Management of preeclampsia & other hypertensive disorders in pregnancy

Algorithm

Purpose

This document has been developed to support hospitals and healthcare professionals to implement the recommendations made in Taonga Tuku Iho on preeclampsia, as a major contributor to provider-initiated preterm birth.

The recommendations, background, and additional information can be reviewed on the Carosika Collaborative Taonga Tuku Iho website www.bestpractice.carosikacollaborative.co.nz

Content source

This document provides a collection of management algorithms for preeclampsia and other hypertensive disorders of pregnancy in Aotearoa. They have been based on the algorithms supplied in the Te Whatu Ora – Health New Zealand 2022 '*Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand: Te Tautohu, Te Tumahu i te Toto Pōrutu me te Pēhanga Toto Kaha i te Hapūtanga ki Aotearoa: A clinical practice guideline*'.

These alogorithms include some minor adaptations that have been made in line with recommendations in Taonga Tuku Iho. All adaptations are specific to care that may impact on preterm preeclampsia and preterm birth and have been made in-line with international guidance. The rationale for differing recommendations is reported in Taonga Tuku Iho.

Te Whatu Ora
Health New Zealand

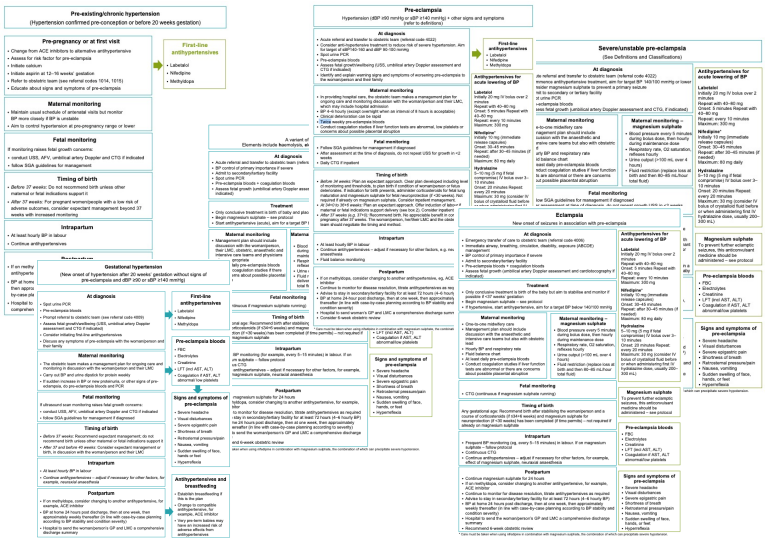
Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand

Te Tautohu, Te Tumahu i te Toto Pōrutu me te Pēhanga Toto Kaha i te Hapūtanga ki Aotearoa

A clinical practice guideline

Released October 2022

Comprehensive clinical oversight of māmā/person and pēpi wellbeing is required and may override recommendations within this algorithm.

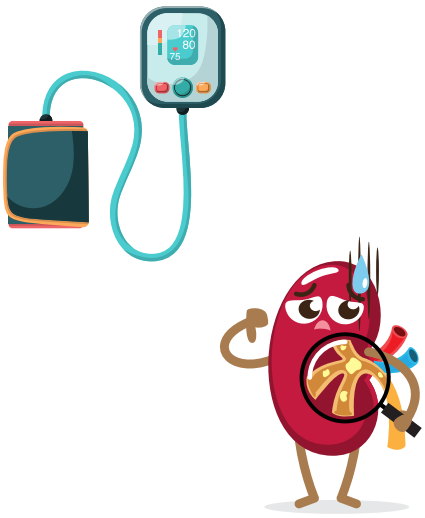


For more information on preterm preeclampsia including access to Taonga Tuku Iho (national best practice guide), you can access the Carosika Collaborative website ***www.carosikacollaborative.co.nz*** *or by using the QR code.*

CAROSIKA
COLLABORATIVE | TAONGA TUKU IHO

Risk assessment & management for the prevention of preeclampsia

Assessment made at booking



Major risk factors (relative risk/odds ratio >3)

- Antiphospholipid syndrome
- Systemic lupus erythematosus
- Previous preeclampsia
- Assisted reproductive technology therapy with oocyte donation
- Renal disease
- Chronic/pre-existing hypertension
- Previous HELLP syndrome
- Pre-existing diabetes
- Family history (mother or sibling) with preeclampsia

Wāhine/people with ≥1 major risk factor

Recommend and prescribe **aspirin**
Daily 100 mg oral dose taken at night/evening, commenced between 12^{+0} to 20^{+0} weeks, and continued to 36^{+0} weeks

Consider **calcium** supplementation
(particularly for those with low dietary intake of calcium)
Daily 1.5-2.0g oral dose from booking to birth

Other risk factors (relative risk/odds ratio ≤3)

- Nulliparity
- Multiple pregnancy
- Other family history of preeclampsia
- Father of baby born via pregnancy with preeclampsia
- Ethnic group – Māori, Pacific Peoples, Indian, African
- New paternity in current pregnancy
- BMI ≥35 kg/m^2 (pre-pregnancy or early in pregnancy)
- Pregnancy interval >10 years
- Wāhine/person age ≥40 years
- Assisted reproductive technology therapy with sperm donation
- Any assisted reproductive technology therapy
- dBP ≥80 mmHg at booking

CAROSIKA
COLLABORATIVE | TAONGA TUKU IHO

Pre-existing/chronic hypertension

Hypertension confirmed preconception or before 20 weeks gestation

First visit in pregnancy

- Change ACE inhibitor/ARB to alternative antihypertensive
- Assess for other risk factors for preeclampsia
- Prescribe calcium 1.5 – 2.0g daily
- Prescribe aspirin 100mg nocte at 12^{+0}–16^{+6} weeks gestation
- Refer to obstetric team (Consultation referral code 1014)
- Educate wahine/person and whānau about signs and symptoms of preeclampsia

Maternal monitoring

- Baseline urine microscopy & PCR, preeclampsia blood tests
- Maintain usual schedule of antenatal visits, but individualise frequency of BP monitoring & monitor more closely if unstable
- Aim to control hypertension sBP ≤135 and dBP ≤85 mmHg
- Repeat urine PCR, preeclampsia blood tests in the event of a rise in BP, new proteinuria and/or other signs & symptoms of preeclampsia
- Arrange a same-day referral back to the obstetric team if preeclampsia develops (Consultation referral code 4022)

Fetal monitoring

- Arrange a monthly USS for fetal growth from 24-26 weeks
- If FGR occurs, follow the Te Whatu Ora SGA and FGR clinical practice guideline and the Carosika Management of preterm FGR/SGA (<37^{+0} weeks) Algorithm

Timing of birth

- **<37^{+0} weeks:** do not recommend planned preterm birth unless other māmā/person and/or pēpi indications
- **≥37^{+0} weeks (and <40^{+0} weeks):** for wāhine/people with a low risk of adverse outcomes, consider expectant management beyond 37 weeks with increased monitoring

Intrapartum

- At least hourly BP in labour
- Continue antihypertensives, adjust as required, e.g. regional anaesthesia

Postpartum

- Consider changing to an alternative antihypertensive e.g. ACE inhibitor
- BP monitoring at home with case-by-case planning according to BP stability and condition severity e.g. 24 hours post-discharge, one week, and then approximately weekly
- Comprehensive hospital discharge summary to wahine/person's primary care provider and LMC

First-line antihypertensives

- Labetalol
- Nifedipine
- Methyldopa

Frequency/dosing titrated to BP

Preeclampsia blood tests

- FBC (platelets)
- Electrolytes & creatinine
- LFT (incl AST, ALT)
- Coagulation studies if high AST/ALT or low platelets

Signs & symptoms of preeclampsia

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

Abbreviations:

ACE - angiotensin converting enzyme
ARB - angiotensin receptor blocker
ALT - alanine transaminase
AST - aspartate transaminase
BP - blood pressure
dBP - diastolic blood pressure
CTG - cardiotocograph
FBC - full blood count
FGR - fetal growth restriction
IV - intravenous
LFT - liver function test
LMC - lead maternity carer
PCR - protein:creatinine ratio
sBP - systolic blood pressure
SGA - small for gestational age
USS - ultrasound scan

CAROSIKA
COLLABORATIVE | TAONGA TUKU IHO

Adapted from: *Te Whatu Ora – Health New Zealand. 2022. Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand: Te Tautohu, Te Tumahu i te Toto Pōrutu me te Pēhanga Toto Kaha i te Hapūtanga ki Aotearoa: A clinical practice guideline*

Gestational hypertension

New onset hypertension (sBP ≥140 mmHg or dBP ≥90) after 20 weeks gestation without signs of preeclampsia

At diagnosis

- Urine PCR and preeclampsia blood tests
- Refer to obstetric team (Consultation referral code 4009)
- Arrange an USS to assess fetal growth
- Consider antihypertensives if sBP ≥140 and/or dBP ≥90 mm Hg
- Educate wahine/person & whānau about signs and symptoms of preeclampsia

Maternal monitoring

- Obstetric team makes an assessment plan for ongoing care and monitoring in consultation with wahine/person and LMC
- Weekly BP and urine protein dipstick
- Aim to control hypertension sBP ≤135 and dBP ≤85 mmHg
- Repeat urine PCR, preeclampsia blood tests in the event of a rise in BP, new proteinuria and/or other signs & symptoms of preeclampsia
- Arrange a same-day referral back to obstetric team is preeclampsia develops (Consultation referral code 4022)

Fetal monitoring

- Arrange a monthly USS for fetal growth from time of diagnosis
- If FGR occurs, follow the Te Whatu Ora SGA and FGR clinical practice guideline and the Carosika Management of preterm FGR/SGA (<37^{+0} weeks) Algorithm

Timing of birth

- **<37^{+0} weeks:** do not recommend planned preterm birth unless other māmā/person and/or pēpi indications
- **≥37^{+0} and <40^{+0} weeks:** consider expectant management or planned birth in discussion with wahine/person and their LMC

Intrapartum

- At least hourly BP in labour
- Continue antihypertensives, adjust as required, e.g. regional anaesthesia

Postpartum

- Consider changing to an alternative antihypertensive e.g. ACE inhibitor
- BP monitoring at home with case-by-case planning according to BP stability and condition severity e.g. 24 hours post-discharge, one week, and then approximately weekly
- Comprehensive hospital discharge summary to wahine/person's primary care provider and LMC

First-line antihypertensives

- Labetalol
- Nifedipine
- Methyldopa

Frequency/dosing titrated to BP

Preeclampsia blood tests

- FBC (platelets)
- Electrolytes & creatinine
- LFT (incl AST, ALT)
- Coagulation studies if high AST/ALT or low platelets

Signs & symptoms of preeclampsia

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

Antihypertensives & breastfeeding

- Establish breastfeeding if this is planned
- Ensure a compatible antihypertensive, e.g. ACE inhibitor
- Very preterm babies may have an increased risk of adverse effects from antihypertensives

Adapted from: *Te Whatu Ora – Health New Zealand. 2022. Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand: Te Tautohu, Te Tumahu i te Toto Pōrutu me te Pēhanga Toto Kaha i te Hapūtanga ki Aotearoa: A clinical practice guideline*

CAROSIKA
COLLABORATIVE | TAONGA TUKU IHO

Preeclampsia

New onset hypertension (dBP ≥90 mmHg or sBP ≥140 mmHg) after 20 weeks gestation with proteinuria and/or māmā/person organ dysfunction and/or uteroplacental dysfunction (see definitions)

At diagnosis

- Same-day referral to obstetric team (Consultation referral code 4022)
- Urine PCR and preeclampsia blood tests
- Arrange an USS to assess fetal growth
- Consider antihypertensives if sBP ≥140 and/or dBP ≥90 mm Hg
- Aim to control hypertension sBP ≤135 and dBP ≤85 mmHg
- Educate wahine/person and whānau about signs and symptoms of worsening preeclampsia

Maternal monitoring

- Obstetric team makes an assessment plan for ongoing care and monitoring in consultation with wahine/person and LMC which should initially include hospital admission
- BP 4–6 hourly (except overnight when an interval of 8 hours is acceptable)
- Repeat preeclampsia blood tests at least weekly (coagulation studies if high AST/ALT, low platelets or concerns for placental abruption)

Fetal monitoring

- Arrange a monthly USS for fetal growth from time of diagnosis
- If FGR occurs, follow the Te Whatu Ora SGA and FGR clinical practice guideline and the Carosika Management of preterm FGR/SGA (<37^{+0} weeks) Algorithm
- Daily CTG if inpatient (computerised CTG if available)

Timing of birth and preparation for preterm birth

- **<34^{+0} weeks**: Plan an expectant approach with a clear plan including consideration of *in utero* transfer and level of monitoring and thresholds to plan birth if condition of wahine/person and/or pēpi deteriorates
- **34^{+0} to 36^{+6} weeks:** Discuss the risks and benefits of planned vs expectant management. Recommend an expectant approach unless features of severe preeclampsia or evidence of pēpi compromise
- **≥37^{+0} weeks:** Recommend birth as no appreciable benefit in continuing pregnancy. Wahine/person, LMC and obstetric team agree timing & mode
- **Preterm birth**: If indication for planned preterm birth presents, administer corticosteroids if ≤34^{+6} weeks and magnesium sulphate for fetal neuroprotection if <30 weeks. Preeclampsia alone is not an indication for caesarean section regardless of gestation

Intrapartum

- At least hourly BP in labour
- Continue antihypertensives, adjust as required, e.g. regional anaesthesia
- Fluid balance monitoring
- Recommend placental histological examination for preterm preeclampsia

Postpartum

- Consider changing to an alternative antihypertensive e.g. ACE inhibitor
- BP monitoring 4–6 hourly and titrate antihypertensives as required
- Monitor for disease resolution, stay in secondary/tertiary facility for ≥72 hours
- BP monitoring at home with case-by-case planning according to BP stability and condition severity e.g. 24 hours post-discharge, one week, and then approximately weekly
- Test for antiphospholipid syndrome if preterm birth <34^{+0} weeks
- Provide individualised counselling on the chance of recurrence and longer-term health implications
- Comprehensive hospital discharge summary to wahine/person's primary care provider and LMC

First-line antihypertensives

- Labetalol
- Nifedipine
- Methyldopa

Frequency/dosing titrated to BP

Antihypertensives for acute lowering of BP

IV Labetalol

- Initial: 20 mg bolus over 2 mins
- Onset: 5 mins
- Repeat: every 10 mins with 40-80mg (if needed)
- Maximum: 300 mg

Nifedipine

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

Take care using with magnesium sulphate, risk of severe hypotension

IV Hydralazine

- 5–10 mg bolus (5 mg if concern of pēpi compromise) over 3–10 mins
- Onset: 20 mins
- Repeat: 5-10mg every 20 mins
- Maximum: 30 mg

Consider IV bolus 200–300 mL crystalloid fluid before/with first dose

Preeclampsia blood tests

- FBC (platelets)
- Electrolytes & areatinine
- LFT (incl AST, ALT)
- Coagulation studies if high AST/ALT or low platelets

Signs & symptoms of preeclampsia

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

CAROSIKA
COLLABORATIVE | TAONGA TUKU IHO

Adapted from: *Te Whatu Ora – Health New Zealand. 2022. Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand: Te Tautohu, Te Tumahu i te Toto Pōrutu me te Pēhanga Toto Kaha i te Hapūtanga ki Aotearoa: A clinical practice guideline*

Severe/unstable preeclampsia

(see definitions)

At diagnosis

- Same-day referral to obstetric team (Consultation referral code 4022)
- Admit to secondary or tertiary facility
- Commence antihypertensives therapy and aim to control hypertension sBP ≤135 and dBP ≤85 mmHg
- Urgently treat severe hypertension, sBP ≥160 mmHg* and/or dBP ≥110 mmHg
- Urine PCR and preeclampsia blood tests
- Arrange an USS to assess fetal growth
- Consider need for IV magnesium sulphate to prevent an eclamptic seizure

Maternal monitoring

- One-to-one midwifery care
- Obstetric led management including anaesthesia and intensive care
- Hourly BP and respiratory rate
- Fluid balance chart
- At least daily preeclampsia bloods (coagulation studies if high AST/ALT, low platelets or concerns for placental abruption)

Maternal monitoring – magnesium sulphate

- BP every 5 mins during bolus dose, hourly with maintenance dose
- Respiratory rate, O_2 saturation, reflexes hourly
- Urine output (>100 mL over 4 hours)
- Fluid restriction (80–85 mL/hour total fluid)

Fetal monitoring

- If FGR present, follow the Te Whatu Ora SGA/FGR clinical practice guideline and the Carosika Management of preterm FGR/SGA (<37^{+0} weeks) Algorithm
- Daily CTG (computerised if available and continuous if magnesium sulphate is given)

Timing of birth and preparation for preterm birth

- **<22^{+0} and 22^{+0}–24^{+6} weeks:** Manage in tertiary unit with maternal fetal medicine involvement, careful discussion with wahine/person & whānau
- **<34^{+0} weeks**: Adopt expectant approach with *in utero* transfer for care in a secondary/tertiary unit with resources for māmā/person and pēpi monitoring and critical care
- **34^{+0}–36^{+6} weeks**: Recommend planned birth unless the only feature of severe preeclampsia is FGR with oligohydramnios/abnormal Doppler (follow Carosika Management of preterm FGR/SGA (<37^{+0} weeks) Algorithm)
- **≥37^{+0} weeks:** Recommend birth after stabilising in a centre with appropriate resources for care of the wahine/person and pēpi
- **Preterm birth**: If indication for planned preterm birth presents, administer corticosteroids if ≤34^{+6} weeks and magnesium sulphate for fetal neuroprotection if <30 weeks. Preeclampsia alone is not an indication for caesarean section regardless of gestation

Intrapartum

- At least hourly BP in labour
- Continue antihypertensives, adjust as required, e.g. regional anaesthesia
- Fluid balance monitoring
- Recommend placental histological examination for preterm preeclampsia

Postpartum

- Continue magnesium sulphate for ≥24 hours if used for maternal indications
- Consider changing to an alternative antihypertensive e.g. ACE inhibitor
- BP monitoring 4–6 hourly and titrate antihypertensives as required
- Monitor for disease resolution, stay in secondary/tertiary facility for ≥72 hrs
- BP monitoring at home with case-by-case planning according to BP stability and condition severity e.g. 24 hours post-discharge, one week, and then approximately weekly
- Test for antiphospholipid syndrome if preterm birth <34^{+0} weeks
- Provide individualised counselling on the chance of recurrence and longer-term health implications
- Comprehensive hospital discharge summary to wahine/person's primary care provider and LMC

*Antihypertensives for acute lowering of BP

IV Labetalol

- Initial: 20 mg bolus over 2 mins
- Onset: 5 mins
- Repeat: every 10 mins with 40-80mg (if needed)
- Maximum: 300 mg

Nifedipine

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

Take care using with magnesium sulphate, risk of severe hypotension

IV Hydralazine

- 5–10 mg bolus (5 mg if concern of pēpi compromise) over 3–10 mins
- Onset: 20 mins
- Repeat: 5-10mg every 20 mins
- Maximum: 30 mg

Consider IV bolus 200–300 mL crystalloid fluid before/with first dose

Magnesium sulphate

To prevent eclamptic seizure, magnesium sulphate is the anticonvulsant medicine of choice – see protocol for use as indicated

Preeclampsia blood tests

- FBC (platelets)
- Electrolytes & areatinine
- LFT (incl AST, ALT)
- Coagulation studies if high AST/ALT or low platelets

Signs & symptoms of preeclampsia

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

Adapted from: *Te Whatu Ora – Health New Zealand. 2022. Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand: Te Tautohu, Te Tumahu i te Toto Pōrutu me te Pēhanga Toto Kaha i te Hapūtanga ki Aotearoa: A clinical practice guideline*

CAROSIKA
COLLABORATIVE | TAONGA TUKU IHO

Eclampsia

New onset of seizures in association with preeclampsia

At diagnosis

- Immediate airway, breathing, circulation, disability, exposure (ABCDE) care
- Emergency transfer of responsibility and care to obstetric team (Consultation referral code 4006)
- Admit to hospital and consider transfer to secondary/tertiary facility
- Urine PCR and preeclampsia blood tests
- CTG to assess fetal wellbeing (computerised if available)

Treatment

- Stabilise whilst monitoring and making plan for birth
- Commence IV magnesium sulphate to prevent further eclamptic seizures
- Commence antihypertensive therapy and aim to control hypertension sBP ≤135 and dBP ≤85 mmHg
- Urgently treat severe hypertension, sBP ≥160 mmHg* and/or dBP ≥110 mmHg

Maternal monitoring

- One-to-one midwifery care
- Obstetric led management including anaesthesia and intensive care
- Hourly BP and respiratory rate
- Fluid balance chart
- At least daily preeclampsia bloods (coagulation studies if high AST/ALT, low platelets or concerns for placental abruption)

Maternal monitoring – magnesium sulphate

- BP every 5 mins during bolus dose, hourly with maintenance dose
- Respiratory rate, O_2 saturation, reflexes hourly
- Urine output (>100 mL over 4 hours)
- Fluid restriction (80–85 mL/hour total fluid)

Fetal monitoring

- CTG (computerised if available and continuous whilst magnesium sulphate is given)

Timing of birth and preparation for preterm birth

Any gestational age: Recommend birth after stabilisation of wahine/person. If time permits, *in utero* transfer for birth in a secondary/tertiary unit with resources for māmā/person and pēpi monitoring and critical care

Preterm birth: Administer corticosteroids if ≤34^{+6} weeks but do not delay birth if detrimental to immediate health of wahine/person and/or pēpi. Additional magnesium sulphate is not required. Preeclampsia alone is not an indication for caesarean section regardless of gestation

Intrapartum

- Frequent BP monitoring in labour
- Continuous CTG monitoring
- Continue antihypertensives, adjust as required, e.g. regional anaesthesia

Postpartum

- Continue magnesium sulphate for ≥24 hours
- Consider changing to an alternative antihypertensive e.g. ACE inhibitor
- BP monitoring 4–6 hourly and titrate antihypertensives as required
- Monitor for disease resolution, stay in secondary/tertiary facility for ≥72 hrs
- BP monitoring at home with case-by-case planning according to BP stability and condition severity e.g. 24 hours post-discharge, one week, and then approximately weekly
- Provide individualised counselling on the chance of recurrence and longer-term health implications
- Comprehensive hospital discharge summary to wahine/person's primary care provider and LMC

*Antihypertensives for acute lowering of BP

IV Labetalol

- Initial: 20 mg bolus over 2 mins
- Onset: 5 mins
- Repeat: every 10 mins with 40-80mg (if needed)
- Maximum: 300 mg

Nifedipine

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

Take care using with magnesium sulphate, risk of severe hypotension

IV Hydralazine

- 5–10 mg bolus (5 mg if concern of pēpi compromise) over 3–10 mins
- Onset: 20 mins
- Repeat: 5-10mg every 20 mins
- Maximum: 30 mg

Consider IV bolus 200–300 mL crystalloid fluid before/with first dose

Magnesium sulphate

To prevent eclamptic seizure, magnesium sulphate is the anticonvulsant medicine of choice – see protocol for use as indicated

Preeclampsia blood tests

- FBC (platelets)
- Electrolytes & areatinine
- LFT (incl AST, ALT)
- Coagulation studies if high AST/ALT or low platelets

Signs & symptoms of preeclampsia

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

CAROSIKA
COLLABORATIVE | TAONGA TUKU IHO

Adapted from: *Te Whatu Ora – Health New Zealand. 2022. Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand: Te Tautohu, Te Tumahu i te Toto Pōrutu me te Pēhanga Toto Kaha i te Hapūtanga ki Aotearoa: A clinical practice guideline*

HELLP

A variant of severe pre-eclampsia including **H**aemolysis, **E**levated **L**iver enzymes and **L**ow **P**latelet count

At diagnosis

- Emergency transfer of responsibility and care to obstetric team (Consultation referral code 4006)
- Admit to hospital and consider transfer to secondary/tertiary facility
- Urgently treat severe hypertension, sBP ≥160 mmHg* and/or dBP ≥110 mmHg
- Urine PCR and preeclampsia blood tests
- CTG to assess fetal wellbeing (computerised if available)
- Arrange an USS to assess fetal growth

Treatment

- Stabilise whilst monitoring and making plan for birth
- Consider IV magnesium sulphate to prevent eclamptic seizure
- Commence antihypertensives therapy and aim to control hypertension sBP ≤135 and dBP ≤85 mmHg
- Urgently treat severe hypertension, sBP ≥160 mmHg* and/or dBP ≥110 mmHg

Maternal monitoring

- Obstetric led management including anaesthesia and intensive care
- Hourly BP and respiratory rate
- Fluid balance chart
- At least daily preeclampsia bloods including coagulation studies

Maternal monitoring – magnesium sulphate

- BP every 5 mins during bolus dose, hourly with maintenance dose
- Respiratory rate, O_2 saturation, reflexes hourly
- Urine output (>100 mL over 4 hours)
- Fluid restriction (80–85 mL/hour total fluid)

Fetal monitoring

- CTG (computerised if available and continuous whilst magnesium sulphate is given)

Timing of birth and preparation for preterm birth

Any gestational age: Recommend birth after stabilisation of wahine/person. If time permits, *in utero* transfer for birth in a secondary/tertiary unit with resources for māmā/person and pēpi monitoring and critical care

Preterm birth: Administer corticosteroids if ≤34^{+6} weeks and magnesium sulphate if <30 weeks (if not already given), but do not delay birth if detrimental to immediate health of wahine/person and/or pēpi. Preeclampsia alone is not an indication for caesarean section regardless of gestation

Intrapartum

- At least hourly BP in labour
- Continuous CTG monitoring
- Continue antihypertensives, adjust as required, e.g. regional anaesthesia

Postpartum

- Continue magnesium sulphate for ≥24 hours if used for maternal indications
- Consider changing to an alternative antihypertensive e.g. ACE inhibitor
- BP monitoring 4–6 hourly and titrate antihypertensives as required
- Monitor for disease resolution, stay in secondary/tertiary facility for ≥72 hrs
- BP monitoring at home with case-by-case planning according to BP stability and condition severity e.g. 24 hours post-discharge, one week, and then approximately weekly
- Provide individualised counselling on the chance of recurrence and longer-term health implications
- Comprehensive hospital discharge summary to wahine/person's primary care provider and LMC

*Antihypertensives for acute lowering of BP

IV Labetalol

- Initial: 20 mg bolus over 2 mins
- Onset: 5 mins
- Repeat: every 10 mins with 40-80mg (if needed)
- Maximum: 300 mg

Nifedipine

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

Take care using with magnesium sulphate, risk of severe hypotension

IV Hydralazine

- 5–10 mg bolus (5 mg if concern of pēpi compromise) over 3–10 mins
- Onset: 20 mins
- Repeat: 5-10mg every 20 mins
- Maximum: 30 mg

Consider IV bolus 200–300 mL crystalloid fluid before/with first dose

Magnesium sulphate

To prevent eclamptic seizure, magnesium sulphate is the anticonvulsant medicine of choice – see protocol for use as indicated

Preeclampsia blood tests

- FBC (platelets)
- Electrolytes & areatinine
- LFT (incl AST, ALT)
- Coagulation studies if high AST/ALT or low platelets

Signs & symptoms of preeclampsia

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

Adapted from: *Te Whatu Ora – Health New Zealand. 2022. Diagnosis and Treatment of Hypertension and Pre-eclampsia in Pregnancy in Aotearoa New Zealand: Te Tautohu, Te Tumahu i te Toto Pōrutu me te Pēhanga Toto Kaha i te Hapūtanga ki Aotearoa: A clinical practice guideline*

CAROSIKA
COLLABORATIVE | TAONGA TUKU IHO