Document Control

Title	**Hypertensive disorders in pregnancy including Pre- Eclampsia, HELLP Syndrome and Acute Fatty Liver Disease**		
Author		**Author's job title**	Obstetrician Lead Clinical Midwife
Directorate	Womens and Childrens	**Department**	Maternity

Version	Date Issued	Status	Comment / Changes / Approval
0.1	Aug2017	Draft	Initial version for consultation
1.0	Oct 2017	Final	Approved by Maternity Guidelines committee
2.0	Jan 2018	Final	Minor amendments, approved for publishing.

Main Contact Lead Clinical Midwife North Devon District Hospital Raleigh Park Barnstaple, EX31 4JB	**Tel: Direct Dial** – 01271 334460 **Tel: Internal** – 5660
Lead Director Director of Nursing	
Superseded Documents Management of severe pre-eclampsia & eclampsia guidelines Hypertensive disorders in pregnancy guidelines	

Issue Date	Review Date	Review Cycle
January 2018	January 2021	Three years

Consulted with the following stakeholders:

- Senior Midwives
- Obstetricians
- Anaesthetists
- Women's and children's Directorate Management
- Consultant Microbiologist
- The Outreach & Resuscitation Team
- Women and Children's Clinical Pharmacist

Approval and Review Process
Maternity Guidelines Group
Drug and Therapeutics Committee

Local Archive Reference
G:\OBSGYNAE\Risk\Guideline Group
Local Path
G:\OBSGYNAE\Risk\Guideline Development
Filename
G:\OBSGYNAE\Risk\Guideline Development\2017\Hypertensive disorders in pregnancy.docx

Policy categories for Trust's internal website (Bob)	**Tags for Trust's internal website (Bob)** Pre- Eclampsia, HELLP Syndrome, Acute Fatty Liver Disease, PET, AFLD, Hypertension, Raised BP, Proteinurea, Eclampsia.

CONTENTS

1. Purpose

1.1. The purpose of this document is to detail the process for management of hypertension and hypertensive disorders of pregnancy.

Hypertensive disorders during pregnancy remain one of the leading causes of maternal death in the UK. Care standards have been identified as a defining feature in determining outcome. Furthermore, hypertensive disorders can result in substantial long term maternal morbidity including acute kidney failure, coagulopathy, chronic hypertension, cardiovascular and cerebrovascular disorders. Risks for the baby will include stillbirth, preterm delivery, Small-for-gestational-age (SFGA) and/or Intrauterine Growth Restriction (IUGR) with the latter carrying their own long term morbidities.

1.2. The policy applies to all Trust staff involved in the care of pregnant women or women who have given birth within the previous six weeks. Implementation of this policy will ensure that all staff are aware of the clinical signs indicative of a hypertensive disorder, and how to effectively assess and treat hypertensive disorders in pregnancy.

2. Definitions

Definition of conditions

2.1. Chronic Hypertension.

Chronic hypertension is hypertension that is present at the booking visit or before 20 weeks or if the woman is already taking antihypertensive medication when referred to maternity services. It can be primary or secondary in aetiology.

2.2. Gestational Hypertension.

Gestational hypertension is new hypertension presenting after 20 weeks without significant proteinuria.

2.3. Pre-Eclampsia.

Pre-eclampsia is new hypertension presenting after 20 weeks with significant proteinuria.

2.4. Severe Pre-Eclampsia.

Severe pre-eclampsia is pre-eclampsia with severe hypertension and/or with symptoms, and/or biochemical and/or haematological impairment.

2.5. Eclampsia.

Eclampsia is a convulsive condition associated with pre-eclampsia.

2.6. HELLP Syndrome.

HELLP syndrome is **H**aemolysis, **E**levated **L**iver enzymes and **L**ow **P**latelet count.

2.7. Acute Fatty Liver Disease.

Acute fatty liver disease (AFLD) forms part of the spectrum of hypertensive disorders unique to pregnancy. It is characterised by microvesicular steatosis in the liver. The presenting symptoms are caused by acute liver insufficiency.

Definition of measurement criteria

2.8. Significant proteinurea

Significant proteinuria is ≥30 mg/mmol in a protein:creatinine ratio (PCR) urinary sample or ≥300 mg protein in a 24-hour urine collection.

2.9. Hypertension

Mild hypertension:	diastolic blood pressure 90–99 mmHg, systolic blood pressure 140 - 149 mmHg.
Moderate hypertension:	diastolic blood pressure 100–109 mmHg, systolic blood pressure 150–159 mmHg.
Severe hypertension:	diastolic blood pressure 110 mmHg or greater, systolic blood pressure 160 mmHg or greater.

3. Responsibilities

Role of the Midwife

3.1. The midwife is responsible for;

- ensuring that any woman who presents with signs and symptoms of a hypertensive disorder has a complete set of observations recorded (as per PAR policy), scored on a MEOWS chart and escalated promptly,
- completing the Trust Maternity Hypertensive Disorder Screening Tool,
- ensuring that treatment is administered promptly,
- referring to the Obstetrician and multi-disciplinary team as appropriate; Medical registrar/Outreach & Resuscitation Team/ Obstetric Anaesthetist for deterioration of the seriously ill Obstetric patient, Obstetric Anaesthetist to request assessment of anaesthesia/pain relief options when a delivery is planned, Haematologist regarding treatment plan.
- comprehensively recording fluid input and output,
- ensuring any investigation results are followed-up promptly,
- ensuring on-going monitoring and observations are correctly recorded, scored and escalated as appropriate.

Role of the Obstetrician

3.2. The Obstetrician is responsible for;

- ensuring that any woman who presents with signs and symptoms of a hypertensive disorder has a prompt comprehensive and focussed assessment complete with a clearly documented plan of care,
- completing the Trust Maternity Hypertensive Disorder Screening Tool,
- initiating a prompt plan of treatment in adherence with this guideline,
- liaison with the Obstetric Anaesthetist, Consultant Haematologist, Medical registrar and other multi-disciplinary team as appropriate; for example for deterioration of the seriously ill Obstetric patient, contact Obstetric Anaesthetist regarding treatment plan assessment of anaesthesia/pain relief options when delivery planned.
- ensuring that on-going assessment, planning and treatment are undertaken frequently and documented clearly.

Role of the Obstetric Anaesthetist

3.3. The Obstetric Anaesthetist is responsible for;

- ensuring that any woman who is at risk of deterioration, or is already critically unwell, due to a hypertensive disorder of pregnancy has a prompt comprehensive and focussed assessment complete with a clearly documented care plan,
- liaising with the multi-disciplinary team to ensure the critically ill woman receives the appropriate level of care in the appropriate location.

4. Management of Chronic and Gestational Hypertension

4.1. General Principles

It is essential that the management plan starts with a clear diagnosis based on the definitions given previously and the plan is in alignment with the tables in Appendix B.

4.2. Vigilance, assessment, multi-disciplinary team response and treatment.

Teamwork and good communication will determine the efficacy of management of the pregnant woman with a hypertensive disorder. The standard of care a woman receives not only determines the outcome but her recovery and long term health (MBRRACE).

It is essential that the clinicians involved in the care of all pregnant women are vigilant to the signs and symptoms of a hypertensive disorder and work together to treat that disorder promptly. The primary defining feature in effective management is to make a clear diagnosis as this will set in motion a definite plan of management. (See Appendix B).

4.3. Antepartum (Chronic Hypertension)

Therapeutic advice

Women with chronic hypertension should have antihypertensive treatment dependent on pre-existing treatment, side-effect profiles and teratogenicity. Stop ACE inhibitors or ARBs in pregnancy, preferably within 2 working days of notification of pregnancy, and offer alternatives. Tell women who take antihypertensive treatments other than ACE inhibitors, ARBs or chlorothiazide that the limited evidence available has not shown an increased risk of congenital malformation with such treatments.

Encourage women with chronic hypertension to keep their dietary sodium intake low because this can reduce blood pressure.

Therapeutic goals

Aim to keep blood pressure lower than 150/100 mmHg, apart from women with target-organ damage secondary to chronic hypertension (for example, kidney disease) who will require treatment to keep blood pressure lower than 140/90 mmHg. Do not offer pregnant women with uncomplicated chronic hypertension treatment to lower diastolic blood pressure below 80 mmHg.

Pregnant women with secondary chronic hypertension should be referred to a specialist in hypertensive disorders.

4.4. Intrapartum (Chronic Hypertension)

Timing of delivery

Do not recommend delivery before 37 weeks gestation for women with chronic hypertension whose blood pressure is lower than 160/110 mmHg, with or without antihypertensive treatment.

For women with chronic hypertension whose blood pressure is lower than 160/110 mmHg after 37 weeks, with or without antihypertensive treatment, timing of birth, and maternal and fetal indications for birth should be agreed between the woman and the SAS Grade or Consultant Obstetrician.

Offer birth to women with refractory severe chronic hypertension, after a course of corticosteroids (if required) has been completed.

The delivery plan made by the Consultant Obstetrician will include a plan for maternal and fetal monitoring during labour and birth.

Attention should be paid to the frequency of blood pressure monitoring and plans to stabilise if it becomes severe or uncontrolled. Plans for fetal monitoring should be documented. Finally, haematological and biochemical monitoring should be considered in addition to plans for regional anaesthesia.

Maternal monitoring and assessment. Fetal monitoring.

Please see 5.5

4.5. Postpartum (Chronic Hypertension)

In women with chronic hypertension who have given birth;

- measure blood pressure;
  - daily for the first two days after birth
  - at least once between day 3 and day 5 after birth
  - as clinically indicated if antihypertensive treatment is changed
- aim to keep blood pressure lower than 140/90 mmHg
- continue antenatal antihypertensive treatment
- review long-term antihypertensive treatment 2 weeks after the birth.

If a woman has taken methyldopa to treat chronic hypertension during pregnancy, stop within 2 days of birth and restart the antihypertensive treatment the woman was taking before she planned the pregnancy.

Offer women with chronic hypertension a medical review at the postnatal review (6–8 weeks after the birth) with the pre-pregnancy care team.

4.6. Antepartum (Gestational Hypertension)

Degree of hypertension	Mild hypertension (140/90 to 149/99 mmHg)	Moderate hypertension (150/100 to 159/109 mmHg)	Severe hypertension (160/110 mmHg or higher)
Admit to hospital	No	No	Yes (until blood pressure is 159/109 mmHg or lower)
Treat	No	With oral labetalol as first-line treatment to keep: • diastolic blood pressure between 80–100 mmHg • systolic blood pressure less than 150 mmHg Refer to Appendix D for dosage	With oral labetalol as first-line treatment to keep: • diastolic blood pressure between 80–100 mmHg • systolic blood pressure less than 150 mmHg Refer to Appendix D for dosage
Measure blood pressure	Not more than once a week	At least twice a week	At least four times a day
Test for proteinuria	At each visit using automated reagent strip reading device or urinary protein : creatinine ratio	At each visit using automated reagent-strip reading device or urinary protein : creatinine ratio	Daily using automated reagent-strip reading device or urinary protein : creatinine ratio
Blood tests	Only those for routine antenatal care	Test kidney function, electrolytes, full blood count, transaminases, bilirubin Do not carry out further blood tests if no proteinuria at subsequent visits	Test at presentation and then monitor weekly: • kidney function, electrolytes, full blood count, transaminases, bilirubin

Only offer women with gestational hypertension antihypertensive treatment other than labetalol after considering side-effect profiles for the woman, fetus and newborn baby. Alternatives include methyldopa and nifedipine.

In women with mild hypertension presenting before 32 weeks, or at high risk of pre-eclampsia, measure blood pressure and test urine twice weekly. Do not offer bed rest in hospital as a treatment for gestational hypertension.

4.7. Intrapartum (Gestational Hypertension)

Do not offer birth before 37 weeks to women with gestational hypertension whose blood pressure is lower than 160/110 mmHg, with or without antihypertensive treatment.

For women with gestational hypertension whose blood pressure is lower than 160/110 mmHg after 37 weeks, with or without antihypertensive treatment, timing of birth, and maternal and fetal indications for birth should be agreed between the woman and the SAS Grade or Consultant Obstetrician.

Offer birth to women with refractory severe gestational hypertension after a course of corticosteroids (if required) has been completed. The delivery plan made by the Consultant Obstetrician will include a plan for maternal and fetal monitoring during labour and birth.

Attention should be paid to the frequency of blood pressure monitoring and plans to stabilise if it becomes severe or uncontrolled. Plans for fetal monitoring should be documented. Finally, haematological and biochemical monitoring should be considered in addition to plans for regional anaesthesia.

Maternal monitoring and assessment. Fetal monitoring.

Please see 5.4

4.8. Postpartum (Gestational Hypertension)

In women with gestational hypertension who have given birth, measure blood pressure:

- daily for the first 2 days after birth
- at least once between day 3 and day 5 after birth
- as clinically indicated if antihypertensive treatment is changed after birth.

In women with gestational hypertension who have given birth:

- continue use of antenatal antihypertensive treatment
- consider reducing antihypertensive treatment if their blood pressure falls below 140/90 mmHg
- reduce antihypertensive treatment if their blood pressure falls below 130/80 mmHg.

If a woman has taken methyldopa to treat gestational hypertension, stop within 2 days of birth. For women with gestational hypertension who did not take antihypertensive treatment and have given birth, start antihypertensive treatment if their blood pressure is higher than 149/99 mmHg.

Ensure there is a clearly documented Obstetric care plan for women with gestational hypertension who have given birth and are being transferred to community care that includes all of the following:

- who will provide follow-up care, including medical review if needed
- frequency of blood pressure monitoring needed
- thresholds for reducing or stopping treatment
- indications for referral to primary care for blood pressure review.

Refer for medical review all women who have had gestational hypertension and remain on antihypertensive treatment 2 weeks after transfer to the community. Ensure that all women who have had gestational hypertension have an appointment for a medical review at the postnatal review (6–8 wks post birth). If antihypertensive treatment is still required following assessment at the postnatal review, specialist assessment should be arranged.

5. Management of Pre-Eclampsia, Severe Pre-Eclampsia, HELLP Syndrome and Acute Fatty Liver Disease

5.1. General Principles

Pre-eclampsia is a multisystem disease; confirming a clinical diagnosis of preeclampsia is crucial and is evidenced to improve outcomes for women and babies thus reducing maternal and perinatal morbidity and mortality. A confirmed diagnosis will set in to motion a plan for clinical management and focus the clinician on the risks to the mother and fetus (MBBRACE, 2015).

Pre-Eclampsia

Women with pre-eclampsia must have an integrated package of care covering admission to hospital, treatment, measurement of blood pressure, testing for proteinuria and blood tests as indicated in the table below.

Degree of hypertension	**Mild hypertension (140/90 to 149/99 mmHg)**	**Moderate hypertension (150/100 to 159/109 mmHg)**	**Severe hypertension (160/110 mmHg or higher)**
Admit to hospital	Yes	Yes	Yes
Treat	No	With oral labetalol as first-line treatment to keep: • diastolic blood pressure between 80–100 mmHg • systolic blood pressure <150 mmHg Refer to Appendix D for dosage	With oral labetalol as first-line treatment to keep: • diastolic blood pressure between 80–100 mmHg • systolic blood pressure <150 mmHg Refer to Appendix D for dosage
Measure blood pressure	At least four times a day	At least four times a day	More than four times daily or as clinically determined
Test for proteinuria	Do not repeat quantification of proteinuria	Do not repeat quantification of proteinuria	Do not repeat quantification of proteinuria
Blood tests	Monitor using the following tests twice a week: kidney function, electrolytes, full blood	Monitor using the following tests three times a week: kidney function, electrolytes,	Monitor using the following tests three times a week: kidney function, electrolytes,

	count, transaminases, bilirubin	full blood count, transaminases, bilirubin	full blood count, transaminases, bilirubin

Therapeutic goals (Pre-Eclampsia)

Women with pre-eclampsia must have a comprehensive assessment performed by a healthcare professional trained in the management of hypertensive disorders of pregnancy at each consultation (see table for Pre-Eclampsia 5.1).

The treatment regimen will focus on;

- controlling the blood pressure to reduce the risk of mortality and morbidity associated with hypertension such as stroke,
- and reducing the risk of seizure.

Only offer women with pre-eclampsia antihypertensive treatment other than labetalol after considering side-effect profiles for the woman, fetus and newborn baby. Alternatives include methyldopa and nifedipine. Refer to Appendix D for dosage

5.2. Antepartum (Pre-Eclampsia)

Advise women at high risk of pre-eclampsia to take 75 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 erythematosis or antiphospholipid syndrome
- type 1 or type 2 diabetes
- chronic hypertension.

Advise women with more than one moderate risk factor for pre-eclampsia to take 75 mg of aspirin daily from 12 weeks until the birth of the baby. 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/m² or more at first visit
- family history of pre-eclampsia
- multiple pregnancy.

Women who present in the antenatal period with signs and symptoms of pre-eclampsia must have a comprehensive assessment using the NDDH tool including blood pressure, testing for proteinurea and blood tests. Clinical diagnosis should be made using the definitions at the beginning of this guideline and a clear plan documented.

5.3. Intrapartum (Pre-Eclampsia)

Planning delivery

Women who have pre-eclampsia with mild or moderate hypertension may progress rapidly to severe disease with its associated risks, however until severe disease manifests it may be unclear whether the risks of pre-eclampsia outweigh the risks of planned late preterm birth for the baby.

Management of the timing of delivery must therefore be decided by the Consultant Obstetrician with a clearly documented plan in the woman's notes including the maternal (biochemical, haematological and clinical) and fetal thresholds for delivery.

Timing of delivery

Conservative management until 34 weeks should be the first line response where the blood pressure is well controlled with an effective treatment regimen and there is a clearly followed monitoring plan.

Elective delivery will be offered to women with pre-eclampsia before 34 wks if;

- severe hypertension develops refractory to treatment
- maternal or fetal indications develop as specified in the consultant plan
- discussion with neonatal and anaesthetic teams are complete and a course of corticosteroids has been given.

Elective delivery will be offered to women with pre-eclampsia at 34 to 36+6 if;

- severe hypertension is present and stabilised,
- maternal or fetal indications develop as specified in the consultant plan,
- after discussion with neonatal and anaesthetic teams and a course of corticosteroids has been given.

Elective delivery can be offered to women with pre-eclampsia after 37 weeks gestation, within 24–48 hours of a new diagnosis.

Emergency delivery should be recommended at any gestation where the risks of the disease outweigh the benefits of the fetus remaining in utero. The discussion for emergency delivery should be undertaken with the woman and her family, the Consultant Obstetrician and Consultant Paediatrician.

The delivery plan made by the Consultant Obstetrician will include a plan for maternal and fetal monitoring during labour and birth.

Attention should be paid to the frequency of blood pressure monitoring and plans to stabilise if it becomes severe or uncontrolled. Plans for fetal monitoring should be documented. Finally, haematological and biochemical monitoring should be considered in addition to plans for regional anaesthesia.

5.4. Intrapartum maternal and fetal monitoring

Fetal monitoring

The delivery plan made by the Consultant Obstetrician will include a plan for fetal monitoring during labour and birth.

Continuous electronic fetal monitoring for labour and birth is recommended for all women with hypertensive disorders. Attention should be paid to;

- the most recent estimated fetal weight on scan in addition to the symphysio-fundal height measurement made by the midwife on abdominal palpation.
- the features of the assessment of the fetal heart which may be affected by the anti-hypertensive medication and placental insufficiency.

Maternal monitoring and assessment.

Continue use of antenatal antihypertensive treatment during labour.

Blood Pressure monitoring will be determined by the severity of the hypertension. Women with mild or moderate hypertension that is well controlled should have hourly blood pressure monitoring. This should be increased if the findings become severe with a documented review and plan by a SAS Grade or Consultant Obstetrician until the blood pressure is within acceptable ranges.

Women with severe hypertension should have continuous monitoring with a documented review and plan by a SAS Grade or Consultant Obstetrician until the blood pressure is within acceptable ranges.

Haematological and biochemical monitoring should be considered on an individual basis determined by the gestation, mode and length of labour (e.g. IOL pre term for Pre-eclampsia v's spontaneous labour at term), the recent haematological and biochemical markers and the severity of symptoms.

Analgesia and anaesthesia options should be made available to all women in labour as per Trust guidance. Specific considerations for women with hypertensive disorders will include the haematological and biochemical markers, primarily platelet count, and the withholding of the standard 1 litre pre-load for epidural anaesthesia for women with severe pre-eclampsia.

Strict **fluid balance** monitoring should be completed throughout labour for women with severe hypertension.

Second stage

The duration of second stage of labour should not be routinely limited for all women with hypertensive disorders. An assessment of individual risk factors should be documented along with a plan that has been discussed and agreed with the woman.

Women with well controlled mild or moderate hypertension should follow routine guidance for management of the second stage as per Intrapartum guidelines.

Women with severe hypertension or unstable hypertension should have regular assessments during the second stage paying attention to descent of the presenting part and signs of progress in the second stage. If there is no demonstrable progress or descent of the presenting part, and the blood pressure is worsening, Operative delivery may be required and an Obstetric review should be completed with a view to expediting delivery.

Management of the third stage

Avoid ergometrine when administering uterotonics for active management of the third stage.

5.5. Postpartum (Pre-Eclampsia)

In women with pre-eclampsia who did not take antihypertensive treatment and have given birth, start antihypertensive treatment if blood pressure is 150/100 mmHg or higher
Measure blood pressure:

- at least four times a day while the woman is an inpatient,
- at least once between day 3 and day 5 after birth,
- on alternate days until normal if blood pressure was abnormal on days 3–5.

In women with pre-eclampsia who have taken antihypertensive treatment and have given birth, continue antenatal antihypertensive treatment. Consider reducing antihypertensive treatment if their blood pressure falls below 140/90 mmHg and reduce antihypertensive treatment if their blood pressure falls below 130/80 mmHg.
N.B. If a woman has taken methyldopa to treat hypertension, stop within 2 days of birth.
Measure blood pressure:

- at least four times a day while the woman is an inpatient
- every 1–2 days for up to 2 weeks after transfer to community care until the woman is off treatment and has no hypertension.

Ask women with pre-eclampsia who have given birth about severe headache, epigastric pain and pre-eclamspia symptoms each time the blood pressure is measured.

Fluid balance monitoring can cease when the hypertension is well controlled and creatinine levels are within the normal range.

Haematological and biochemical monitoring should be completed no less than 48–72 hours after birth or step-down from critical care for women with mild or moderate hypertension. Do not repeat if the results are all completely normal. If the haematological and biochemical markers are improving but stay within the abnormal range, repeat again within 48 hours.

If the haematological and biochemical markers are not improving, repeat again within 24 hours and ensure a fully documented Obstetric assessment and plan is completed.

Women with pre-eclampsia who have given birth can be discharged home and transferred to community care if all of the following criteria have been met:

- there are no symptoms of pre-eclampsia
- blood pressure, with or without treatment, is 149/99 mmHg or lower
- blood test results are stable or improving.

Ensure there is a written care plan that includes all of the following:

- who will provide follow-up care, including medical review if needed
- frequency of blood pressure monitoring
- thresholds for reducing or stopping treatment
- indications for referral to primary care for blood pressure review
- self-monitoring for symptoms.

Postnatal follow-up:

- 2 weeks after transfer to community care a medical review must be completed for women who are still on antihypertensive treatment.
- 6– 8 weeks after the birth a medical review must be completed for all women who have had pre-eclampsia.
- 6–8 weeks after the birth the postnatal review must include referral for a specialist assessment for all women who have had pre-eclampsia and who still need antihypertensive treatment at the postnatal review.

In women with pre-eclampsia who have given birth, carry out a urinary reagent-strip test at the postnatal review (6–8 weeks after the birth).

Offer women who had pre-eclampsia and still have proteinuria (1+ or more) at the postnatal review (6–8 weeks after the birth) a further review at 3 months after the birth to assess kidney function and consider offering them a referral for specialist kidney assessment.

Severe Pre-Eclampsia

5.6. Severe pre-eclampsia continues to cause maternal and perinatal morbidity. The standard of care women receive in managing this critical illness has a defining impact for the mother and the baby. The primary defining feature in effective management is to make a clear diagnosis as this will set in motion a definite plan of management.

Diagnosis of Severe Pre-Eclampsia will be based on the RCOG (2011) definition;
'Severe pre-eclampsia is pre-eclampsia with severe hypertension and/or with symptoms, and/or biochemical and/or haematological impairment'

In practice, you will see:
- ✓ **severe hypertension**
- ✓ and **significant proteinuria**

in addition, you *may also* see
- ☐ **symptoms** of severe headache, oedema, visual disturbances, epigastric pain, vomiting, papilloedema, signs of clonus (≥3 beats), liver tenderness.
- ☐ **abnormal bloods** including abnormal liver enzymes (ALT or AST rising to above 50 IU/litre, platelet count falling below 150, LDH>525.

5.7. Antepartum (Severe Pre-Eclampsia)

Diagnosis of severe pre-eclampsia will come with an assessment of, and discussion about, the need for delivery. This will be undertaken with the woman and guidance from the Paediatric team about location and timing of delivery. Estimation of fetal weight and uterine dopplers should be completed.

Acute management of severe pre-eclampsia will be conducted in the inpatient setting appropriate to the woman's needs. This may be on delivery suite prior to delivery with attendance by the wider multi-disciplinary team as appropriate or it may be in the high dependency or ICU setting. It may also require transfer out for maternal or fetal reasons and this option should be readily and promptly considered in the best interests of the mother and the baby.

Location of care

Women with severe pre-eclampsia should be referred to the appropriate expertise within the mutli-disciplinary team. This will include the Obstetric Anaesthetist and may further include the ICU Anaesthetist and Outreach Resuscitation team. The location of care will be determined by the multi-disciplinary team and the decision will be based on the location where the needs of the woman can be best met. In general terms, this will be as follows;

Level 3 care
(ICU) for women with severe pre-eclampsia with any of the following complications:

- needing ventilation
- evidence of cardiac failure

Level 2 care
(ICU/HDU/CDS) for women with severe pre-eclampsia with any of the following complications:

- eclampsia
- HELLP syndrome
- haemorrhage
- hyperkalaemia
- severe oliguria
- coagulation support
- intravenous antihypertensive treatment
- initial stabilisation of severe hypertension
- abnormal neurology

Level 1 care (CDS) for women with severe pre-eclampsia requiring ongoing conservative management or as a step-down from level 2 or 3 care settings.

See 5.4 for monitoring plans.

5.8. Intrapartum (Severe Pre-Eclampsia)

Therapeutic goals
The goals in management of severe pre-eclampsia are;

- control hypertension
- reduce risk of seizure
- precise fluid restriction and fluid balance
- plan to deliver

Reducing the risk of seizure in Severe Pre-Eclampsia

Once severe pre-eclampsia is diagnosed commence intravenous magnesium sulphate.

Administration of magnesium sulphate;

- ☐ loading dose of 4 g should be given intravenously over 5-15 minutes,
- ☐ followed by an infusion of 1g/hour maintained for 24 hours,
- ☐ recurrent seizures should be treated with a further dose of 2g given over 5 minutes.

Monitor:

- ☐ patellar reflexes hourly (or elbow with epidural)
- ☐ respiratory rate (>10 per min) every 15 mins
- ☐ O2 Sats >95% every 15 mins
- ☐ pulse rate every 15 mins
- ☐ urine output hourly
- ☐ MgS04 levels if toxicity suspected or persistent oliguria or known impaired renal function

N.B see Appendix D for serum levels reference range

Do not use diazepam, phenytoin or lytic cocktail as an alternative to magnesium sulphate in women with pre-eclampsia.

- Magnesium sulphate is more effective than phenytoin, diazepam and lytic cocktail in preventing the course of pre-eclampsia to eclampsia as well as preventing further eclamptic fits.

- Lytic cocktail is no longer relevant in UK clinical practice.

Diazepam, phenytoin or other anticonvulsants or anaesthetic agents may be considered by the Consultant Anaesthetist in the ICU setting for women with persistent and unresolved seizures.

Controlling hypertension in Severe Pre-Eclampsia

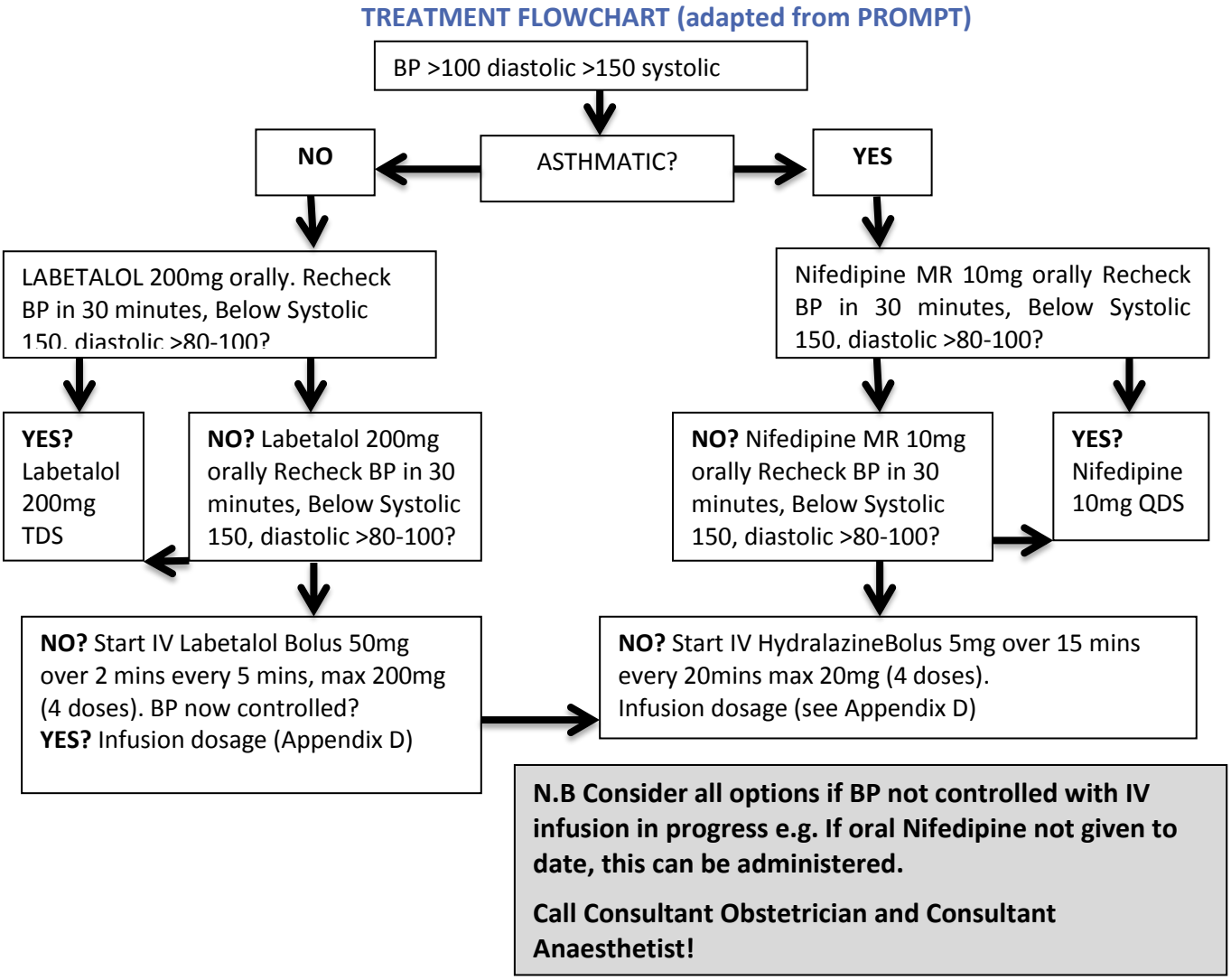
Aim: keep blood pressure <150 mmHg systolic and between 80 - 100 mmHg diastolic**.**

Treat severe hypertension immediately with the following;

- ☐ labetalol (oral or intravenous), hydralazine (intravenous), nifedipine (oral). **Refer to Appendix D for treatment regimen.**

Monitor response to treatment to:

- ☐ ensure blood pressure falls, identify adverse effects for woman and fetus and modify treatment according to response.



Fluid Restriction

In women with severe pre-eclampsia, **limit total fluid input to 80 ml/hour**.

Maintain a meticulous fluid balance of input and output to reduce the risk of fluid overload and pulmonary hypertension.

Urine output should be >0.5ml/kg/hr or approximately >100mls/4hrs. If there is any concern about urine output Obstetric and Aneasthetic assessment is required.

Do not use volume expansion in women with severe pre-eclampsia unless there are other on-going fluid losses (for example, haemorrhage). It may be considered as a once-off 500ml administration if hydralazine is the antenatal antihypertensive.

Plan for delivery

The mode of birth and/or individualised induction of labour plan will be determined by the clinical circumstances and the woman's preference.

Management of the timing of delivery will be decided by the Consultant Obstetrician, in discussion with the woman, with a clearly documented plan in the woman's notes including the maternal (biochemical, haematological and clinical) and fetal thresholds for delivery.

Refer to 5.4 Planning delivery/Timing of delivery for detailed advice per gestation.

Administration of antepartum corticosteroids for fetal lung maturation

If birth is considered likely within 7 days;

- ☐ give two doses of betamethasone 12 mg intramuscularly 24 hours apart in women between 24 and 34 weeks
- ☐ consider giving two doses of betamethasone 12 mg intramuscularly 24 hours apart in women between 35 and 36 weeks.

Intrapartum maternal and fetal monitoring

Refer to 5.5 for Intrapartum maternal and fetal monitoring, and management of the second stage.

Management of the third stage
Avoid ergometrine when administering uterotonics for active management of the third stage.

5.9. Postpartum (Severe Pre-Eclampsia)

Management of the woman with newly diagnosed severe pre-eclampsia in the postpartum period will rely on the therapeutic goals and management plan set out in 5.5.

Women who were diagnosed with severe pre-eclampsia antepartum or intrapartum, and are now delivered, should follow an accurate plan of management as defined in 5.6.

Despite delivery, women who have pre-eclampsia may progress rapidly to severe disease with its associated risks at any stage in the postpartum period. **Ask women with pre-eclampsia who have given birth about severe headache, epigastric pain and pre-eclamspia symptoms each time the blood pressure is measured.**

Eclampsia

5.10. Eclampsia is a convulsive condition associated with pre-eclampsia. It is characterised by seizures which may be profound or subtle in nature therefore the clinician should be both vigilant and prepared for eclampsia when any hypertensive disorder of pregnancy is diagnosed.

Therapeutic goals and Management plan (Eclampsia)

Eclampsia is an Obstetric emergency that warrants an immediate call for help and emergency response as follows;

1. Call for help; you will need a senior midwife, SAS Grade or Consultant Obstetrician and Obstetric Anaesthetist. You may also need to alert the theatre team. Out of hours the Consultant Obstetrician and Anaesthetist should be called to attend.

2. Assess Airway, Breathing and Circulation

3. Control seizure/s;

    a. commence Magnesium Sulphate 4g IV over 5-15 mins

    b. maintenance dose 1g per hour until 24 hours post last seizure

    c. recurrent seizures 2g IV bolus over 5mins

    d. Do not use diazepam, phenytoin or lytic cocktail as an alternative to magnesium sulphate in women with pre-eclampsia.
        i. Magnesium sulphate is more effective than phenytoin, diazepam and lytic cocktail in preventing the course of pre-eclampsia to eclampsia as well as preventing further eclamptic fits.
        ii. Lytic cocktail is no longer relevant in UK clinical practice.
        iii. Diazepam, phenytoin or other anticonvulsants or anaesthetic agents may be considered by the Consultant Anaesthetist in the ICU setting for women with persistent and unresolved seizures.

During this emergent phase observations will need to be completed every 5mins. Ensure that;

- ✓ Hypertension is managed,
- ✓ Strict fluid balance is maintained,
- ✓ Observations are plotted correctly on the MEOWS chart,
- ✓ Make a plan for delivery,
- ✓ A clear Obstetric plan is documented,
- ✓ A clear Anaesthetic plan is documented.

HELLP Syndrome

5.11. HELLP (Haemolysis, Elevated Liver enzymes, Low Platelets) syndrome is a variant of severe pre-eclampsia where hypertension is less marked but where there is severe involvement of both the liver and the coagulation system. In addition to the usual complications of severe pre-eclampsia there is a risk of haemorrhage due to disseminated intravascular coagulation (DIC), liver failure and/or rupture, renal failure, eclampsia, pulmonary oedema and adult respiratory distress syndrome (RCOG, 2011).

HELLP syndrome is a life threatening condition that may present unheralded without signs of pre-eclampsia; it can easily be confused with 'severe heartburn', non-specific illnesses or gastroenteritis. Repeated administration of analgesia for epigastric pain must not be undertaken without a full biochemical and haematological profile.

The primary defining feature in effective management is to make a prompt and clear diagnosis as this will set in motion a definite plan of management.

In practice, you may see
- ✓ epigastric pain (the commonest symptom),
- ✓ hepatic (liver) tenderness,
- ✓ less often headaches, vomiting, malaise,
- ✓ hypertension may be mild or even absent,
- ✓ raised capillary blood glucose in the absence of diabetes.

In practice, you will see
- ✓ deranged biochemical and haematological markers including;
- ✓ Platelet count < 100x10 9/L (and/or falling from previous results)
- ✓ Plasma ALT> 70 umol/L
- ✓ Bilirubin in the MSU (due to haemolysis)

Multidisciplinary team involvement and location of care

Early referral is recommended for women with HELLP syndrome to the appropriate expertise within the mutli-disciplinary team. This will include the Obstetric Anaesthetist and may further include the ICU Anaesthetist, Consultant Haematologist and Outreach Resuscitation team.

The location of care will be determined by the multi-disciplinary team and the decision will be based on the location where the needs of the woman can be best met. See 5.8 for more details. Transfer out to a specialist unit for maternal or fetal reasons may also be required and this option should be readily and promptly considered in the best interests of the mother and the baby.

5.12. Therapeutic goals and Management plan (HELLP Syndrome)

Do not use dexamethasone or betamethasone for the treatment of HELLP syndrome.

The therapeutic goals in the management of HELLP syndrome are to achieve a return to normal biochemical and haematological profiles without significant long term complications. The management will be based on frequent and comprehensive senior multidisciplinary review of maternal stability and fetal wellbeing.

To achieve this, complete the following;

1. Expedite delivery.
2. Limit total fluid input to 80 ml/hour.
3. Maintain a meticulous fluid balance of input and output to reduce the risk of fluid overload and pulmonary hypertension.
4. Reduce the risk of seizure and manage hypertension (if it exists) as per 5.9 'Control Hypertension' and 'Reduce risk of seizure'.
5. The need for platelet transfusion or fresh frozen plasma (FFP) should be considered in severe cases where the platelet count falls below 50.
6. Minimum thrice daily documented assessment and plan by the Consultant Obstetrician and Obstetric Anaesthetist.
7. Daily senior multidisciplinary liaison between the Consultant Obstetrician, Consultant Anaesthetist (covering Obstetrics), Consultant Haematologist, Consultant Paediatrician and Outreach Resuscitation team.

Acute Fatty Liver Disease

5.13. Acute fatty liver disease (AFLD) is a rare but potentially fatal condition for both mother and baby with an indigence of 1 per 20,000 pregnancies. The primary complication of AFLD is that diagnosis is frequently delayed thereby resulting in a manifest condition that is difficult to reverse.

It occurs predominantly in the third trimester and forms part of a spectrum of hypertensive disorders related to pre-eclampsia and therefore carries with it the risk of the usual complications of severe pre-eclampsia in addition to multiple organ failure, haemorrhage, liver rupture, eclampsia, pulmonary oedema and adult respiratory distress syndrome.

Women at greatest risk are those who are older, primiparous, low BMI, multiple pregnancies. Twin gestation carries 14 fold increased risk for AFLD.

The primary defining feature in effective management is to make a prompt and clear diagnosis as this will set in motion a definite plan of management.

In practice, you may see;

✓ Renal failure,

- ✓ Hypoglycemia,
- ✓ Infection,
- ✓ Gastrointestinal haemorrhage,
- ✓ Coagulopathy,
- ✓ Severe postpartum haemorrhage,
- ✓ Stillbirth.

Acute Fatty Liver Disease is closely related to, and can be difficult to differentiate from, HELLP syndrome.

Symptom	HELLP	AFLD
Elevated Transaminases	**+**	**++**
Hypoglycaemia	**+/-**	**++**
Hyperuricaemia	**+**	**++**
DIC	**+**	**++**
Leucocytosis	**+**	**++**
Multiple Pregnancy	**+**	**++**
USS/CT	Normal	Bright Liver/ Ascites
Male Fetus	50%	70% (M:F = 3:1)
Hypertension	**++**	**+**
Proteinuria	**++**	**+**
Primiparous	**++**	**+**
Epigastric Pain	**+**	**+**
Thrombocytopaenia	**++**	**+/-**

Since a widely accepted diagnostic criterion does not exist for AFLD, UKOSS recommends using the criteria referred to as the Swansea Criteria.

Swansea diagnostic criteria for AFLD: 6 or more of the following in the absence of another explanation.	
NB Listed in order of clinical significance **BOLD** indicates 98-100% association with AFLD	
Clinical features	☐ Vomiting ☐ Abdominal Pain ☐ Polydipsia/Polyuria ☐ Encephalopathy
Biochemical and/or Haematological profiles	☐ **Bilirubin >14 umol** ☐ **AST/ALT >42 IU/l** ☐ **Haematological Leucocytosis >11 x109 /l** ☐ Renal Urate >340 umol/l ☐ Endocrine Glucose < 4 mmol/l ☐ Creatinine >150 umol/l ☐ Ammonia >47 umol/l ☐ Coagulopathy- PT >14 secs OR APTT > 34 secs (often with Plt count >100 x1012)

Radiological findings	Abdominal USS showing Bright Liver echo texture/Ascites.
Histological findings.	Liver Biopsy showing microvesicular steatosis

Multidisciplinary team involvement and location of care

Early referral is recommended for women with Acute Fatty Liver Disease to the appropriate expertise within the mutli-disciplinary team. This will include the Obstetric Anaesthetist and may further include the ICU Anaesthetist, Consultant Haematologist and Outreach Resuscitation team.

The location of care will be determined by the multi-disciplinary team and the decision will be based on the location where the needs of the woman can be best met. See 5.8 for more details. Transfer out to a specialist unit should be readily and promptly considered in the best interests of the mother and the baby.

5.14. Therapeutic goals and Management plan (Acute Fatty Liver Disease)

The therapeutic goals in the management of Acute Fatty Liver Disease are to achieve a return to normal biochemical and haematological profiles without significant long term complications. The management will be based on frequent and comprehensive senior multidisciplinary review of maternal stability and fetal wellbeing.

Early diagnosis of Acute Fatty Liver Disease and prompt delivery is the defining feature of effective treatment.

To achieve this, complete the following;

1. Referral to a specialist Liver Unit is recommended. Transfer to NDDH ICU prior to external transfer may be considered, if CDS is the interim location of care documented review and plan by the ICU Anaesthetist is required.

2. Expedite delivery: mode of delivery will most usually by LSCS with GA due to the severity of the condition and associated risk of spinal haematoma with regional anaesthesia.

3. Aggressive management of coagulopathy with FFP, Crypoprecipitate, Novoseven in discussion with haematologist

4. Aggressive management of hypoglycaemia with 50% intravenous glucose.

5. Consider N-acetyl Cysteine as it can improve haemodynamics whilst preventing progressive decompensation.

6. Have a low threshold for parenteral antibiotics given the risk of infection.

7. Reduce the risk of cerebral oedema by: raising the head of the bed, use of oral Lactulose and if appropriate use of IV sedation and hyperventilation.

8. Limit total fluid input to 80 ml/hour.

9. Maintain a meticulous fluid balance of input and output to reduce the risk of fluid overload and pulmonary hypertension.

10. Reduce the risk of seizure and manage hypertension (if it exists) as per 5.9 'Control Hypertension' and 'Reduce risk of seizure'.

11. Minimum thrice daily documented assessment and plan by the Consultant Obstetrician and Obstetric Anaesthetist.

12. Daily senior multidisciplinary liaison between the Consultant Obstetrician, Consultant Anaesthetist (covering Obstetrics), Consultant Haematologist, Consultant Paediatrician and Outreach Resuscitation team.

6. Monitoring Compliance with and the Effectiveness of the Guideline

Process for Implementation, Monitoring Compliance and Effectiveness

An up to date copy of this guideline is available to all staff on the Trust intranet. The Quick Reference Guide in Appendix B should be laminated and posted in plain view in all clinical areas. As a matter of routine, this guideline will be reviewed triennially by the Maternity Services Guideline group.

Reporting for non-compliance and review of effectiveness of the guideline will be identified through the risk process within maternity and led by appointed maternity Risk leads. The maternity services audit process will include review of this guideline. All versions of these guidelines will be archived in electronic format by the author within the Maternity Team policy archive. Any revisions to the final document will be recorded on the Document Control Report. To obtain a copy of the archived guidelines, contact should be made with the Maternity team.

7. References

RCOG (2011) Hypertension in pregnancy: the management of hypertensive disorders during pregnancy. NICE Collaboration (NICE CG107).

Knight M, Kenyon S, Brocklehurst P, Neilson J, Shakespeare J, Kurinczuk JJ (Eds.) on behalf of MBRRACEUK. Saving Lives, Improving Mothers' Care - Lessons learned to inform future maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009–12. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2014.

8. Associated Documentation

Patients at Risk of deterioration (PAR) policy

Appendix A: NDDH Hypertensive Disorder Assessment Tool

INITIAL ASSESSMENT

TICK AND COMPLETE ALL ACTIONS

- ☐ Note risk factors; primip, ≥40 years old, pregnancy interval >10 years, BMI ≥35, multiple pregnancy, family history PET.
- ☐ BP series; 3 BP readings x 5mins apart (measure cuff size and check manually)
- ☐ Proteinurea; urinalysis with automated device = 1+ or more protein. Send urine for urgent PCR.
- ☐ Symptoms; Tick which in red box below.
- ☐ Send Bloods; FBC, U&E, LFT, Coagulation, LDH.
- ☐ Obstetric review, plan and treatment prescribed. N.B. WITHIN 30mins if severe hypertension and/or severe PET.

CLINICAL FINDINGS (from Initial Assessment) TICK ALL THAT APPLY

☐ **Mild Hypertension**
- ➢ Systolic 140 – 149
- ➢ Diastolic 90 – 99

☐ **Moderate Hypertension**
- ➢ Systolic 150 – 159
- ➢ Diastolic 100 – 109

☐ **Severe Hypertension**
- ➢ Systolic ≥ 160
- ➢ Diastolic ≥ 110

☐ **Proteinurea;**
- urinalysis with automated device; 1+ or more protein

☐ **Significant proteinurea**;
- ≥30 mg/mmol PCR
- ≥300mg Protein 24hr collection

☐ **BLOODS abnormal**
- ☐ Platelets <150
- ☐ ALT >50
- ☐ LDH>525

General blood results;
- ☐ Abnormal liver function
- ☐ Abnormal renal function

☐ **SYMPTOMS**;
- ☐ severe headache,
- ☐ oedema,
- ☐ visual disturbances,
- ☐ epigastric pain,
- ☐ vomiting,
- ☐ papilloedema
- ☐ signs of clonus (≥3 beats)
- ☐ liver tenderness

DIAGNOSIS TICK WHICH ONE

☐ **Chronic hypertension;**
✓ hypertension present at booking or <20 wks
or the woman is already taking antihypertensive medication pre-pregnancy. NO proteinurea.
MILD/ MODERATE /SEVERE Hypertension (circle which)

☐ **Gestational hypertension;**
✓ new hypertension >20 wks, NO proteinurea.

MILD/MODERATE/SEVERE Hypertension (circle which)

☐ **PET**
✓ Mild or Moderate hypertension >20 wks AND
✓ significant proteinurea

☐ **Severe PET**
✓ Severe hypertension AND
✓ significant proteinurea and/OR
symptoms and/OR
biochemical impairment and/OR

☐ **HELLP Syndrome**
Haemolysis; LDH >600, Bilirubin >1.2
Elevated **L**iver enzymes – ALT >70 and LDH >600
Low **Pl**atelets <100 OR notably <previous result

☐ **Acute Fatty Liver disease**

See overleaf for Treatment protocol

TREATMENT PROTOCOL TICK AND COMPLETE AS APPROPRIATE TO DIAGNOSIS

☐ **CHRONIC HYPERTENSION** and **GESTATIONAL HYPERTENSION (**treat MODERATE OR SEVERE hypertension **ONLY)**

- ☐ Labetalol PO as first-line treatment to keep: diastolic BP 80–100 mmHg and systolic BP <150 mmHg
  See below for anti-hypertensive treatment regimen

☐ **Monitoring BP, urinalysis and bloods;**

- ☐ **Moderate hypertension;** Outpatient management.
  - ☐ Measure BP at least twice weekly, measure urine at each check using automated device or PCR,
  - ☐ Take initial bloods for U&Es, LFTs, FBC and LDH. If no subsequent proteinurea then no blood tests.
- ☐ **Severe hypertension;** Admit to hospital until BP stabilised, then outpatient management if remains stable.
  Measure BP at least four times a day, measure urine daily using automated reagent-strip reading device or PCR, take blood weekly for U&Es, LFTs, FBC and LDH.

☐ **PET**

☐ Admit to hospital NB Obstetric review and plan within one hour of clinical findings.

☐ **MANAGEMENT OF HYPERTENSION (**treat MODERATE OR SEVERE hypertension **ONLY)**

Aim for diastolic BP 80–100 mmHg and systolic BP <150 mmHg

- ☐ Labetalol 200mg PO as first-line treatment, repeat after 30mins. Maintenance dose 200mg three times daily.
- ☐ Labetalol IV bolus; 50mg, max 4 doses total 200mg.
  - ☐ IV infusion;
- ☐ Hydralazine IV infusion;

☐ **MANAGEMENT OF RISK OF SEIZURE**

Consider commencing anti-convulsant as documented below for Severe PET

☐ **Monitoring BP, urinalysis and bloods;**

- ☐ Measure BP four times a day, increase depending on clinical circumstances
- ☐ Urinalysis; once Significant Proteinurea is diagnosed on PCR or Protein 24hr collection DO NOT REPEAT
- ☐ Take bloods for U&Es, LFTs, FBC and LDH three times per week. Increase if clinically necessary.

☐ **SEVERE PET**

☐ Admit to hospital. NB Obstetric review and plan within 30 minutes of clinical findings.

☐ **MANAGEMENT OF HYPERTENSION (**treat MODERATE OR SEVERE hypertension **ONLY)**

Aim for diastolic BP 80–100 mmHg and systolic BP <150 mmHg

- ☐ Follow anti-hypertensive protocol documented above for PET

☐ **MANAGEMENT OF RISK OF SEIZURE**

Commence anti-convulsant as follows;

- ☐ MgS04 IV loading dose 4g
- ☐ MgS04 IV maintenance dose at 1g per hour

☐ **SEVERE PET**

- ☐ Strict fluid management, restricted to 80ml/hr
- ☐ Make plan to deliver

☐ **Monitoring BP, urinalysis and bloods;**

- ☐ Measure BP more than four times a day, increase depending on clinical circumstances.
- ☐ Urinalysis; once Significant Proteinurea is diagnosed on PCR or Protein 24hr collection DO NOT REPEAT.
- ☐ Take bloods for U&Es, LFTs, FBC and LDH three times per week. Increase if clinically necessary.

HELLP SYNDROME or ACUTE FATTY LIVER DISEASE ; Immediate review by Consultant Obstetrician required.
Individualised Consultant Obstetrician and Multi-disciplinary team plan and treatment protocol required.

Appendix B: Women with Hypertensive Disorders

<table>
<tr><th colspan="6">WOMEN WITH HYPERTENSIVE DISORDERS
ANTEPARTUM CARE
LADYWELL UNIT QUICK REFERENCE GUIDE</th></tr>
<tr><th>Condition</th><th>Therapeutic goals & Location of care</th><th colspan="3">Monitoring plan</th><th>Treatment plan</th></tr>
<tr><td>Chronic Hypertension</td><td>Aim to keep BP <150/100 mmHg. N.B. apart from women with target-organ damage keep BP <140/90 mmHg.

CLC Antenatal clinic/community

Admit to hospital if severe hypertension.</td><td>Mild 140/90 to 149/99 mmHg

Measure BP
Not more than once a week</td><td>Moderate 150/100 to 159/109 mmHg

Measure BP
At least twice a week</td><td>Severe 160/110 mmHg or Higher
<u>Admit to hospital</u>

Measure BP
At least four times a day or as clinically determined</td><td>Treat Moderate to Severe Hypertension with oral labetalol to keep:
• diastolic BP between 80–100 mmHg
• systolic BP <150 mmHg
Refer to Appendix D for dosage</td></tr>
<tr><td>Gestational Hypertension</td><td>Aim to keep BP <150/100 mmHg.

CLC Antenatal clinic/ community

Admit to hospital if severe hypertension 160/110 mmHg or higher</td><td>Mild 140/90 to 149/99 mmHg

Measure BP
Not more than once a week

Test for proteinuria
At each visit

Blood tests
Only those for routine antenatal care</td><td>Moderate 150/100 to 159/109 mmHg

Measure BP
At least twice a week

Test for proteinuria
At each visit

Blood tests
Test: Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin.
Only repeat if proteinuria at subsequent visits.</td><td>Severe 160/110 mmHg or Higher
<u>Admit to hospital</u>

Measure BP
At least four times a day or as clinically determined

Test for proteinuria
Daily using automated device or urine protein : creatinine ratio

Blood tests Test at presentation and monitor weekly.</td><td>Treat Moderate to Severe Hypertension with oral labetalol to keep:
• diastolic BP between 80–100 mmHg
• systolic BP <150 mmHg

Refer to Appendix D for dosage</td></tr>
</table>

WOMEN WITH HYPERTENSIVE DISORDERS ANTEPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE

Condition	Therapeutic goals & Location of care	Monitoring plan			Treatment plan
Pre-Eclampsia	Control Hypertension Reduce risk of seizure **<u>Admit to hospital</u>** Pre-eclampsia is new hypertension presenting after 20 weeks with significant proteinuria. N.B. At first incidence of hypertension use reagent strip, if 1+Protein = test Urine PCR (protein : creatinine ratio) Significant proteinuria = >30 mg/mmol.	**Mild 140/90 to 149/99 mmHg** **Measure BP** At least four times a day **Test for proteinuria** Do not repeat diagnosis of proteinuria. **Blood tests** Monitor twice a week: **Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin.**	**Moderate 150/100 to 159/109 mmHg** **Measure BP** At least four times a day **Test for proteinuria** Do not repeat diagnosis of proteinuria. **Blood tests** Monitor three times a week (see list to left)	**Severe 160/110 mmHg or Higher** **Measure BP** At least four times a day or as clinically determined **Test for proteinuria** Do not repeat diagnosis of proteinuria. **Blood tests** Monitor three times a week (see list to left)	Treat **Moderate to Severe Hypertension** with labetalol as first line to keep: • diastolic BP between 80–100 mmHg • systolic BP <150 mmHg Refer to Appendix D for dosage
Severe Pre-Eclampisa	Control Hypertension Reduce risk of seizure Restrict fluid &balance Plan to deliver **<u>Admit to hospital</u>** Severe pre-eclampsia is pre-eclampsia with severe hypertension and/or symptoms, and/or biochemical and/or haematological impairment.	**Measure BP** At least four times a day or as clinically determined **Blood tests** Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output. **Plan for delivery** - Timing of delivery, Mode of birth and/or individualised induction of labour plan. **Administration of antepartum corticosteroids for fetal lung maturation** If appropriate Betamethasone 12 mg x2doses IM 24 hrs apart.			**Treat severe hypertension immediately:** • diastolic BP 80–100 mmHg • systolic BP <150 mmHg. Treat with; Labetalol, hydralazine, nifedipine. Refer to Appendix D dosage **Reduce risk of seizure; commence** Magnesium Sulphate.

WOMEN WITH HYPERTENSIVE DISORDERS ANTEPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE			
Condition	**Therapeutic goals & Location of care**	**Monitoring plan**	**Treatment plan**
HELLP Syndrome	Goal is to return to normal biochemical and haematological profiles without significant long term complications. **<u>Admit to hospital</u>**	**Blood tests** Coagulation, Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output. **Measure BP** At least hourly or as clinically Determined. Minimum three times daily documented assessment and plan by Consultant Obstetrician and Obstetric Anaesthetist. Daily liaison between the Consultant Obstetrician, Obstetric Anaesthetist and senior multidisciplinary team.	**Expedite Delivery.** **Reduce risk of seizure; commence** Magnesium Sulphate. **Manage hypertension** (if it exists); Treat Moderate to Severe Hypertension with labetalol as first line to keep: diastolic BP 80–100 mmHg and systolic BP <150 mmHg. Can use hydralazine and/or Nifedipine. Refer to Appendix D for dosage Platelet transfusion or fresh frozen plasma (FFP) should be considered in severe cases where the platelet count falls below 50
Acute Fatty Liver Disease	Diagnosis based on the Swansea Criteria. **<u>Referral to a specialist Liver Unit</u>** is recommendedNDDH ICU until transfer.	**Blood tests** Coagulation, Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output. **Measure BP** At least hourly or as clinically determined. Minimum three times daily documented assessment and plan by Consultant Obstetrician and Obstetric Anaesthetist. Daily liaison between the Consultant Obstetrician, Obstetric Anaesthetist and senior multidisciplinary team. **See 5.14 in full guideline for management.**	**Expedite Delivery.** Aggressive management of hypoglycaemia with 50% IV glucose. Low threshold for antibiotics. Manage coagulopathy with Consultant Haematologist Advice; FFP, Crypo, Novoseven

WOMEN WITH HYPERTENSIVE DISORDERS INTRAPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE			
Condition	**Therapeutic goals & Location of care**	**Monitoring plan**	**Treatment plan**
Chronic Hypertension	Aim to keep BP <150/100 mmHg. N.B. apart from women with target-organ damage keep BP <140/90 mmHg. **Hospital based delivery recommended.**	**Measure BP** At least hourly in active labour or as clinically determined. **Fetal Heart Monitoring** Continuous CTG recommended. **Second Stage** Do not limit second stage unless severe hypertension and uncontrolled. **Third Stage** Avoid ergometrine when administering uterotonics for active management of the third stage.	Continue use of antenatal anti-hypertensive treatment during labour. Treat **Moderate to Severe Hypertension** with oral labetalol to keep: • diastolic BP between 80–100 mmHg • systolic BP <150 mmHg Refer to Appendix D for dosage
Gestational Hypertension	Aim to keep BP <150/100 mmHg. **Hospital based delivery recommended.**	**Measure BP** At least hourly in active labour or as clinically determined. **Fetal Heart Monitoring** Continuous CTG recommended. **Second Stage** Do not limit second stage unless severe hypertension and uncontrolled. **Third Stage** Avoid ergometrine when administering uterotonics for active management of the third stage.	Continue use of antenatal anti-hypertensive treatment during labour. Treat **Moderate to Severe Hypertension** with oral labetalol to keep: • diastolic BP between 80–100 mmHg • systolic BP <150 mmHg Refer to Appendix D for dosage

WOMEN WITH HYPERTENSIVE DISORDERS INTRAPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE			
Condition	**Therapeutic goals & Location of care**	**Monitoring plan**	**Treatment plan**
Pre-Eclampsia	Control Hypertension Reduce risk of seizure **Hospital based delivery recommended.** Pre-eclampsia is new hypertension presenting after 20 weeks with significant proteinuria. N.B. At first incidence of hypertension use reagent strip, if 1+Protein = test Urine PCR (protein : creatinine ratio) Significant proteinuria = >30 mg/mmol.	**Blood tests** Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Measure BP** At least hourly in active labour or as clinically determined. **Fetal Heart Monitoring** Continuous CTG recommended. **Second Stage** Do not limit second stage unless severe hypertension and uncontrolled. **Third Stage** Avoid ergometrine when administering uterotonics for active management of the third stage.	Treat **Moderate to Severe Hypertension** with labetalol as first line to keep: • diastolic BP between 80–100 mmHg • systolic BP <150 mmHg Refer to Appendix D for dosage
Severe Pre-Eclampisa	Control Hypertension Reduce risk of seizure Restrict fluid &balance Plan to deliver **<u>Admit to hospital</u>** Severe pre-eclampsia is pre-eclampsia with severe hypertension and/or symptoms, and/or biochemical and/or haematological impairment.	**Blood tests** Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output. **Measure BP** At least hourly in active labour or as clinically determined. **Fetal Heart Monitoring** Continuous CTG recommended. **Second Stage** Limit second stage to one hour. **Third Stage** Do not use ergometrine when administering uterotonics for active management of the third stage.	**Treat severe hypertension immediately:** • diastolic BP 80–100 mmHg • systolic BP <150 mmHg. Treat with; Labetalol, hydralazine, nifedipine. Refer to Appendix D for dosage **Reduce risk of seizure; commence** Magnesium Sulphate.

WOMEN WITH HYPERTENSIVE DISORDERS INTRAPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE			
Condition	**Therapeutic goals & Location of care**	**Monitoring plan**	**Treatment plan**
HELLP	Goal is to return to normal biochemical and haematological profiles without significant long term complications. **<u>Admit to hospital</u>**	**Blood tests** Coagulation, Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output. **Measure BP** At least hourly or as clinically Determined. Minimum three times daily documented assessment and plan by Consultant Obstetrician and Obstetric Anaesthetist. Daily liaison between the Consultant Obstetrician, Obstetric Anaesthetist and senior multidisciplinary team.	**Expedite Delivery.** **Reduce risk of seizure; commence** Magnesium Sulphate. **Manage hypertension** (if it exists); Treat Moderate to Severe Hypertension with labetalol as first line to keep: diastolic BP 80–100 mmHg and systolic BP <150 mmHg. Can use hydralazine and/or Nifedipine. Refer to Appendix D for dose Platelet transfusion or fresh frozen plasma (FFP) should be considered in severe cases where the platelet count falls below 50
Acute Fatty Liver Disease	Diagnosis based on the Swansea Criteria. **<u>Referral to a specialist Liver Unit</u>** is recommended NDDH ICU until transfer.	**Blood tests** Coagulation, Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output. **Measure BP** At least hourly or as clinically determined. Minimum three times daily documented assessment and plan by Consultant Obstetrician and Obstetric Anaesthetist. Daily liaison between the Consultant Obstetrician, Obstetric Anaesthetist and senior multidisciplinary team. **See 5.14 in full guideline for management.**	**Expedite Delivery.** Aggressive management of hypoglycaemia with 50% IV glucose. Low threshold for antibiotics. Manage coagulopathy with Consultant Haematologist Advice; FFP, Crypo, Novoseven

WOMEN WITH HYPERTENSIVE DISORDERS POSTPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE			
Condition	**Therapeutic goals & Location of care**	**Monitoring plan**	**Treatment plan**
Chronic Hypertension	Aim to keep BP <150/100 mmHg. N.B. apart from women with target-organ damage keep BP <140/90 mmHg. CLC hospital based /community **Admit to hospital** if severe hypertension.	**Measure BP**; - daily for the first two days after birth - at least once between day 3 and day 5 - as clinically indicated if antihypertensive treatment is changed - aim to keep blood pressure lower than 140/90 mmHg Arrange a medical review at the postnatal review (6–8 weeks after the birth) with the pre-pregnancy care team.	Continue antenatal anti-hypertensive treatment. Stop Methyldopa within 2 days and restart the pre-pregnancy anti-hypertensive treatment. Treat **Moderate to Severe Hypertension** i.e. >149/99 mmHg. Refer to Appendix D for dosage. Review long-term anti-hypertensive treatment 2 weeks after the birth.
Gestational Hypertension	Aim to keep BP <150/100 mmHg. CLC hospital based /community **Admit to hospital** if severe hypertension.	**Measure BP**; - daily for the first two days after birth - at least once between day 3 and day 5 - as clinically indicated if antihypertensive treatment is changed - aim to keep blood pressure lower than 140/90 mmHg Ensure there is an Obstetric plan prior to transfer to community: - who will provide follow-up care, including medical review if needed - frequency of BP monitoring - thresholds for reducing or stopping treatment - indications for referral to primary care for BP review. Arrange a medical review at the postnatal review (6–8 weeks after the birth). N.B if still on treatment at 6-8wk review, refer for specialist assessment.	Continue antenatal anti-hypertensive treatment. Stop Methyldopa within 2 days. Treat **Moderate to Severe Hypertension** i.e. >149/99 mmHg. Refer to Appendix D for dosage Consider reducing antihypertensive if BP <140/90 mmHg. Reduce antihypertensive if BP <130/80 mmHg.

WOMEN WITH HYPERTENSIVE DISORDERS POSTPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE			
Condition	**Therapeutic goals & Location of care**	**Monitoring plan**	**Treatment plan**
Pre-Eclampsia **AND** **Severe Pre-Eclampisa** **(Diagnosis pre delivery)**	Control Hypertension Reduce risk of seizure Pre-eclampsia is new hypertension presenting after 20 weeks with significant proteinuria. N.B. At first incidence of hypertension use reagent strip, if 1+Protein = test Urine PCR (protein : creatinine ratio) Significant proteinuria = >30 mg/mmol.	**Diagnosis** of Pre-eclampsia **pre delivery**: **Measure BP** **Women NOT on anti-hypertensives** - at least four times a day while inpatient - at least once between day 3 and day 5 - on alternate days until normal (if abnormal days 3–5) **Women ON anti-hypertensives** - at least four times a day while inpatient - every 1–2 days for 2 weeks after transfer to community until off treatment and no hypertension. **Ask about severe headache, epigastric pain and pre-eclamspia symptoms at each BP check.** **Blood tests** Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Complete 48–72 hours after birth. Repeat 24hrs if not improved, 48hrs if improved. **Fluid balance;** stop once hypertension is well controlled and creatinine levels normal. Ensure Obstetric plan prior to community transfer: - who will provide follow-up care, including medical review if needed - frequency of BP monitoring - thresholds for reducing or stopping treatment - indications for referral to primary care for BP review. Arrange a medical review 2 wks after transfer to community for women still on treatment. Arrange a medical review at the postnatal review (6–8 weeks after the birth). N.B if still on treatment at 6-8wk review, refer for specialist assessment. **Test for proteinuria** Test at the postnatal review (6–8 weeks after the birth). If proteinuria (1+ or more) noted arrange a further review at 3 months to assess kidney function and consider referral for specialist kidney assessment.	Continue antenatal anti-hypertensive treatment. Stop Methyldopa within 2 days. Treat >150/100 mmHg. Refer to Appendix D for dosage Consider reducing anti-hypertensive if BP <140/90 mmHg. Reduce anti-hypertensive if BP <130/80 mmHg.

WOMEN WITH HYPERTENSIVE DISORDERS POSTPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE				
Condition	**Therapeutic goals & Location of care**	**Monitoring plan**	**Treatment plan**	
Pre-Eclampsia **AND** **Severe Pre-Eclampisa** **(NEW Diagnosis POST delivery)**	Control Hypertension Reduce risk of seizure Restrict fluid &balance **Admit to hospital** Severe pre-eclampsia is pre-eclampsia with severe hypertension and/or symptoms, and/or biochemical and/or haematological impairment.	**NEW diagnosis** of pre-eclampsia **POST delivery**. **Admit to hospital** **Measure BP** At least four times a day or as clinically determined **Blood tests** Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output.	**Treat severe hypertension immediately:** • diastolic BP 80–100 mmHg • systolic BP <150 mmHg. Treat with; Labetalol, hydralazine, nifedipine. Refer to Appendix D for dosage **Reduce risk of seizure; commence** Magnesium Sulphate.	
HELLP	Goal is to return to normal biochemical and haematological profiles without significant long term complications. **Admit to hospital**	**Blood tests** Coagulation, Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output. **Measure BP** At least hourly or as clinically Determined. Minimum three times daily documented assessment and plan by Consultant Obstetrician and Obstetric Anaesthetist. Daily liaison between the Consultant Obstetrician, Obstetric Anaesthetist and senior multidisciplinary team.	**Reduce risk of seizure; commence** Magnesium Sulphate. **Manage hypertension** (if it exists); Treat Moderate to Severe Hypertension with labetalol as first line to keep: diastolic BP 80–100 mmHg and systolic BP <150 mmHg. Can use hydralazine and/or Nifedipine. Refer to Appendix D for dosage Platelet transfusion or fresh frozen plasma (FFP) should be considered in severe cases where the platelet count falls below 50	

WOMEN WITH HYPERTENSIVE DISORDERS POSTPARTUM CARE LADYWELL UNIT QUICK REFERENCE GUIDE			
Condition	**Therapeutic goals & Location of care**	**Monitoring plan**	**Treatment plan**
Acute Fatty Liver Disease	Diagnosis based on the Swansea Criteria. **<u>Referral to a specialist Liver Unit</u>** is recommendedNDDH ICU until transfer.	**Blood tests** Coagulation, Renal function, Liver function, FBC, LDH, ALT, ALP, bilirubin. Repeat as clinically determined. **Fluid Restriction** - Limit total fluid input to 80 ml/hour. - Meticulous fluid balance of input/output. **Measure BP** At least hourly or as clinically determined. Minimum three times daily documented assessment and plan by Consultant Obstetrician and Obstetric Anaesthetist. Daily liaison between the Consultant Obstetrician, Obstetric Anaesthetist and senior ultidisciplinary team. **See 5.14 in full guideline for management.**	Aggressive management of hypoglycaemia with 50% IV glucose. Low threshold for antibiotics. Manage coagulopathy with Consultant Haematologist Advice; FFP, Crypo, Novoseven

Appendix C: Early Warning Score for Maternity – Minimal Standard of Frequency

This is applicable to all adult inpatients on Maternity wards, excluding those in Active Labour

Stable No Triggers	Low Score Group	Normal Observations minimal 12 hourly: • respiratory rate • pulse rate • blood pressure • oxygen saturation • temperature • AVPU
Low Risk 1 Yellow Trigger	Potential for Deterioration	Inform Midwife in Charge Observations at least 4 hourly (more frequent could be required) • Record all of the above
Medium Risk 1 Red or 2 Yellow Triggers or nurse concern	Deteriorating Patient	Observations at least 2 hourly (more frequent could be required) • Record all of the above but include Urine Output Urgent Doctor review within one hour who must define medical plan If unable to improve vital signs in one hour or serious concern call the SpR or Consultant. Consider a call to the Outreach team on 007
High Risk 2 or more Red Triggers	Critically Ill Patient	Observations at least hourly (more frequent could be required) • Record all of the above but include Fluid Balance with Urine Output Urgent Dr review within 30 minutes. A Medical Plan must be defined in conjunction with a Senior Doctor If unable to improve vital signs in one hour or serious concern call the SPR or Consultant. Consider a call to the Outreach team on 007
Patient Imminent chance of Cardio-Respiratory Arrest	**Call the Arrest Team on 2222** **You will also need the Obstetric Emergency Team**	

The standard frequency of observations and trigger for escalation does not replace clinical decision making, rather it should support it. If any clinician is worried about a woman they should not delay escalation of their concerns for peer or specialist review.

Urgent review of the deteriorating woman should be undertaken without delay by the clinician receiving the referral. In maternity this will primarily be the senior midwife and/or SAS Grade or Consultant Obstetrician and/or the appropriate Anaesthetist available for Obstetrics.

Appendix D: Anti-Hypertensive and Magnesium Sulphate (MgS04) Therapy tables

Magnesium Sulphate (MgS04) Therapy

Administration of magnesium sulphate to reduce risk of seizure;

☐ loading dose of 4g MgS04 intravenous (IV) should be given over 5-15 minutes,
☐ followed by an IV infusion of g MgS04 per hour maintained for 24 hours,
☐ recurrent seizures should be treated with a further IV dose of 2g MgS04 given over 5 minutes.

Monitor:
☐ patellar reflexes hourly (or elbow with epidural)
☐ respiratory rate (>10 per min) every 15 mins
☐ O2 Sats >95% every 15 mins
☐ pulse rate every 15 mins
☐ urine output hourly
☐ MgS04 levels if toxicity suspected or persistent oliguria or known impaired renal function

Do not use diazepam, phenytoin or lytic cocktail as an alternative to magnesium sulphate in women with pre-eclampsia.

- Magnesium sulphate is more effective than phenytoin, diazepam and lytic cocktail in preventing the course of pre-eclampsia to eclampsia as well as preventing further eclamptic fits.
- Lytic cocktail is no longer relevant in UK clinical practice.
- Diazepam, phenytoin or other anticonvulsants or anaesthetic agents may be considered by the Consultant Anaesthetist in the ICU setting for women with persistent and unresolved seizures.

Serum Magnesium Levels

- 2-4mmol/L - Therapeutic range
- >4mmol/L - Feeling of warmth, flushing, double vision, slurred speech
- >5mmol/L - Absent reflexes, respiratory depression
- >6mmol/L - Respiratory arrest

>12mmol/L- Cardiac arrest

Antihypertensive therapy table

LABETALOL

is the first line treatment at NDDH, oral or intravenous, in the following regimen;

N.B Contraindication- Asthma, pulmonary oedema.

☐ **Oral Labetalol**

- 200mg if the Obstetric assessment considers time available for oral intake and therapeutic efficacy, repeat after 30 mins.
- Maintenance dosage 200mg three times daily (TDS)

☐ **IV Labetalol**

BOLUS

- Give IV 50mg bolus (neat solution) slowly over 5 minutes.
- Repeat after 5 -10 minutes if necessary.
- A total of 4 doses (each 50 milligrams) may be given.
- Do not exceed total maximum cumulative dose of 200 mg.

MAINTENANCE INFUSION

- Use Labetalol five milligrams per ml neat solution. Draw up 50 ml neat solution into 50ml syringe and use the BRAUN syringe driver to deliver.
- Start 20mg/4mls per hour doubling every 30mins to a max of 160mg/32ml per hour.

IV HYDRALAZINE

☐ BOLUS

- Dilute 20 mg hydralazine (powder) with 3mls Water for Injection then add 17mls normal saline to total 20mls solution
- Give hydralazine 5mg (5mls) IV as slow bolus over 15 minutes using the BRAUN syringe driver to deliver at a rate of 20ml per hour. STOP PUMP AFTER 15mins.
- Do not exceed maximum cumulative dose of 20 mg.

☐ IV **HYDRALAZINE** MAINTENANCE INFUSION

- Use 20 mg hydralazine (powder) diluted with 3mls Water for Injection then add 17mls normal saline to total 20mls solution into 20ml syringe and use the BRAUN syringe driver to deliver.
- Start at 2mg (2mls) per hour and increase by 2mg (2mls) per hour every 30 mins as required to a max of 18mg/hr.
- NB. Women receiving Hydralazine MUST be warned of the side effects (they can feel particularly uncomfortable and/or painful) including tachycardia, flushing/feeling hot, stuffy nose, tightness in chest, hyperreflexia, abdominal pain, nausea and vomiting, headache which may be severe.
- STOP Hydralazine if there is significant tachycardia >120bpm and call the SAS Grade or Consultant Obstetrician and senior Obstetric Anaesthetist.
- Consider using up to 500 ml crystalloid fluid before or at the same time as the first dose of intravenous hydralazine in the antenatal period.

Oral **NIFEDIPINE**

- Slow Release or Modified Release (SR/MR) **tablets only** NOT Immediate Release (IR) orange capsules.
- 10 milligrams – swallow whole. Repeat after 30 minutes.
- Maintenace dosage 10mg four times daily (QDS)
- Contraindications: aortic stenosis, use within 1 month of myocardial infarction, unstable or acute attacks of angina and acute porphyria.
- Nifedipine increases muscular blockade of magnesium sulphate therefore should NOT be used in conjunction with Magnesium Sulphate.

Medicines and breastfeeding interaction table

No known adverse effects - Assess wellbeing of baby daily for at least 2 days	Dose	Comments
Labetalol	100mg BD, increase to a max of 800mg a day in divided doses	
Nifedipine	10mg BD, increase to max 40mg BD	
Enalapril	5mg OD, increase to 20mg OD if required	Check maternal U+Es one week after starting dose
Captopril	12.5mg BD, increase to 25mg BD	Check maternal U+Es one week after starting dose
Atenolol	25-50mg OD, increase to max 100mg a day in divided doses	
Metoprolol	100mg OD, increase to max 400mg a day in dived doses	
Notes: For all babies whose mothers are taking AHT in the postnatal period asses wellbeing of the baby especially adequacy of breastfeeding at least daily for the first 2 days after birth Insufficient evidence on the safety of ARB (Angiotensin receptor blockers) Amlodipine ACE other then Enalapri/ Captopril		

Appendix E: Postnatal discharge for woman with hypertension in pregnancy

Northern Devon Healthcare NHS Trust

Patient ID Sticker

Postnatal discharge for woman with hypertension in pregnancy

Date

Dear Dr / CMW

Your patient had hypertension in pregnancy or the postnatal period and has been discharged into the community today.

She delivered on: at weeks gestation.

We made the diagnosis of:

- Essential hypertension (Pre-existing hypertension)
- Pregnancy induced (gestational) hypertension
- Pre eclampsia/ severe pre eclampsia
- HELLP syndrome

Her current antihypertensive medication is:

Medication	Dose	Frequency

The plan of postnatal management:

- Essential / Pregnancy induced hypertension
  Check her BP daily for the first two days after birth.
  Once between day 3 & 5 after birth or as clinically indicated.
  Keep BP <140/90 for essential hypertension and <150/100 for Pregnancy induced hypertension.
- Pre-eclampsia
  Once between day 3& 5 after birth
  Every 1-2 days up to 2 wks (if she is on antihypertensive) or until BP is normal (without treatment)

- Refer to **GP** if the patient remains on medication at 2 weeks, if two measurements =/ > 150/100 more than 20 mins apart and **hospital review** if symptoms of pre-eclampsia or if BP is >160/100 mmHg.
- She had/ did not have significant proteinuria and we would /would not suggest checking her BP and urine dipstick at 6 weeks postnatal.
- If Patient remains on medication at 6 weeks postnatal or proteinuria persists, please refer her for appropriate medical review at the hospital.

Her most recent blood tests are normal/ abnormal (please circle):

Normal range	Blood test	Date	Date
44-73	Creatinine		
6-32	ALT		
11-14	Haemoglobin		
150-400	Platelets		

- We would suggest repeating the blood in weeks.
- We have not arranged a formal follow up for her at the hospital. (OR)We have arranged to review her in the clinic in 6-8 weeks.

We hope this information is helpful to you for her management in the community setting.

Yours sincerely

Name in capitals (Bleep No:)
Position

Magnesium Sulphate concentration

Same regimen
Different concentration

1. **Commencing 20.03.2018** Magnesium Sulphate will now be supplied as 10% concentration (instead of 50% solution):

   10mls solution = 1g MgS04

2. **NO dilution required!**
3. **Draw NEAT solution into 50ml syringe** & deliver via Braun syringe
4. **Regimen remains the SAME**

   - ✓ Loading dose 4g MgS04 IV over 5-15 mins,

     Draw up 40mls neat solution MgS04 10% in a 50ml syringe, use Braun syringe driver and set rate at 160mls/hr to deliver 4g in 15mins.

   - ✓ Infusion dose MgS04 1g/10mls/hr for 24 hrs:

     Draw up 50mls neat solution MgS04 10% in a 50ml syringe, use Braun syringe driver and set rate at 10mls/hr to deliver 1g per hour.

   - ✓ Recurrent seizures IV bolus 2g/20mls MgS04 over 5 mins.

     If infusion is already in progress, stop infusion and re-set rate in Braun syringe driver to 240mls/hr to deliver bolus 2g/20mls MgS04 10% over 5mins.

     No infusion in progress? Draw up 20mls neat solution MgS04 10% in a 50ml syringe, use Braun syringe driver and set rate 240mls/hr to deliver 2g in 5mins.