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Gestational hypertension, non-severe pre-eclampsia and chronic hypertension management in pregnant women guideline

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Contents

1. Introduction

These guidelines outline the management of women with hypertension in pregnancy. Women with hypertension will present throughout gestation and their management is dependent on the diagnosis. The different hypertensive disorders are defined below and the guideline includes management for all of these conditions.

Definitions and management guidelines are based on the NICE Hypertension in Pregnancy Guidelines (NICE, 2010).

2. Purpose

To standardise care delivery in relation to non- severe-hypertension in pregnancy whilst reducing risks to pregnant women and promoting the safe delivery of the baby.

3. Roles and Responsibilities

The Head of Midwifery and the Clinical Director have delegated responsibility for:

- Ensuring that guidelines are implemented according to the agreed process.
- Ensuring that the effectiveness of the guideline is monitored.
- Reviewing current risk assessments, control measures, procedures and training within the maternity service to ensure that deficiencies are identified and reported on and that recommendations and action plans are developed and monitored according to the Clinical Effectiveness strategy.
- The matrons are accountable to the Head of Midwifery for implementing, monitoring and evaluating compliance with the guideline.

4. Detail of the Guideline

4.1 Definitions

Chronic hypertension: Hypertension present at booking visit or identified before 20 weeks, or that is being treated at time of referral to maternity services. Can be primary or secondary in aetiology.

Gestational hypertension: New hypertension presenting after 20 weeks without significant proteinuria.

Pre-eclampsia: New hypertension presenting after 20 weeks with significant proteinuria.

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

Eclampsia: Convulsive condition associated with pre-eclampsia.

Gestational proteinuria: Significant proteinuria (see below) diagnosed after 20 weeks in the absence of hypertension.

4.2 Classification of Hypertension

Hypertension: Diastolic blood pressure 90–109 mmHg, systolic blood pressure 140–159 mmHg.

Severe hypertension: Diastolic blood pressure ≥ 110 mmHg, systolic blood pressure ≥ 160 mmHg (average of 3 readings over 30 minutes)

4.3 Initial assessment of women with gestational hypertension

- This guidance refers to women seen on the antenatal assessment unit, antenatal clinic and antenatal/postnatal wards.
- Please see appendix 1 for a summary of the management of women with gestational hypertension.
- Women presenting with suspected hypertension should have a minimum of 3 blood pressure readings over at least a half hour period using an appropriately sized cuff. Where possible blood pressure should be measured with an electronic validated machine – these are much more accurate than manual readings if performed with the woman at rest and using an appropriately sized cuff. However there may be circumstances where an alternative device may be required, for instance if a patient has an irregular heartbeat since electronic machines do not always give a valid reading in these circumstances.
- Women presenting >20 weeks and <37 weeks should have a PlGF-based test performed (serum blood bottle) to aid the diagnosis/exclusion of pre-eclampsia.
- Women should have urinalysis performed and if ≥"+" on dipstick, a PCR should be requested.
- Following initial assessment, a diagnosis of gestational hypertension or pre-eclampsia should be made and documented. Women should then be assessed according to the tables in appendix 1 or appendix 2.

4.4 Diagnosis of significant proteinuria > 20 weeks

- Confirmation of significant proteinuria in the presence of hypertension is diagnostic of pre-eclampsia.
- In isolation (normotensive), gestational proteinuria is a risk factor for the development of pre-eclampsia and adverse pregnancy outcome. Women with gestational proteinuria should be managed in the same way as those with gestational hypertension (appendix 1).
- An MSSU should always be performed in women with any degree of proteinuria to exclude urinary tract infection.
- Significant proteinuria is defined as PCR ≥30mg/mmol in the NICE guidelines. However, a PCR ≥30 but ≤50 mg/mmol could be considered borderline in women with mild/moderate hypertension where the maternal/fetal condition is otherwise reassuring and a repeat test within 48-72 hours could be considered.
- A PlGF-based test should be used to aid the diagnosis of pre-eclampsia in women with borderline proteinuria.
- Once a diagnosis of significant proteinuria has been made, it is NOT necessary to repeat PCR assessments. Deteriorating proteinuria does not predict worse maternal or fetal outcomes (Lindheimer, 2010).
- 24 hour protein quantifications are not more reliable than PCR protein quantifications (Cote 2008a, 2008b) and should not be used

4.5 Blood tests

- PlGF-based testing should be requested in women <37 weeks with symptoms/signs indicative of pre-eclampsia (i.e. new hypertension, proteinuria or suspected placental insufficiency) – see appendix 3 (ratio) or appendix 4 (POC).
- Blood tests are used to obtain baseline haematological, renal and liver function and/or to diagnose multisystem disease. Whilst abnormal blood results therefore indicate significant disease and require urgent senior medical review, normal blood tests do not

exclude a diagnosis of pre-eclampsia or exclude the possibility of adverse maternal or fetal outcomes.

- Frequency of blood tests is outlined in Appendix 1 and 2.

4.6 Management of women with gestational hypertension

- Gestational hypertension can become pre-eclampsia at any stage and the progression to pre-eclampsia is unpredictable.
- PlGF-based testing should be used <37 weeks to aid the diagnosis of pre-eclampsia and the frequency of subsequent monitoring – see flow chart appendix 3 (ratio) or appendix 4 (POC).
- Perform blood tests (FBC, U&E, LFTs) at presentation and repeat weekly if normal.
- If the diagnosis is made before 37 weeks then an ultrasound for fetal growth, AFI and umbilical artery Doppler should be performed and repeated as clinically indicated.
- Women with the following should be considered to be at higher risk of progression to pre-eclampsia:
    - nulliparity
    - age ≥40 years
    - pregnancy interval of more than 10 years
    - family history of pre-eclampsia
    - multiple pregnancy
    - BMI of 35 kg/m² or more
    - gestational age <32 weeks at diagnosis
    - previous history of pre-eclampsia or gestational hypertension
    - pre-existing vascular disease
    - pre-existing kidney disease
- Women diagnosed with gestational hypertension should be managed according to the table in appendix 1.

4.7 Treatment of gestational hypertension: management of women with non-severe hypertension (BP 140/90–159/109mm Hg)

- See table summarising management in appendix 1.
- Admission to hospital is not usually necessary if there are no features of pre-eclampsia.
- Hypertension should be treated if persistently >140/90 mmHg with a view to maintaining blood pressure around 135/85mmHg.
- First line treatments include labetalol and nifedipine:
    - Labetalol should be prescribed tds, starting at 100-200mg tds and titrating up to a maximum of 2.4g/day [caution in women with a history of severe asthma].
    - Nifedipine MR should be prescribed bd, starting at 10-20mg bd and titrating to a maximum of 60mg bd [warn women that nifedipine commonly causes a transient headache in the first 72 hours].
- Woman should be advised there is no proven benefit of one antihypertensive agent over another but that both medications are considered safe in pregnancy. Both medications have common, non-severe side effects.
- Measure the woman's BP weekly.

4.7.1 Gestational hypertension: severe hypertension (BP ≥ 160/110mm Hg)

- See table summarising management in appendix 1.
- Admit to hospital for antihypertensive treatment until BP ≤ 159/109 mmHg.

- Antihypertensive medication should be commenced as above.
- Measure the woman's BP at least 4 times a day until the target BP is achieved (it is not usually necessary to measure blood pressure between 22.00 and 06.00 if the blood pressure at 22.00 is satisfactory and there are no other concerns).
- In women receiving outpatient care after severe hypertension has been effectively treated in hospital, ongoing surveillance should continue as for non-severe hypertension.

4.7.2 Gestational hypertension: delivery planning

A care plan should be documented by a senior obstetrician which includes:

- timing and nature of future fetal monitoring;
- maternal and/or fetal indications for birth;
- if and when corticosteroids should be given

- In women with well controlled gestational hypertension alone with no other signs of placental disease, maternal or fetal compromise (see below), delivery is not usually indicated before 38 weeks.
- Exact timing of delivery will depend on other maternal factors (previous obstetric history, maternal preference etc).
- Examples of clinical features which should be discussed with a senior obstetrician and may indicate the need for delivery <38 weeks include:
  - Development of severe hypertension and/or rise in blood pressure requiring significant increases in antihypertensive doses or necessity for a second antihypertensive agent
  - sFlt:PlGF ratio test >85 / POC PlGF <12
  - EFW below 10th centile and/or oligohydramnios
  - Significant downward trend in platelet count or count <100x10^{9}/L, creatinine >80 µmol/L, ALT >40U/L,
  - Development of significant maternal symptoms (frontal headache, blurred vision, new vomiting, epigastric pain)

4.7.3 Gestational hypertension: intrapartum management

Antenatal hypertensive treatment should be continued as prescribed.

- The woman's blood pressure should be monitored 4 hourly prior to the establishment of labour and hourly during established labour.
- Aim to keep the woman's BP <150/100 mm Hg. Blood pressure above this level should be treated with short acting agents (e.g. labetalol, nifedipine MR). In women in established labour where gastric absorption may be compromised, IV antihypertensive therapy should be considered where there is sustained severe hypertension (i.e. the woman has not responded to oral medication within one hour of treatment) – see management severe hypertension guideline.
- **Do not give** Syntometrine® (ergometrine) for third stage of labour.
- Haematological and biochemical testing does not need to be repeated if it has been previously normal (within the previous week) and there are no new signs of pre-eclampsia, even if regional analgesia is being considered.
- Do not routinely limit duration of second stage of labour.

4.7.4 Gestational hypertension: post-natal management

Measure the woman's blood pressure:

- At least daily for the first two days after birth

- At least once between day 3 and 5 after birth
- As clinically indicated if antihypertensive medication is required or changed

- Aim to keep the woman's blood pressure <140/90 mm Hg.
- Aim to optimise antihypertensive regime to maximise compliance, i.e. as few tablets per day as possible and one agent if possible. Suitable options include nifedipine MR bd, amlodipine 5-10mg od, labetalol tds (all safe in breastfeeding).
- Consider reducing the woman's medication if BP <130/80 mm Hg.
- Stop treatment if the woman's BP <120/70 mm Hg.
- If a woman has been initiated on methyldopa to treat gestational hypertension if other agents suggested have been unsuccessful, stop within two days of birth because of its depressive effects – for full details in breast feeding please see Section 4.9.3.
- Do not repeat blood tests unless abnormal in the antenatal/intrapartum period.
- Ensure a post-natal discharge letter is completed by the medical staff (see appendix 5) stating the diagnosis, frequency of blood pressure monitoring in the community and the next medical review. Women requiring medication in the postnatal period should be reviewed by their GP 2 weeks post-delivery or sooner if blood pressure is not well controlled (>140/90 mm Hg).
- Women who have developed gestational hypertension should be advised that they are at increased risk of developing hypertension and cardiovascular disease in the future and given advice regarding diet, exercise and smoking cessation as appropriate (see appendix 7).

4.8 Management of women with pre-eclampsia

- If the woman has been diagnosed with severe pre-eclampsia as defined in section 4.1 please use Severe Pre-Eclampsia guideline.
- Pre-eclampsia is defined as gestational hypertension with one other feature suggestive of placental disease:
  - sFlt:PlGF Ratio >85 / POC PlGF <12 (an intermediate sFlt:PlGF ratio 39-84 / POC PlGF 13-99 is consistent with a diagnosis of pre-eclampsia if there are any of the signs below).
  - New significant proteinuria (UPCR >30mg/mmol) – repeat testing can be considered if UPR 30-50 mg/mmol, to confirm the diagnosis.
  - Haematological or biochemical abnormalities (rising creatinine, abnormal ALT, Platelets <100).
  - Growth restriction (SGA<10th centile, static growth (<280g weight gain over two weeks), oligohydramnios, abnormal umbilical artery Doppler).
- Women with a history of chronic hypertension are at significant risk of developing pre-eclampsia which can be difficult to diagnose. In women with chronic hypertension the development of gestational proteinuria, necessity for significant increases in antihypertensive medication, maternal symptoms or deterioration in biochemical or haematological parameters and/or concerns regarding fetal growth/wellbeing should be considered as potential signs of pre-eclampsia. PlGF-based testing <37 weeks should be used to confirm the diagnosis in women with chronic hypertension see flow chart in appendix 3 (ratio) or appendix 4 (POC).

4.8.1 Assessment of women with pre-eclampsia

See table summarising management in appendix 2.

- Carry out a full assessment including serial BP measurements.
- Treat blood pressure as for gestational hypertension.

- Perform fetal monitoring if >26 weeks.
- Admit to hospital for monitoring for initial monitoring [usually at least 48 hours]. Complete an IP management form – appendix 5.
- Perform blood tests 2-3 times per week.
- If the diagnosis is uncertain and <37 weeks, use PlGF-based testing to confirm the diagnosis.
- If delivery is not planned within the next 72 hours, carry out an ultrasound for fetal growth, AFI and umbilical artery Doppler (if one has not been performed in the last 2 weeks).
- It is not necessary to repeat the UPCR once proteinuria has been confirmed. Increasing levels of proteinuria are not indicative of worsening disease
- Counsel the woman about the diagnosis of pre-eclampsia, the potential for early delivery and the risk of severe complications developing in 1-3% of women (eclampsia, severe uncontrolled hypertension, stroke, abruption). Explain that these complications are not predictable.
- Once blood pressure control has been optimised during an inpatient stay, and following review by a Consultant Obstetrician, consider out patient monitoring with alternate day review.
- The need for readmission should be reconsidered at every visit (blood pressure control, symptoms, fetal concerns, abnormal or deteriorating blood tests).

  A care plan should be documented by a senior Obstetrician which includes:
  - timing and nature of future fetal monitoring;
  - maternal and/or fetal indications for birth;
  - if and when corticosteroids should be given.

4.8.2 Pre-eclampsia: delivery planning

Examples of clinical features which should be discussed with a senior Obstetrician and may indicate the need for early delivery include:

- Development of severe hypertension and/or rise in blood pressure requiring significant increases in antihypertensive doses or necessity for a second antihypertensive agent
- EFW below 10th centile and/or oligohydramnios or static growth
- Significant downward trend in platelet count or count <100x10^{9}/L, creatinine >80 µmol/L, ALT >40U/L
- Development of significant maternal symptoms (frontal headache, blurred vision, new vomiting, epigastric pain)

Before 34 weeks: Manage conservatively (do not plan same-day delivery of baby)

Consultant obstetric staff to:

- document maternal (biochemical, haematological and clinical) and fetal indications for elective birth before 34 weeks;
- write a plan for antenatal fetal monitoring and course of corticosteroids (if required), steroids should be given once a plan for birth has been made such that, where possible, steroids are given within 24-48 hours of birth;
- offer birth if: severe refractory hypertension, or if maternal or fetal clinical indication develops as defined in the plan

34+0 to 36+6 weeks:

Discuss the findings of the PHOENIX trial (Chappell et al, Lancet 2019) with the woman; advise the woman that:

- The risk of severe maternal complications is increased with expectant management beyond 34 weeks (severe hypertension and severe pre-eclampsia, emergency caesarean section and likelihood of needing magnesium sulphate)
- The likelihood of the baby being admitted to the neonatal unit is increased by around 25% with planned early delivery, mainly due to prematurity. The PHOENIX trial did not find any difference in short term respiratory or neurological complications with planned early birth versus expectant management. More babies in the expectant group were growth restricted and more required treatment for hypoglycaemia
- More women achieved vaginal birth in the group allocated to planned early birth compared with expectant management
- The median increase in gestation in women managed expectantly in the PHOENIX trial was 5 days; 55% of women developed a complication requiring birth before 37 weeks.

Following this discussion, a plan for the timing of birth should be agreed and documented. If birth is planned <37 weeks, corticosteroids should be offered.

After 37+0 weeks:

Recommend birth within 24–48 hours in women with pre-eclampsia.

4.8.3 Pre-eclampsia: intrapartum care

- Antenatal hypertensive treatment should be continued as prescribed.
- The woman's blood pressure should be monitored 4 hourly prior to the establishment of labour and hourly during established labour.
- Aim to keep the woman's BP <150/100 mm Hg. Women who develop severe hypertension >160 mmHg (systolic) and/or 110 mmHg(diastolic) (average of 3 readings over 30 minutes) should be managed according to the SEVERE PRE-ECLAMPSIA PROTOCOL.
- Check FBC, U&Es, LFTs at the onset of labour, do not repeat during labour if normal.
- **Do not give Syntometrine® (ergometrine) for third stage of labour**.
- Do not routinely limit duration of second stage.

4.8.4 Pre-eclampsia: postnatal investigation, monitoring and treatment (including after discharge from critical care)

- In women with pre-eclampsia, 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
- Women should be asked about severe headache and epigastric pain each time blood pressure is measured
- Maintain the woman's blood pressure <140/90 mm Hg
- Aim to optimise antihypertensive regime to maximise compliance, i.e. as few tablets per day as possible and one agent if possible. First line options include nifedipine MR bd OR amlodipine 5-10mg od (safe in breastfeeding).
- Labetalol can be continued but as needs to be taken tds is not ideal post-partum
- Second line options include enalapril 5-10mg (needs renal function monitoring within 7-10 days and dose escalation up to 20mg), atenolol 25mg daily), doxazosin (2-4mg bd) (all considered safe for breast feeding – see section in chronic hypertension below)
- Consider reducing medication if BP <130/80 mm Hg
- Stop treatment if BP <120/70 mm Hg

- If a woman has been treated with methyldopa to treat gestational hypertension, stop within two days of birth because of its depressive effects – for full details in breast feeding please see Section 4.9.3
- Do not repeat blood tests unless abnormal in the antenatal/intrapartum period
- Ensure a post-natal discharge letter is completed by the medical staff (see appendix 6) stating the diagnosis, frequency of blood pressure monitoring in the community and the next medical review. Women requiring medication in the postnatal period should be reviewed by their GP 2 weeks post-delivery or sooner if blood pressure is not well controlled (>140/90 mm Hg).
- Women who have developed severe pre-eclampsia or who require delivery prior to 34 weeks should be offered Obstetric review
- Women who have developed pre-eclampsia should be advised that they are at increased risk of developing hypertension and cardiovascular disease in the future and given advice regarding diet, exercise and smoking cessation as appropriate. Women should also be given the post-natal hypertension information leaflet (appendix 8) and asked to have an annual BP check with their GP.

4.9 Gestational proteinuria (without hypertension)

A small subset of women present with proteinuria in the absence of hypertension. In some cases this is physiological or attributable to a urinary tract infection, but it may also herald the development of pre-eclampsia. Studies have demonstrated that around 50% of women with isolated proteinuria develop pre-eclampsia (Morikawa 2008) and importantly, even in the absence of hypertension, these women are at significantly increased risk of adverse pregnancy outcomes such as fetal growth restriction and placental abruption (Morikawa 2008, Holston 2009). If hypertension develops in women with proteinuria they should be managed according to pre-eclampsia guidelines (see section 4.7)

- Women diagnosed with gestational proteinuria should be managed according to the table in appendix 1.
- Even in the absence of hypertension, women with gestational proteinuria are at increased risk of adverse pregnancy outcome and should therefore be offered birth > 38 weeks (as per gestational hypertension guideline)

4.10 Management of women with chronic hypertension

- Women diagnosed with hypertension prior to 20 weeks gestation or with a pre-pregnancy diagnosis of hypertension should be referred for Obstetric review
- Women with chronic hypertension should be prescribed aspirin 150mg from at least 8 weeks gestation through to 36 weeks to reduce the risk of pre-eclampsia.
- An assessment of proteinuria (PCR) and renal function should be obtained at booking or at diagnosis (whichever is earlier).
- Women with significant proteinuria (PCR>30mg/mmol) before 20 weeks should be investigated for underlying renal disease if a renal diagnosis has not been established and MUST be referred for Obstetric review
- All women with a diagnosis of chronic hypertension should be offered a renal scan if it has not previously been performed.
- All women with chronic hypertension should be evaluated by the clinical team as to the need for an echocardiogram (e.g. long standing hypertension, other cardiovascular comorbidities)
- Women with a diagnosis of chronic hypertension should be informed of the increased risk of fetal growth restriction and superimposed pre-eclampsia requiring preterm delivery.

- Blood pressure should be monitored every 2-4 weeks during pregnancy. Where possible home/self-blood pressure monitoring should be facilitated and supported.
- A placental screen (fetal biometry, & uterine artery Doppler) should be performed at 21-24 weeks. Women with a positive screen should have 3 weekly growth scans from 26 weeks (or earlier if indicated), women with a negative screen should be offered 4 weekly growth scans from 32 weeks.
- Low molecular weight heparin should be considered for women with nephrotic range proteinuria (PCR >300mg/mmol) or lower grade proteinuria if there are other factors which increase the risk of VTE (see kidney disease guideline on intranet)
- Women with chronic hypertension who develop clinical signs which could indicate developing pre-eclampsia (significant increase in blood pressure, development of new proteinuria, abnormal haematological or biochemical indices and/or concerns regarding fetal growth/wellbeing) should be offered PlGF-based testing (<37 weeks) and managed in line with suspected / confirmed pre-eclampsia guideline in section 4.7 above (see appendix 1& 2).

4.10.1 Treatment of chronic hypertension

Women with uncomplicated hypertension (no renal or other end organ disease) should maintain their blood pressure <140/90mmHg with a target blood pressure of 135/85mmHg.

- Women with renal disease should maintain their BP <140/75-85mmHg
- A full discussion with the woman regarding the risks and benefits of antihypertensive treatment should occur and should be documented. (Briggs,2014; Schaefer, 2014, UKTIS, 2010) (see appendix 7 for patient information on antihypertensives)
- First line antihypertensives:
  - Labetalol 200mg tds/qds increasing to a maximum of 600mg qds (contraindication severe asthma)
  - Nifedipine MR 10mg bd increasing to a maximum 60mg bd
    OR
  - Amlodipine 5-10mg od
    Where possible increase the primary agent before adding a second therapy to improve compliance
- Second line antihypertensives
  Women requiring second line antihypertensives require specialist consultant input. The drugs listed below are options provided for reference but should only be commenced following discussion with a specialist consultant obstetrician:
  - Doxazosin (2-4mg bd)
  - Methyldopa (250-750mg tds)
  - Hydralazine (should only be prescribed if all other options have been explored)
- Blood pressure should be checked within a week of a change in antihypertensive medication (ideally use home monitoring)
- Antihypertensive medication should be reduced/discontinued if the blood pressure is consistently < 75mmHg (diastolic)
  Contact your local Pharmacy and Medicines Information for additional information regarding medication using pregnancy if required.
  The team should consider registration with UKTIS for patient exposed to drugs during pregnancy.

4.10.2 Delivery planning for women with chronic hypertension

- Decision for delivery should be made by a consultant obstetrician

- For women requiring antihypertensive medication with stable blood pressure, delivery should be offered around 38-39 weeks following discussion with the woman and a full assessment of maternal and fetal factors
- Where possible a plan for post-natal antihypertensive medications should be made and documented prior to delivery

4.10.3 **Post-natal management**

Measure blood pressure:

- At least daily for the first two days after birth
- At least once between day 3 and 5 after birth
- As per pre-eclampsia guidance if antihypertensive medication is required
- Aim to maintain BP <140/90mmHg in the postnatal period. If BP is above target **discuss ongoing antihypertensive regime with a senior Obstetrician as soon as possible to avoid delaying post-natal discharge.**
- Aim to optimise antihypertensive regime to maximise compliance, i.e. as few tablets per day as possible and one agent if possible.
- Consider restarting pre-pregnancy medication, the following medications should be considered in the post-natal period dependent upon whether the woman would like to breast feed. Other considerations for the welfare of the baby include if they were premature and have any other medical conditions. In these cases please refer to your Pharmacy Medicines Information for additional information. (Briggs, 2014; Hale, 2012; Schaefer, 2014; Toxnet, 2013a; Toxnet 2013b; Toxnet, 2013c; Toxnet 2014a; Toxnet 2014b)
    - Nifedipine M/R or Amlodipine 5 or 10mg is considered safe during breast feeding.
    - Enalapril is considered to be one of the safest ACE inhibitors in breast feeding, babies should be monitored for signs of hypotension, captopril can also be used with similar monitoring if enalapril is incompatible
    - Doxazosin has little evidence published on breast feeding some reference suggest that up to 4mg may be safe due to low levels excreted in breast milk. Baby should be monitored for hypotension.
    - Atenolol 25 or 50mg od can be used as an alternative to labetolol if compliance is a problem. High amounts secreted into breast milk monitor child for signs of beta blockade especially bradycardia
- Do not repeat blood tests unless abnormal in the antenatal/intrapartum period.
- Women with chronic hypertension requiring medication in the antenatal period will be offered a 6 week post-natal appointment with as per local guidance.
- Ensure a post-natal discharge letter is completed by the medical staff (see appendix 6) stating the diagnosis, frequency of blood pressure monitoring in the community and the next medical review. Women with a diagnosis of chronic hypertension should have appropriate ongoing surveillance in primary or secondary care.

IF THERE ARE DIFFICULTIES MANAGING POST NATAL HYPERTENSION THESE SHOULD BE ESCALATED TO THE CONLSTUANT ON CALL. IF FURTHER SPECIAILST ADVICE IS REQUIRED, PLEASE CONTACT A MEMBER OF THE HYPERTENSION TEAM

4.11 Incidents

An incident form should be submitted in the following instances:

- Failure to treat severe hypertension within 30 minutes.
- Use of Syntometrine® (ergometrine) in women with hypertension.

4.12 Communication and documentation

All women with learning disabilities, visual or hearing impairments or those whose first language is not English must be offered assistance with interpretation and understanding where applicable, and where appropriate a telephone interpreter must be used. It is paramount that clear channels of communication are maintained at all times between all staff, the women and their families. Once any decisions have been made/agreed, comprehensive and clear details must be given to the woman thereby confirming the wishes of the women and their families.

The contents of any leaflet issued must be explained in full at the time it is issued. All communication difficulties (including learning difficulties) and language barriers must be addressed as outlined in the previous paragraph at the time the leaflet is issued. Ensure the provision and discussion of information of the risks and benefits with women during the antenatal, intrapartum and postnatal periods.

Staff should aim to foster a culturally sensitive care approach in accordance with the religious and cultural beliefs of the parents and families in our care.

5. Equality, Diversity and Human Rights Impact Assessment

This document should be equality impact assessed using each provider Trust's Equality Impact Assessment (EqIA) framework.

6. Consultation, Approval and ratification Process

This guideline has been approved and ratified in accordance with the agreed process.

7. Dissemination and Implementation

This guideline has been disseminated and implemented in accordance with the agreed process.

8. Monitoring Compliance

This guideline can be audited in accordance with the local maternity audit plan. The findings of the audit report will be presented to staff via the Obstetric Clinical Effectiveness Group and where appropriate an action plan will be developed and monitored at the Obstetric Clinical Effectiveness Group.

9. References

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Appendices

Appendix 1: Management of gestational hypertension

Appendix 2: Management of pre-eclampsia

Appendix 3: Flow chart for PlGF-based testing (ratio)

Appendix 4: Flow chart for PlGF-based testing (POC)

Appendix 5: Inpatient management for women with hypertensive disease

Appendix 6: Postnatal discharge letter

Appendix 7: Decision aid for antihypertensive treatment for women with chronic hypertension

Appendix 8: Post-natal information leaflet for women who have developed hypertension in pregnancy

Appendix 1: Management of gestational hypertension

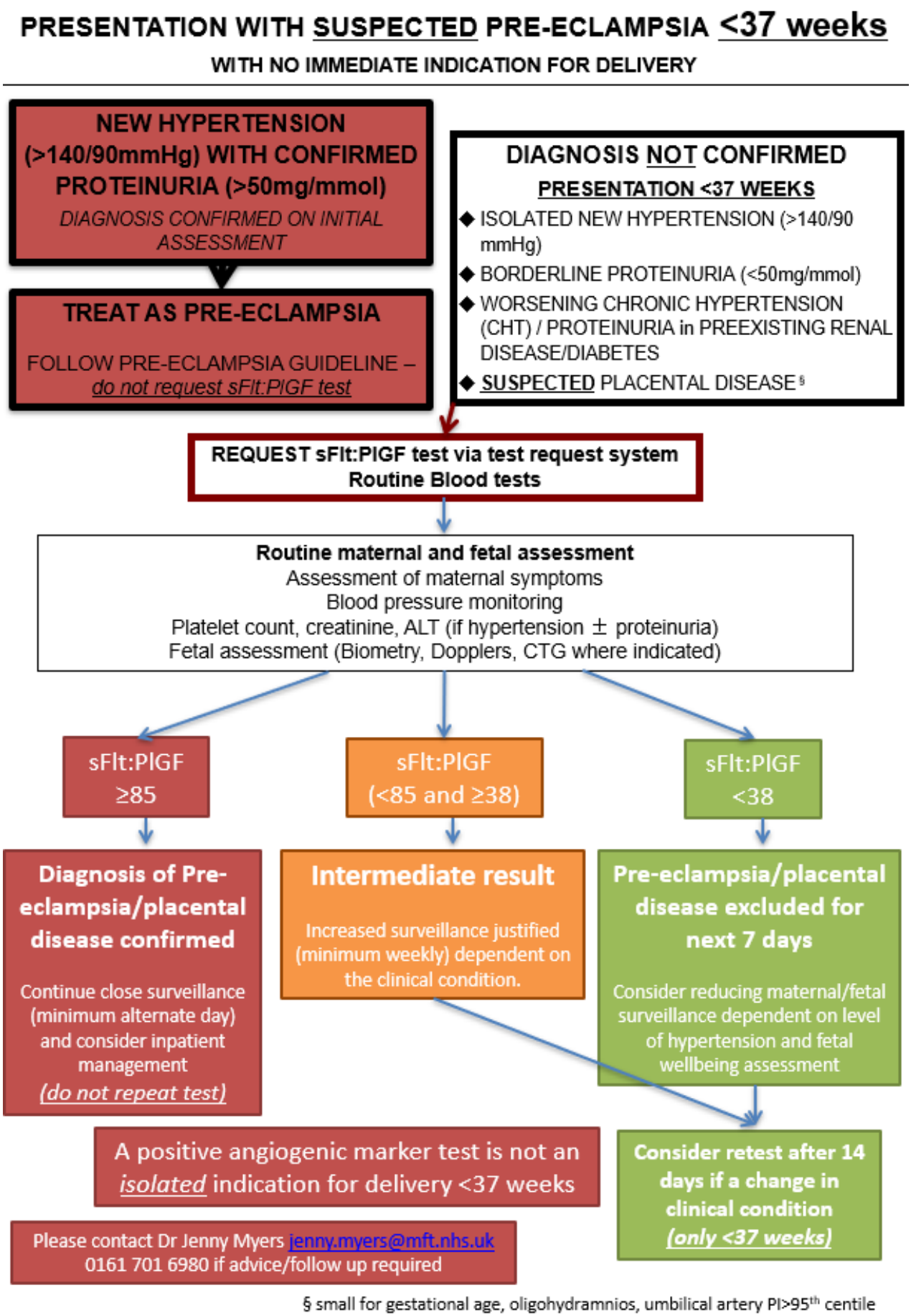
	Degree of hypertension	
	Hypertension[§]: blood pressure of 140/90–159/109 mmHg	**Severe hypertension:** blood pressure of 160/110 mmHg or more
Admission to hospital	Do not routinely admit to hospital	Admit, but if BP falls below 160/ 110 mmHg then manage as for hypertension
Antihypertensive treatment	Offer pharmacological treatment if BP remains above 140/90 mmHg	Offer pharmacological treatment to all women
Target blood pressure once on treatment	Aim for BP of 135/85 mmHg or less	Aim for BP of 135/85 mmHg or less
Blood pressure measurement	Once or twice a week (depending on BP) until BP is 135/85 mmHg or less	Every 15–30 minutes until BP is less than 160/110 mmHg
Dipstick proteinuria testing	Repeat once or twice a week (with BP measurement) if proteinuria **not** diagnosed[§]	Daily while admitted
Blood tests	Measure full blood count, liver function and renal function at presentation and then weekly	Measure full blood count, liver function and renal function at presentation and then weekly
PlGF-based testing	Carry out PlGF-based testing if **<37 weeks (see ratio flow chart** or **POC flow chart)**	Carry out PlGF-based testing **<37 weeks (see ratio flow chart** or **POC flow chart)**
Fetalassessment	Offer fetal heart auscultation at every antenatal appointment Consider ultrasound assessment of the fetus at diagnosis and, if normal, repeat every 2-4 weeks, if clinically indicated Carry out a CTG only if clinically indicated	Offer fetal heart auscultation at every antenatal appointment Carry out ultrasound assessment of the fetus at diagnosis and, if normal, repeat every 2-4 weeks. Carry out a CTG at diagnosis and then only if clinically indicated
Document diagnosis	**Confirm the diagnosis of gestational hypertension OR gestational proteinuria at every visit** **If a diagnosis of pre-eclampsia is made – manage as per Table 2.** **Pre-eclampsia definition:** • Gestational hypertension in addition to at least one of the following: ○ sFlt/PlGF Ratio >85 / POC PlGF <12 ○ New proteinuria[§] ○ Haematological or biochemical abnormalities (rising creatinine, abnormal ALT, Platelets <100) ○ Growth restriction (SGA<10th centile, static growth (<280g weight gain over two weeks), oligohydramnios, abnormal umbilical artery Doppler)	

[§] Proteinuria diagnosed using urine protein:creatinine ratio (UPCR) of >30mg/mmol (consider repeating if between 30-50mg/mmol to confirm the diagnosis

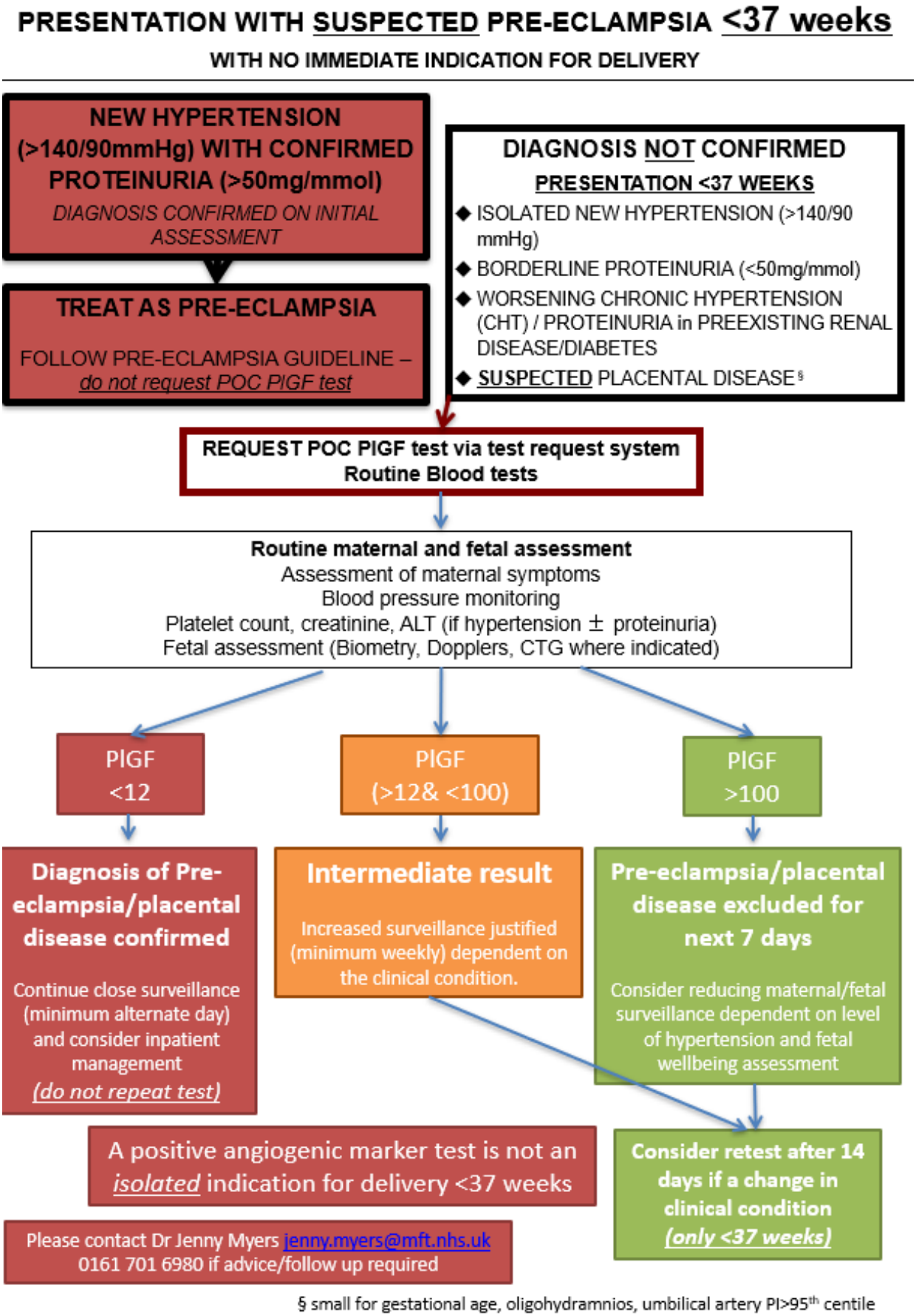
Appendix 2: Management of pre-eclampsia

	Degree of hypertension	
	Hypertension: Blood pressure of 140/90–159/109 mmHg	**Severe hypertension:** blood pressure of 160/ 110 mmHg or more (average of 3 readings over 30 minutes)
Admission to hospital	Admit for initial assessment once the diagnosis is confirmed. If any clinical concerns for the wellbeing of the woman or baby continue inpatient surveillance¶. **The decision to manage a woman with pre-eclampsia as an outpatient should only be made after a period of IP surveillance and after review by a Consultant Obstetrician**	Admit, but if BP falls below 160/ 110 mmHg then manage as for hypertension
Antihypertensive pharmacological treatment	Offer pharmacological treatment if BP remains above 140/90 mmHg	Offer pharmacological treatment to all women
Target blood pressure once on treatment	Aim for BP of 140/90 mmHg or less	Aim for BP of 140/90mmHg or less
Blood pressure measurement	At least every 48 hours, and more frequently if admitted	Every 15-30 minutes until BP is <160/110 mmHg, at least 4 times per day whilst IP
Dipstick proteinuria	Do not repeat, once proteinuria confirmed (see above)	Do not repeat, once proteinuria confirmed (see above)
Blood tests	Measure FBC, U&Es, LFTs twice per week	Measure FBC, U&Es, LFTs 3 times per week
Fetal assessment	Offer fetal heart auscultation at every antenatal appointment Carry out ultrasound assessment of the fetus at diagnosis and, if normal, repeat every 1-2 weeks, if clinically indicated Carry out a CTG if clinically indicated	Offer fetal heart auscultation at every antenatal appointment Carry out ultrasound assessment of the fetus at diagnosis and, if normal, repeat every 1-2 weeks, if clinically indicated Carry out a CTG if clinically indicated

Appendix 3: Flow chart for PlGF-based testing (ratio test)



Appendix 4: Flow chart for PlGF-based testing (POC test)



Appendix 5: Inpatient management for women with hypertensive disease

INPATIENT CARE PLAN FOR WOMEN WITH HYPERTENSION/PRE-ECLAMPSIA

Name_____ DOB_____ Hospital Number_____	Date_____ Contact numbers: _____ _____

Diagnosis: **Chronic hypertension / Pre-eclampsia / Gestational HT**
(circle CHT & PE if superimposed pre-eclampsia)

Blood pressure targets (to be completed by admitting team): **/** mmHg

General principles for BP monitoring:

- Aim to measure BP 4-6 hourly
- Measure BP with an electronic machine (dynamap or microlife) validated for use in pregnancy
- Use an appropriately sized cuff
- Ensure the woman is seated, resting (not talking) and has her arm supported during the measurement
- Do not recheck BP manually unless specifically instructed to do so
- If the fist BP is above target then recheck after a couple of minutes ensuring the woman is correctly positioned and at rest
- It is not usually necessary to wake women in the night to measure BP – if the BP is in target at 22.00 then it can be repeated at 06.00 unless there is another indication to do sooner (e.g. symptoms develop overnight)

Specific instructions on measurement (to be completed by admitting team)

Blood tests: Frequency
(usually alternate days if normal)

Result Date

PlGF Test:
sFlt/PlGF ratio **>85** / POC PlGF **<12 Diagnostic of pre-eclampsia** (do not repeat)
sFlt/PlGF ratio 38-84 / POC PlGF 13-99 **Intermediate**
sFlt/PlGF ratio <38 / POC PlGF >=100 **Normal** pre-eclampsia ruled out – consider repeat in 14 days if clinically indicated

Proteinuria: mg/mmol **Chronic (< 20 weeks) / NEW in pregnancy**

- UPCR >30 mg/mmol (with a negative MSU) is diagnostic of proteinuria (consider confirming with a second test if UPCR 30-50mg/mmol)
- Once proteinuria has been confirmed it is NOT necessary to repeat the PCR
- In some women with kidney disease PCR is used to monitor disease activity, this will be specified by the specialist team

VTE risk assessment: **Continue AN LMWH / Commence LMWH whilst IP**

- Pre-eclampsia and proteinuria are risk factors for VTE and will usually require pharmacological prophylaxis

Plan for steroids:

Current antihypertensive treatment

(please ensure prescribed on admission alongside other regular medication)

Drug	Dose	Frequency	Suggested change to dose/frequency if BP> target§
Suggestions for new drugs if BP >target			

§ > target is defined as BP> target on two occasions at least 4 hours apart. It is important to wait for dose changes to be effective before adding new drugs.

Episode of severe, systolic hypertension (>160mmHg):

- Repeat BP in 15 minutes
- Discuss ongoing care with the medical team if still >160
- Medical staff should risk assess in the context of the current diagnosis and background level of hypertension – women with new hypertension are at significantly higher risk of cerebral haemorrhage than those with chronic hypertension
- Assess for other symptoms/signs of severe pre-eclampsia (headache, visual disturbance, epigastric pain, clonus)

In women with sustained, severe hypertension (>160mmHg on three occasions over 30 minutes) or with symptoms suggestive of severe pre-eclampsia, ongoing care should be discussed with the on-call consultant and transfer to DU considered

Antihypertensive therapy general information:

First line medications for hypertension are labetalol and nifedipine

- **Labetalol**:
  - Short acting (works within 30-60 minutes lasts for a max of 6 hours)
  - Needs to be given at least tds- usual starting dose 100-200mg tds
  - Can be titrated in 100-200mg dose increments to a maximum daily dose of 2400mg/day
  - Common side effects are dizziness and tiredness
  - Only effective in around 50% of women of Afro Caribbean ethnicity
- **Nifedipine**:
  - Always use the modified release (MR) preparation which is given bd
  - Effect within 4-8 hours
  - Usual starting dose 10-20mg bd increased to a maximum of 60mg bd (unusual to see further benefit > 40mg bd)
  - Warn women that a headache is a very common side effect which usually resolves within 48 hours. Ankle oedema is also common
- **Amlodipine**
  - Useful ALTERNATIVE to nifedipine
  - Long acting drug which should be prescribed once daily (5-10mg)
  - Useful for women who will need prolonged treatment with antihypertensives
  - Same side effects as nifedipine but less common
- **Doxazosin**
  - Consider in women with resistant hypertension if escalated doses of labetalol and nifedipine have not been effective
  - Commence at 2-4mg (MR) once daily or 2-4mg bd up to a maximum of 8mg/day
  - Can cause precipitate hypotension
- **Methyldopa**
  - Useful as 3rd line, short acting and effective for 6 hours only, 250-750mg tds/qds
  - Commonly causes tiredness and depression and should only be used for short duration
  - Not effective as an acute treatment for severe hypertension
- **Hydralazine**
  - Can be used 3rd/4th line, but should only be prescribed by a consultant
  - Oral doses 25-50mg bd-qds, short acting
  - Can cause precipitate hypotension, should not usually be prescribed alongside doxazosin

Appendix 6: Postnatal discharge letter

Important postnatal discharge information for women with hypertension in pregnancy

Date: _____/_____/_____

Dear Community Midwife / General Practitioner

Re:…….....Hospital No……..

DOB……../……./…….. NHS no…….

This patient is currently ……. days postnatal and has been discharged from ward ……. on ___/___/___

Diagnosis: (please indicate) **Gestational hypertension / Gestational proteinuria / Pre-eclampsia / Chronic hypertension**

In view of her hypertension in pregnancy she requires close postnatal monitoring.

Discharged on Medication YES / NO DO NOT USE METHYLDOPA POSTNATALLY

DRUG	Dose	Frequency
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please monitor Blood Pressure daily for 5 days from the date of discharge. If the BP is not within normal limits continue to monitor on alternate days for 2 weeks.

Aim for a Blood Pressure of less than < 140 / 90 and follow management plan below:

IF BP <120/ 70 STOP REGIME.	IF BP <130/ 80 REDUCE REGIME	IF BP > 150/100 REFER TO GP FOR REGIME MANAGEMENT	IF BP >160/110 OR SYPMTOMATIC REFER TO HOSPITAL FOR SAME DAY REVIEW.

Please arrange GP review if still on medication 2 weeks after discharge from hospital.

Hospital Follow up YES / NO _____/_____/_____ (6 weeks postnatal)
(All women with early onset pre-eclampsia <34wks or who required HDU care should have a 6 week hospital follow up)

For women not attending hospital follow up::

- Please check the woman's urine at the 6 week postnatal check to ensure that any proteinuria has resolved, if proteinuria is still present please check urine PCR and refer to a renal physician as appropriate

Women with hypertensive disease in pregnancy are at increased risk of recurrence in future pregnancies and hypertension in later life and therefore justify long term surveillance with an annual blood pressure check (minimum).
Women should be advised regarding a healthy diet and lifestyle (provide information leaflet).

Name……...Signature……Date…../……/…….

Appendix 7: Decision aid for antihypertensive treatment for women with chronic hypertension

More information at https://action-on-pre-eclampsia.org.uk/public-area/high-blood-pressure-in-pregnancy/#resources

NIHR | Collaboration for Leadership in Applied Health Research and Care South London
KING'S College LONDON
ACTION ON PRE-ECLAMPSIA
High blood pressure in pregnancy Medication choice
1 Labetalol
2 Nifedipine
3 Methyldopa
BP
Medication information
All three medications lower BP in pregnancy. They are ranked by NICE guideline recommendations[1]
Type: Beta blocker
Total dose: 200-2400mg
Usual freq: 3 times daily (inc. lunchtime)
License: Has a license
Type: Calcium channel blocker
Total dose: 20-80mg
Usual freq: 2 times daily
License: Has a license for use in pre-term birth but not high blood pressure (used for many years)
Type: Central acting agent
Total Dose: 500-3000mg
Usual freq: 3 times daily (inc. lunchtime)
License: Does not have a license for use in pregnancy (used for many years)
Side-effects
Women
Common side-effects (about 1:10 women): headaches and shortness of breath. Not advised in women with Asthma[3]
Common side-effect (about 1:10 women) headaches[3]
Frequency of side-effects unknown: low mood and extreme tiredness. Not advised in women with a history of depression or in the postnatal period[3]
All three medications can commonly cause dizziness and tiredness (about 1:10 women).
Baby
When comparing the outcomes of babies born to women taking blood pressure lowering medication no differences in safety have been found between the three medications.[2]
Possible temporary low blood sugars immediately after birth
No known side-effects
No known side-effects
Child
The longer-term effect on your child's health has not been well studied (currently no major concerns exist)[4].
The longer-term effect on your child's health has not been well studied (currently no major concerns exist)[4].
The longer-term effect on your child's health has not been well studied (currently no major concerns exist)[4].
1 National Collaborating Centre for Women's and Children's Health (NCCWCH) (2019) Hypertension in Pregnancy: the management of hypertensive disorders during pregnancy. NICE Clinical Guideline. London: Royal College of Obstetricians and Gynaecologists.
2 Abalos E, Duley L, Steyn DW. Antihypertensive drug therapy for mild to moderate hypertension during pregnancy. Cochrane Database Syst Rev. 2018.
3 Joint Formulary Committee (2018) British National Formulary. Available at: https://bnf.nice.org.uk/.
4 Fitton CA, Steiner MFC, Aucott L, et al. In-utero exposure to antihypertensive medication and neonatal and child health outcomes: a systematic review. J Hypertens. 2017
5 Magee LA, von Dadelszen P, Singer J, et al. The CHIPS Randomized Controlled Trial (Control of Hypertension in Pregnancy Study): is Severe Hypertension Just an Elevated Blood Pressure? Hypertension. 2016
6 Scott CA, Bewley S, Rudd A, et al. Incidence, risk factors, management, and outcomes of stroke in pregnancy. Obstet Gynecol. 2012
7 Judy, A. E., C. L. McClain, E. S. Lawton, et al. (2019). "Systolic Hypertension, Preeclampsia-Related Mortality, and Stroke in California." Obstet Gynecol. 2019
8 Magee LA, von Dadelszen P, Rey E, et al. Less-Tight versus Tight Control of Hypertension in Pregnancy. New England Journal of Medicine. 2015
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Appendix 8: Postnatal information leaflet for women who have developed hypertension in pregnancy

NHS
Manchester University
NHS Foundation Trust

MANCHESTER 1824
The University of Manchester

HIGH BLOOD PRESSURE

Staying Healthy After Pregnancy

Keep your heart healthy and reduce your risk of cardiovascular disease with a healthy diet, exercise, and regular check-ups

Quit Smoking

Smoking is a major cause of heart disease, and can double your risk of having a heart attack.

Stopping smoking has big benefits for your health, and it's never too late to quit. Head to the NHS website or speak to your GP to find out what support is available to help you quit smoking.

Check-Ups and Future Pregnancies

Your doctor and midwife will explain how your blood pressure will be monitored in the weeks following your pregnancy.

After this time, you should **see your GP at least once a year** for a **blood pressure check**. This is especially important as high blood pressure doesn't usually cause noticable symptoms, so the only way to know if it's high is to get it checked. If it is high, your GP may offer you some medications to help lower it.

In any future pregnancies, because of the increased risk of pre-eclampsia, you should meet your midwife early on to discuss any extra scans or appointments that you might need. You may also be given aspirin to reduce your risk of getting pre-eclampsia.

Further Information

Action on Pre-Eclampsia - Support and Advice
https://action-on-pre-eclampsia.org.uk/

NHS Eat Well
https://www.nhs.uk/live-well/eat-well/

British Heart Foundation - Staying Active Guide
https://www.bhf.org.uk/informationsupport/support/healthy-living/staying-active

NHS Quit Smoking Services
https://www.nhs.uk/live-well/quit-smoking/nhs-stop-smoking-services-help-you-quit/

High Blood Pressure in Pregnancy

High blood pressure is **one of the most common** complications during pregnancy and affects **1 in 10 pregnant women**.

Even if your blood pressure returns to normal after pregnancy, it can still have **serious consequences for your future health**.

Getting high blood pressure in pregnancy almost **doubles your risk** of a **heart attack** or **stroke** in later life, and makes it up to **4 times more likely** that you will get high blood pressure again in the future. It also means that **pre-eclampsia** or high blood pressure are more likely to develop in future pregnancies.

Taking care of a newborn can be a busy and challenging time, but it is important to think about your own health as well. There are **plenty of simple ways** to stay healthy and reduce your risk.

Eating a Healthy Diet

Having a healthy diet is one of the simplest ways to reduce your risk of heart disease and high blood pressure.

Changing our habits can be difficult, so try small changes gradually instead of big ones all at once.

Healthy Tips

- Eat at least 5 portions of fruit and vegetables a day
- Switch to wholegrain bread, rice, and pasta
- Get plenty of fibre (found in oats, beans, lentils, and healthy cereals like Weetabix)
- Indulge in healthier snacks like fruit, unsalted nuts or low-fat yoghurt

PROTECT YOUR HEART

WITH A HEART-HEALTHY DIET

- Avoid adding extra salt to meals (salt is a big contributor to high blood pressure)
- Swap saturated fats (like butter, ghee, bacon, cheese, ice cream) for unsaturated fats (found in nuts, seeds, and oily fish)
- Cut down on processed meat like sausages, salami and bacon
- Avoid heavily processed foods and ready meals
- Keep alcohol intake within the recommended limits.

Regular Exercise

Taking regular exercise is another great way to keep your heart healthy. It can also help to control weight, boost mental health, and reduce blood pressure and cholesterol.

The NHS recommends that all adults get 150 minutes of moderate exercise a week.

This can include brisk walks (pram pushing is perfect!), postnatal exercise classes, cycling, or even just walking to work or taking the stairs. Anything that gets your heart beating faster or makes you breathe harder counts.

Try to be active every day, even if it's just for a few 10 minute bursts.