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Facilitated by: Eleanor Martin, Educator	Last reviewed: February 2016
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## Hypertensive Disorders including Pre Eclampsia Policy

Hutt Maternity Policies provide guidance for the midwives and medical staff working in Hutt Maternity Services. Please discuss policies relevant to your care with your Lead Maternity Carer.

### **Purpose**

The purpose of this guideline is to:

- Establish a local approach to care that is evidence based and consistent
- Inform good decision making
- Provide safe and effective care for women and their babies experiencing this condition

### **Scope**

- Maternity Staff employed by Hutt Valley DHB
- Hutt Valley DHB maternity access agreement holders.
- Anaesthetic staff
- Neonatal staff

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*This Guideline is based on:*

Lowe, S.A., Bowyer, L., Lust, K., McMahon, M.R., North, R.A., Paech, M. & Said, J.M. (2014). The Society of Obstetric Medicine of Australia and New Zealand (SO-MANZ) Guideline for the Management of Hypertensive Disorders of Pregnancy. Retrieved from <http://www.somanz.org/>

### **Definition of hypertension in pregnancy**

Systolic blood pressure  $\geq 140$  mmHg and/or Diastolic blood pressure  $\geq 90$  mmHg (Korotkoff 5)

These measurements should be confirmed by 2-3 readings over 20-30 minutes.

### **Severe hypertension in pregnancy**

Severe hypertension requiring urgent treatment is defined as a systolic blood pressure  $\geq 170$  mmHg with or without diastolic blood pressure  $\geq 110$  mmHg.

### **Informed Consent**

The right of a consumer to make an informed choice and give informed consent, including the right to refuse medical treatment, is enshrined in law and in the Code of Health and Disability Consumers' Rights in New Zealand. This means that a woman can choose to decline treatment, referral to another practitioner, or transfer of clinical responsibility. If this occurs follow the process map on page 18 of the Referral Guidelines (Ministry of Health, 2012).

### **Classification of hypertensive disorders in pregnancy**

**The classification is as follows:**

- Preeclampsia – eclampsia
- Gestational hypertension
- Chronic hypertension
- Essential
- Secondary
- White coat
- Preeclampsia superimposed on chronic hypertension

### **Preeclampsia**

Is a multi-system disorder characterized by hypertension and involvement of one or more other organ systems and/or the baby.

A diagnosis of preeclampsia can be made when hypertension arises after **20 weeks gestation and is accompanied by one or more of the following**

- **Renal involvement**  
Significant proteinuria –a spot urine protein/creatinine ratio  $\geq 30$ mg/mmol  
Serum or plasma creatinine  $> 80-90$   $\mu$ mol/L  
Oliguria:  $<80$ mL/4 hr.
- **Haematological involvement**  
Thrombocytopenia  $<100 \times 10^9/L$  (request a manual count from the lab)

Haemolysis: schistocytes or red cell fragments on blood film, raised bilirubin, raised lactate dehydrogenase >600mIU/L, decreased haptoglobin  
Disseminated intravascular APTT  $\geq 1.5$  X normal, INR  $\geq 1.5$ , Fibrinogen <2.0 g/L.

- **Liver involvement**  
Raised serum transaminases ALT and AST >30U/L.  
Severe epigastric and/or right upper quadrant pain
- **Neurological involvement**  
Convulsions (eclampsia)  
Hyperreflexia with sustained clonus  
Persistent, new headache  
Persistent visual disturbances  
Stroke
- **Pulmonary oedema**
- **Fetal growth restriction (FGR)**

### **Gestational Hypertension**

New onset of hypertension > 20/40.

May or may not develop preeclampsia i.e. no other systems involved as per pre eclampsia

### **Chronic Hypertension**

This includes essential hypertension and hypertension secondary to other medical conditions.

Essential hypertension is blood pressure >140/90 mmHg confirmed before pregnancy or before 20 /40.

*Secondary* causes of chronic hypertension in pregnancy include:

- Chronic kidney disease e.g. glomerulonephritis, reflux nephropathy, and adult polycystic kidney disease.
- Renal artery stenosis
- Systemic disease with renal involvement e.g. diabetes mellitus, systemic lupus erythaematosus.
- Endocrine disorders e.g. phaeochromocytoma, Cushing's syndrome and primary hyperaldosteronism.
- Coarctation of the aorta.

Investigations for chronic hypertension may be warranted.

### **Preeclampsia superimposed on chronic hypertension**

Pre-existing hypertension is a strong risk factor for the development of preeclampsia. Superimposed preeclampsia is diagnosed when a woman with chronic hypertension develops one or more of the systemic features of preeclampsia after 20 weeks gestation.

### **Investigation of new onset hypertension after 20 weeks gestation**

*Referral Guidelines; Code 4009, Gestational hypertension, Referral Category; Consultation*

Any woman presenting with new hypertension after 20 weeks gestation should be assessed and managed in a day assessment unit. (See policy number MATY040).

Severe hypertension, headache, epigastric pain, oliguria or nausea and vomiting are signs which should lead to urgent admission to birthing suite for management, as should any concern about fetal wellbeing.

The following investigations are recommended.

- Spot urine PCR. Once PCR in pre-eclampsia range it does not need to be repeated
- Full blood count (Hb and Platelets)
- Creatinine, electrolytes, urate
- Liver function tests ALT and AST
- Consider INR, APTT, Fibrinogen if platelets  $\leq 100$ .
- Ultrasound assessment of fetal growth, amniotic fluid volume, UAPI and MCAPI (middle cerebral artery pulsatility index) in order to calculate CPR (Cerebro- placental ratio). Plot on GROW chart.

### **Ongoing investigation of women with hypertension in pregnancy**

Clear plan of care should be documented and updated in the woman's clinical records, by secondary care.

Each assessment should involve a systematic review the woman's symptoms, examination, laboratory investigations and foetal wellbeing. (See Ante natal day Case Monitoring policy No. Maty040).

Further laboratory assessment of women with hypertension in pregnancy should be based on the following recommendations:

**Table 1: Ongoing investigation of women and baby with hypertension in pregnancy**

	<b>Modality</b>	<b>Frequency</b>	<b>Foetal Surveillance</b>
Chronic Hypertension	Assess for proteinuria, baseline PCR Preeclampsia bloods	Each visit If sudden increase in BP or new proteinuria or onset of symptoms	Uterine artery Doppler 20-22 weeks Scans at 28 and 34 weeks or when change in clinical picture. If uterine artery Doppler is abnormal rescan more frequently
Gestational hypertension	Assess for proteinuria baseline PCR Preeclampsia bloods	1-2x/week At diagnosis and if symptomatic, change in BP	Scan at diagnosis, 28 and 3-4 weeks
Preeclampsia	Assess for proteinuria by PCR Preeclampsia bloods. If non proteinuric preeclampsia daily urine dip and if + protein send urine for PCR	At time of diagnosis: Twice weekly or more frequent if unstable	2 weekly scans AFI and dopplers and Cerobroplacental ratio, MCAPI depending on gestation.

**Management of preeclampsia and gestational hypertension**

Pre eclampsia is a progressive disorder and birth is the definitive management.

*Referral Guidelines Code 4022 Referral Category Transfer*

**Timing of birth**

Timing of birth is dependent upon the severity of the maternal disease and the gestation at which the preeclampsia or gestational hypertension presents.

**Table 2. Timing of birth and gestation of presentation of preeclampsia Gestation at onset**

	<b>Previabile &lt;23+6 weeks</b>	<b>24-31+6 weeks</b>	<b>32-36+6</b>	<b>37+0 onwards</b>
Birth plan	Consult with Tertiary institution: This is a SMO to SMO consultation process.	Consult and transfer to Tertiary institution: This is a SMO to SMO consultation process.	Aim to prolong pregnancy where possible. SMO decision Consult anaesthetist and Paediatrician.	Plan birth on best day in best way.

Clear “endpoints” for birth defined for each woman as in table below, such that the decision made for induction of labour or caesarean section is based on agreed criteria.

A consultation with anaesthetist SMO and the paediatric RMO takes place.

## Indications for Birth

Maternal	Foetal
Gestational Age $\geq$ 37/40	Placental Abruption
Inability to control hypertension	Severe foetal growth restriction
Deteriorating Platelet Count	Non –reassuring foetal status
Intravascular haemolysis	FDIU
Deteriorating liver function	
Deteriorating Renal function	
Persistent neurological Symptoms	
Persistent epigastric pain, nausea and vomiting especially with abnormal LFT'S	
Pulmonary Oedema	

### **Management of women between 24 and 32 weeks**

- Transfer of care to a tertiary provider CCDHB(if clinical circumstances allow)
- Consider Magnesium Sulphate for neuro protection if < than 30/40 (Magnesium Sulphate protocol Appendix 1).

### **Management of women 32- 34 weeks (if clinical circumstances allow)**

- Discuss woman with anaesthetist SMO and paediatric RMO
- Consider the administration of steroids and delaying birth for at least 24-48 hours.
- *In the presence of HELLP syndrome woman is admitted and birth is planned.*

### **Management of women at term**

- Consult anaesthetist SMO
- IOL or Caesarean section

### **Treatment of hypertension**

Aim for gradual and sustained drop in BP

Oral antihypertensive treatment should be commenced if BP systolic  $\geq$  160 mmHg or a diastolic  $\geq$  110mmHg because of the risk of intracerebral haemorrhage and eclampsia. Aim for BP of 140-150/90-100

Consider methyldopa or nifedipine as evidence associates labetalol with growth restriction.

Drug	Dose	Action	Contraindication	Practise Points
Methyl Dopa	Loading dose of 1 gram followed by 250 – 750 mgs QID		Depression	Slow onset of action over 24 hours, dry mouth, sedation, depression, blurred vision
Nifedipine	20mg slow release TDS or 30 mgs SR BD	Ca channel antagonist	Aortic stenosis	Severe headache in first 24 hours Flushing, tachycardia, peripheral oedema, constipation
Labetalol Oral dose	100-400mg q8h	B-Blocker with mild alpha vasodilator effect	Asthma	Bradycardia, bronchospasm, headache, nausea, scalp tingling

### **Management for Severe Hypertension/ Severe PET**

- Transfer woman to Birthing Suite.
- Obstetric SMO to attend and document plan of care (clear documentation of “end point”)
- Anaesthetist SMO and Paediatric RMO to be informed
- One on one midwifery care, this is non negotiable. If there is insufficient staffing Clinical Midwifery Manager is informed to resolve staffing.
- Document observations on MEOWS chart
- Adequate IV access obtained: preferably size 16 gauge cannula
- Send urine for Spot PCR only if first presentation
- Send blood for baseline picture
  - Full blood count (HB and Platelets): Purple tube
  - Creatinine , electrolytes, urate: Gold tube
  - Liver function tests ALT and AST: Gold tube
  - Consider INR, APTT, Fibrinogen if platelets  $\leq$  100: Blue Tube

**1. Monitor BP (frequency depends on the measurement).**

If BP  $\geq$  to 170mmHg systolic or 110mmHg diastolic treat urgently. Aim for 150/90-100.

Control BP-

Fluid Bolus (Hartmann- 250 mls) with initial rapid BP lowering medications prescribed.

IV boluses can be given till desired BP achieved

Epidural can be considered to achieve BP control for women in labour (after checking platelets).

Drug	Dose	Route	Onset of Action	Adverse Effects
Labetalol 1 <sup>st</sup> line	200mg	oral	Recheck BP after 15 mins. Oral dose may be repeated at SMO's discretion.	
Nifedipine Short acting 2 <sup>nd</sup> Line	10-20 mg tablet  Max 60-80 mgs	Oral	30-45 mins. Repeat after 45 mins	Headache flushing
Labetalol 3 <sup>rd</sup> line	10-20mgs  Repeat every 10 mins to max dose 80 mgs	IV <b>bolus</b> over 2 mins.	Maximal effect usually occurs within 5 mins after each dose. Continue until blood pressure is 150/90-100 mmhg	Bradycardia: Hypo- tension Foetal Bradycardia * Labetalol infusion can result in overdos- ing if not closely mon- itored Infusion rarely required, Consult SMO and anaesthe- tist SMO
Hydralazine 4 <sup>th</sup> line	2.5-5 mgs  Max 30 mgs	IV <b>bolus</b> repeat after 20 mins	20 mins	Flushing, headache, nausea, Hypotension/ Tachycardia

## **2. Foetal Surveillance**

Electronic foetal monitoring is continuous while the woman is in labour or is being stabilized.

## **3. Prevention of seizures and control of acute seizures**

*Eclampsia Code 4006 Referral Guidelines Referral Category Emergency.*

Magnesium sulphate has been shown in randomised trials to be the medication of choice in the prevention of convulsions.

Administration of magnesium sulphate is a two-stage process:

- Administration of a bolus dose
- Maintenance infusion (see Appendix1)

Refer to the *Eclampsia policy* (MATY053) for treatment of acute seizures.

## **4. Fluid management**

- Crystalloid fluid preferably Hartmann's Solution: maintain intravenous fluids at 80-100 mls/hr or as prescribed by the attending SMO.
- No fluid boluses unless prescribed by SMO
- Do not give diuretics unless treating pulmonary oedema.
- Insert an indwelling urinary catheter.
- Hourly output measured (20-30 mls/hr).
- Document on fluid balance record on the back of the MOWS chart

## **5. Monitor for Neurological involvement**

- Seizures (eclampsia)
- Hyperreflexia with sustained clonus
- Persistent, new headache
- Persistent visual disturbances (photopsia, scotomata, cortical blindness, posterior reversible encephalopathy syndrome, retinal vasospasm)
- Stroke
- Patellar reflexes
- Level of consciousness

## **6. on going Observations**

- Frequency of observations is determined by clinical indications. Can be as often as every 5 mins.
- Continuous O2 Saturation monitoring.
- Oxytocin is the ecboic of choice either 5 international units intravenously or 10 international units intramuscularly.
- The paediatric RMO should be present for the birth.
- The timing and type of intrapartum analgesia should be discussed with the woman in conjunction with the Obstetric SMO and anaesthetic SMO. This decision will take into account the woman's clotting status.

## 7. Postnatal Care

- High risk VTE – prescribe low molecular weight heparin if coags are normal.
- If epidural catheter in place consult with anaesthetic SMO prior to removal. Wait 2 hours from epidural removal before giving low molecular weight heparin.
- Continue recording observations on MEOWS chart.
- Routine postnatal care of the woman and baby.
- Lab tests to be repeated in the postpartum period.
- Women who report persistent severe headaches, visual changes, epigastric pain with nausea or vomiting, or respiratory symptoms need immediate assessment and potential hospital care.
- A full and open discussion can occur whenever the woman and her partner are ready – even at the six week postnatal clinic appointment.
- Medication in most cases return to pre-pregnancy anti-hypertensive regimen if compatible with breastfeeding.

In case of difficulty with controlling BP

Stop Methyldopa/Labetalol

Change to ACE inhibitor or Calcium channel blocker or Beta blocker

- ACE inhibitor (1<sup>st</sup> line)  
Enalapril 10mg BD as starting dose, maximum dose 20mg BD  
(Or could use patient's pre-pregnancy medication such as Cilazapril 2.5 to 5mg OD)
- Calcium channel blocker (2<sup>nd</sup> line)  
Nifedipine SR 20mg BD or TDS if needed for control of blood pressure  
(Watch for headache side effect and discontinue if headache occurs)
- Beta blocker (3<sup>rd</sup> line)  
Metoprolol CR 47.5mg BD or 95mg BD  
Or  
Labetalol 400mg TDS  
(Avoid Beta blocker if history of asthma)

**Blood pressure may be normal immediately post-birth but should be anticipated to rise, blood pressure will usually peak day 4 to 5 post-partum.**

Give anti-hypertensive medication routinely unless concerns re hypotension e.g. BP less than 110/70

Avoid NSAIDS (impair renal function)

Be aware-

Tramadol- can lower seizure threshold

Avoid Bendrofluazide and other diuretics- can cause dehydration and cause thirst (not ideal as first line). Usually reserve diuretics for fluid overload and heart failure.

Blood pressure should improve postpartum by 6 to 12 weeks.

Blood pressure should be monitored and antihypertensive medications weaned and stopped accordingly, unless history of chronic hypertension.

If woman had Preeclampsia, follow up should include blood pressure check, blood tests (specifically renal function) and urine test to ensure resolution of proteinuria by 6 to 12 weeks postpartum.

General Practitioner should be asked to do this if Obstetric follow up not planned

- Note medical staff can request this directly from GP by sending an Email via Concerto under “Add New Document” and “Create Note to GP”

The postnatal period is a good time to tell woman she should take prophylactic aspirin in her next pregnancy (also document in GP discharge summary).

### **Associated documents**

Guidelines for blood pressure measurement in pregnancy, labour and the postnatal period

Eclampsia policy MATY

Protocol: Administration of magnesium sulphate for prevention and treatment of eclampsia (includes the administration of calcium gluconate)

MAU Antenatal day case monitoring for women with pre-eclampsia

Intravenous hydralazine policy

Intravenous Labetalol policy

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### **Informed Consent**

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## Appendix I

### Magnesium Sulphate Protocol

#### Purpose

The purpose of this guideline is to:

- Establish a local approach to care, that is evidence based and consistent
- Inform decision making
- Provide safe and effective care for women and their babies

#### Scope

All obstetric staff employed by the Hutt Valley DHB

All midwifery staff employed by the Hutt Valley DHB

All Hutt Valley DHB maternity access agreement holders.

Anaesthetic staff

Neonatal staff

#### Indications for use of magnesium sulphate

- Women when experiencing a fulminating pre-eclampsia
- Foetal neuro-protection for babies under 30 weeks in consultation with Paediatric SMO

#### Administration of Magnesium Sulphate

The woman is assessed by the Obstetric Team. The registrar must consult with the Obstetric SMO (and paediatric SMO as appropriate) prior to the prescription of magnesium sulphate therapy.

**The obstetric SMO /RMO is present in birthing suite while the loading dose is being administered.**

#### Equipment

- 6 ampoules of Magnesium sulphate (2.47g of Magnesium sulphate in each ml, (contains 10mmol magnesium and 10mmol sulphate ions)
- 2 x 100 ml bag of 0.9% sodium chloride
- 1000 ml 0.9% sodium chloride
- 20 ml syringe
- 10 ml syringe
- Drawing up needles
- 2 intravenous giving sets
- 1 'Y' extension set leur-lock with back check valves
- Calcium gluconate (antidote for magnesium sulphate)

#### Loading Dose:

A loading dose of 4 grams is administered intravenously over 20 minutes.

Prescription

4g MgSO<sub>4</sub> in 8mls added to 100ml of 0.9% sodium chloride.

Total volume 108ml.

Administer over 20 minutes.

Procedure

In a 10cc syringe draw up 8ml of MgSO<sub>4</sub>. Add to a 100ml bag of 0.9% sodium Chloride.

Total volume = 108ml.

Administer over 20 minutes via an electronic infusion device.

Rate of 324mls/hour.

Rate checked by 2 staff members prior to commencing infusion.

Warn the woman of the burning/flushing effect she may feel. The midwife must stay with the woman while the loading dose is being administered.

### **Maternal observations during the loading dose**

- Pulse (P), Blood pressure (BP), Respirations (RR), Continuous Oxygen SaO<sub>2</sub>, reflexes.
- Frequency every 5 minutes.

### **Foetal observations**

- Continuous electronic foetal monitoring until the baby has birthed.

### **Continuous Infusion**

The loading dose is followed by a continuous infusion of 1 gram of MgSO<sub>4</sub> per hour.

### **Prescription**

8g MgSO<sub>4</sub> in 16mls added to 100ml of 0.9% sodium chloride.

Total volume = 116mls.

Administer over 8 hours via an electronic infusion device = 1g MgSO<sub>4</sub>/hour.

Procedure

In a 20cc syringe draw up 16mls MgSO<sub>4</sub>. Add to a 100ml bag of 0.9% sodium Chloride.

Total volume = 116mls

Commence a mainline infusion of 1000ml 0.9% sodium chloride at rate as directed by obstetrician. Add the Y connector with back check valve to the tubing.

Connect the MgSO<sub>4</sub> to the second arm of the Y connection.

Administer MgSO<sub>4</sub> over 8 hours via an electronic infusion device.

Rate of 14.5 mls/hour.

Rate checked by 2 staff members prior to commencing infusion.

The infusion is continued for minimum 24 hours after birth or the last seizure and then discontinued. **Note:** This will require a minimum of 3 infusions of 8g MgSO<sub>4</sub> in 100ml of 0.9% sodium chloride.

### **Maternal Observations**

Commence ¼ hourly observations of the following:

- Respirations, Pulse, Blood Pressure by a manual BP machine ,
- Patellar reflexes
- Level of consciousness,
- Oxygen saturations

Observations can change to hourly when the woman has stabilised.

Foetal Observations

Continuous electronic foetal monitoring until the baby is delivered.

Serum Magnesium levels

The above regime of Magnesium Sulphate does not require testing of blood concentration because clinical effect can be monitored by deep tendon reflex. (Steegers, E.a.P., von Dadelszen, P., et al, 2010) unless requested by medical staff. In women with renal compromise, serum magnesium monitoring is recommended (The Antenatal Magnesium Sulphate for Neuroprotection Guideline Development Panel, 2010).

- Take 1 hour after commencement of loading dose
- Repeat at regular intervals (4 hourly) while infusion is running
- Repeat urgently if the woman exhibits signs of toxicity

### **Magnesium levels and symptoms range in (mmol /litre) 2**

Normal range 0.5 – 1.1

Therapeutic range 2 – 4

Loss of patellar reflex > 5

Somnolence > 5

Respiratory depression >6

Paralysis >7

Cardiac arrest > 12

(Reference Fontaine and Sabourin, 2005).

Discontinuing the Infusion

The infusion should be maintained for at least 24 hours after the last seizure or after birth of the baby.

The administration rate may need to be reduced under the advice of the obstetric Consultant if the following effects are noted

- Decreased O<sub>2</sub> saturations
- Depressed respiration rate <12/min/
- Hypotension diastolic <80 mmHg
- Tachycardia >120/min

### **Immediate action is required in the event of Magnesium toxicity:**

Magnesium sulphate toxicity leads to

- Loss of deep tendon reflexes
- Muscle paralysis
- *Respiratory arrest*
- *Cardiac arrest*
- *Death*

Signs of toxicity include:

- Flushing of face
- Loss of patella reflexes
- Weakness
- Nausea
- Sleepiness
- Double vision
- Blurred vision

**In the event of above, stop magnesium sulphate and Call 777 and state 'maternal arrest'**

- Start basic life support
- Prepare 1 gram calcium gluconate IV (10 mls of a 10% solution) over 10 minutes to be given as directed by SMO Obstetrician
- The SMO Obstetrician / SMO Anaesthetist will make the decision for on-going management and physical transfer of mother.
- An anti-convulsant may be used at the discretion of a consultant. Caution must be used when administering such medications as they may lead to respiratory depression, aspiration and cardiac arrest especially when used in conjunction with magnesium sulphate.

## Appendix 2

### Obstetric SMO or RMO administration only

#### Hydralazine - Intravenous Administration Procedure

##### Indication:

- Emergency management of severe hypertension uncontrolled by oral antihypertensives.

##### Contraindications:

- Maternal cardiac disease, known hypersensitivity

##### Equipment

- 5 ampoules of Hydralazine - 20mgs powder in a 2ml ampoule.
- 5mls of sterile water for injection.
- 100mls of intravenous normal saline.
- 10ml syringe.
- 2 intravenous giving sets.
- 1 electronic infusion device.

##### Procedure

- Transfer to delivery suite
- Commence Electronic Fetal Monitoring
- RMO administration of a loading dose of Hydralazine
- RMO review
- If indicated, in discussion with the specialist obstetrician, repeat the loading dose and/or commence a hydralazine infusion

##### Loading Dose

A loading dose of 2.5 -5 mgs is to be administered by the RMO as a slow manual push. (NB: if there is suspected pre-eclampsia related hypovolaemia, the lower dose is recommended.)

This may be the only treatment required to control the blood pressure.

If necessary, after 10 minutes observation, the RMO, with specialist consultation may prescribe a second bolus dose of 2.5 - 5 mgs (5-10mls) which may be given via the electronic infusion device at the commencement of an infusion.

Maximum loading dose 30 mgs.

##### Preparation of loading dose (1 mg/ml)

- Inject 1ml of sterile water into a 20mg ampoule of Hydralazine.
- Draw up the mixed Hydralazine 20mgs into a 20ml syringe. Total volume 1ml.
- Dilute to 20mls by adding 19mls of normal saline.
- Concentration is now 20mgs in 20mls.
- Attach a completed 'medication added' label to the syringe.

### **Administration**

- The RMO administers the initial loading dose of 5-10mgs (5-10mls) of Hydralazine by slow intravenous injection over a period of 5 minutes to avoid a sudden decrease in blood pressure.
- Inform the woman that she may experience headache, palpitations and flushing.

### **Monitoring**

- Baseline observations TPR then 30 minutes or as clinically indicated
- BP taken on manual sphygmomanometer, repeat every 5 minutes for 20 minutes then reduce to 30 mins until stable
- Continuous electronic foetal monitoring is maintained.

### **Continuous Infusion**

- If further treatment is required a continuous Hydralazine infusion may be prescribed following consultation with the Obstetric specialist.

### **Preparation of continuous infusion**

- Withdraw 5mls of Normal saline from a 100ml bag.
- Discard the 5mls
- Dilute 100mg of Hydralazine (5 ampoules) with 5mls of sterile water for injection.
- Draw up the 100mgs (5mls) of Hydralazine and inject into the 95mls of normal saline in the bag. Total volume 100mgs in 100mls.
- The IV infusion MUST be double-checked by a senior midwife prior to being connected to the woman, with specific attention to the '5 rights'.

### **Administration of Hydralazine Infusion**

- A normal saline mainline infusion is commenced.
- Using an electronic pump, the Hydralazine infusion is connected to the side arm of the normal saline infusion.
- The infusion is then started at a rate of 5mg (5ml) per hour
- Increase the rate of the infusion by 1mg (1ml) every 15 minutes (maximum 20mgs/hour) according to the response of the blood pressure. The aim is to decrease the diastolic blood pressure to 100mmHg or less.
- If the total hourly dosage is going to exceed 20mg, consult with the registrar or consultant on further treatment options.
- When the blood pressure has stabilised, i.e. a decrease in diastolic blood pressure to 100mmHg or less, sustained for 15minutes, reduce the Hydralazine every 15 minutes by 1mg (1ml).

### **Monitoring**

- Blood pressure and pulse every 15minutes and record on MEOWS chart.
- Insert an indwelling catheter with an hourly urine bag attached.
- Strict fluid input and output is recorded on the fluid balance chart (back of MEOWS chart).
- Report any changes in the woman's condition immediately to the registrar.

- N.B. Do not use an automated device if blood pressure recordings are very high or very low as they tend to under estimate blood pressure recordings. An automated device is only recommended if the blood pressure is within normal limits.
- Ensure continuous foetal monitoring while the Hydralazine is in progress.

Once the maternal diastolic blood pressure is stabilised, i.e. <100mmHg reduce the level of monitoring following consultation with the medical team.

## Appendix 3

### Obstetric SMO or RMO administration only

#### Quick Reference

##### Intravenous Labetalol Infusion

#### Indication:

- Emergency management of severe hypertension uncontrolled by oral antihypertensives.
- Contraindications: maternal cardiac disease, known hypersensitivity

#### Risks:

- Maternal hypotension, with impaired placental blood flow, fetal compromise
- Cautious use when IUGR, severe pre-eclampsia, maternal hypovolaemia and epidural analgesia

#### Procedure

1. Transfer to Birthing suite
2. Commence Electronic Fetal Monitoring
3. Obstetric RMO administration of a Loading Dose/bolus of intravenous labetalol
4. RMO review and, if indicated, repeat the loading dose and/or commence a labetalol infusion.

### Registrar or consultant administration only

#### Labetalol Loading Dose

#### Preparation

- A 1mg / ml solution should be used
- Dilute 50 mg of intravenous labetalol (ie: 10ml from ampoule 100mg / 20mls) in 40ml of normal saline (=> 50 mg of labetalol in 50 mls = 1mg / 1ml solution).

Attach a completed medication added label to the 50 ml syringe.

#### Administration

- The RMO or SMO administers the initial loading dose of 10-20mgs of intravenous labetalol (i.e.: 10 - 20mls from prepared loading solution) by slow intravenous injection over a period of 2 minutes to avoid a sudden decrease in blood pressure. (NB: if there is suspected pre-eclampsia related hypovolaemia, the lower dose is recommended and maternal volume expansion should be considered with normal saline.)
- This may be the only treatment required to control the blood pressure. The aim is to maintain a BP of 150/100 mmHg.
- If necessary, after 10 minutes observation, the SMO or RMO may administer another one or two bolus dose of 10-20mgs (10-20mls of leading dose solution). Max 80mgs

## **Monitoring**

- Initial blood pressure, then repeat blood pressure measurement every five minutes for 20 minutes.
- The aim is to maintain a BP of 150/100 mmHg.
- If stable, repeat blood pressure every 30 minutes after the initial 20 mins.
- Continuous electronic foetal monitoring is maintained.
- Document on MEOWS chart

## **Continuous Labetalol Infusion**

If further treatment is required a continuous labetalol infusion may be prescribed following consultation with the SMO obstetrician. A 1mg / ml solution should be used.

## **Preparation**

- Add 100 mg (20 mls = 1 ampoules of 100mg / 20ml ampoule of labetalol) to 80 ml of normal saline.
- The resultant 100ml solution contains 100mg labetalol hydrochloride (1mg/ml).
- The IV infusion MUST be double-checked by a senior midwife prior to being connected to the woman, with specific attention to the '5 rights' and the IV line.

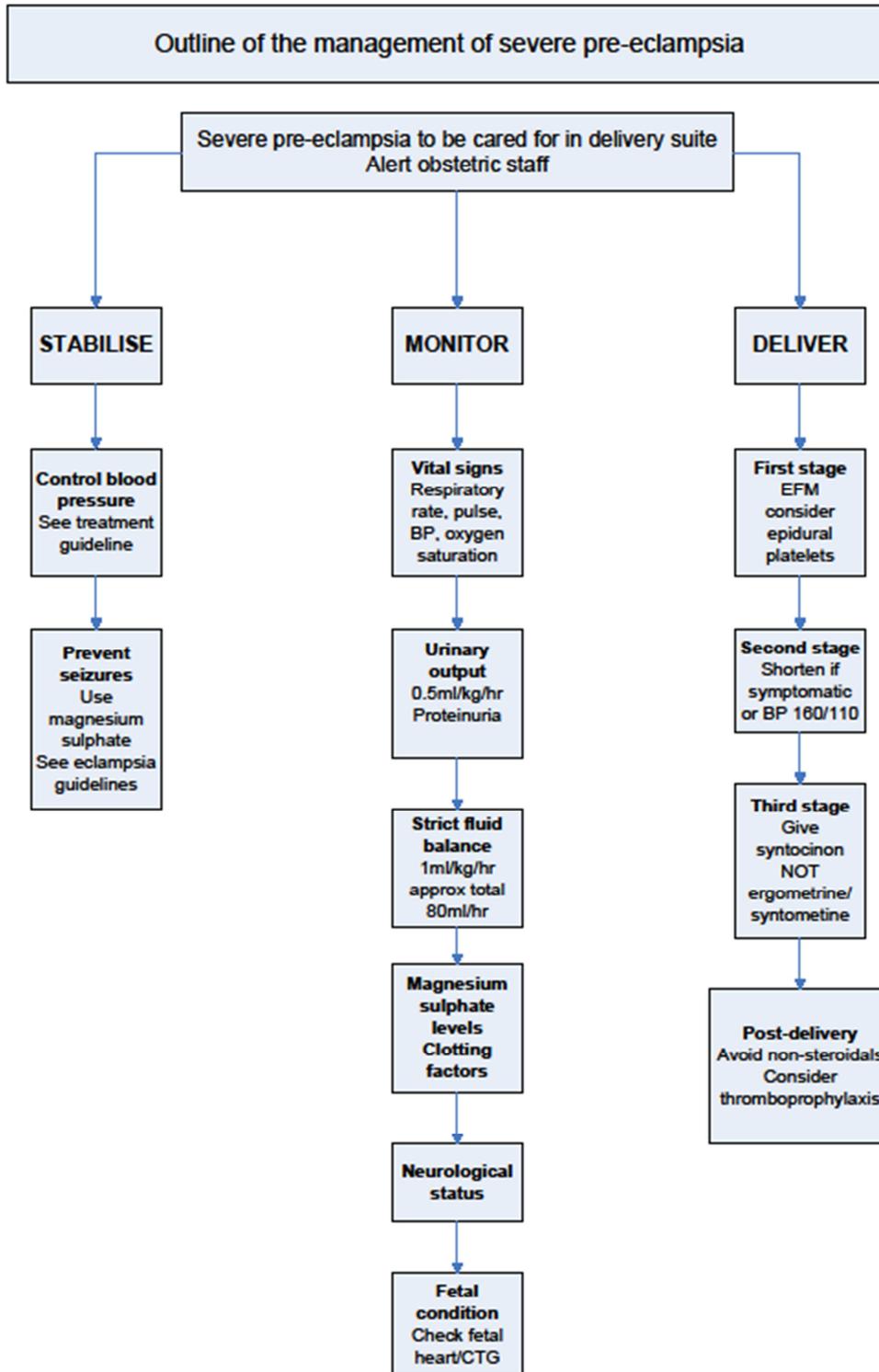
## **Administration**

- A normal saline mainline infusion is commenced.
- Using an electronic pump, the labetalol infusion is connected to the side arm of the normal saline infusion.
- The infusion is then started at a rate of 20mg/hour (20ml/hour)
- Double the rate of infusion every 30 minutes until a satisfactory response is obtained or a dose of 160mg/hour (160ml/hour) is reached. Occasionally higher doses may be necessary. The aim is to decrease the diastolic blood pressure to 100mmHg and ideally to maintain a BP of 150/100 mmHg.
- When the blood pressure has stabilised, i.e. there has been a decrease in diastolic blood pressure to 100mmHg or less and this has been sustained for 15 minutes, reduce the labetalol every 15 minutes by 1mg/hr.
- Monitoring

## **Maternal**

- Blood pressure and pulse every 15 minutes, and record on the MEOWS chart
- Insert an indwelling catheter with an hourly urine bag attached.
- Strict fluid input and output is recorded on the MEOWS chart.
- Report any changes in the woman's condition immediately to the RMO

## APPENDIX 4



Draycott, Winter, Crofts & Bamfield, 2010.