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| Hypertension in Pregnancy inc Home Blood Pressure Monitoring |
| **Scope: Clinical Practice** |
| |  |  |  |  | | --- | --- | --- | --- | | Version 7.2 | Valid from 9/11/2023 | Review due 24/8/2026 | Authors: Beth Deverill | |

Version 7.1 Amendment made to monitoring BP and using Digital monitoring. In line with SBLv3

7.2 Home blood pressure monitoring SOP added as appendix

Patient Leaflet/ My pregnancy App NO

Flow charts required to be uploaded to Eolas Medical app: **Yes,** all medical emergencies PROMPT info

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# Definitions and complications of Hypertension

* **Mild-moderate** BP 140-159/90-109 mmHg
* **Severe** BP ≥ 160/110 mmHg

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| **Essential / Chronic Hypertension** | **Gestational / Pregnancy Induced Hypertension** | Pre-eclampsia (PET) | Severe PET |
| * Hypertension present at booking or <20 wks or that is being treated at time of referral to maternity services * Can be primary or secondary in aetiology * Continues during pregnancy | * New diagnosis of hypertension in pregnancy * >20 wks gestation * Without significant proteinuria | * New diagnosis of hypertension in pregnancy * 20 wks gestation * With significant proteinuria | * PET with severe hypertension * And/or with symptoms * And/or biochemical impairment * And/or haematological impairment |

**Significant proteinuria:** UPCR ≥30 mg/mmol

**Eclampsia:** Occurrence of one or more seizures in a woman with pre-eclampsia.

**HELLP syndrome**

* Haemolysis, Elevated Liver enzymes, and Low Platelets syndrome is a severe form of pre-eclampsia

NB. Consider phaeochromocytoma in women with atypical, severe hypertension in pregnancy. If a woman with one autoimmune disease becomes unwell in pregnancy, consider another autoimmune condition.

**Haematological and biochemical screening**

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| **FBC** | **U+E** | | **LFT** | |
| **Haemoglobin** At Booking >110  ≥28/40 >105  **Platelets** 150-400  **WCC** 6-16 | **Sodium** 130-140  **Potassium** 3.3-4.1  **Bicarbonate** 20-30  **Urea**  1st Trimester: 2.8 - 4.2  2nd Trimester: 2.5 - 4.1  3rd Trimester: 2.4 - 3.8 | **Creatinine**  1st Trimester: 52-68  2nd Trimester: 44-64  3rd Trimester: 55-73 | **Bilirubin**  1st Trimester: 4-16  2nd Trimester: 3-13  3rd Trimester: 3-14 | **Alk Phos**  **1st Trimester: 32-100**  **2nd Trimester: 43-135**  **3rd Trimester: 133-418**  **ALT** 6-32  **Albumin** 28-37  **Total Bile Acids** >19 |

# Investigation and management guidance of suspected

# Pre-eclampsia <35/40 (PIGF)

Gestation 20 – 34+6

BP ≥140/90 **OR**

Proteinurea ≥+1 **OR**

PET Symptoms

**Run PIGF Test**

Obvious PET diagnosis.

* **Admit**
* Give Steroids
* Scan for Growth/LV/Doppler’s
* Senior Obstetric review

BP 140-159/90- 109

BP Series\*

Take Bloods\*\* but don’t send

BP <140/90

≥ +1 Protein

No Protein

Check BP and Urine Weekly

Check BP and Urine twice weekly

Bloods weekly

Arrange ANC review within 2 weeks

ADMIT for close monitoring

Consider steroids

Senior Obstetrician review

If BP Stabilised, treat as outpatient (consider admission if abnormal bloods /symptomatic / abnormal USS)

Send PET bloods and urine PCR

Scan for Growth / LV/ dopplers (unless performed within last 2 weeks)

Discard PET blood samples

Send Urine PCR (chase as OP)

Treat BP if ≥140/90

BP ≥ 160 /110

No Protein

No Protein꙳꙳

≥ +1 Protein꙳

**PIGF ≤12**

**High Risk**

Likely severe placental dysfunction

Median time to delivery 9 days

**PIGF >12 but <100**

**Medium Risk**

Probable placental dysfunction

Median time to delivery 23 days

**PIGF ≥100**

**Low Risk**

No Placental dysfunction

Median time to delivery 62 days

Routine Care

≥ +1 Protein

\*A series of 3 recordings

\*\* 2x purple 1x yellow 1x blue

꙳On more than 1 occasion and UTI excluded

General Antenatal Management

**Once degree of Hypertension identified please refer to specific type of hypertension for additional instructions**.

Measurement of BP

* Readings should be taken with the women resting, in a 45º angle with appropriate size cuff at the level of the heart.
* As part of the ongoing risk assessment for FGR, blood pressure should be recorded using a digital monitor that has been validated for use in pregnancy
* Each time BP is measured an explanation of the symptoms of pre-eclampsia should be given and the woman advised to seek immediate medical review if she develops any of the following (including during the first four weeks postpartum):
  + Severe headaches (increasing frequency unrelieved by regular analgesics).
  + Visual problems, such as blurred vision, flashing lights, double vision, or floating spots.
  + Persistent new epigastric pain or pain in the right upper quadrant.
  + Vomiting.
  + Breathlessness.
  + Sudden swelling of the face, hands, or feet.
  + Women with suspected pre-eclampsia require urgent secondary care assessment.
  + Postpartum monitoring and follow-up are essential. an explanation of the symptoms of pre-eclampsia should be given and the woman advised to seek immediate medical review if she develops any of the following (including during the first four weeks postpartum)

Management of proteinuria

* Each time BP is measured check for proteinuria using reagent strip dip stick.
* If there is proteinuria (+1 or more) perform a wash down sample. If proteinuria is still present, a PCR should be sent . The results should be followed up the next day with urgent referral to QAU if raised
* Consideration should be given to possible UTI causing proteinuria and specific questions asked.
* Significant proteinuria is a urinary protein: creatinine ratio of at least 30 mg/mmol, or albumin: creatinine ratio of at least 8 mg/mmol. Proteinuria of at least [1+] on dipstick testing should prompt one of these additional tests.

If the PCR result is 30mg/mmol or above and there is still uncertainty about the diagnosis of pre-eclampsia, consider re-testing on a new sample, alongside clinical view

* If there is proteinuria prenatally perform baseline renal function test and consider renal USS +/- referral to renal physicians for further investigations.
* Do not routinely use 24hr urine collection to quantify proteinuria.
* Do not use first morning void to quantify proteinuria.

Reducing the risk of hypertensive disorders in pregnancy

Booking

Lifestyle and diet

Advice on rest, exercise, and work for women at risk of hypertensive disorders during pregnancy should be the same as for healthy pregnant women.

Do not recommend salt restriction during pregnancy solely to prevent gestational hypertension or PET.

Nutritional supplements

Do not recommend the following supplements solely with the aim of preventing hypertensive disorders during pregnancy:

* Magnesium, folic acid, antioxidants (vitamins C and E) , fish oils or algal oils, garlic

Diabetes

For women with pre-existing diabetes or gestational diabetes, see the NBT guideline on *diabetes in pregnancy*

Antiplatelet agents (Aspirin)

Aspirin prophylaxis reduces the occurrence of PET, preterm birth and fetal and neonatal mortality in women at moderate or high risk of developing PET.

Badgernet will identify, via the booking risk assessment, when aspirin is recommended

**Chronic Hypertension**

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| **Definition** |
| Hypertension that is present at, or prior to the booking visit, or before 20 weeks' gestation — blood pressure tends to fall during the first and second trimesters and a woman with high blood pressure before week 20 of pregnancy can therefore be assumed to have pre-existing hypertension |

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| **Pre-Pregnancy advice** |
| * Offer women with chronic hypertension referral to a specialist in hypertensive disorders of pregnancy to discuss the risks and benefits of treatment. *At NBT this will be a Maternal Medicine pre pregnancy referral* held at ANC * Advise women who take angiotensin-converting enzyme (ACE) inhibitors or angiotensin-II receptor blockers (ARBs):   + that there is an increased risk of congenital abnormalities if these drugs are taken during pregnancy   + to discuss alternative antihypertensive treatment with the healthcare professional responsible for managing their hypertension, if they are planning pregnancy   + to discuss alternative treatment with the healthcare professional responsible for managing their condition, if ACE inhibitors or ARBs are being taken for other conditions such as renal disease. * Advise women to stop ACE inhibitors or ARBs if they become pregnant (preferably within 2 working days of notification of pregnancy) and offer alternatives. * Advise women who take thiazide or thiazide-like diuretics:   + that there may be an increased risk of congenital abnormalities and neonatal complications if these drugs are taken during pregnancy to discuss alternative antihypertensive treatment with the healthcare professional responsible for managing their hypertension if they are planning pregnancy   Advise women who take antihypertensive treatment to inform their GP if they plan to start a family. A referral can be made to the ANC for a pre pregnancy clinic appointment. |

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| **Antenatal Care** |
| Offer pregnant women with chronic hypertension advice on:   * weight management * exercise * healthy eating * lowering the amount of salt in their diet.   Provide this advice in line with the *NICE guideline on hypertension in adults: diagnosis and treatment.*   * Continue with existing antihypertensive treatment if safe in pregnancy, or switch to an alternative treatment, unless:   + sustained systolic blood pressure is less than 110 mmHg or   + sustained diastolic blood pressure is less than 70 mmHg or   + the woman has symptomatic hypotension.   Offer antihypertensive treatment to pregnant women who have chronic hypertension and who are not already on treatment if they have:   * sustained systolic blood pressure of 140 mmHg or higher or * sustained diastolic blood pressure of 90 mmHg or higher.   Consider labetalol to treat chronic hypertension in pregnant women. Consider nifedipine for women in whom labetalol is not suitable, or methyldopa if both labetalol and nifedipine are not suitable. Base the choice on any pre-existing treatment, side-effect profiles, risks (including fetal effects) and the woman’s preference.  *Consider offering enrolment into appropriate research studies such as PANDA*.  Offer [placental growth factor (PlGF)-based testing](#PIGF11) to help rule out pre-eclampsia between 20 weeks and up to 35 weeks of pregnancy, if women with chronic hypertension are suspected of developing pre-eclampsia. (See the NICE diagnostics guidance on PlGF-based testing to help diagnose suspected pre-eclampsia). |

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| **Antenatal Clinic Appointments** |
| In women with chronic hypertension, schedule additional antenatal appointments in the maternal medicine clinic, based on the individual needs of the woman and her baby.  This may include as a minimum :   * Review following 12/40 USS * Scans and appointments in line with FGR pathway |

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| **Community Midwifery appointments** |
| Home BP monitoring twice a week.  If not eligible for home BP monitoring, monitoring with community midwife once or twice weekly depending on clinical indication  Refer to QAU if ≥20/40 if BP ≥140/90 |

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| **Fetal Surveillance** |
| * Carry out an ultrasound for fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry as per the FGR pathway. * Only carry out cardiotocography if clinically indicated |
| **Birth Planning / Intrapartum** |
| * Do not offer planned early birth before 37 weeks to women with chronic hypertension whose blood pressure is lower than 160/110 mmHg, with or without antihypertensive treatment, unless there are other medical indications. * 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 senior obstetrician. * If planned early birth is necessary consider a course of antenatal corticosteroids and magnesium sulphate if indicated, in line with the NBT guideline on *preterm labour and birth.* |

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| **Postnatal investigation, monitoring and treatment** |
| In women with chronic 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 e.g if antihypertensive treatment is changed after birth or BP is unstable .   In women with chronic hypertension who have given birth:   * aim to keep blood pressure lower than 140/90 mmHg * continue antihypertensive treatment * advise a review of antihypertensive treatment 2 weeks after the birth, with their GP.   Offer women with chronic hypertension a medical review 6–8 weeks after the birth with their GP or specialist as appropriate. |

**Gestational Hypertension**

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| **Definition** |
| New hypertension presenting after 20 weeks' gestation without significant proteinuria |

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| **Assessment** |
| In women with gestational hypertension, a full assessment should be carried out in a secondary care setting by a healthcare professional who is trained in the management of hypertensive disorders of pregnancy.  In women with gestational hypertension, take account of the following risk factors that require additional assessment and follow-up:   * nulliparity * age 40 years or older * pregnancy interval of more than 10 years * family history of pre-eclampsia * multi-fetal pregnancy * BMI of 35 kg/m2 or more * gestational age at presentation * previous history of pre-eclampsia or gestational hypertension * pre-existing vascular disease * pre-existing kidney disease. |

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| **Antenatal Care** |

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|  | **Mild-Moderate Hypertension:** | **Severe hypertension:** |
| **blood pressure of 140/90–159/109 mmHg** | **blood pressure of 160/110 mmHg or more** |
| **Admission to hospital** | Do not routinely admit to hospital as an inpatient | Admit, but if BP falls below 160/110 mmHg then manage as for mild/moderate 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 antihypertensive treatment** | Aim for BP of 135/85 mmHg or less | Aim for BP of 135/85 mmHg or less |
| **Blood pressure measurement** | Twice a week aiming for BP of ≤135/85 mmHg This can be undertaken with Home blood pressure monitoring (HBPM) if /eligible  Refer to QAU if BP ≥ 140/90 | Every 15–30 minutes until BP is less than 160/110 mmHg |
| **Dipstick proteinuria testing**a | Once or twice a week (with BP measurement) | 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 with community team. |
| **PlGF-based testing** | Carry out [PlGF-based testing](#PIGF11) on 1 occasion if there is suspicion of pre-eclampsia | Carry out [PlGF-based testing](#PIGF11) on 1 occasion if there is suspicion of pre-eclampsia |
| **Fetal assessme**n**t** | Offer fetal heart auscultation at every antenatal appointment. Carry out ultrasound assessment of the fetus at diagnosis and, if normal, repeat every 2 to 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 weeks, if severe hypertension persists. Carry out a CTG at diagnosis and then only if clinically indicated. |
| a where available use an automated reagent-strip reading device for dipstick screening for proteinuria in a secondary care setting. | | |
| Abbreviations: BP, blood pressure; CTG, cardiotocography; PIGF, placental growth factor. | | |
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| **PIGF**  Offer placental growth factor ([PlGF)-based testing](#PIGF11) to help rule-out pre-eclampsia in women presenting with suspected pre-eclampsia (for example, with gestational hypertension) between 20 weeks and up to 35 weeks of pregnancy.  Consider labetalol to treat gestational hypertension. Consider nifedipine for women in whom labetalol is not suitable, and methyldopa if labetalol or nifedipine are not suitable. Base the choice on side-effect profiles, risk (including fetal effects) and the woman’s preferences.  *Consider offering enrolment into appropraite research studies such as PANDA.*  Do not offer bed rest in hospital (inpatient) as a treatment for gestational hypertension | | |

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| **Fetal Surveillance** |
| **Mild / Moderate**   * Carry out an ultrasound for fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry as per the FGR pathway. * Offer fetal heart auscultation at every antenatal appointment from 20/40 * only carry out cardiotocography if clinically indicated   **Severe**   * Offer fetal heart auscultation at every antenatal appointment from 20/40   • Carry out an ultrasound for fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry as per the FGR pathway  If the results of all fetal monitoring are normal do not routinely repeat cardiotocography unless clinically indicated, however repeat cardiotocography if any of the following occur:  • the woman reports a change in fetal movement  • vaginal bleeding  • abdominal pain  • deterioration in maternal condition.  Complete a care plan that includes all of the following:  • the timing and nature of future fetal monitoring  • fetal indications for birth and if and when antenatal corticosteroids should be given  • plans for discussion with neonatal paediatricians and obstetric anaesthetists. |

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| **Birth Planning** |
| Do not offer planned early birth before 37 weeks to women with gestational hypertension whose blood pressure is lower than 160/110 mmHg, unless there are other medical indications.  For women with gestational hypertension whose blood pressure is lower than 160/110 mmHg after 37 weeks, timing of birth, and maternal and fetal indications for birth should be agreed between the woman and the senior obstetrician.  If planned early birth is necessary consider a course of antenatal corticosteroids and magnesium sulfate if indicated, in line with the *NBT guideline on preterm labour management* |

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| **Postnatal investigation, monitoring and treatment** |
| 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 and at day 10 and as clinically indicated if antihypertensive treatment is changed after birth * GP review at 2/52. Home BP monitoring daily until GP review.   In women with gestational hypertension who have given birth:   * continue antihypertensive treatment if required * Suggested antihypertensives during the postnatal period can be found in the general postnatal care section. * Advise women that the duration of their postnatal antihypertensive treatment will usually be similar to the duration of their antenatal treatment (but may be longer) * Consider reducing antihypertensive treatment if their blood pressure consistently below 130/80 mmHg. Contact GP in the first instance, however if urgent the on call registrar can be contacted on ext 46917 or bleep 9342 * A GP appointment should be arranged for 2 weeks post delivery and 6 weeks as a minimum   For women with gestational hypertension who did not take antihypertensive treatment and have given birth, start antihypertensive treatment if their blood pressure is ≥150/100 mmHg.  [Complete Discharge plan care plan](#PNDC) template 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.   Advise women who have had gestational hypertension and who remain on antihypertensive treatment, to book a medical review with their GP 2 weeks after transfer to community care.  Advise all women who have had gestational hypertension to book a medical review with their GP or specialist 6–8 weeks after the birth. |

**Pre-Eclampsia**

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| **Definition** |
| New hypertension presenting after 20 weeks' gestation with significant proteinuria. Pre-eclampsia is a multi-system disorder which can affect the placenta, kidney, liver, brain, and other organs of the mother. |

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| **Antenatal Care** |
| Assessment   * Commence on FGR pathway * Assessment of women with pre-eclampsia should be performed by a healthcare professional trained in the management of hypertensive disorders of pregnancy. * Carry out a full clinical assessment at each antenatal appointment for women with pre-eclampsia, and offer admission to hospital for surveillance and any interventions needed if there are concerns for the wellbeing of the woman or baby. * Routine PET Blood screen: FBC, U+E, LFT. Consider Clotting screen if indicated.   The use of prediction models such as fullPIERS and PREP\_S, as suggested by NICE is awaiting further evaluation prior to use at NBT |

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| **Treatment** |

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|  | **Mild to Moderate Hypertension:** | **Severe hypertension:** |
| blood pressure of 140/90–159/109 mmHg | blood pressure of 160/110 mmHg or more |
| **Admission to hospital** | Admit if any clinical concerns for the wellbeing of the woman or baby or if high risk of adverse events | Admit, but if BP falls below 160/110 mmHg then manage as for mild/moderate 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 antihypertensive treatment** | Aim for BP of 135/85 mmHg or less | Aim for BP of 135/85 mmHg or less |
| **Blood pressure measurement** | Daily BP with HBPM (if eligible) or schedualled care appointment at QAU for remainder of pregnancy.  4 hourly BP if the woman is admitted to hospital. | Every 15–30 minutes until BP is less than 160/110 mmHg, then at least 4 hourly whilst the woman is an inpatient, depending on clinical circumstances |
| **PIGF** | [Perform](#PIGF11) | [Perform](#PIGF11) |
| **Dipstick proteinuria testing**a | Only repeat if clinically indicated, for example:   * If new symptoms and signs develop * If there is uncertainty over diagnosis * Signs of infection | Only repeat if clinically indicated, for example:  • If new symptoms and signs develop  • If there is uncertainty over diagnosis  • Signs of infection |
| **Blood tests** | Measure full blood count, liver function and renal function twice a week. *Via scheduled care in the QAU* | Measure full blood count, liver function and renal function 3 times a week |
| **Fetal assessment** | Offer fetal heart auscultation at every antenatal appointment  Commence on FGR Pathway  Carry out a cCTG at diagnosis and then twice daily while an inpatient | Offer fetal heart auscultation at every antenatal appointment  Commence on FGR Pathway  Carry out a cCTG at diagnosis and then twice daily while an inpatient |
| a Use an automated reagent-strip reading device for dipstick screening for proteinuria in a secondary care setting. | | |
| Abbreviations: blood pressure (BP) CTG, cardiotocography (CTG) Home blood pressure monitoring (HBPM) | | |

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| **Fetal Surveillance** |
| Carry out an ultrasound for fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry as per the FGR pathway  Complete a care plan that includes all of the following:  • the timing and nature of future fetal monitoring including USS and cCTG  • fetal indications for birth and if and when antenatal corticosteroids should be given  • plans for discussion with neonatal paediatricians and obstetric anaesthetists. |

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| **Birth Planning** |
| Record maternal and fetal thresholds for planned early birth before 37 weeks in women with pre-eclampsia. Thresholds for considering planned early birth could include (but are not limited to) any of the following known features of severe pre-eclampsia:   * inability to control maternal blood pressure despite using 3 or more classes of antihypertensives in appropriate doses * maternal pulse oximetry less than 90% * progressive deterioration in liver function, renal function, haemolysis, or platelet count * ongoing neurological features, such as severe intractable headache, repeated visual scotomata, or eclampsia * placental abruption * reversed end-diastolic flow in the umbilical artery doppler velocimetry, a non-reassuring cardiotocograph, or stillbirth.   Other features not listed above may also be considered in the decision to plan early birth.   * Involve a senior obstetrician in any decisions on timing of birth for women with pre-eclampsia. * Discuss with the anaesthetic team if birth is planned in a woman with pre-eclampsia. * Discuss with the neonatal team if birth is planned in a woman with pre-eclampsia, and neonatal complications are anticipated. * Offer intravenous magnesium sulphate and a course of antenatal corticosteroids if indicated, if early birth is planned for women with preterm pre-eclampsia, in line with the NBT guideline on *preterm labour and birth*.   Deciding on timing of birth with Pre eclampsia as recommended in table below:   |  |  | | --- | --- | | **Weeks of pregnancy** | **Timing of birth** | | **Before 34 weeks** | Continue surveillance unless there are indications (as above) for planned early birth. Offer intravenous Magnesium Sulphate and a course of antenatal corticosteroids in line with the *NBT guideline on preterm labour management* | | **From 34 to 36+6 weeks** | Continue surveillance unless there are indications (as above) for planned early birth.  When considering the option of planned early birth take into account the woman’s and baby’s condition, risk factors (such as maternal comorbidities, multi-fetal pregnancy) and availability of neonatal unit beds. Consider a course of antenatal corticosteroids in line with the NBT guideline on preterm labour management | | **37 weeks onwards** | Initiate birth within 24–48 hours. | |
| **Neonatal Care** | |
| Corticosteroids for fetal lung maturation:  • Antenatal steroids should be considered in all women between 24+0 and 33+6 likely to birth within 7 days with PET. AN corticosteroids can be considered between 34+0 and 37+0 and should be a joint decision between the woman and her obstetric consultant in line with the NBT guideline on preterm labour management.  • Administration in pregnancies beyond 37+0 weeks is not indicated, even for scheduled caesarean birth, as current evidence does not suggest benefit and the long-term effects remain unknown. | |

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| **Intrapartum Care** |
| Give advice and treatment to women with hypertensive disorders of pregnancy in line with the NBT guideline on intrapartum care.  Offer care in accordance with the NBT guideline on intrapartum care for women with hypertension whether treated or untreated, and not just on the basis of blood pressure in labour.  Give women with chronic hypertension advice and care in line with the NICE guideline on intrapartum care for women with existing medical conditions or obstetric complications and their babies.  Caesarean section versus induction of labour  Choose mode of birth for women with severe hypertension, severe pre-eclampsia or eclampsia according to the clinical circumstances and the woman's preference.  Blood Pressure  During labour, measure blood pressure:  • hourly, in women with hypertension  • every 15–30 minutes until blood pressure is less than 160/110 mmHg in women with severe hypertension.  Continue use of antenatal antihypertensive treatment during labour.  Haematological and biochemical monitoring  Determine the need for haematological and biochemical tests during labour in women with hypertension using the same criteria as in the antenatal period even if regional analgesia is being considered.  Care during Epidural analgesia  Do not preload women who have severe pre-eclampsia with intravenous fluids before establishing low-dose epidural analgesia or combined spinal epidural analgesia.  Second stage  Do not routinely limit the duration of the second stage of labour in women with controlled hypertension.  Consider operative or assisted birth in the second stage of labour for women with severe hypertension whose hypertension has not responded to initial treatment. |

Postnatal investigation, monitoring and treatment (including after discharge from critical care)

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| **Blood pressure**  In women with pre-eclampsia who did not take antihypertensive treatment and have given birth, measure blood pressure:  • at least 4 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 to 5.    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.  Ask women with pre-eclampsia who have given birth about severe headache and epigastric pain each time blood pressure is measured.    In women with pre-eclampsia who took antihypertensive treatment and have given birth, measure blood pressure:  • at least 4 times a day while the woman is an inpatient  • every 1 to 2 days for up to 2 weeks after transfer to community care until the woman is off treatment and has no hypertension.    For women with pre-eclampsia who have taken antihypertensive treatment and have given birth:    • continue antihypertensive treatment (for choice of antihypertensive during the postnatal period, see the section on antihypertensive treatment during the postnatal period, including during breastfeeding)  • 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 pre-eclampsia, stop within 2 days after the birth and change to an alternative treatment if necessary (for choice of antihypertensive during the postnatal period, see the section on antihypertensive treatment during the postnatal period,  including during breastfeeding).  Offer women with pre-eclampsia who have given birth transfer 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 150/100 mmHg or less  • blood test results are stable or improving.  Write a [care plan](#PNDC) for women with pre-eclampsia 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  • thresholds for reducing or stopping treatment  • indications for referral to primary care for blood pressure review  • self-monitoring for symptoms.  Offer women who have had pre-eclampsia and who remain on antihypertensive treatment, a medical review with their GP 2/52 after transfer to community care.  Offer all women who have had pre-eclampsia a medical review with their GP 6 to 8 weeks after the birth.  **Haematological and biochemical monitoring**  In women who have pre-eclampsia with mild or moderate hypertension, or after step-down from critical care:  • measure platelet count, transaminases and serum creatinine 48 to 72 hours after birth or step-down  • do not repeat platelet count, transaminases or serum creatinine measurements if results are normal at 48 to 72 hours.  If biochemical and haematological indices are outside the reference range in women with pre-eclampsia who have given birth, repeat platelet count, transaminases and serum creatinine measurements as clinically indicated until results return to normal.  In women with pre-eclampsia who have given birth, carry out a urinary reagent-strip test 6 to 8 weeks after the birth.  Offer women who had pre-eclampsia and still have proteinuria (1+ or more) at 6 to 8 weeks after the birth, a further review with their GP or specialist at 3 months after the birth to assess kidney function.    Consider referring women with an abnormal kidney function assessment at 3 months for a specialist kidney assessment in line with the NICE |

General Post Natal Care

* Refer to specific ‘type’ of hypertension for specific post natal instructions.

Antihypertensives and breastfeeding

Advise women with hypertension who wish to breastfeed that their treatment can be adapted to accommodate breastfeeding, and that the need to take antihypertensive medication does not prevent them from breastfeeding.

Explain to women with hypertension who wish to breastfeed that:

* antihypertensive medicines can pass into breast milk
* most antihypertensive medicines taken while breastfeeding only lead to very low levels in breast milk, so the amounts taken in by babies are very small and would be unlikely to have any clinical effect
* most medicines are not tested in pregnant or breastfeeding women, so disclaimers in the manufacturer’s information are not because of any specific safety concerns or evidence of harm
* Make decisions on treatment together with the woman, based on her preferences.

As antihypertensive agents have the potential to transfer into breast milk:

* consider monitoring the blood pressure of babies, especially those born preterm, who have symptoms of low blood pressure for the first few weeks
* when discharged home, advise women to monitor their babies for drowsiness, lethargy, pallor, cold peripheries or poor feeding.

BAME women

For women of black African or Caribbean family origin with hypertension during the postnatal period, consider antihypertensive treatment with:

* nifedipine or
* amlodipine if the woman has previously used this to successfully control her blood pressure.

Multiple Antihypertensive use

For women with hypertension in the postnatal period, if blood pressure is not controlled with a single medicine consider a combination of nifedipine (or amlodipine) and enalapril. If this combination is not tolerated or is ineffective, consider either:

* adding atenolol or labetalol to the combination treatment **or**
* swapping 1 of the medicines already being used for atenolol or labetalol.

When treating women with antihypertensive medication during the postnatal period, use medicines that are taken once daily when possible.

Where possible, avoid using diuretics or angiotensin receptor blockers to treat hypertension in women in the postnatal period who are breastfeeding or expressing milk.

Treat women with hypertension in the postnatal period who are not breastfeeding and who are not planning to breastfeed in line with the *NBT Infant feeding policy*

Risk of recurrence of hypertensive disorders of pregnancy

Advise women with hypertensive disorders of pregnancy that the overall risk of recurrence in future pregnancies is approximately 1 in 5. Advise women who have had a hypertensive disorder of pregnancy that this is associated with an increased risk of hypertension and cardiovascular disease in later life

Advise women who have had a hypertensive disorder of pregnancy to discuss how to reduce their risk of cardiovascular disease, including hypertensive disorders, with their GP or specialist. This may include:

* avoiding smoking
* maintaining a healthy lifestyle
* maintaining a healthy weight

For women who have had pre-eclampsia or hypertension with early birth before 34 weeks, consider pre-pregnancy counselling to discuss possible risks of recurrent hypertensive disorders of pregnancy, and how to lower them for any future pregnancies. A GP referral can be made to the ANC for a pre pregnancy clinic appointment.

(see NICE guideline for full details and tables)

Body mass index and recurrence of hypertensive disorders of pregnancy

Advise women who have had pre-eclampsia to achieve and keep a BMI within the healthy range before their next pregnancy (18.5–24.9 kg/m2).

Inter-pregnancy interval and recurrence of hypertensive disorders of pregnancy

Advise women who have had pre-eclampsia that the likelihood of recurrence increases with an inter-pregnancy interval greater than 10 years.

Long-term risk of end-stage kidney disease

Tell women with a history of pre-eclampsia who have no proteinuria and no hypertension at the postnatal review (6–8 weeks after the birth) that although the relative risk of end-stage kidney disease is increased, the absolute risk is low and no further follow‑up is necessary. Women who have had an AKI need annual RFTs.

Thrombophilia and the risk of pre-eclampsia

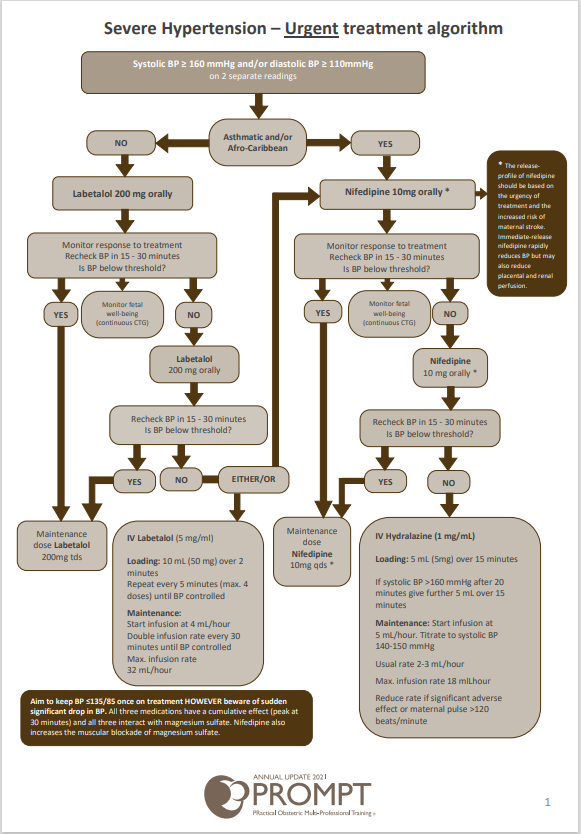
Do not routinely perform screening for thrombophilia in women who have had pre-eclampsia.

Discharge Information

Ensure there is a clear discharge plan entered onto Badgernet. The previous paper version [Postpartum Hypertension Discharge Plan](#PNDC) can be used as a guide

Emergency Management

Medical management of severe hypertension, severe pre-eclampsia or eclampsia in a critical care setting.



**Magnesium Sulphate Emergency Regimen**

**Loading dose: 4 g magnesium sulphate given over 5 – 15 minutes**

• Draw up 8 ml of 50% magnesium sulphate solution (4 g) followed by 12 mL of 0.9% normal

saline into a 20 mL syringe. This will give a total volume of 20 mL

• Administer manually as an intravenous bolus over 5 minutes (4mL/minute), or it can be

given via an infusion pump over 15 minutes

**Maintenance dose: 1g/hour for 24 hours:**

• Draw up 20 mL of 50% magnesium sulphate solution (10 g) followed by 30 mL of 0.9% normal saline into a 50 mL syringe. This will give a total volume of 50 mL

• Place the prepared medication into a syringe driver and set the pump to run intravenously at 5 mL/hour (N.B. if infusion pump was used for the loading dose, check the infusion pump rate carefully, as the maintenance dose rate is much slower)

• Continue infusion for 24 hours following birth or the last seizure, whichever is the most

recent event

**Recurrent seizures: 2 - 4 g magnesium sulphate given over 5 - 15 minutes:**

• Seek immediate senior help

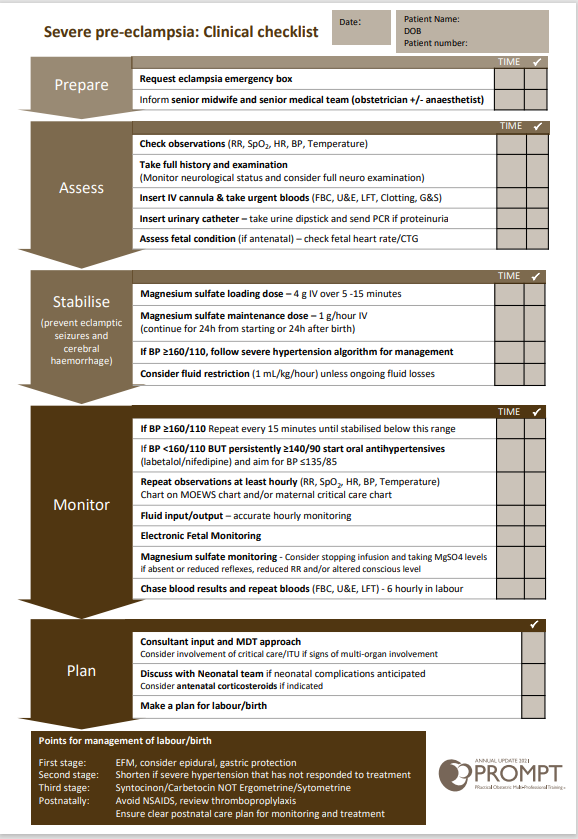
• Draw up 4 mL of 50% magnesium sulphate solution (2g) followed by 6 mL of 0.9% saline into a 10 mL syringe. This will give a total volume of 10 mL

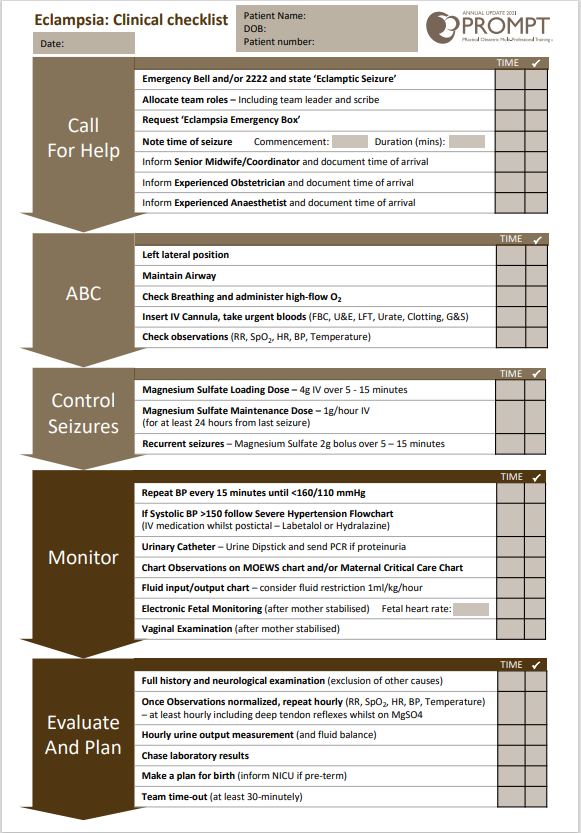
• Administer manually as an intravenous bolus over 5 minutes (2 mL/minute), or it can be

given via an infusion pump over 15 minutes

• If possible, take blood for magnesium levels prior to giving the bolus dose

The maternal condition must be stabilised prior to making plans for birth (if antenatal)





Anticonvulsants

If a woman in a critical care setting who has severe hypertension or severe pre-eclampsia has or previously had an eclamptic fit, give intravenous magnesium sulphate.

Consider giving intravenous magnesium sulphate to women with severe pre-eclampsia who are in a critical care setting if birth is planned within 24 hours.

Consider the need for magnesium sulphate treatment, if 1 or more of the following features of severe pre-eclampsia is present:

• ongoing or recurring severe headaches

• visual scotomata

• nausea or vomiting

• epigastric pain

• oliguria and severe hypertension

• progressive deterioration in laboratory blood tests (such as rising creatinine or liver transaminases, or falling platelet count).

Use the Collaborative Eclampsia Trial regimen for administration of Magnesium Sulphate:

• A loading dose of 4 g should be given intravenously over 5 to 15 minutes, followed by an infusion of 1 g/hour maintained for 24 hours.

If the woman has had an eclamptic fit, the infusion should be continued for 24 hours after the last fit.

• Recurrent fits should be treated with a further dose of 2 g to 4 g given intravenously over 5 to 15 minutes.

The MHRA has issued a warning about the risk of skeletal adverse effects in the neonate following prolonged or repeated use of magnesium sulphate in pregnancy.

Maternal administration of magnesium sulphate for longer than 5 to 7 days in pregnancy has been associated with skeletal adverse effects and hypocalcaemia and hypermagnesemia in neonates.

If use of magnesium sulphate in pregnancy is prolonged or repeated, consider monitoring of neonates for abnormal calcium and magnesium levels and skeletal adverse effects.

Do not use diazepam, phenytoin or other anticonvulsants as an alternative to magnesium sulfate in women with eclampsia.

Antihypertensives

Treat women with severe hypertension who are in critical care during pregnancy or after birth immediately with 1 of the following:

• labetalol (oral or intravenous)

• oral nifedipine

• intravenous hydralazine. some brands of nifedipine were specifically contraindicated during pregnancy by the manufacturer in its summary of product characteristics. Refer to the individual summaries of product characteristics for each preparation of nifedipine for further details.

In women with severe hypertension who are in critical care, monitor their response to treatment:

• to ensure that their blood pressure falls

• to identify adverse effects for both the woman and the baby

• to modify treatment according to response.

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.

Audit and Monitoring

Audit to be completed if concerns with non-compliance or as part of action plan following safety incident.

Reference List

Linked Documents:

NICE (2023) Diagnostics guidance on PLGF-based testing to help diagnose suspected preterm pre-eclampsia.

NICE (2023) Hypertension in pregnancy: diagnosis and management

NICE (2021) Antenatal care NG201

NICE (2015) Diabetes in pregnancy: management from preconception to the postnatal period

[NG3] Published: 25 February 2015 Last updated: 16 December 2020

NICE (2019) Hypertension in adults: diagnosis and management [NG136] Published: 28 August 2019 Last updated: 18 March 2022

NICE PLGF-based testing to help diagnose suspected preterm pre-eclampsia

NICE Preterm labour and birth NG25 Published: 20 November 2015 Last updated: 10 June 2022

NICE Chronic kidney disease: assessment and management [NG203] Published: 25 August 2021 Last updated: 24 November 2021

NICE Intrapartum care for healthy women and babies [CG190] Published: 03 December 2014 Last updated: 14 December 2022

NICE Preterm labour and birth Guideline [NG25] Published: 20 November 2015 Last updated: 10 June 2022

Cardiovascular disease: risk assessment and reduction, including lipid modification

NICE Obesity: identification, assessment and management Clinical guideline [CG189] Published: 27 November 2014 Last updated: 08 September 2022

NBT (2023) Infant feeding policy

Addressograph

**Postpartum Hypertension Discharge Plan**

Delivery Date ………………………… at …………… weeks gestation

Diagnosis: (please circle)

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

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| --- | --- | --- |
| **Current antihypertensive medication is:** | | |
| Medication | Dose | Frequency |
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**Woman to call Community Midwife if any of the following symptoms: Headache , right sided rib pain, oedema (swellings) , visual disturbances**

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| --- | --- | --- | --- | --- |
| Blood test | Normal Range | Last Test Date | Normal (N)  Abnormal (A) | **If Pre eclampsia:**   * measure platelet count, transaminases and serum creatinine 48 to 72 hours afterbirth or step-down (HDU) * do not repeat platelet count, transaminases or serum creatinine measurements if results are normal at 48 to 72 hours.   Please repeat the following bloods tests (tick):  FBC U&E  LFT  Clotting    Other………  On date: ……………………………… |
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**Pre-Eclampsia**

**Not Medicated**:

• BP 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.

If previously unmedicated with a BP **>150/100** arrange review at hospital as medication likely needed.

**If Medicated**:

* every 1-2 days up to 2/52 until off treatment and has no hypertension
* continue antihypertensives
* Medication review with GP if **<140/90**. Consider reducing or stopping.
* Reduce antihypertensive treatment if their blood pressure falls below **130/80** mmHg

If Methyldopa stop within 2 days and change to alternative.

A medical review with their GP 2 weeks after transfer to community care.

GP review Check urine dip stick at 6 week GP check. If Protein ≥+ 1 refer To renal specialists.

Consider referring for a specialist kidney assessment at 3 months if appropriate

**Gestational**

Daily BP first 2 days PN

BP Once between day 3+5 and at every PN contact or if clinically indicated

GP review at 2/52. Home monitoring daily until GP review.

Consider reducing Antihypertensives once BP **<130/80**

GP appt 2 weeks and 6 weeks

If not medicated start medication if BP ≥150/100mmHg

**Chronic**

Daily BP first 2 days PN

BP Once between day 3 & 5 or clinically indicated.

BP target **< 140/90 C**ontinue antihypertensive treatment.

Review anti hypertensives with GP @ 2/52

GP review at 6-8 weeks.

The duration of postnatal antihypertensive treatment will usually be similar to the

duration of antenatal treatment (but may be longer)

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# **Home Blood Pressure Monitoring**

# **(HBPM) Protocol.**

# **Introduced 9.11.2023**

**Division: *Women and Childrens/Maternity***

|  |  |  |
| --- | --- | --- |
| **Main Author(s):** | | Sonia Barnfield, Cameron Hinton, Carli Bleaken. Maggie Smith |
| **Consultation:** | | Antenatal Forum |
| **Approval Authority (Committee/ Group/ Lead Clinician):** | | Maternity Clinical Documentation Group |
| **Date of Approval:** | | 24/8/2023 |
| **Next Review Due:** | | 24/8/2026 |
| **Version:** | | Version 1 |
| **KEYWORDS:** | | Home Blood Pressure Monitoring |
| **Summary of changes since the previous version** | New Document | |

|  |  |
| --- | --- |
| 1. **Purpose** | Home Blood Pressure Monitoring (HBPM) allows a woman to self-monitor her blood pressure at home. Home readings may provide a more frequent or accurate picture of a woman’s BP than intermittent DAU or clinic readings.  HBPM can reduce face to face visits.  Our experience so far shows a reduction in unnecessary visits to the Antenatal Assessment Unit and reduces 2 x weekly appointments with the Community Midwife without incurring any adverse outcomes. Women report a positive experience. |
| 1. **Key Messages** | HBPM is not intended to replace necessary clinical reviews maternal blood tests or assessment of fetal wellbeing.  HBPM requires excellent compliance from patients and vigilance from staff to make sure it is being used safely. |
| 1. **Relevant Policies & Guidance** | Hypertension in Pregnancy |
| 1. **Operational Areas Included** | Antenatal Assessment Unit  Quantock Ward  ANC  Community Midwives |
| 1. **Operational Areas Excluded** | Non-Maternity |
| 1. **Who should read this** | All Midwives caring for antenatal patients requiring HBPM |
| 1. **Roles responsible for carrying out this procedure** | It is the responsibility of the Midwife who is setting the patient up with HBPM that the patient meets the criteria documented in this SOP.  It is the responsibility of the CMW to monitor readings in the community and ensure referral to the antenatal assessment unit if blood pressure readings are above 140/90. |

## Procedure:

**Who is HBPM suitable for?**

* Staff working in the Antenatal Assessment Unit (AAU), ANC, or Quantock Ward can offer HBPM to any woman who they think would benefit from it. The majority of these women will fulfil standard criteria for AAU referral and monitoring (gestational hypertension or borderline BP after 20 weeks gestation).
* Women with chronic hypertension who are booked for antenatal care with the maternal medicine team will have HBPM initiated through the consultant clinic in ANC.
* Women who are seen in antenatal clinic with hypertension should be referred to for a BP series, PET bloods and PCR +/- PLGF (see guidance) and can have HBPM commenced from AAU if suitable.
* Community Midwives will be responsible for overseeing the ongoing surveillance of all the patients on HBPM and ensuring appropriate follow-up plans are in place.
* Maternal medicine patients will be assessed by a member of the maternal medicine team regarding their suitability for HBPM whilst AAU patients should fit the criteria listed below.

**Inclusion criteria for AAU women:**

* Any woman with mild –moderate hypertension in pregnancy
  + Gestational Hypertension (GH)
  + Chronic Hypertension
  + White Coat Hypertension / ‘borderline BP profiles.
* High risk for hypertension in pregnancy as decided by Maternal medicine team e.g. Patients with established renal disease. Type 1 Diabetes, SLE
* Women must have a good understanding of English (written and spoken) so that they can follow the instructions and give informed consent.
* No clinical indication for inpatient monitoring (required to be inpatient if PLGF <12 or uncontrolled HTN-please see NBT Hypertension in pregnancy guideline)

The following women should be considered for HBPM with the priority given to Group 1:





**Exclusion Criteria:**

* Unable to give consent or understand the instructions.
* Declines HBPM
* Evidence of non-compliance with attendance or monitoring.
* Arm circumference greater than 42cm
* Delivery planned within 7 days
* Severe, uncontrolled hypertension that requires the woman to be admitted for stabilisation (HBPM can be started if she improves clinically and is appropriate for outpatient care).
* PLGF <12Any woman where there is concern over fetal growth/wellbeing.

Women who have a confirmed diagnosis of Pre-eclampsia (PET) or who do not fulfil these criteria may have HBPM initiated as part of an individualised plan of care by a

Consultant or senior obstetric trainee (ST6/7). This may involve a PLGF. These cases are not included in this pathway of HBPM in pregnancy and fall under Scheduled Care Team and Telephone Triage Team

**Process of initiating HBPM:**

**Discussing HBPM with the patient:**

**The following should be explained to the woman:**

* there is a need to monitor her BP more frequently
* the purpose of HBPM is to reduce the number of unnecessary visits and offer the patient some control in the monitoring of her BP.
* the importance of compliance and accurately recording the results.
* she should contact AAU if she has any abnormal readings or symptoms of severe hypertension/pre-eclampsia (persistent headache, visual disturbance, vomiting, facial swelling, upper abdominal pain) or reduced fetal movements.
* If the patient agrees to HBPM, go through the smartphone app with her and give her the patient information sheet.
* **Individualised plans** should be made for all women as to how frequently they need to monitor their BP using NBT hypertension guideline for guidance. This plan should be documented within their maternity notes and within the patient record on the K2 Hampton app.
* **Albustix** to be prescribed with an FP10 women should be given a urine pot and explained how to obtain a wash down sample to ensure accurate results.

**Teaching HBPM technique to a patient:**

* The machines provided to patients are Microlife® automatic machines.
* Each patient will be loaned their own machine for the duration of monitoring in pregnancy. The machines are numbered and the patient’s details should be documented next to the appropriate number in the log spreadsheet (held in HBPM folders in AAU/ANC).
* Complete the loan agreement form and file in HBPM folder.
* Advise the patient to take their BP when they are relaxed and have been sitting down for 5 minutes and at least an hour following antihypertensive medication. They should take their BP from the same arm each time.
* Demonstrate to the patient how and where to site the cuff. The bottom edge of the cuff should sit 2cm above the antecubital fossa (elbow fold) and the artery mark on the cuff should line up with the brachial artery (the inside front of the arm). The cuff should be done up so that it stays on, but not too tightly.
* Demonstrate to the patient how to start the machine to record the BP (Press the ‘POWER’ button once and it will automatically start recording).
* Once recorded, show them which numbers to record as systolic and diastolic BP. Demonstrate the re-call function to obtain the last recorded BP.
* If the patient is to perform urinalysis at home, show them how to use the dipsticks.
* Ensure that you are happy the patient is confident with the technique before continuing.

**Registering a patient on their phone:**

* Patients will be given the K2 Hampton leaflet with instructions on how to register as a patient.
* Click ‘Register’ and ask patient to fill in details. Select ‘NBT’ for institution.
* Show the patient how to add a BP or urine recording and highlight the warning sign that will flag with an abnormal reading.

**Monitoring/Visit Schedule:**

* Patients must be given a clear plan for how often to check their BP and urine and the timing of their next appointment or telephone consultation. Patients asked to check BP and urine on Mondays and Thursdays. This will become a feature on the app.
* Ensure Community Midwives are notified of any women using the HBPM service, you can do this by sending the Medical Discharge on BadgerNet to the to the Community Discharge Office.
* Community Midwives to log onto K2 Hampton on Mondays and Thursdays to check the BP readings and urinalysis that has been submitted for the women in their teams.

**Follow-up in AAU, Community or telephone ANC consultation**

* When patients return for follow-up in AAU, ANC or in community, their HBPM recordings should be reviewed by the midwife/doctor, either on the patient’s phone app or on the desktop app.
* Patients should be asked about symptoms of pre-eclampsia and fetal movements

**Patients who present with abnormal readings:**

* If patients self-present with abnormal BP recordings they should attend on the same day for a BP profile and review. This should be in AAU. Their HBPM trend should be reviewed as part of the assessment and actions updated on K2 Hampton so Community Teams can see that this has been actioned.

**Patients on HBPM who are admitted to hospital:**

* Unless specified by a Consultant, patients who have been using HBPM should have their blood pressure recorded by a healthcare professional whilst an inpatient. Standard BP machines should be used and the results should be documented on Antenatal Meows BadgerNet

**Timing of delivery:**

The optimal timing of delivery should be discussed on an individual basis.

**Postnatal BP checking:**

If HBPM is to continue after delivery, women are responsible to return the BP machine to AAU or ANC in due course as outlined in the Loan Agreement.

Women should be given a written plan for their blood pressure targets, times of review and contact numbers.

The frequency of monitoring and target readings should be set by a member of the obstetric team before the patient is discharged. This will depend on their underlying diagnosis and whether they are on treatment or not.

1. **Blood pressure thresholds for self-monitoring**

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| --- | --- | --- | --- |
| Responsibility | Name | Division / Specialty | Job Title |
| Authorised by | **Dr Cameron Hinton** | Maternity | Antenatal Lead consultant |
| Reviewer | Lisa Redmayne | Maternity | Antenatal Band 7 |
| Reviewer | Carli Bleaken | Maternity | Quantock SWS |
| Ratified by: Maternity Clinical Documentation Group 24/8/2023 | | | |