

# ROYAL HOSPITAL FOR WOMEN

LOCAL OPERATING PROCEDURE

## CLINICAL POLICIES, PROCEDURES & GUIDELINES

Approved by Quality & Patient Safety Committee  
19 September 2013

### HYPERTENSION – MANAGEMENT IN PREGNANCY

*This LOP is developed to guide clinical practice at the Royal Hospital for Women. Individual patient circumstances may mean that practice diverges from this LOP.*

#### 1. AIM

- Diagnosis and management of chronic hypertension in pregnancy, gestational hypertension and pre-eclampsia

#### 2. PATIENT

- Woman with chronic hypertension or already on anti-hypertensive medications: Blood pressure (BP)  $\geq 140/90$  prior to 20 weeks gestation
- Woman with gestational hypertension: de novo BP  $\geq 140/90$  after 20 weeks gestation, with no other features of pre-eclampsia where BP returns to normal within 3 months post-partum
- Woman with pre-eclampsia: de novo BP  $\geq 140/90$  after 20 weeks gestation accompanied by one or more of the following:
  - Renal involvement : significant proteinuria – (spot urine protein/creatinine ratio  $\geq 30\text{mg}/\text{mmol}$ ); creatinine  $> 90 \mu\text{mol}/\text{L}$  or oliguria
  - Haematological involvement: thrombocytopenia; haemolysis; disseminated intravascular coagulation
  - Liver involvement: raised transaminases; severe epigastric pain
  - Neurological involvement : eclampsia; hyperreflexia with sustained clonus ; persistent visual disturbances; severe headache; stroke
  - Pulmonary oedema
  - Fetal growth restriction
  - Placental abruption<sup>1</sup>

#### 3. STAFF

- Registered Midwives
- Student Midwives
- Medical Staff

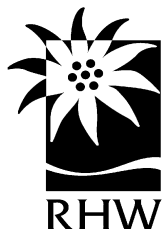
#### 4. EQUIPMENT

- Mercury Sphygmomanometer (If upper arm  $>33\text{cm}$  circumference use large cuff)
- Urinalysis dipsticks

#### 5. CLINICAL PRACTICE

##### Antenatal

- Ascertain medical history at booking visit
- Refer woman for joint physician and obstetric care in the Medical Complications of Pregnancy clinic for consideration of Aspirin and Calcium if:
  - chronic hypertension
  - history of severe or early onset pre-eclampsia (less than 34 weeks)
  - underlying disease (renal, autoimmune etc)
- Refer woman for obstetric consultation if history of pre-eclampsia in previous pregnancy at  $\geq 34$  weeks gestation

**HYPERTENSION – MANAGEMENT IN PREGNANCY cont'd**

- Prescribe appropriate anti-hypertensive medications for pregnancy: ACE inhibitors and diuretics should be ceased as soon as possible and blood pressure (BP) observed and/or a medication suitable for pregnancy prescribed (table 2)
- Measure blood pressure in all pregnant women at each antenatal visit using appropriate sized cuff
- Commence antihypertensive treatment if systolic blood pressure (SBP)  $\geq 160$  or diastolic blood pressure (DBP)  $\geq 100$  mm Hg
- Admit woman and treat SBP  $\geq 170$  mmHg or DBP  $\geq 110$  urgently since these women are at risk of cerebral haemorrhage (see protocol for IV hydralazine)

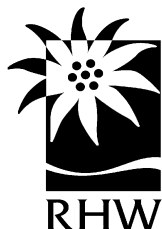
**Assessment**

- Assess any woman presenting with new hypertension ( $\geq 140/90$  mm Hg) after 20 weeks gestation for signs and symptoms of pre-eclampsia
- Perform the following maternal investigations:
  - Urine dipstick analysis for proteinuria, request spot protein/creatinine ratio if  $\geq 1+$  (30mg/dl)
  - Full blood count (FBC)
  - Urea, creatinine, electrolytes
  - Liver function tests
- Perform coagulation studies, blood film, lactate dehydrogenase (LDH), fibrinogen, only if severe thrombocytopenia, falling haemoglobin or disseminated intravascular coagulation (DIC) is suspected
- Perform the following fetal assessment (see Table 1) :
  - Ultrasound assessment of fetal growth, amniotic fluid volume and umbilical artery blood flow
  - Cardiotocograph (CTG) if  $\geq 26$  weeks and reduced fetal movements, commencement of anti-hypertensive therapy, pre-eclampsia or clinical concern

**Management**

- Refer woman with gestational hypertension or pre-eclampsia to obstetric team
- Admit woman with new diagnosis or deteriorating pre-eclampsia. Assess other women via day assessment unit
- Prescribe anti-hypertensive medication according to clinical need (see table 2): Labetalol is often used as a first line drug in the absence of contraindications such as asthma where Methyldopa is commonly prescribed
- Administer medications in a staggered fashion i.e. 0600,1400, 2200 and 0800,1600, 2400 if two different drugs are prescribed 8<sup>th</sup> hourly
- Administer regular medication one hour earlier than charted if BP is outside recommended parameters; PRN medication may be given one hour after administering regular medication if persistent hypertension. Recheck BP in one hour
- Do not administer regular and PRN antihypertensive medication simultaneously as this may lead to precipitous drops in BP, unless specifically requested by a doctor

**Exception:** at the commencement of treatment, first dose of labetalol or methyldopa may be prescribed with a short acting agent such as hydralazine (oral or IV).



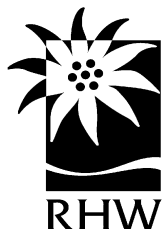
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**HYPERTENSION – MANAGEMENT IN PREGNANCY cont'd**

- Consider eclampsia prophylaxis with Magnesium Sulphate in woman with severe pre-eclampsia
- Prescribe Betamethasone 11.4mg IMI twice, 24 hours apart for fetal lung maturation if pre-eclampsia presents before 34 weeks gestation. Consider steroids if Caesarean section delivery is planned prior to 39 weeks gestation<sup>2</sup>
- Educate woman as to signs and symptoms of pre-eclampsia and provide the Pre-eclampsia Patient Leaflet (Appendix 1)
- Consult anaesthetist for woman with severe pre-eclampsia and all women with thrombocytopenia
- Assess ongoing clinical symptoms and signs as in- or out-patient and by regular blood and urine tests as indicated (Table 1)
- Consult Neonatologist and consider consultation with obstetric physician for woman with pre-term pre-eclampsia
- Determine and document clear criteria for delivery for woman with pre-eclampsia
- Recommend delivery to woman with pre-eclampsia at  $\geq 37$  weeks gestation since there is no maternal or neonatal benefit in prolonging gestation<sup>3</sup>
- Recommend delivery to woman with uncomplicated chronic hypertension at 39 weeks gestation since the risks of stillbirth increases substantially in ongoing pregnancies<sup>4</sup>
- Arrange consultation with consultant obstetrician after 37 weeks for woman with gestational hypertension to discuss indications for delivery

**TABLE 1: ANTENATAL MANAGEMENT OF HYPERTENSION**

DIAGNOSIS	MODALITY	FREQUENCY
<b>Chronic hypertension</b>	Urinalysis	Each visit
	Pre-eclampsia bloods	Sudden increase in BP or new proteinuria
	Ultrasound for fetal growth, Amniotic Fluid Index (AFI) and Umbilical Artery Doppler	Every 4 <sup>th</sup> week from 28 weeks
<b>Gestational Hypertension</b>	Urinalysis	Weekly
	Pre-eclampsia bloods	Weekly
	Ultrasound for fetal growth, AFI and Umbilical Artery Doppler	At diagnosis, then every 4 <sup>th</sup> week
<b>Pre-eclampsia</b>	Urinalysis	At diagnosis, then if non-proteinuric repeat daily if inpatient, or twice weekly if outpatient
	Pre-eclampsia bloods	Twice weekly, more frequently if unstable
	Ultrasound for fetal growth, AFI and Umbilical Artery Doppler	At diagnosis then every 2 weeks unless abnormal ultrasound
	CTG	Twice weekly



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**HYPERTENSION – MANAGEMENT IN PREGNANCY cont'd**

**Postpartum**

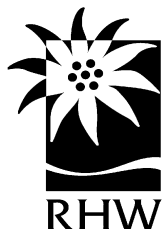
- Admit woman with severe pre-eclampsia to the acute care ward for the first 24 hours post-delivery. These women may initially have worsening oedema, thrombocytopaenia, liver and renal function and hypertension
- Wean anti-hypertensive agents when BP consistently <130/80mmHg
- Prescribe an alternative medication for woman taking Methyl Dopa within 48 hours of delivery
- Arrange a consultation >6 weeks post birth with Medical Complication in Pregnancy Clinic for woman with early onset pre-eclampsia (≤34 weeks gestation) for anti-phospholipid antibody syndrome and systemic lupus erythematosus investigations
- Reassure woman taking the following anti hypertensive medications that there are no known adverse effects on babies receiving breast milk; Labetalol, Nifedipine, Enalapril, Captopril, Atenolol, Metoprolol. There is insufficient data on the following drugs ; Angiotensin II Receptor Blockers (ARBs), Amlodipine, Angiotensin Converting Enzyme (ACE) inhibitors other than enalapril and captopril
- Advise woman regarding long term health implications of pre-eclampsia and the importance of annual blood pressure checks and assessment for cardiovascular risks

**6. DOCUMENTATION**

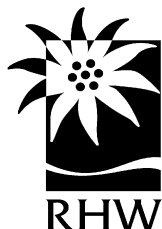
- Antenatal care record
- ObstetriX
- Integrated clinical notes
- Medication card
- Observation chart

**TABLE 2: ANTI-HYPERTENSIVE DRUGS IN PREGNANCY**

Drug	Dose	Action	Contraindications	Practice points
Methyl dopa	250-750mg tds	Central	Depression	Slow onset of action over 24 hour. Dry mouth, sedation, depression, blurred vision.
Clonidine	75-300µg tds			Withdrawal effect with clonidine
Labetalol	100-400mg tds	β blocker with mild alpha vasodilator effect	Asthma, chronic airways limitation	Bradycardia, bronchospasm, headache, nausea, scalp tingling which usually resolves within 24-48hours (labetalol only)
Oxprenolol	20-160mg tds	β blocker with ISA	Heart block	
Nifedipine	20mg bd - 60mg SR bd	Ca channel antagonist	Aortic stenosis	Severe headache associated with flushing, tachycardia  Peripheral edema, constipation
Prazosin	0.5-5mg tds	α blocker		First dose effect-orthostatic hypotension
Hydralazine	25-50 mg tds	Vasodilator		Flushing, headache, nausea, lupus-like syndrome

**HYPERTENSION – MANAGEMENT IN PREGNANCY cont'd****7. EDUCATIONAL NOTES**

- Hypertension in pregnancy is defined as: SBP $\geq$  140 mmHg and/or DBP $\geq$  90 mmHg (Korotkoff 5). These measurements should be confirmed by repeated readings over several hours
- Screening for pre-eclampsia in low risk women has not been validated and should be considered a research tool
- Women who are considered high risk for pre-eclampsia may benefit from Aspirin and possibly Calcium prophylaxis.
- In a Cochrane review of 13 studies of good quality (involving 15,730 women), there was a reduction in the average risk of pre-eclampsia associated with calcium supplementation (13 trials, 15,730 women: RR 0.45, 95% CI 0.31 to 0.65). The effect was greatest for women with low baseline calcium intake (eight trials, 10,678 women: RR 0.36, 95% CI 0.20 to 0.65) and those selected as being at high risk (five trials, 587 women: RR 0.22, 95% CI 0.12 to 0.42).
- In a Cochrane review of antiplatelet agents (largely low dose aspirin) for treating pre-eclampsia, fifty-nine trials (37,560 women) were included. There was a 17% reduction in the risk of pre-eclampsia associated with the use of antiplatelet agents ((46 trials, 32,891 women, relative risk (RR) 0.83, 95% confidence interval (CI) 0.77 to 0.89), number needed to treat (NNT) 72 (52, 119)). Although there is no statistical difference in RR based on maternal risk, there is a significant increase in the absolute risk reduction of pre-eclampsia for high risk (risk difference (RD) -5.2% (-7.5, -2.9), NNT 19 (13, 34)) compared with moderate risk women (RD -0.84 (-1.37, -0.3), NNT 119 (73, 333)).
- Raised blood pressure is commonly but not always the first manifestation of pre-eclampsia
- The earlier in pregnancy the diagnosis of gestational hypertension, the more likely it is to progress to pre-eclampsia.
- Oedema is not included in the diagnostic features of pre-eclampsia. It is a common feature of normal pregnancy and severe pre-eclampsia may be present in the absence of any oedema. Nevertheless, rapid development of generalised oedema should alert the clinician to screen for pre-eclampsia. Be wary of pulmonary oedema
- Dipstick testing for proteinuria is a screening test with very high false positive and negative rates. If in doubt perform urine protein/creatinine ratio. The presence of urinary tract infection should also be excluded
- Bed rest for pre-eclampsia has no significant maternal or fetal benefit. However, admission to hospital allows close supervision of both mother and fetus as progress of the disorder is unpredictable. Outpatient monitoring may be appropriate in milder cases after a period of initial observation
- Adverse fetal outcome rises with diastolic blood pressures above 90 mmHg and systolic blood pressure  $>140$ mmHg<sup>5</sup>
- 25-30% of women managed expectantly with early onset pre-eclampsia will develop severe morbidity including Haemolysis Elevated Liver Function and Low Platelet Level (HELLP) syndrome, abruption, pulmonary oedema and eclampsia<sup>1</sup>
- The Hypertension Pre-eclampsia Intervention Trial at Term (HYPITAT) trial<sup>3</sup> compared immediate induction of labour (IOL) vs expectant management for women with mild pre-eclampsia or gestational hypertension from 36 weeks onwards. There was NO maternal or neonatal benefit to expectant management, indeed, the CS rate was non-significantly higher in the expectant management group. 44% of the expectant management group had a poor maternal outcome vs. 31% of the women allocated immediate IOL (p<0.0001)

**HYPERTENSION – MANAGEMENT IN PREGNANCY cont'd****Rare disorders and Pre-eclampsia**

- Other rare disorders may present with some of the features of pre-eclampsia: acute fatty liver of pregnancy, haemolytic uremic syndrome, thrombotic thrombocytopenic purpura or exacerbation of systemic lupus erythematosus
- Pre-eclampsia presenting before 20 weeks gestation usually indicates a predisposing factor such as : hydatidiform mole, multiple pregnancy, fetal triploidy, severe renal disease or antiphospholipid antibody syndrome
- Although a very rare disorder, undiagnosed pheochromocytoma in pregnancy is potentially fatal and may present as pre-eclampsia. Measure fasting plasma free metanephrines/normetanephrines or 24 hour urinary catecholamines in the presence of very labile/severe hypertension

**Recurrence of pre-eclampsia and long-term health implications**

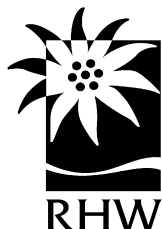
- Women with early onset ( $\leq 32$  weeks gestation) have the highest incidence of recurrence of pre-eclampsia in a future pregnancy, approximately 25%
- Women with later onset pre-eclampsia have an approximate 15% recurrence risk
- For future pregnancies: recommend pre-pregnancy or early pregnancy assessment re prophylactic treatment (aspirin and calcium)
- Women who have had pre-eclampsia or gestational hypertension are at higher risk of cardiovascular disease, stroke and venous thromboembolism in later life. They should have annual blood pressure checks and assessment for vascular risk factors

**8. RELATED POLICIES / PROCEDURES / CLINICAL PRACTICE LOP**

- Blood Pressure Measurement on a Pregnant Woman
- Eclampsia – Management of
- Eclampsia Prophylaxis with Magnesium Sulphate
- Hydralazine – Administration of IV Hydralazine to Antenatal Patients
- Hypertension (severe and/or urgent) in Pregnancy
- Labetalol – Intravenous Administration
- Magnesium Sulphate – Medications
- Pre-eclampsia – intrapartum care
- Corticosteroids for women at risk of preterm birth
- Postpartum haemorrhage prevention

**9. REFERENCES**

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- 2 Stutchfield P, Whitaker R, Russell I. Antenatal Steroids for Term Elective Caesarean Section (ASTECS) Research Team. Antenatal betamethasone and incidence of neonatal respiratory distress after elective caesarean section: pragmatic randomised trial. BMJ 2005 Sep 24;331(7518):662



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**HYPERTENSION – MANAGEMENT IN PREGNANCY cont'd**

- 3 Induction of labour versus expectant monitoring for gestational hypertension or mild pre-eclampsia after 36 weeks gestation (HYPITAT): a multicentre, open-label randomised controlled trial. Koopmans C.M et al *Lancet* 2009;374:979-88
- 4 Optimal timing of delivery in pregnancies with pre-existing hypertension. Hutcheon J A et al *BJOG* 2011;118:49-54
- 5 MacGillivray I. Pre-eclampsia. The hypertensive diseases of pregnancy. London: WB Saunders; 1983. p. 174-90
- 6 Smith GCS (2012) Researching New Methods of Screening for Adverse Pregnancy Outcome: Lessons from Pre-eclampsia. *PLoS Med* 9(7): e1001274
- 7 Hofmeyr GJ, Lawrie TA, Atallah AN, Duley L. Calcium supplementation during pregnancy for preventing hypertensive disorders and related problems. *Cochrane Database of Systematic Reviews* 2010, Issue 8. Art. No.: CD001059. DOI: 10.1002/14651858.CD001059.pub3.
- 8 Duley L, Henderson-Smart DJ, Meher S, King JF. Antiplatelet agents for preventing pre-eclampsia and its complications. *Cochrane Database of Systematic Reviews* 2007, Issue 2. Art. No.: CD004659. DOI: 10.1002/14651858.CD004659.pub2.

**Appendix**

- 1 Pre-eclampsia Patients Leaflet

**REVISION & APPROVAL HISTORY**

Reviewed and endorsed Maternity Services LOPs group 10/9/13  
Approved Quality & Patient Safety Committee 19/5/11  
Obstetric Clinical Guidelines Group April 2011

## APPENDIX 1

### **My blood pressure was high at my check up today. Does that mean I have pre-eclampsia?**

Not necessarily, but it does mean you need to have some tests to find out that you and your baby are OK. Sometimes women have one or two high blood pressure readings and never have a problem again. Pre-eclampsia is the most common cause of high blood pressure in pregnancy, but there are many other reasons that you may develop high blood pressure. If you had high blood pressure before the pregnancy there is an increased chance that you may develop pre-eclampsia.

### **What tests will I have?**

To start off with, you will need to have a series of blood pressure readings over a period of time. You will also have some blood tests to check that your kidneys, liver and blood clotting are normal, as these can be affected by pre-eclampsia. Minor changes, although not affecting your health, can confirm the diagnosis and be used to monitor the disorder. Testing your urine for protein is also helpful in monitoring your kidney function and you will be asked to test this more often. Regular weight checks can be used to keep a watch on any swelling due to pre-eclampsia, however some swelling is very common in pregnancy especially in the hands and feet and does not signify a problem.

As pre-eclampsia can sometimes (but not always) affect the growth of your baby it is also important that we assess your baby's wellbeing. One of the simplest ways to do this is for you to keep a record of your baby's movements. Another way is with a Cardio-Tocograph (CTG) which is a tracing of your baby's heartbeat.

Ultrasound will also be used to monitor your baby's growth and wellbeing.

### **But I don't feel sick.**

Very often women with pre-eclampsia have no symptoms and feel quite well. Sometimes, however, you may experience headaches, visual disturbances such as blurred vision or seeing spots or stars, deep pain in the upper

abdominal area which is different from heartburn, or just feel generally unwell. You should tell your midwife or doctor about any of these things.

### **What happens now?**

Your continued care focuses on close observation of you and your baby, either in hospital, day stay or clinic. If everything else is stable but your blood pressure is high you may be given medication to control this, however there is no treatment for pre-eclampsia other than delivering the baby. Whilst in the past women were often confined to bed rest this is now known to be of no benefit. Pre-eclampsia tends to get worse as the pregnancy progresses, either gradually or sometimes suddenly. Early delivery of the baby is common.

### **How will my baby be born?**

Most commonly you will still be able to have a vaginal birth, although your labour may be induced. Whilst caesarean birth is always a possibility, it is usually only necessary when pre-eclampsia is very severe or early.

### **What happens after my baby is born?**

Pre-eclampsia is a problem of pregnancy and goes away afterwards. Usually everything gets back to normal quite quickly, but sometimes in the first day or two symptoms persist before you get better. Sometimes your blood pressure can take a few weeks to settle down and your doctor may decrease your medication slowly after you have gone home.

### **What about my next pregnancy?**

While you have more chance of having pre-eclampsia again than someone who has not had it, it may not happen again. Please inform the midwife or doctor caring for you in your next pregnancy that you developed pre-eclampsia previously and they will discuss care with you.



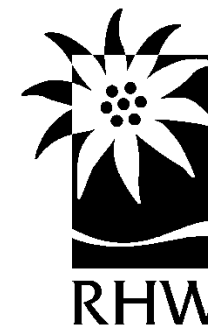
### **Symptoms of worsening pre-eclampsia:**

If these symptoms occur, please notify the hospital or your doctor immediately.

- Persistent headache
- Blurred vision or “spots”, “stars” or “zig zags” that last for more than a few minutes
- Deep pain in the upper abdominal area
- Reduced urine output
- Reduced fetal movements
- Pain or constant tightness of your uterus
- Vaginal bleeding
- Feeling generally unwell

### **Phone numbers:**

Royal Hospital for Women	9382 6111
Pregnancy Day Stay	9382 6417
Antenatal Ward	9382 6449
Delivery Suite	9382 6100 (24 hours)



## **Pre-eclampsia**

### **What is pre-eclampsia?**

Pre-eclampsia is a common complication of pregnancy. The disorder has been known by various names over the years, including Toxemia and Pregnancy Induced Hypertension (PIH). These are all the same disorder but pre-eclampsia is now considered the most appropriate name. Most commonly pre-eclampsia is first picked up by an increase in blood pressure, but it is a complex disorder which may affect your kidneys, liver and/or blood clotting or your baby's growth. It can be quite a mild problem or a very serious one. About 1 in 10 women having their first baby will need to come into hospital (either just for half a day or for much longer) for tests for pre-eclampsia at some stage in their pregnancy. Pre-eclampsia may occur in any pregnancy. It occurs in the second half of the pregnancy.