>
</tbody>
</table>

### DRUGS

- Labetolol Oral | 200+200 |
- Labetolol IV | 50+50+50+50 |

Failure to respond discuss with Consultant Obstetrician and Consultant Anaesthetist