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## Hypertension in Pregnancy (Chronic, Gestational, and Mild-Moderate Pre-eclampsia)

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*Approval Date: December 2019*

*Review Date: December 2022*

*Document No:*

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## **1. Introduction**

Hypertension in pregnancy is the most common complication of pregnancy, affecting around 15% of pregnancies. It contributes to complications such as SGA, Abruption, Prematurity and stillbirth. There are a range of hypertensive disorders of pregnancy and their severity. This guideline will look at Chronic hypertension, Gestational hypertension, and mild to moderate pre-eclampsia. There is a separate guideline for severe pre-eclampsia. Management flow charts are available in the appendices for quick reference.

## **2. Chronic Hypertension**

### **2.1 Introduction**

1 in 5 adults in Wales have high blood pressure. Some will be known to have hypertension, have been investigated and managed by primary care services. However, some may not have yet been diagnosed until they become pregnant. Initial physiological changes in pregnancy may cause the blood pressure to drop in the first trimester before returning to more normal levels during the second trimester. Hypertension related to pregnancy does not present before 20 weeks gestation and therefore hypertension identified prior to 20 weeks should be managed as chronic hypertension.

Ideally women with hypertension should receive pre-pregnancy counselling. This is because many medicinal therapies are not suitable for pregnancy, with first line drugs by ACE (Angiotensin converting enzyme) inhibitors and Angiotensin II receptor blockers being prescribed. These drugs have been linked to cardiac congenital malformations, skeletal problems, oligohydramnios, foetal and neonatal renal failure, pulmonary hypoplasia, prolonged hypotension, and neonatal death. Examples include Lisinopril, Enalapril and Lotensin (as ACE inhibitors), Valsartan, Losartan and Candesartan (as Angiotensin II receptor blockers). Ideally these women should change their antihypertensive medication to a more pregnancy compatible medication (Labetalol, nifedipine or methyldopa), and be stable on that regime, before conceiving. For women who conceive on these medication they should have their antihypertensive changed as soon as possible. Similarly diuretics should also be avoided where possible during pregnancy.

### **2.2 Early Pregnancy**

These women should be booked for consultant led care, regardless of how long they have had hypertension. Their antihypertensive medication should be reviewed as above and changed if needed. Because chronic hypertension is a risk factor for developing pre-eclampsia these women should be offered low doses aspirin (75 – 150 mg daily, reduces the risk of severe pre-eclampsia by about 25%). If there is proteinuria early in pregnancy then blood should be taken for renal function (U & Es) and a urine for PCR sent.

If new hypertension is identified in early pregnancy then in addition to above assessment for end organ damage needs to be made. This includes:

- blood tests for glucose, U & E, total cholesterol, HDL Cholesterol, TFT and calcium.
- Urine should be sent for PCR.
- A 12 lead ECG
- Renal Ultrasound

Most hypertension is primary, but occasionally occurs secondary to conditions such as Conns syndrome (low potassium), thyroid dysfunction, hypercalcaemia, Cushings syndrome, and phaeochromoctyomas (have associated palpitations, sweating and tachycardia).

If the blood pressure is sustained at a systolic of more than 140 OR diastolic more than 90 mmHg then treatment should be started. First line treatment is with Labetalol, or nifedipine if labetalol is not suitable.

### **2.3 Antenatal Care**

During pregnancy aim for a blood pressure around 135/85 mmHg. The frequency of antenatal visits will depend on control of the blood pressure, especially towards the end of the third trimester.

These women will require serial growth scans. CTG monitoring is only required if clinically indicated for other reasons.

Induction of labour should NOT be offered before 39/40 where the blood pressure is controlled and growth is normal.

### **2.4 Intrapartum Care**

Women should be advised to deliver on a consultant obstetric unit, with continuous CTG.

Blood pressure should be measured hourly during active labour. Antihypertensive medication should be continued during labour.

Active management of the third stage is advised but with syntocinon only. Ergometrine should be avoided as it increase blood pressure.

### **2.5 Post natal care**

Blood pressure should be monitored daily for the first 2 days post natal, and at least once between day 3 and 5.

For women who have been on labetalol, the baby will need to follow the hypoglycaemia pathway.

Women can continue on their antihypertensive medication with the exception of methyldopa which should be changed within the first 2 days post partum. Women may wish to return to their pre-pregnancy medication if it was different to their antenatal antihypertensive, with the exception of diuretics or angiotensin II receptor blockers if the woman is breastfeeding.

Women should have a review with their GP 6-8 weeks post natal, for review of their hypertension and medication.

### 3. Gestational Hypertension

#### 3.1 Introduction

About 5% of pregnancies are complicated by gestational hypertension. This is the development of high blood pressure without proteinuria AFTER 20 weeks gestation. Gestational hypertension. About half of women with gestational hypertension will progress to pre-eclampsia, the earlier the diagnosis of gestational hypertension the more likely it is that progression to pre-eclampsia will occur.

#### 3.2 Early Pregnancy / Risk Assessment

All women should be assessed at booking for risk factors for developing gestational hypertension and pre-eclampsia. Table 1 lists the risk factors. Those with 1 major risk factor OR 2 moderate risk factors should be advised to start aspirin 75-150 mg daily from 12/40, as it reduces the risk of severe pre-eclampsia by 25%. For further guidance on Aspirin see the Aspirin in Pregnancy Guideline on WISDOM.

Major Risk Factors	Moderate Risk Factors
Previous Hypertension of Pregnancy Pre-existing Diabetes Chronic Hypertension Antiphospholipid syndrome / SLE / Autoimmune disorders Chronic Kidney Disease	First Ongoing Pregnancy BMI >35 10 years or more since last pregnancy Maternal age >40 Family history of pre-eclampsia Multiple pregnancy
<b>1 risk factor commence Aspirin from 12 weeks gestation</b>	<b>2 risk factors commence Aspirin from 12 weeks gestation</b>

Table 1: Risk Factors for gestational hypertension and pre-eclampsia

#### 3.3 New Hypertension in pregnancy

Hypertension in pregnancy is defined as a blood pressure reading of more than 140/90 in either the systolic or the diastolic readings, sustained over a 10 minute period when the woman is at rest and using the correct size blood

pressure cuff. When this occurs for the first time then a full antenatal assessment should be undertaken including urinalysis. The woman should be referred to the Antenatal Assessment Unit for further investigation and plan of care. This does not necessarily require admission.

**Mild Gestational Hypertension, blood pressure 140/90 – 149/99) with no proteinuria.**

These women should be assessed for risk factors for pre-eclampsia, and be assessed for signs and symptoms of pre-eclampsia. At the first presentation of gestational hypertension blood should be taken for FBC, LFT and U & E. The fetal heart should be auscultated but a CTG is not required unless there are other concerns (such as altered fetal movements or small for gestational age). An ultrasound scan should be arranged if the woman is not already having serial growth scans.

Anti-hypertensives should be commenced:

- Labetalol 200mg bd as first line
- Nifedipine m/r 10 mg bd if labetalol contraindicated.

It is advised women are observed for 1 hour post medication to ensure a response to therapy and no adverse response. If these women are well and the blood pressure has responded they may then have out patient surveillance weekly through ADAU.

At each visit an antenatal assessment will be performed including blood pressure and urinalysis, along with bloods for FBC, LFT, U&Es. A CTG is not required unless there are other concerns. Serial growth scans will be required.

**Moderate gestational hypertension, blood pressure between 150-159/100-109 with no proteinuria.**

Initial management should be as per mild gestational hypertension.

Anti-hypertensive therapy should be commenced:

- Labetalol 200mg tds or
- Nifedipine M/R 10mg bd).

It is again advised that these women are observed for at least one hour to ensure a response to therapy with no adverse response. If there are no other concerns these women may then have outpatient follow up, but initially this should be twice a week blood pressure checks (one with Community Midwife and another with ADAU for blood tests as well). Once the woman has been on the same antihypertensive regime for more than two weeks this may then be reduced to weekly.

### **Severe Gestational Hypertension, blood pressure greater than 160/110 with no proteinuria.**

Initial management should be with antihypertensives:

- Labetalol 200mg qds or
- Nifedipine M/R 20mg).

15-30 minutes blood pressure readings until below the 160/110 threshold, blood tests for FBC, U&E, LFT, +/- G&S, and urinalysis for proteinuria. A CTG should be undertaken and an ultrasound scan arranged (unless already having serial growth scans). These women should be admitted until the blood pressure has been stable for at least 4 hours, after which, if well, she may then have outpatient monitoring as per Moderate gestational hypertension.

#### **3.4 Ongoing surveillance**

Women with gestational hypertension are at higher risk of progressing to pre-eclampsia. Therefore these women need to have their blood pressure and urinalysis checked at least weekly. They also need weekly bloods for FBC, U&E, LFTs. CTGs are not required unless there are other clinical concerns such as altered fetal movements. If the woman develop proteinuria then a PCR should be sent to quantify the amount of proteinuria.

Women should receive serial growth scans from the time of diagnosis until delivery.

In women whose blood pressure is controlled, and serial scans are normal Induction of labour can be considered after 37/40 gestation. It is advised this occurs between 37 and 40/40 gestation in discussion with the woman and the severity of the hypertension.

Appendix 2 summarises antenatal management.

#### **3.5 Intrapartum Care**

Women should be advised to deliver on a consultant obstetric unit, with continuous CTG.

Blood pressure should be measured hourly during active labour. Antihypertensive medication should be continued during labour. If blood pressure elevates during labour then a clean sample (by in out catheter if necessary) of urine should be obtained for proteinuria, and PCR sent if necessary.

Active management of the third stage is advised but with syntocinon only. Ergometrine should be avoided as it increase blood pressure.

### **3.6 Post partum Care**

Blood pressure should be measured at least daily for the first 2 days, and at least once between day 3 and 5 post natal. Anti hypertensives should be continued. As a rough guide women require treatment for the same duration postnatally as antenatally. Consider reducing the dose of antihypertensive if the blood pressure is less than 130/80. For women discharged on antihypertensives it is advised they see their GP 2-4 weeks post natally.

### **3.7 Post Partum Onset of gestational hypertension**

Gestational hypertension can start post partum. Bloods should be taken for FBC, U&E and LFTs. Antihypertensives should be commenced if the blood pressure is more than 150/100. Post natal consider enalapril (5mg once daily upto maximum of 40mg daily) or nifedipine M/R (10-20 mg od-bd). Second line includes a combination of these 2 drugs or atenolol (25 – 50mg daily).

## **4. Pre-eclampsia**

### **4.1 Introduction**

Pre-eclampsia is one of the most common conditions affecting pregnancy. It makes significant contributions to premature delivery and neonatal mortality. Severe pre-eclampsia and Eclampsia can lead to maternal and fetal death, but rates of maternal mortality related to pre-eclampsia are falling in the UK. Pre-eclampsia has a wide spectrum of presentation and severity, and clinical assessment and judgement should always be used over these guidelines. Senior staff should be involved in the care and management of these women.

### **4.2 Early Pregnancy / Risk Assessment**

All women should have a risk assessment at their booking appointment. The risk factors are displayed in section 3.2. Women deemed at risk should be commenced on aspirin as for gestational hypertension.

### **4.3 Diagnosis and management of Pre-eclampsia**

**Pre-eclampsia is hypertension (>140/90) AND significant proteinuria (>1+ on dipstick or PCR >30mg/mmol).**

Pre-eclampsia is classified into mild, moderate and severe as for gestational hypertension, based on the blood pressure. Severe pre-eclampsia is addressed in its own guideline.

Women presenting for the first time with hypertension and proteinuria should be assessed through the antenatal assessment unit. Assessment should include:

- History for risk factors for pre-eclampsia
- Symptoms of pre-eclampsia including headache, abdominal pain, peripheral oedema and breathlessness
- Examination for signs of pre-eclampsia including abdominal palpation for liver tenderness, peripheral oedema, peripheral reflexes and clonus, and auscultation of the chest for evidence of pulmonary oedema.

- Observations to include at least 2 blood pressure readings 15 minutes apart, pulse, respiratory rate and oxygen saturations on air.
- Urinalysis. If at least 1+ of protein then send PCR. If any blood or leucocytes also present send for MSU as well
- Bloods for FBC, U&E, LFT, G&S. DO NOT send urates as these are not specific enough to change management.
- CTG at initial assessment only.
- Arrange for serial ultrasound scanning if not already having serial scans.
- Antihypertensive therapy should be commenced if blood pressure is persistently >140/90. Labetalol 200mg (bd for mild, tds for moderate) is first line, or nifedipine m/r 10mg if labetalol is not suitable.
- Calculate the risk of adverse maternal outcome using fullpiers at <https://pre-empt.bcchr.ca/evidence/fullpiers>  
Note this does not calculate the risk of adverse fetal outcomes.
- Admit for surveillance for approximately 24 hours unless the woman is asymptomatic with mild hypertension (140-149/90-99) and only 1+ of protein, with easy access back to the hospital. This is because pre-eclampsia can rapidly escalate in severity.
- Consider steroids if <34/40 gestation.
- Recalculate the VTE (Venous thromboembolism) score.

#### 4.4 Ongoing surveillance

In patient management depends on many variables. Reasons to continue inpatient management include:

- Symptomatic of pre-eclampsia
- Abnormal blood test, esp plts < 150, ALT > 70 and Cr > 90
- Severe pre-eclampsia ie blood pressure >160/110
- Concerns about fetal wellbeing such as abnormal dopplers
- PCR > 100mg
- Fullpiers score of more than 10%

For outpatient monitoring women should live within a reasonable distance of the hospital with easy access to transport in (not driven by the patient). They should also be aware of concerning symptoms to report, and agree to come for increased surveillance. Women should be seen on alternate days by the community midwife for blood pressure and urinalysis, and twice a week by the antenatal day assessment unit for blood tests (FBC, U&E, LFT). CTGs are not required unless there are other concerns. If proteinuria levels increase on dipstick then a review in the antenatal assessment unit is advised with repeat investigations. Women should be booked under consultant led care and be seen with growth scans.

Appendix 3 summarises Management.

#### 4.5 Delivery and Intrapartum Care

Women should be offered induction of labour from 37/40 if stable. Decisions to offer delivery before 37/40 gestation should be made by a Consultant in

discussion with the woman. All women should be advised to labour on the consultant led unit and have continuous CTG monitoring.

Intrapartum women should continue antihypertensive therapy, and have their blood pressure measured hourly. Bloods should be taken if not done in the past 24 hours, and in addition a clotting and G&S should be taken in case regional anaesthesia is required. Care should be taken with intravenous fluids to avoid fluid overload.

Active management of the third stage with syntocinon is advised. Ergometrine should be avoided in these women as it increases the blood pressure further.

#### **4.6 Post Natal Care**

Whilst in hospital blood pressure should be monitored four times a day. Anti hypertensive medication may need to be reduced, especially if the blood pressure falls below 130/80. Bloods for FBC, U&E and LFT should be checked at 48 hours post delivery.

For discharge women should be well with normal or improving blood tests. Once discharged they should have alternate day blood pressure measurements. If in the community the blood pressure is >150/100 then medical review is advised.

#### **4.7 Post Natal Onset of pre-eclampsia**

Pre-eclampsia can develop post delivery. Proteinuria can be difficult to measure in these circumstances as there is contamination with lochia. Bloods should be taken for FBC, U&E and LFTs. Antihypertensives should be commenced if the blood pressure is more than 150/100. Post natal consider enalapril (5mg once daily upto maximum of 40mg daily) or nifedipine M/R (10-20 mg od-bd) as first line therapy. Second line includes a combination of these 2 drugs or atenolol (25 – 50mg daily).

# Appendix 1

## Chronic Hypertension (or before 20/40)

### Antenatal

- Consultant led care
- Start Aspirin 75mg
- Review antihypertensives, advise Labetalol or Nifedipine
- If proteinuria check PCR and U&Es
- If new diagnosis check glucose, TFT, calcium, U&Es, total and HDL Cholesterol, 12lead ECG, Renal scan
- Serial growth scans
- Frequency of visits depends on blood pressure control
- Aim bp 135/85

### Intrapartum

- IOL >39/40 if well controlled and normal growth
- Continue normal antihypertensives
- Continuous CTG in established labour
- Hourly bp in established labour

### Post Natal

- Change methyldopa within 2 days
- Can change to prepregnancy medication unless breastfeeding when should avoid diuretics and Angiotensin II receptor blockers.
- Bp measurements daily for 2 days, and then once between day 3 and 5
- GP review 6-8 weeks

## Appendix 2

### Management of Gestational Hypertension

	<b>Mild GH</b>	<b>Moderate GH</b>	<b>Severe GH</b>
Definition	Bp 140-149/90-99 No significant protein	Bp 150-159/100-109 No Significant protein	Bp >160/110 No Significant Protein
History	All women should be assessed for risk factors for pre-eclampsia, and for symptoms of pre-eclampsia		
Examination	All women should be assessed for signs of pre-eclampsia including abdominal tenderness, peripheral oedema and reflexes.		
Urine	All women should have urinalysis. If 1+ or more of protein send PCR		
Blood Tests	All women should have FBC, U&E, LFT at first presentation		
CTG	FH should be auscultated but CTG is NOT required unless other concerns		CTG should be performed
Scan	All women require serial growth scans if not already being undertaken		
Medication	Labetalol 200mg bd or nifedipine M/R 10mg bd	Labetalol 200mg tds or nifedipine M/R 10mg bd	Labetalol 200mg qds or nifedipine M/R 20mg bd
Admission to ward	No	No	Yes
Criteria for Home	Well, asymptomatic of pre-eclampsia, at least 1 hour post therapy		Asymptomatic of PET, Bp below 150/100 for more than 4 hours post therapy
Follow up	Weekly ADAU	Twice weekly (one with CMW, one with ADAU)	
ADAU Tests	Bp, Urine, Bloods CTG only required if other concerns		
ANC	With serial growth scans		
IOL	Consider between 37 and 40 weeks gestation depending on severity of GH, growth and womans wishes		

## Appendix 3

### Management of suspected pre-eclampsia

	<b>Mild PET</b>	<b>Moderate PET</b>	<b>Severe PET</b>
Definition	Bp 140-149/90-99 1+ or more protein	Bp 150-159/100-109 1+ or more protein	Bp >160/110 1+ or more protein
History	All women should be assessed for risk factors for pre-eclampsia, and for symptoms of pre-eclampsia		
Examination	All women should be assessed for signs of pre-eclampsia including abdominal tenderness, peripheral oedema and reflexes, Chest auscultation and oxygen saturations.		
Urine	All women should have urinalysis. If 1+ or more of protein send PCR. If blood or leucocytes also send MSU		
Blood Tests	All women should have FBC, U&E, LFT at first presentation		
CTG	CTG should be performed		
Other	VTE score and FullPIERS score		
Scan	All women require serial growth scans if not already being undertaken		
Medication	Labetalol 200mg bd or nifedipine M/R 10mg bd	Labetalol 200mg tds or nifedipine M/R 10mg bd	See Severe Pre-eclampsia Guideline
Admission to ward	Yes unless Aysymptomatic and 1+ protein	Yes	Admit to HDU
Criteria for Home	Well, asymptomatic of pre-eclampsia, PCR<100, bloods normal, easy access to return, FullPIERS <10%		
Follow up	Twice weekly in ADAU for bloods (FBC U&E LFT) with CMW alternate days for bp and urinalysis		
ADAU Tests	Bp, Urine, Bloods CTG only required if other concerns		
ANC	With serial growth scans		
IOL	Advice induction after 37/40		

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## Maternity Services

### Checklist for Clinical Guidelines being Submitted for Approval

Title of Guideline:	Hypertension in Pregnancy (Chronic, Gestational, and Mild-Moderate Pre-eclampsia)
Name(s) of Author:	Louise-Emma Shaw
Chair of Group or Committee approving submission:	Antenatal Forum
Brief outline giving reasons for document being submitted for ratification	Update of expired guideline
Details of persons included in consultation process:	Antenatal forum
Name of Pharmacist (mandatory if drugs involved):	
Issue / Version No:	
Please list any policies/guidelines this document will supercede:	Pregnancy, Hypertensive Disorders.
Date approved by Group:	December 2019
Next Review / Guideline Expiry:	December 2022
Please indicate key words you wish to be linked to document	Hypertension, pre-eclampsia
File Name: Used to locate where file is stores on hard drive	

