Document No: **196593**

TITLE: Pre-Eclampsia/Eclampsia

Contents

1. Purpose

Severe pre-eclampsia and eclampsia are relatively rare but serious, potentially life threatening, complications of pregnancy.

This guideline is a reference and guide to the management of pre-eclampsia and eclampsia at Te Whatu Ora Lakes and draws on and references the best practice information contained in Te Whatu Ora – Health New Zealand (2022) Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand.

In recognition of Te Tiriti o Waitangi (the Treaty of Waitangi) and the Crown's special relationship with Maori, Te Whatu Ora – Lakes, is committed to acknowledging the Treaty by working in partnership with Maori. Staff involved in implementing this policy should be aware of the Tiriti o Waitangi Policy (EDMS 40583).

2. Scope

All Te Whatu Ora Lakes medical, midwifery and nursing staff and Lead Maternity Care (LMC) Midwives caring for women/people during pregnancy and postnatally.

3. Glossary

ALT	Alanine Transaminase
AST	Aspartamine Transaminase
BP	Blood Pressure
CTG	Cardiotocograph
CVP	Central Venous Pressure
dBP	Diastolic Blood Pressure
FBC	Full Blood Count
GP	General Practitioner
HELLP	Haemolysis, Elevated Liver enzymes and Low Platelet count
ICU	Intensive Care Unit
IV	Intravenous
LFT	Liver Function Test
MEWS	Maternity Early Warning Score
MSU	Mid-Stream Urine
PET	Pre-eclampsia
SHO	Senior House Officer
sBP	Systolic Blood Pressure
SGA	Small for Gestational Age
USS	Ultrasound Scan
VTE	Venous Thromboembolism

4. Definitions and Diagnosis

In this guideline, hypertensive disorders in pregnancy are classified in line with the Te Whatu Ora – Health New Zealand (2022) Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand guideline and include;

- Chronic/pre-existing hypertension
- Gestational hypertension
- Pre-eclampsia
- Eclampsia
- HELLP syndrome

Hypertension:	Systolic BP (sBP) $\geq$ 140 mmHg and/or diastolic BP (dBP) $\geq$ 90 mmHg, as measured on two or more consecutive occasions at least four hours apart. *N.B.: It is important to note a rise in baseline blood pressure of 30 mmHg systolic or 15 mmHg diastolic. However, although it may be of clinical importance, it is no longer used to diagnose hypertension.*
Chronic/pre-existing hypertension:	Confirmed before conception or before 20 weeks of gestation with or without a known cause, as measured on two or more consecutive occasions at least four hours apart.
Gestational hypertension:	New onset hypertension occurring after 20 weeks' gestation (in a woman/person who had normal blood pressure before 20 weeks' gestation) and; • diastolic blood pressure is $\geq$90 mmHg or systolic blood pressure is $\geq$ 140 mmHg • the woman/person has none of the abnormalities that define pre-eclampsia • her blood pressure returns to normal within three months after giving birth

Definitions and Diagnosis cont'd

Pre-eclampsia:	New onset hypertension occurring after 20 weeks' gestation (in a woman/person who had normal blood pressure before 20 weeks' gestation) or superimposed on pre-existing hypertension **and one or more** of the following also develops as a new condition(s): • Proteinuria – spot urine protein:creatinine ratio ≥30 mmol or ≥2+ on dipstick testing, confirmed by a protein:creatinine ratio test *N.B.: Proteinuria is not essential for a pre-eclampsia diagnosis* • Other maternal organ dysfunction: o Renal insufficiency (creatinine >90 µmol/L, urine output of <80 mL/4 hours o Liver involvement – elevated transaminases (AST & ALT) at least twice upper limit of normal +/- right upper quadrant or epigastric abdominal pain). *N.B.: normal ranges are ALT 0 - 30 µmol/L and AST 10 - 50 µ/L* o neurological complications (common examples are hyperreflexia when accompanied by clonus, severe headaches and persistent visual scotomata; other examples are eclampsia, altered mental status, blindness, stroke) o haematological complications (thrombocytopenia – platelet count below 100 × 109 /L, haemolysis) • uteroplacental dysfunction (e.g., fetal growth restriction, abruption)
	Each of the following is a severe feature of pre-eclampsia: • severe hypertension (dBP ≥110 mmHg or sBP ≥160 mmHg) despite antihypertensive treatment • Deteriorating clinical condition including: o Impaired liver function not responding to treatment and not accounted for by alternative diagnosis – elevated transaminases (AST and ALT) – at least twice the upper limit of normal ± right upper quadrant or epigastric abdominal pain (may be referred to upper back) o Progressive renal insufficiency (serum creatinine >90 µmol/L or doubling of serum creatinine concentration in the absence of other renal disease, urine output of <80 mL/4 hour) o Worsening thrombocytopenia (platelet count less than 100 × 109/L) o Pulmonary oedema o HELLP syndrome o Eclampsia o Worsening fetal growth restriction (with oligohydramnios or abnormal Doppler).
Unstable pre-eclampsia:	Women/people with pre-eclampsia have worsening pre-eclampsia blood results and severe hypertension not controlled by antihypertensives. Also known as 'fulminating pre-eclampsia'.
Eclampsia:	New onset of seizures occurs in association with preeclampsia. It is a severe manifestation of pre-eclampsia and can occur before, during or after birth. It can be the presenting feature of pre-eclampsia in some women/people.
HELLP syndrome:	A variant of severe pre-eclampsia (elements include Haemolysis, Elevated Liver enzymes and Low Platelet count). In a woman/person with pre-eclampsia, the presence of any of the following is an indicator of HELLP: • maternal platelet count of less than 100 × 10^9/L • elevated transaminases (elevated blood concentrations of liver enzymes to twice the normal concentration) • microangiopathic haemolytic anaemia with red cell fragments on blood film.

5. Risk Factors and Prevention

Health professionals should identify risk factors when booking a pregnant woman/person for antenatal care, refer as appropriate and commence any preventative treatment.

Risk factors for developing pre-eclampsia include (in order of relative risk):

- Autoimmune conditions: antiphospholipid antibodies and SLE
- Previous history of pre-eclampsia
- Assisted Reproductive Technology (oocyte donation)
- Renal disease
- Chronic hypertension
- Previous history of HELLP
- Pre-existing diabetes
- Family history of pre-eclampsia
- Genetic ancestry (African, Indian, Maori, Pacific)
- Nulliparity
- Multiple pregnancy
- Change in partner
- Elevated BMI equal to or greater than 35

(See Te Whatu Ora – Health New Zealand (2022) national guideline, page 14-15, for a full table of risk factors).

Prevention:

- Controlling blood pressure level is vital at any stage of care.
- While this will not prevent pre-eclampsia developing it will reduce the risk of stroke and poor outcomes for the mother.
- It is recommended that pregnant women/people at high risk of developing pre-eclampsia, take the following to reduce their risk of developing pre-eclampsia and associated adverse events such as preterm birth;
    - **low-dose aspirin:** (100 mg daily at night) commence between 12 - 16 weeks' gestation (may be continued until birth).

  If low dietary intake of calcium;
    - **calcium:** (1.5 – 2.0 g oral elemental calcium per day) from booking until birth.
      Prescribe as: Calcium Carbonate 1.25 grams (500mg elemental)
      Brand name: Calci-Tab 500

6. Procedure / Management

a) Taking Blood Pressure Readings

- The woman/person should be rested and sitting at a 45^{o} angle.
- The blood pressure cuff should be of the appropriate size - the inflatable part of the blood pressure cuff covering about 40% of the circumference of the upper arm and the cuff covering 80% of the area from the elbow to the shoulder - and placed at the level of the heart.
- Korotkoff phase 5 is the appropriate measurement of diastolic blood pressure.
- The method used should be consistent and documented.
- Automated methods need to be used with caution as they may give inaccurate blood pressure readings in pre-eclampsia
- Documentation of blood pressure readings should be on the Maternity Early Warning Score (MEWS) Chart
- Multiple readings should be used to confirm the diagnosis

b) Investigations

Blood tests are to be taken as instructed by a Senior Obstetrician.

- Urine protein - significant proteinuria = PCR $\geq$ 30 mg/mmol
- MSU
- Strict fluid balance from admission, monitoring input and output
- Ensure a current group and screen is available
- Full blood count and platelets
- Serum urate ($\geq$ 0.36 mmol/l at term is pathological)
  upper limit = 0.0 number of weeks, e.g. 32 weeks = 0.32, maximum is 0.36.
- Renal function tests (serum creatinine > 90 mmol/l is abnormal)
- Liver function tests
- **N.B.:** Only do coagulation screen if platelets are <150 or there has been a significant fall

c) Assessment of the Fetus

Confirm gestation against early scans, symphysis fundal height and fetal movements.

Investigations:

- CTG
- Ultrasound scan for presentation, growth and liquor volume
- Estimated fetal weight plotted on customised growth chart
- Umbilical artery doppler studies, if appropriate

d) Indications for Delivery - Pre-eclampsia or Gestational Hypertension;

Maternal	Fetal
• Gestational age ≥ 37 weeks • Inability to control hypertension • Deteriorating platelet count • Intravascular haemolysis • Deteriorating liver function • Deteriorating renal function • Persistent neurological symptoms • Persistent epigastric pain, nausea or vomiting with abnormal LFTs • Pulmonary oedema	• Placental abruption • Severe FGR • Non-reassuring fetal status

e) Treatment of Acute Hypertension

When systolic blood pressure is ≥160 mmhg or diastolic blood pressure ≥110 mmhg, treat as indicated. In women/people with other markers of potentially severe disease, treatment can be considered at lower degrees of hypertension.

Antihypertensive medications:

- Nifedipine – oral – (do not give sublingually or use the slow release formulation)
- Labetalol - oral or IV – (contraindicated in asthmatics)
- Hydralazine – IV – (contraindicated in SLE)

- Any of these agents can be used for acute management of severe hypertension.
- Labetalol has the theoretical advantage that it can be given initially by mouth in severe hypertension and then, if needed, intravenously.
- Continuous CTG monitoring is required during IV administration.

The Consultant Obstetrician or Registrar must be informed if blood pressure requires acute treatment.

Management should be discussed with the consultant as presently the choice of agent may also be influenced by the familiarity of the specialist with a particular drug.

f) Ongoing treatment for hypertension

Treatment of mild to moderate hypertension in the range 140-160 / 90-100 mmHg should be considered as optional, above these levels treatment is mandatory.

Atenolol, angiotensin converting enzyme inhibitors (ace inhibitors), angiotensin-blocking drugs (ARB) and diuretics should be avoided.

g) Magnesium Sulphate – Treatment of Eclampsia / Severe Pre-Eclampsia

Magnesium Sulphate is the drug of choice for severe pre-eclampsia and eclampsia. It should also be considered for women/people with pre-eclampsia for who there is concern about the risk of eclampsia.

For information about use, precautions, dose etc. of Magnesium Sulphate please refer to the protocol in the Lakes' Maternity Clinical Guideline 'Magnesium Sulfate for Pre-eclampsia and for Neuroprotection in Pre- Term Births < 30 Weeks' 2396297.

Procedure/Management cont'd

Pre-eclampsia

Hypertension (dBP ≥90 mmHg or sBP ≥140 mmHg) + other signs and symptoms
(refer to definitions)

At diagnosis

- Acute referral and transfer to obstetric team (referral code 4022)
- Consider anti-hypertensive treatment to reduce risk of severe hypertension. Aim for target of sBP140-160 and dBP 90-100 mmHg
- Spot urine PCR
- Pre-eclampsia bloods
- Assess fetal growth/wellbeing (USS, umbilical artery Doppler assessment and CTG if indicated)
- Identify and explain warning signs and symptoms of worsening pre-eclampsia to the woman/person and their family

First-line antihypertensives

- Labetalol
- Nifedipine
- Methyldopa

Maternal monitoring

- In providing hospital care, the obstetric team makes a management plan for ongoing care and monitoring discussion with the woman/person and their LMC, which may include hospital admission
- BP 4–6 hourly (except overnight when an interval of 8 hours is acceptable)
- Clinical deterioration can be rapid
- Twice weekly pre-eclampsia bloods
- Conduct coagulation studies if liver function tests are abnormal, low platelets or concerns about possible placental abruption

Fetal monitoring

- Follow SGA guidelines for management if diagnosed
- After assessment at the time of diagnosis, do not repeat USS for growth in <2 weeks
- Daily CTG if inpatient

Timing of birth

- *Before 34 weeks:* Plan an expectant approach. Clear plan developed including level of monitoring and thresholds, to plan birth if condition of woman/person or fetus deteriorates. If indication for birth presents, administer corticosteroids for fetal lung maturation and magnesium sulphate for fetal neuroprotection (if <30 weeks). Not required if already on magnesium sulphate. Consider inpatient management.
- *At 34+0 to 36+6 weeks:* Plan an expectant approach. Offer induction of labour if maternal or fetal indications support delivery (see box 2). Consider inpatient mgmt.
- *After 37 weeks (e.g. 37+0):* Recommend birth. No appreciable benefit in continuing pregnancy after 37 weeks. The woman/person, her/their LMC and the obstetric team should negotiate the timing and method.

Antihypertensives for acute lowering of BP

Labetalol
Initially 20 mg IV bolus over 2 minutes
Repeat with 40–80 mg
Onset: 5 minutes Repeat with 40–80 mg
Repeat: every 10 minutes
Maximum: 300 mg

Nifedipine*
Initially 10 mg (immediate release capsules)
Onset: 30–45 minutes
Repeat: after 30–45 minutes (if needed)
Maximum: 80 mg daily

Hydralazine
5–10 mg (5 mg if fetal compromise) IV bolus over 3–10 minutes
Onset: 20 minutes Repeat: every 20 minutes
Maximum: 30 mg (consider IV bolus of crystalloid fluid before or when administering first IV hydralazine dose, usually 200–300 mL)

Intrapartum

- At least hourly BP in labour
- Continue antihypertensives – adjust if necessary for other factors, e.g. neuraxial anaesthesia
- Fluid balance monitoring

Pre-eclampsia bloods

- FBC
- Electrolytes
- Creatinine
- LFT (incl AST, ALT)
- Coagulation if AST, ALT abnormal/low platelets

Postpartum

- If on methyldopa, consider changing to another antihypertensive, eg, ACE inhibitor
- Continue to monitor for disease resolution, titrate antihypertensives as required
- Advise to stay in secondary/tertiary facility for at least 72 hours (4–6 hourly BP)
- BP at home 24-hour post discharge, then at one week, then approximately weekly thereafter (in line with case-by-case planning according to BP stability and condition severity)
- Hospital to send woman's GP and LMC a comprehensive discharge summary
- Consider 6-week obstetric review

Signs and symptoms of pre-eclampsia

- Severe headache
- Visual disturbances
- Severe epigastric pain
- Shortness of breath
- Retrosternal pressure/pain
- Nausea, vomiting
- Sudden swelling of face, hands, or feet
- Hyperreflexia

* Care must be taken when using nifedipine in combination with magnesium sulphate, the combination of which can precipitate severe hypotension.

Severe/unstable pre-eclampsia

(See Definitions and Classifications)

At diagnosis

- Acute referral and transfer to obstetric team (referral code 4022)
- Commence antihypertensive treatment, aim for target BP 140/100 mmHg or lower
- Consider magnesium sulphate to prevent a primary seizure
- Admit to secondary or tertiary facility
- Spot urine PCR
- Pre-eclampsia bloods
- Assess fetal growth (umbilical artery Doppler assessment and CTG, if indicated)

Maternal monitoring

- One-to-one midwifery care
- Management plan should include discussion with the anaesthetic and intensive care teams but also with obstetric lead
- Hourly BP and respiratory rate
- Fluid balance chart
- At least daily pre-eclampsia bloods
- Conduct coagulation studies if liver function tests are abnormal or there are concerns about possible placental abruption

Maternal monitoring – magnesium sulphate

- Blood pressure every 5 minutes during bolus dose, then hourly during maintenance dose
- Respiratory rate, O2 saturation, reflexes hourly
- Urine output (>100 mL over 4 hours)
- Fluid restriction (replace loss at birth and then 80–85 mL/hour total fluid)

Fetal monitoring

- Follow SGA guidelines for management if diagnosed
- After assessment at time of diagnosis, do not repeat growth USS in <2 weeks
- Daily CTG (continuous if on magnesium sulphate or IV antihypertensives)

Timing of birth

- Peri-viability and before: Manage in a tertiary setting with maternal fetal medicine involvement if possible, and with careful discussion with the woman/person
- Before 34 weeks: Adopt expectant approach in a secondary or tertiary centre with resources for maternal and fetal monitoring and critical care of the woman/pregnant person and the baby. If indication for birth presents, administer corticosteroids for fetal lung maturation and magnesium sulphate for fetal neuroprotection (if <30 weeks). Not required if already on magnesium sulphate.
- After 34 weeks: Recommend birth after stabilising the woman/pregnant person in a centre with appropriate resources for care of the woman/pregnant person and baby

Intrapartum

- At least hourly BP in labour
- CTG
- Continue antihypertensives – adjust if necessary for other factors, for example, effect of magnesium sulphate, neuraxial anaesthesia

Postpartum

- Continue magnesium sulphate for 24 hours
- If on methyldopa, consider changing to another antihypertensive, for example, ACE inhibitor
- Continue to monitor for disease resolution, titrate antihypertensives as required
- Advise to stay in secondary/tertiary facility for at least 72 hours (4–6 hourly BP)
- BP at home 24 hours post discharge, then at one week, then approximately weekly thereafter (in line with case-by-case planning according to BP stability and condition severity)
- Hospital to send the woman/person's GP and LMC a comprehensive discharge summary
- Recommend 6-week obstetric review

Antihypertensives for acute lowering of BP

Labetalol
Initially 20 mg IV bolus over 2 minutes
Repeat with 40–80 mg
Onset: 5 minutes Repeat with 40–80 mg
Repeat: every 10 minutes
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5–10 mg (5 mg if fetal compromise) IV bolus over 3–10 minutes
Onset: 20 minutes Repeat: every 20 minutes
Maximum: 30 mg (consider IV bolus of crystalloid fluid before or when administering first IV hydralazine dose, usually 200–300 mL)

Magnesium sulphate

To prevent further eclamptic seizures, this anticonvulsant medicine should be administered – see protocol

Pre-eclampsia bloods

- FBC
- Electrolytes
- Creatinine
- LFT (incl AST, ALT)
- Coagulation if AST, ALT abnormal/low platelets

Signs and symptoms of pre-eclampsia

- Severe headache
- Visual disturbances
- Severe epigastric pain
- Shortness of breath
- Retrosternal pressure/pain
- Nausea, vomiting
- Sudden swelling of face, hands, or feet
- Hyperreflexia

* Care must be taken when using nifedipine in combination with magnesium sulphate, the combination of which can precipitate severe hypotension.

Eclampsia

New onset of seizures in association with pre-eclampsia

At diagnosis

- Emergency transfer of care to obstetric team (referral code 4006)
- Immediate airway, breathing, circulation, disability, exposure (ABCDE) management
- BP control of primary importance if severe
- Admit to secondary/tertiary facility
- Pre-eclampsia bloods + coagulation bloods
- Assess fetal growth (umbilical artery Doppler assessment and cardiotocography if indicated)

Treatment

- Only conclusive treatment is birth of the baby but aim to stabilise and monitor if possible if <37 weeks' gestation
- Begin magnesium sulphate – see protocol
- If hypertensive, start antihypertensive, aim for a target BP below 140/100 mmHg

Maternal monitoring

- One-to-one midwifery care
- Management plan should include discussion with the anaesthetic and intensive care teams but also with obstetric lead
- Hourly BP and respiratory rate
- Fluid balance chart
- At least daily pre-eclampsia bloods
- Conduct coagulation studies if liver function tests are abnormal or there are concerns about possible placental abruption

Maternal monitoring – magnesium sulphate

- Blood pressure every 5 minutes during bolus dose, then hourly during maintenance dose
- Respiratory rate, O2 saturation, reflexes hourly
- Urine output (>100 mL over 4 hours)
- Fluid restriction (replace loss at birth and then 80–85 mL/hour total fluid)

Fetal monitoring

- CTG (continuous if magnesium sulphate running)

Timing of birth

Any gestational age: Recommend birth after stabilising the woman/person and a course of corticosteroids (if ≤34+6 weeks) and magnesium sulphate for neuroprotection (if <30 weeks) has been completed (if time permits) – not required if already on magnesium sulphate

Intrapartum

- Frequent BP monitoring (eg, every 5–15 minutes) in labour. If on magnesium sulphate – follow protocol
- Continuous CTG
- Continue antihypertensives – adjust if necessary for other factors, for example, effect of magnesium sulphate, neuraxial anaesthesia

Postpartum

- Continue magnesium sulphate for 24 hours
- If on methyldopa, consider changing to another antihypertensive, for example, ACE inhibitor
- Continue to monitor for disease resolution, titrate antihypertensives as required
- Advise to stay in secondary/tertiary facility for at least 72 hours (4–6 hourly BP)
- BP at home 24 hours post discharge, then at one week, then approximately weekly thereafter (in line with case-by-case planning according to BP stability and condition severity)
- Hospital to send the woman/person's GP and LMC a comprehensive discharge summary
- Recommend 6-week obstetric review

Antihypertensives for acute lowering of BP

Labetalol
Initially 20 mg IV bolus over 2 minutes
Repeat with 40–80 mg
Onset: 5 minutes Repeat with 40–80 mg
Repeat: every 10 minutes
Maximum: 300 mg

Nifedipine*
Initially 10 mg (immediate release capsules)
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Repeat: after 30–45 minutes (if needed)
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Maximum: 30 mg (consider IV bolus of crystalloid fluid before or when administering first IV hydralazine dose, usually 200–300 mL)

Magnesium sulphate

To prevent further eclamptic seizures, this anticonvulsant medicine should be administered – see protocol

Pre-eclampsia bloods

- FBC
- Electrolytes
- Creatinine
- LFT (incl AST, ALT)
- Coagulation if AST, ALT abnormal/low platelets

Signs and symptoms of pre-eclampsia

- Severe headache
- Visual disturbances
- Severe epigastric pain
- Shortness of breath
- Retrosternal pressure/pain
- Nausea, vomiting
- Sudden swelling of face, hands, or feet
- Hyperreflexia

* Care must be taken when using nifedipine in combination with magnesium sulphate, the combination of which can precipitate severe hypotension.

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HELLP

A variant of severe pre-eclampsia.
Elements include **h**aemolysis, **e**levated **l**iver enzymes and **l**ow **p**latelet count

At diagnosis

- Acute referral and transfer to obstetric team (referral code 4006)
- BP control of primary importance if severe
- Admit to secondary/tertiary facility
- Spot urine PCR
- Pre-eclampsia bloods + coagulation bloods
- Assess fetal growth (umbilical artery Doppler assessment and cardiotocography if indicated)

Treatment

- Only conclusive treatment is birth of baby and placenta
- Begin magnesium sulphate – see protocol
- Start antihypertensive (acute), aim for a target BP below 140/100 mmHg

Maternal monitoring

- Management plan should include discussion with the woman/person, their LMC, obstetric, anaesthetic and intensive care teams and physicians where appropriate
- At least daily pre-eclampsia bloods
- Conduct coagulation studies if there are concerns about possible placental abruption

Maternal monitoring – magnesium sulphate

- Blood pressure every 5 minutes during bolus dose then hourly during maintenance dose
- Respiratory rate, O2 saturation, reflexes hourly
- Urine output (>100 mL over 4 hours)
- Fluid restrictions (replace loss at delivery and then 80–85 mL/hour total fluid) abruption

Fetal monitoring

- CTG (continuous if magnesium sulphate running)

Timing of birth

Any gestational age: Recommend birth after stabilising the woman/person and a course of corticosteroids (if ≤34+6 weeks) and magnesium sulphate for neuroprotection (if <30 weeks) has been completed (if time permits) – not required if already on magnesium sulphate

Intrapartum

- Frequent BP monitoring (for example, every 5–15 minutes) in labour. If on magnesium sulphate – follow protocol
- Continuous CTG
- Continue antihypertensives – adjust if necessary for other factors, for example, effect of magnesium sulphate, neuraxial anaesthesia

Postpartum

- Continue magnesium sulphate for 24 hours
- If on methyldopa, consider changing to another antihypertensive, for example, ACE inhibitor
- Continue to monitor for disease resolution, titrate antihypertensives as required
- Advise to stay in secondary/tertiary facility for at least 72 hours (4–6 hourly BP)
- BP at home 24 hours post discharge, then at one week, then approximately weekly thereafter (in line with case-by-case planning according to severity)
- Hospital to send the woman/person's GP and LMC a comprehensive discharge summary
- Recommend 6-week obstetric review

Antihypertensives for acute lowering of BP

Labetalol
Initially 20 mg IV bolus over 2 minutes
Repeat with 40–80 mg
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Pre-eclampsia bloods

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Signs and symptoms of pre-eclampsia

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- Sudden swelling of face, hands, or feet
- Hyperreflexia

* Care must be taken when using nifedipine in combination with magnesium sulphate, the combination of which can precipitate severe hypotension.

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7. Ongoing Management

a) Fluid Management

Women/people with severe pre-eclampsia typically have a deficit in their intravascular volume of about a litre and additional deficits can occur due to decreased intake, blood loss, increase requirements, e.g. labour.

- urine output of **>30mls per hour** = adequate circulating intravascular volume

Fluid overload may occur due to impaired renal function;

- fluid restriction of **80mls/hour or 1ml/kg/hr** - intrapartum and in immediate postpartum periods, thereafter, fluid as per routine fluid balance management.

All fluid input and output should be documented on a Fluid Balance Chart according to the Lakes DHB Fluid Balance Monitoring Guideline (928832).

b) Analgesia During Labour

Severe pre-eclampsia is not a contraindication for epidural and analgesia, providing the platelet count is >100 × 10^9/L.

Any pregnant woman/person with a lower platelet count or abnormal clotting should have their care discussed with the consultant and anaesthetist. Caesarean section requires a platelet count >50 × 10^9/L and transfusion may be necessary.

All pregnant women/people with proteinuria hypertension should have these indices checked on admission to the birthing unit otherwise delay in implementing epidural analgesia may occur.

c) Third Stage Management

Third stage should be managed with **5 units of IV Syntocinon** given slowly.

If syntocinon infusion is indicated;

- give **40 units in 500ml 0.9% sodium chloride at rate of 125 ml/hour**.
- If fluid restriction, then run at an increased concentration (40 units in 100ml 0.9% sodium chloride at 25ml/hr over 4 hours).

N.B.: Ergometrine or Syntometrine <u>should not</u> be given as this can further increase the blood pressure.

If there is post-partum haemorrhage due to atony use Carboprost 250 micrograms intramuscularly or intramyometrial. Please refer to the PPH guidelines.

d) Criteria for Transfer to ICU

Anaesthetic and Obstetric Consultant and Midwife in Charge should always jointly discuss possible transfer to ICU. These indications will almost always be after the delivery of the baby;

- Persisting convulsions
- Blood pressure > 170 systolic, > 110 diastolic despite Nifedipine and Labetalol
- Pulmonary oedema with oliguria
- Compromised myocardial function
- Deteriorating coagulopathy, renal or hepatic function

e) Post-Partum Management

Close monitoring:

Women/people with pre-eclampsia should be closely monitored during the post-partum period as their blood pressure can rise up to five days after giving birth. While most post-partum eclamptic seizures will occur within the first 48 hours, seizures can occur later than this so careful medical review should be undertaken before arranging for discharge.

After delivery mothers who have been on the pre-eclampsia protocol should have;

- close observation in the Birthing Unit or ICU until the condition stabilises (at least 24 hours with severe pre-eclampsia)
- strict fluid balance monitoring for at least 24 hours with IV fluid restriction until spontaneous diuresis occurs
- careful monitoring of blood pressure (at least daily for 7 days then weekly to 6 weeks)
- anti-hypertension treatment continued (if magnesium infusion, continue for 24 hours)
- VTE prophylaxis if required as per guideline, with care given to thrombocytopenia
- bloods checked the day after birth and twice weekly until stabilised
- advice to remain in secondary facility for a minimum of 72 hours
- a comprehensive discharge summary completed, including the plan for checking postnatal blood pressure, and shared with the General Practitioner and LMC

Anti-hypertensive medication should be continued post-partum as dictated by the blood pressure.

It may be necessary to continue treatment for up to three months, although most women/people can have treatment stopped before this.

Women/people with persisting hypertension and proteinuria at six weeks may have renal disease and should be considered for further investigation.

Postnatal Follow Up

- **Six Week Check**: An assessment of blood pressure and proteinuria via the General Practitioner after the six-week postnatal check is advised. If hypertension or proteinuria persists then further investigation is recommended.

- **Postnatal Review**: Women/people whose pregnancies have been complicated by severe pre-eclampsia or eclampsia should be offered a formal postnatal review to discuss the events of the pregnancy.

- **Pre-conception Care**: Pre-conceptual counselling should be offered in any future pregnancy so the events that occurred, any risk factors, and preventative therapies can be discussed.

8. In-Utero Transfer

If in-utero transfer is deemed safe and necessary, then the following applies:

- If preterm delivery is likely to be imminent after transfer and the gestational age is >25 weeks and <34 weeks, the first dose of steroids should be given prior to transfer
- The patient's blood pressure and condition should be stabilised and thoroughly assessed (consider consultation with anaesthetist and ICU if required) before a decision is made to transfer
- Consider the need for the patient to be transferred with appropriately qualified doctor (i.e. Obstetric Registrar) in attendance
- Transport options are;
  - Helicopter: An Intensive Care Paramedic will be on board, a midwife will need to be provided
  - Patient Transfer Ambulance: (untrained ambulance crew) a midwife to be provided, consider if also needs to be accompanied by a suitably qualified doctor
  - Retrieval: The tertiary unit may be able to a send a team of medical/midwifery staff to retrieve the woman/person from Rotorua Hospital or transfer from Taupo to Rotorua Hospital
- Resuscitation equipment for the transfer is required
- The mode of transport will depend on local circumstances but in general the most rapid of mode should be used

Medical Equipment for Transit:

- Pulse oximetry
- Oxygen cylinder / masks
- Syringes / needles
- Magnesium Sulphate
- Nifedipine capsules
- BBA transfer bag

Observations in Transit:

- 15 minute observations
- Blood pressure
- Pulse
- Respiratory rate
- Level of consciousness if the woman has had sedation

9. Equipment Used

- Pre-eclampsia box containing required equipment and drugs is kept in the Birthing Unit dispensary.

10. Pre-eclampsia and Eclampsia Audit Standards

Collection of data for audit may include:

- All women/people with severe pre-eclampsia should be offered/given magnesium sulphate for primary prophylaxis of eclampsia

11. Associated Documents

- Fluid Balance Chart
- Fluid Balance Monitoring Guideline, Lakes DHB - 928832
- ICU Observation Chart
- Maternity Early Warning Score (MEWS) Chart
- Magnesium Sulfate for Pre-eclampsia and for Neuroprotection in Pre- Term Births < 30 Weeks - 2396297
- Transfer document

12. References

Te Whatu Ora – Health New Zealand (2022) Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand.

Authorised by: Maternity Clinical Quality Improvement (CQI) Meeting