Wrightington, Wigan and Leigh Teaching Hospitals
NHS Foundation Trust

Title of Guideline	**Antenatal and postnatal management of women with hypertension**
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Division & Specialty	Surgery - Obstetrics
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Explicit definition of patient group to which it applies	Maternity patients
Abstract	
Statement of evidence base of the guideline Evidence Base (1-5)	
Consultation Process	O&G Guideline Group
Target Audience	
This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt contact a senior colleague or expert. Caution is advised when using guidelines after the review date.	

1a	Meta analysis of RCT
1b	At least 1 RCT
2a	At least 1 well designed controlled study without randomisation
2b	At least 1 other well designed quasi experimental study
3	Well –designed non-experimental descriptive studies (ie comparative / correlation and case studies)
4	Expert committee reports or opinions and / or clinical experiences of respected authorities
5	Recommended best practise based on the clinical experience of the guideline developer

Antenatal and postnatal management of women with hypertension

Written by Fatimah Soydemir, April 2005, updated by Jennifer Davies June 2007 and June 2010, updated by E Church December 2011, June 2014, July 2015, November 2015 and Amit Verma January 2016 and February 2018. Updated by Catherine Taylor and the guideline group September 2019. New letter to GP for aspirin February 2020 (v10.1), PlGF pathway added by Amit Verma April 2020 (v11). Appendices 2 and 3 updated September 2020 (v11.1). Updated July 2022 (v12)

For **intrapartum** management of women with pre-eclampsia please see **Obs 27** – intrapartum management of severe hypertension/pre-eclampsia in pregnancy.

Definitions

Mild hypertension – BP 140/90-149/99 mmHg
Moderate hypertension – BP 150/100-159/109 mmHg
Severe hypertension – BP ≥160/110 mmHg

Chronic hypertension – diagnosis prior to pregnancy.
Gestational hypertension – diagnosis during pregnancy without significant (PCR < 30) proteinuria.
Pre-eclampsia – combination of hypertension developing during pregnancy and significant proteinuria (PCR > 30) or renal/hepatic dysfunction/ thrombocytopenia or fetal growth restriction.
Eclampsia – fits as a consequence of pre-eclampsia.

Introduction

This guideline covers diagnosis and management of hypertensive disorders during pregnancy in the antenatal and postnatal period. It is important to remember to monitor blood pressure following delivery, as 44% of eclamptic fits occur in the postnatal period.

Pre-pregnancy counselling

Women with chronic hypertension should ideally attend for pre-pregnancy counselling. Medication review should be undertaken so that women on angiotensin-converting enzyme inhibitors (ACE), angiotensin II receptor blockers (ARB) or thiazide diuretics can be converted to drugs with safer profiles in pregnancy. These women can be referred to the medical antenatal clinic. Such medication should be stopped and replaced with an alternative within 2 days of pregnancy being notified.

Reducing the risk of pre-eclampsia

Women with **one major** or **more than one moderate** risk factor for pre-eclampsia should be advised to take aspirin 150mg daily from 12 weeks until birth.

The following are major risk factors for pre-eclampsia so women with any of these are considered high risk for developing pre-eclampsia:-

1. Previous hypertension or pre-eclampsia
2. Chronic hypertension
3. Chronic kidney disease
4. Auto-immune disease such as systemic lupus erythematosis (SLE) or antiphospholipid syndrome
5. Type 1 and type 2 diabetes
6. IVF pregnancies

The following are moderate risk factors:-

1. First pregnancy
2. Age 40 years or older
3. Pregnancy interval of more than 10 years
4. Body mass index (BMI) of 35 kg/m^2 or more at first visit
5. Family history of pre-eclampsia
6. Multiple pregnancy.

There is no evidence that dietary supplementation with magnesium, folic acid, antioxidants, fish oils, garlic. Nor is there evidence that nitric oxide donors, diuretics, low molecular weight heparin, progesterone will prevent hypertension.
Women with hypertension should not be advised to restrict activity.
Salt restriction does not prevent hypertension but should be advised in those with chronic hypertension.

	Action	**Rationale**
1.	Evaluate for risk of pre-eclampsia as above	To identify a high risk group
2.	Women with one major or more than one moderate risk factor should be offered Aspirin 150mg daily.	It reduces the incidence of pre-eclampsia by 10%. The current regional guidance recommends 150mg rather than 75mg.
3.	If a woman wishes to commence aspirin a letter should be sent to the GP explaining the reasons for giving aspirin and asking that it be prescribed until birth (Appendix 1)	To commence treatment in a timely fashion and to keep GP informed.
4.	For those at risk of developing hypertension take blood for baseline U&E when taking booking bloods	They are also at increased risk of developing abnormal renal function

5.	A management plan for the pregnancy should be documented in the hand held notes of the woman and in the hospital notes	To ensure all staff are aware of the individual management plan

Chronic hypertension

	Action	Rationale
1.	Those with chronic hypertension should continue with current medication unless on ACE inhibitors, ARB or thiazide diuretics which should be switched to labetalol or nifedepine or methyl dopa if labetalol not suitable.	ACE inhibitor, ARB and thiazide diuretics are teratogenic. Labetalol, nifedipine and methyl dopa have been widely used in pregnancy with no reported significant adverse events
2.	Stop medication if hypotensive (sustained BP<110/70)	Low BP may restrict placental perfusion
3.	Those with chronic hypertension on no treatment should commence treatment if sustained BP >140/90	Treatment is needed in pregnancy at these levels
4.	Arrange blood pressure checks as appropriate to degree and stability of hypertension	This may vary at different times
5.	See in ANC every 2-4 weeks depending on BP control	
6.	Do not offer planned early birth before 37 weeks if BP < 160/110 on or off treatment	

Urinary protein:creatinine ratio (PCR)

PCR is calculated from a random urine sample sent in a dry pot (not the red MSSU pot). Do not use first morning urine.

On HIS search for urine then select protein / creatinine ratio (urine).

Only measure PCR if there is + or ++ protein in urine when hypertension is present. If there is +++ then the result is significant anyway and immediate action is required unless blood pressure is normal in which case check PCR.

If a PCR is sent, arrange review on the day assessment unit 2 days later for review with the result. **The result will not be available for at least 24 hours**.

- If PCR<30 mg/mmol no action is needed.
  This is not a significant level and needs no immediate action.
  Consider repeating a week later if hypertension persists.
- If PCR>30 mg/mmol observe closely but do not repeat unless there is no other evidence of preeclampsia.
  >30 is significant but the actual level is not important
- If PCR>100 mg/mmol arrange close observation and follow up.
  Those with PCR > 100 mg/mmol are at risk of rapid deterioration. Consider the possibility of renal disease
- If PCR>300 mg/mmol consider thromboprophylaxis.
  PCR > 300 mg/mmol is in the nephrotic range

Placental Growth Factor (PlGF) – based testing

Placental Growth Factor (PlGF) based testing is a simple blood test that quickly predicts the risk of pre-eclampsia so that pregnant women receive the most appropriate care.

If the test rules-out pre-eclampsia then this can lead to a reduction in monitoring and pregnant women can often return home quicker and spend less time in hospital.

Evidence has shown the test can be a better predictor of pregnancy outcome than standard tests.

Medication for treating high blood pressure in pregnancy

Use labetalol 100-200mg bd as first line
Nifedipine MR 10-20mg bd if labetalol contraindicated or not effective
Methyl dopa 250mg tds if labetalol and nifedipine not effective or contraindicated

Procedure for evaluating hypertension

	Action	Rationale
1.	Remove any clothing, which might restrict blood flow in arm on which blood pressure is to be measured.	Constriction may result in inaccurate measurement
2.	Select cuff of appropriate size i.e. large cuff should be used if arm circumference >35cm	Too small a cuff results in falsely high readings
3.	Take blood pressure on two occasions at least 10 mins apart.	To take account of "White Coat" / anxiety induced hypertension
4.	If blood pressure noted to be raised in a community setting refer to ANC or DAU for full evaluation by obstetrician	Hypertension in pregnancy requires medical input.
5.	For a blood pressure profile, make 3 BP measurements at least 15-20 minutes apart use the highest reading excluding the first measurement in the profile and any measurements prior to admission to the maternity unit.	The first reading may be artificially raised due to anxiety. Readings outside the unit may have used an inappropriate cuff size or technique
6.	Perform urine dipstick for protein assessment	Significant proteinuria (+ or greater) may be a sign of pre-eclampsia
Normal blood pressure (systolic blood pressure <140mmHg and diastolic <90mmHg)		
7.	If **asymptomatic**, urine shows **no protein**, low risk or clear plan of care in place. No further investigation or additional monitoring needed Otherwise refer to obstetrician	Not hypertensive, routine antenatal care appropriate
8.	If urine shows **trace or + protein**. As above and send MSSU for culture and arrange for review of result.	Proteinuria could be a sign of a urinary tract infection.

9.	If urine dipstick **protein ++ or more**. Send MSSU. Check a urinary protein:creatinine ratio (PCR) and interpret/review as above. Arrange BP monitoring daily until PCR result available	Proteinuria could be a sign of a urinary tract infection. If no infection, assess whether the proteinuria is significant (>30mg/mmol). Please note, a result will not be available for at least 24 hours.
Mild/Moderate hypertension (BP 140/90 – 159/109, urine no/trace protein		
10.	Perform PlGF test, take blood for FBC, U&E, LFT. Consider additional risk factors • nulliparity • over 40 years old • pregnancy interval > 10 years • family history of pre-eclampsia • multiple pregnancy • BMI > 35 kg/m^2 • Early gestational age at presentation • previous history of pre-eclampsia or gestational hypertension • pre-existing vascular disease • pre-existing kidney disease. Consider induction of labour if pregnancy at 38-39 weeks. If not being induced • Send MSSU • Consider growth scan, liquor and Dopplers if not done in last 3 weeks • Ascultate FH at every appointment, CTG only if clinically indicated. • Start oral labetalol 200mg twice daily. Aim to keep blood pressure <135/85.	See PlGF pathway (Appendix 6) Evaluate for changes of pre-eclampsia Risk of continuing pregnancy may outweigh risks from induction of labour Exclude urinary infection. Evaluate fetal well being Controlling hypertension to minimise risk of intracerebral haemorrhage

	• Review twice (BP and urine dipstick) in first week and then 1-2 weekly depending on response. • Measure bloods weekly Continue treatment until delivery.	Plan optimal management of pregnancy
Any degree of hypertension, urine + or ++ protein		
11.	• Perform PlGF test unless severe hypertension BP≥160/110 when no need for PlGF and manage patient as per PlGF pathway (Appendix 6) and Intrapartum management of hypertension guideline Obs 27 • Take blood for FBC, U&E, LFT • Obstetric review • Consider risk factors • Consider symptoms • Check CTG • Send MSSU • Send urinary PCR and interpret as above. • Growth scan and Dopplers if not within last 2 weeks • Consider induction if pregnancy > 37/40 **Mild/moderate hypertension and no other factors** • Review on DAU the next day	Severe hypertension needs immediate management whatever the PlGF. Consider further assessment if Creatinine >90 micromol/l, ALT >70 IU/l, Platelets <150,000/microlitre PCR will quantify proteinuria. Please note, a result will not be available for at least 24 hours. Delivery may be required before a result is available. No need to treat or admit for mild hypertension.

	All other situations **ADMIT** for observation • Measure and record blood pressure at minimum of 4 hourly intervals • Twice daily antenatal fetal monitoring • If less than 36 weeks and delivery is planned within 1 week - give steroids. • If **BP >140/90** start oral labetalol 200mg twice daily. Aim to keep blood pressure ≤135/85. • Consider optimum timing of delivery in discussion with consultant obstetrician • Consider starting on magnesium sulphate as per Intrapartum management of hypertension guideline Obs 27 or if preterm see Preterm labour Guideline Obs 2.	Rapid deterioration may occur Promote fetal lung maturity Hypertension increases risk of maternal cerebral haemorrhage Magnesium sulphate administration reduces the likelihood of eclampsia and provides neuroprotection for preterm infants
If urine dipstick 3+ protein or more		
12.	**ADMIT** for observation and investigation regardless of BP • Send MSSU • Do not send urinary PCR • If raised blood pressure >140/90 perform PlGF test (and follow PlGF pathway (Appendix 6) • Take blood for FBC, U&E, LFT • If **BP >140/90** start oral labetalol 200mg twice daily. Aim to keep blood pressure ≤135/85.	3+ or more on dipstick is significant and should be acted upon. Hypertension increases risk of maternal cerebral haemorrhage

	• Ascertain whether the woman has pre-existing renal disease • Check U&E even if normotensive • Measure and record BP at a minimum of 4 hourly • Twice daily antenatal fetal monitoring with CTG • If less than 36 weeks and delivery is planned within 1 week - give steroids and magnesium sulphate. • Consider starting on magnesium sulphate as per Intrapartum management of hypertension guideline Obs 27.	Evaluate for renal disease Promote fetal lung maturity and provide neuroprotection for preterm infants Magnesium sulphate administration reduces the likelihood of eclampsia
13.	There **is no need** to check clotting on a routine basis.	This is unlikely to be abnormal in the presence of normal platelets and liver function.

Postnatal management

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

Chronic hypertension / Gestational hypertension

Aim to keep BP < 140/90 treating as required.
Gestational hypertension with no medication - start medication postnatally if BP>150/100 – see below – row 3.

If no medication was used in pregnancy it is recommended to use enalapril or nifedipine postnatally. If already on medication continue with the same medication if blood pressure is well controlled whilst taking it.

BP checks

- Daily for 2 days
- At least once between Days 3-5
- In women with chronic hypertension consider recommencing their pre-pregnancy medication.
- Review after 2 weeks by GP or Obstetrician
- Review after 6-8 weeks by GP or Obstetrician

Pre-eclampsia

	Action	Rationale
1.	Most women with severe hypertension will be managed as a high dependency patient on delivery suite. If the woman is on Magnesium Sulphate she will remain on delivery suite at least until this has finished. Blood investigations should be reviewed and blood pressure stabilised prior to transfer to maternity ward.	Individualised care is required To facilitate monitoring, and easy access to equipment if required To allow appropriate monitoring of treatment.
2.	Post natal fluid management should be instituted according to Guideline Obs 27 Once a sustained diuresis is occurring hourly urinary measurements can be discontinued and the catheter removed. A fluid balance chart should still be kept for as long as the woman needs to remain an in-patient.	It is important to monitor fluid balance to reduce the risk of pulmonary oedema

3.	**Oral antihypertensives** are likely to be needed after delivery and should be considered when the woman can tolerate oral intake. If women have been on methyldopa during pregnancy, stop within 2 days of birth and consider commencing any of the above medications Offer Enalapril to treat hypertension in women during postnatal period with appropriate monitoring of maternal renal function and maternal serum potassium. For women of black African or Caribbean family origin with hypertension, consider nifedipine or amlodipine if the woman has previously used to successfully control her BP If BP is not controlled with a single medicine, consider a combination of nifedipine (or amlodipine) or enalapril. If the combination is not tolerated or ineffective, consider adding atenolol or labetalol or swapping one of the medicines for atenolol or labetalol. When treating women during post-natal period, use medicines that are taken once daily when possible. **A number of preparations are available and any of those listed in the Appendix 7 can be used.**	Oral antihypertensives may be required as a short term (up to six weeks) measure following delivery To reduce the likelihood of developing postnatal depression in these women Caution in mothers with preterm deliveries and infants <2 months due to risk of oedema, hypotension and renal toxicity. If used may need monitoring (see Appendix 7).
4.	Further blood tests are not required following transfer to the maternity ward if all parameters are within normal limits. If blood parameters are outside normal limits they should be repeated each day	Blood parameters are unlikely to become abnormal at this stage. To ensure blood parameters return to normal values

5.	Blood pressure should continue to be monitored 4 hourly for up to 48 hours following delivery. All observations should be recorded on a MEOWS chart. Enquire about headache and epigastric pain and record this in the notes	Alteration to any antihypertensive medication may be required as a consequence of this monitoring.
6.	Timing of discharge will be variable depending on maternal condition. Blood pressure needs to be adequately controlled (<150/100) (either on or off medication) before discharge. Blood tests should be stable. Those on medication should be discharged with a 2 week supply A review appointment with the GP should be arranged before 2 weeks for a medication review	Once at home the frequency of BP monitoring will be individualised (see below) but on alternate days as a minimum
7.	Women managed according to Obs 27 should be formally debriefed with documentation on the debrief proforma for hypertension (Appendix 3) before discharge home. A standard letter (Appendix 2) should be completed and sent to the GP as part of the discharge process for any woman treated for hypertension during pregnancy or delivery. A copy of the letter should be retained in the case notes as evidence of communication with GP.	To explain treatment, answer any questions the woman or her family may have and counsel regarding future pregnancies and future cardiovascular risks. To communicate pregnancy issues with the GP

8.	Following discharge from hospital all women treated for hypertension during pregnancy or delivery should have their blood pressure monitored on alternate days for 10 days following delivery. Aim to keep BP <150/100. If <130/80 reduce the dose of antihypertensives and recheck BP the following day. If BP >150/100 refer to obstetric registrar Liaise with obstetric registrar or GP if any concerns	Blood pressure measurements are checked in order to indicate whether treatment is appropriate. BP monitoring on alternate days for 10 days is a minimum requirement. The monitoring schedule may of course need to be individualised if more frequent monitoring is deemed appropriate. Aim to keep normotensive. To avoid hypotension and unnecessary side effects of medication. Medication needs reviewing
9.	If blood pressure measurement at 10 days postnatal is stable, weekly BP monitoring should be undertaken until postnatal discharge. Follow up with the GP.	

See also Appendices 4, 5 and 6 – Table and Flow chart and PlGF pathway

References

1. Hypertension in pregnancy: the management of hypertensive disorders during pregnancy. NICE clinical guideline NG133 June 2019
2. Smith et al ; Management of postpartum hypertension: DOI: 10.1111/j.1744-4667.2012.00144.x The Obstetrician & Gynaecologist http://onlinetog.org 2013
3. Placental growth factor testing to assess women with suspected pre-eclampsia: a multicentre, pragmatic, stepped-wedge cluster-randomised

controlled trial Kate E Duhig et al PARROT trial group. Lancet 2019 May 4; 393(10183): 1807–1818. doi: 10.1016/S0140-6736(18)33212-4

4. Eclampsia Trial Collaborative Group. Which anticonvulsant for women with eclampsia? Evidence from Collaborative Eclampsia Trial. Lancet 1995, 345: 1455-63

Process for audit

There are no specific audit criteria for this guideline but it will be audited as required dependent on clinical indications.

Appendix 1

Antenatal letter to GP about starting aspirin

Appendix 2

Post natal letter to GP about monitoring BP

Appendix 3

Debriefing sheet

Appendix 4

Tabulated management of hypertension in pregnancy

Appendix 5

Flow chart for management of hypertension in pregnancy

Appendix 6

PlGF pathway

Appendix 7

Antihypertensives and safety in breast feeding

Wrightington, Wigan and Leigh Teaching Hospitals
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Re:

Date

Dear Dr

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

One of the following high risk factors: (please tick)

- Hypertensive disease during a previous pregnancy ☐
- Chronic kidney disease ☐
- Autoimmune disease e.g. systemic lupus erythematosus or antiphospholipid syndrome ☐
- Type 1 or Type 2 diabetes ☐
- Chronic hypertension ☐
- IVF pregnancy ☐
- Previous SGA < 3rd centile ☐
- Thrombocytosis >500x10^9/l ☐

More than one of the following moderate risk factors:

- First pregnancy ☐
- BMI of 35 or more at booking ☐
- Family history of pre-eclampsia ☐
- Age 40 years or over ☐
- Multiple pregnancy ☐
- Pregnancy interval of more than 10 years ☐

We have recommended that she takes **Aspirin 150mg daily** until delivery **starting between 8 and 12 weeks** to reduce the risk of pre-eclampsia and fetal growth restriction (Bujold et al, 2010)

Thank you

Name:

Designation:

Wrightington, Wigan and Leigh Teaching Hospitals
NHS Foundation Trust
Royal Albert Edward Infirmary
Wigan Lane
Wigan
WN1 2NN

Dear Dr

Patient Name
Patient Hospital/NHS No
Address

During pregnancy your patient developed:

Gestational hypertension □ Pre-eclampsia □ Eclampsia □

She delivered on ……

Gestation ……

Mode of delivery……

She was discharged home on ……

On the following medication: ……

The community midwife will monitor her blood pressure alternate days for 10 days and then weekly until discharge from midwifery care. A 2 week supply of medication has been provided and the midwife has been asked to liaise with you if antihypertensive medication is still required at that time.

The medication should be reduced / stopped if BP < 130/80

She has been advised to take aspirin 150 mg daily in a future pregnancy to reduce the risk of recurrence. She has also been advised about the increased risk of developing hypertension and its complications in later life.

We will be grateful if you will review her ongoing antihypertensive medication requirements and consider prescribing aspirin 150mg by 8 weeks in her next pregnancy.

Yours sincerely,

…….. Job title: ……

Please photocopy, send one copy to the GP, file one copy in the maternity notes.

NHS
Wrightington, Wigan and Leigh Teaching Hospitals
NHS Foundation Trust

Name: **Unit number:** **DOB:**

POST – HYPERTENSIVE DISORDERS

Congratulations on the birth of your baby.

During your pregnancy, labour or delivery unfortunately you experienced one of the conditions listed below. This form aims to provide you with an explanation of events and provide an answer to any questions that you have raised.

Chronic hypertension (Essential hypertension)	
Gestational (Pregnancy induced) hypertension	
Pre-eclampsia	
Eclampsia	

Overall the risk of developing hypertensive disorder in future pregnancy is 1 in 5 (20%)

Chronic Hypertension:

Future pregnancy risk of gestation hypertension is 1 in 34 (3%).
Future pregnancy risk of pre-eclampsia is 1 in 50 (2%).

Gestational Hypertension:

Future pregnancy risk of gestational hypertension is 1 in 7 (approximately between 11% and 15%).
Future pregnancy risk of pre-eclampsia is 1 in 8 (approximately between 6% and 12%).

Pre-Eclampsia:

Future pregnancy risk of gestational hypertension is 1 in 14 (7%).
Future pregnancy risk of pre-eclampsia is up to 1 in 6 (16%), risk increases to 1 in 3 (33%) if you delivered between 28-34 weeks and 1 in 4 (23%) between 34-37 weeks.
No evidence was identified for women who are delivered before 28 weeks but their risk is likely to be as high as those women who gave birth between 28-34 weeks.

Gestational hypertension and pre-eclampsia:

Both are associated with an increased risk of developing high blood pressure and its complications in later life.

Women with Chronic hypertension, Gestational hypertension or Pre-eclampsia have an increased risk of Cardiovascular events, Cardiovascular mortality and Stroke compared with the background population.

Risk Reduction:

Risk of complications is reduced by a healthy lifestyle, avoiding smoking and maintaining a normal weight and taking aspirin 150mg daily as soon as pregnancy confirmed.
Risk of hypertensive disorders in future pregnancy is higher if the pregnancy interval is more than 10 years.

Specific information discussed:

Appropriate information leaflet provided: (Please document all information leaflets given to the mother)

Pre-printed GP letter completed	YES □	NO □	Letter photocopied	YES □	NO □
One copy sent to the GP	YES □	NO □	One copy retained in the case notes	YES □	NO □

Completed by: NAME ----------

SIGNATURE---------- GRADE----------

Discussion conducted by the doctor who performed (or was present at) the delivery? YES □ NO □

Date completed ---------- Time----------

Top Copy for case notes **Second Copy to GP** **Third Copy to Patient**

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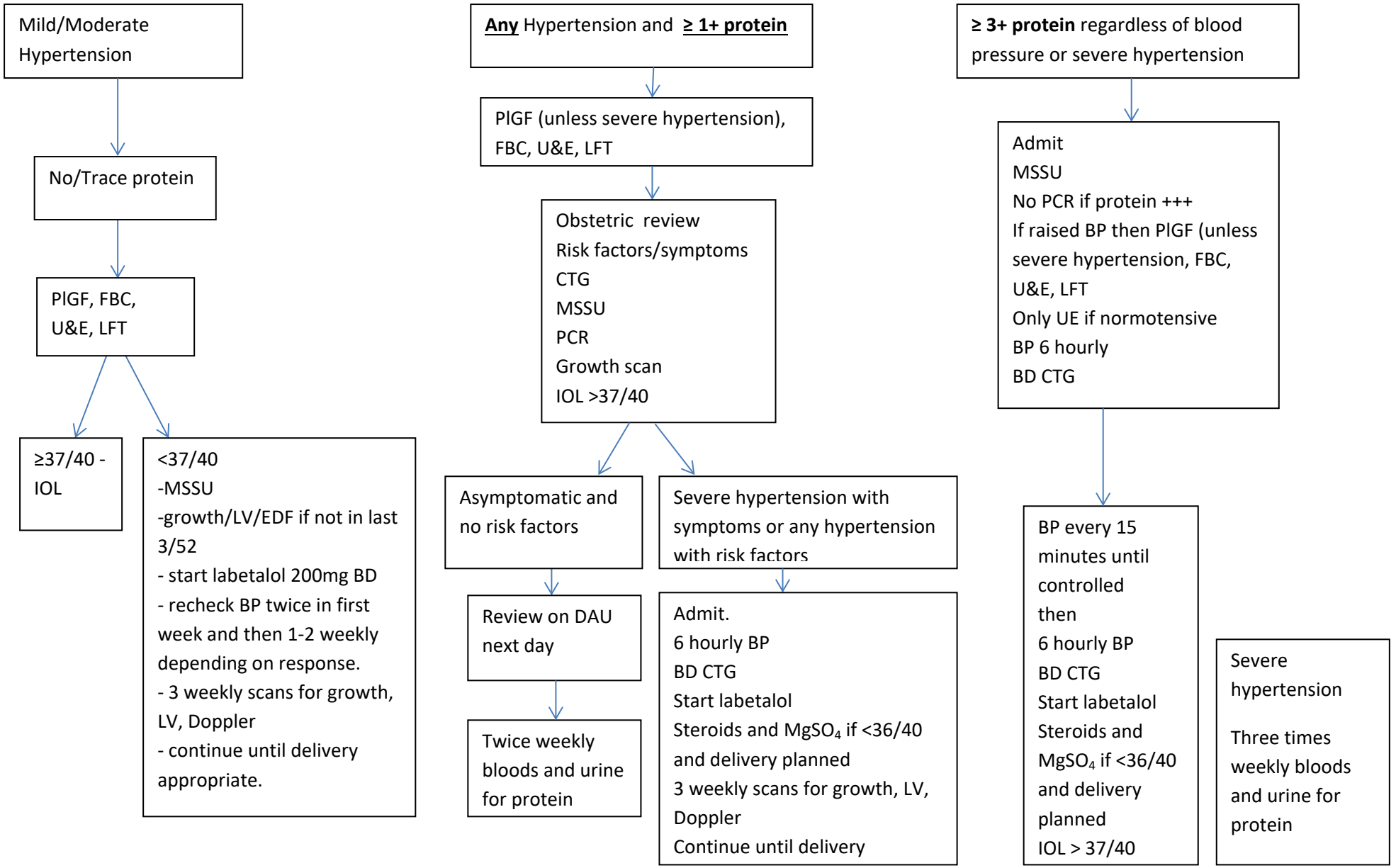
Management of hypertension in pregnancy

Based on tables in NICE guideline (2019)

	Chronic hypertension	Gestational hypertension		Preeclampsia	
		Mild/moderate BP 140/90 – 159/109	**Severe BP ≥ 160/110**	**Mild/moderate BP 140/90 – 159/109**	**Severe BP ≥ 160/110**
PlGF test	Consider if ≥140/90	Yes	No	Yes	No
Admission to hospital	No	Depends on PlGF test result (see PlGF pathway)	Admit until BP <160/110	Depends on PlGF test result or if any clinical concerns for mother or baby	Admit until BP <160/110
Antihypertensives	Treat if BP>140/90	Treat if BP>140/90	Treat all	Treat if BP>140/90	Treat all
Target BP	≤135/85	≤135/85	≤135/85	≤135/85	≤135/85
BP checks	1-4 weekly dependent on BP	1-2 times a week until BP ≤135/80	Every 15-30 minutes until BP<160/110	Every 48 hours. 4 x daily if admitted	Every 15-30 minutes until BP<160/110 Then 4 x daily whilst in-patient
Proteinuria testing	With BP checks	With BP checks	Daily	Only if new symptoms or signs	Only if new symptoms or signs
Blood tests **FBC, LFT, U&E**	None	1 x / week	1 x / week	2 x / week	3 x / week

	Chronic hypertension	Gestational hypertension		Preeclampsia	
		Mild/moderate BP 140/90 – 159/109	**Severe BP ≥ 160/110**	**Mild/moderate BP 140/90 – 159/109**	**Severe BP ≥ 160/110**
Fetal assessment					
• **FH auscultation**	• every AN appointment	• every AN appointment	• every AN appointment	• every AN appointment	• every AN appointment
• **Growth scans, LV and Doppler**	• 4 weekly	• 3 weekly	• 2 weekly	• 2 weekly	• 2 weekly
• **CTG**	• only if indicated for other reasons	• only if indicated for other reasons	• at diagnosis and then only if indicated for other reasons	• at diagnosis and then only if indicated for other reasons	• at diagnosis and then only if indicated for other reasons
Timing birth	After 37 weeks	After 37 weeks	As indicated depending on BP	Around 37 weeks or earlier if clinically indicated e.g. • failure to control BP • Deterioration in blood tests • Neurological symptoms • Abnormal CTG • Reversed EDV	Around 37 weeks or earlier if clinically indicated e.g. • failure to control BP • Deterioration in blood tests • Neurological symptoms • Abnormal CTG • Reversed EDV

Postnatal					
	Chronic hypertension	**Gestational hypertension**		**Preeclampsia**	
		Mild/moderate BP 140/90 – 159/109	**Severe BP ≥ 160/110**	**Mild/moderate BP 140/90 – 159/109**	**Severe BP ≥ 160/110**
BP monitoring	Daily for 2 days Once between Days 3-5	Daily for 2 days Once between Days 3-5	Daily for 2 days Once between Days 3-5	At least 4 x / day as in patient At least once between Days 3-5 Then alternate days until BP normal	At least 4 x / day as in patient until BP< 150/100 Then alternate days until BP normal and off treatment
Target BP on medication	< 140/90	< 140/90	< 140/90	140/90	140/90
Reduce medication	< 130/80	< 130/80	< 130/80	< 130/80	< 130/80
Introduce medication	≥ 150/100	≥ 150/100	≥ 150/100	≥ 150/100	≥ 150/100
Review	2 weeks 6-8 weeks	2 weeks 6-8 weeks	2 weeks 6-8 weeks	2 weeks 6-8 weeks	2 weeks 6-8 weeks


Mild/Moderate Hypertension
No/Trace protein
PlGF, FBC, U&E, LFT
≥37/40 - IOL
<37/40
-MSSU
-growth/LV/EDF if not in last 3/52
- start labetalol 200mg BD
- recheck BP twice in first week and then 1-2 weekly depending on response.
- 3 weekly scans for growth, LV, Doppler
- continue until delivery appropriate.
Any Hypertension and ≥ 1+ protein
PlGF (unless severe hypertension), FBC, U&E, LFT
Obstetric review
Risk factors/symptoms
CTG
MSSU
PCR
Growth scan
IOL >37/40
Asymptomatic and no risk factors
Review on DAU next day
Twice weekly bloods and urine for protein
Severe hypertension with symptoms or any hypertension with risk factors
Admit.
6 hourly BP
BD CTG
Start labetalol
Steroids and MgSO4 if <36/40 and delivery planned
3 weekly scans for growth, LV, Doppler
Continue until delivery
≥ 3+ protein regardless of blood pressure or severe hypertension
Admit
MSSU
No PCR if protein +++
If raised BP then PlGF (unless severe hypertension, FBC, U&E, LFT
Only UE if normotensive
BP 6 hourly
BD CTG
BP every 15 minutes until controlled
then
6 hourly BP
BD CTG
Start labetalol
Steroids and MgSO4 if <36/40 and delivery planned
IOL > 37/40
Severe hypertension
Three times weekly bloods and urine for protein

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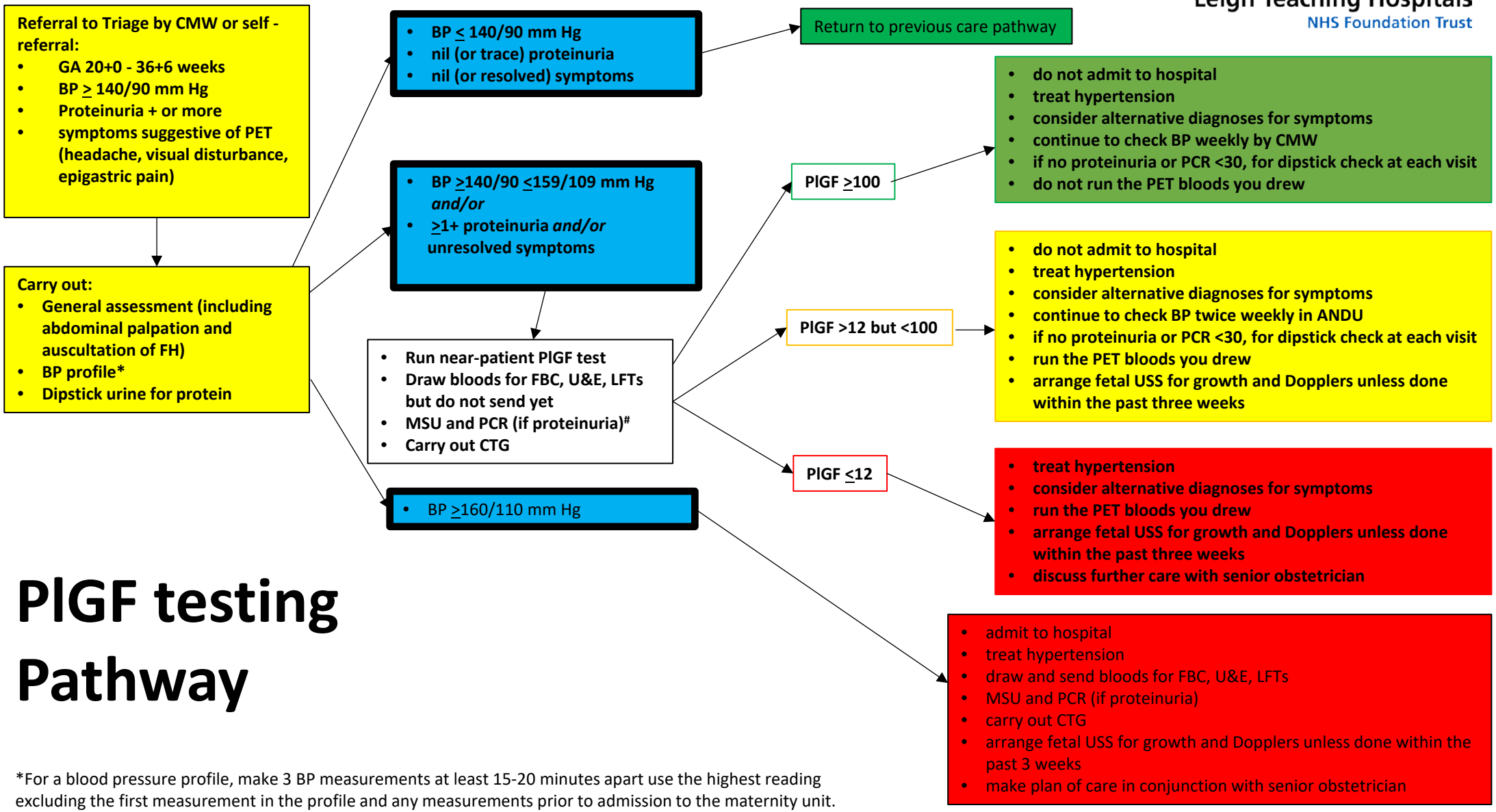
PlGF testing Pathway



*For a blood pressure profile, make 3 BP measurements at least 15-20 minutes apart use the highest reading excluding the first measurement in the profile and any measurements prior to admission to the maternity unit.
#If any PCR result is greater than 30, regard as proteinuric and do not repeat

April 2020

Management of antenatal and post-partum hypertension

Table – Safety of medication in breastfeeding

Drug	Dose	Side-effects	Monitoring in baby	Safe in breastfeeding?
Labetalol	100mg twice daily - 200mg four times daily (max 2400mg/daily)	Postural hypotension, headache, urinary hesitancy, insomnia, fatigue	Drowsiness, lethargy, pallor, poor feeding and adequate weight gain	Yes Only small amounts excreted in breastmilk
Atenolol	25-100mg daily		As above	No - Safer alternatives are preferred during breastfeeding, especially during the neonatal period and in case of prematurity. One case where cyanosis, bradycardia and hypothermia occurred in a 5-day-old infant.
Nifedipine (SR)	10-40mg twice daily	Headache, tachycardia, palpitations, flushing, constipation and peripheral oedema.	As above	Yes It has been used to decrease the pain of nipple vasospasm in breastfeeding mothers.
Amlodipine	5-10mg daily		As above	Nifedipine is the preferred Ca channel blocker in breastfeeding. Amlodipine can be used if the benefits of breastfeeding outweigh the risks. There have been no reported adverse effects in infants.
Enalapril	10 – 40mg daily	Hypotension, headache, dizziness, cough, renal impairment, changes in renal function/urine output, hyperkalaemia.	As above Premature infants and young infants under two months: oedema, hypotension and renal toxicity.	Yes Only small amounts excreted in breastmilk Active metabolite is poorly absorbed orally. Be extra cautious in pre-term infants due to renal toxicity and risk of accumulation.

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