HYPERTENSIVE DISORDERS IN PREGNANCY

CLINICAL GUIDELINE MCSA.MBC.2.1

A. Definitions/terminology:

1. **Hypertension**
   If two systolic BP ≥ 140mmHg taken 4 hours apart
   If two diastolic BP ≥ 90mmHg taken 4 hours apart
   A single systolic BP ≥ 160mmHg
   A single diastolic BP ≥ 110mmHg

   Standard for measurement of BP

   - Use regularly calibrated machines
   - BP to be taken in the sitting position with legs uncrossed and in a relaxed position. The arms should be free of clothing, and arm supported so the cuff is at the level of the heart.
   - If the MUAC > 33cm, a larger cuff size should be used. Current machines available with 2 sizes for adults i.e., adult and obese.

2. **Pre-hypertension**

   - Blood pressure of 130-139/85-89 mmHg
   - Repeat blood pressure after rest (30min – 2 hours), if still pre-hypertensive review in 3 – 7 days otherwise normal follow-up

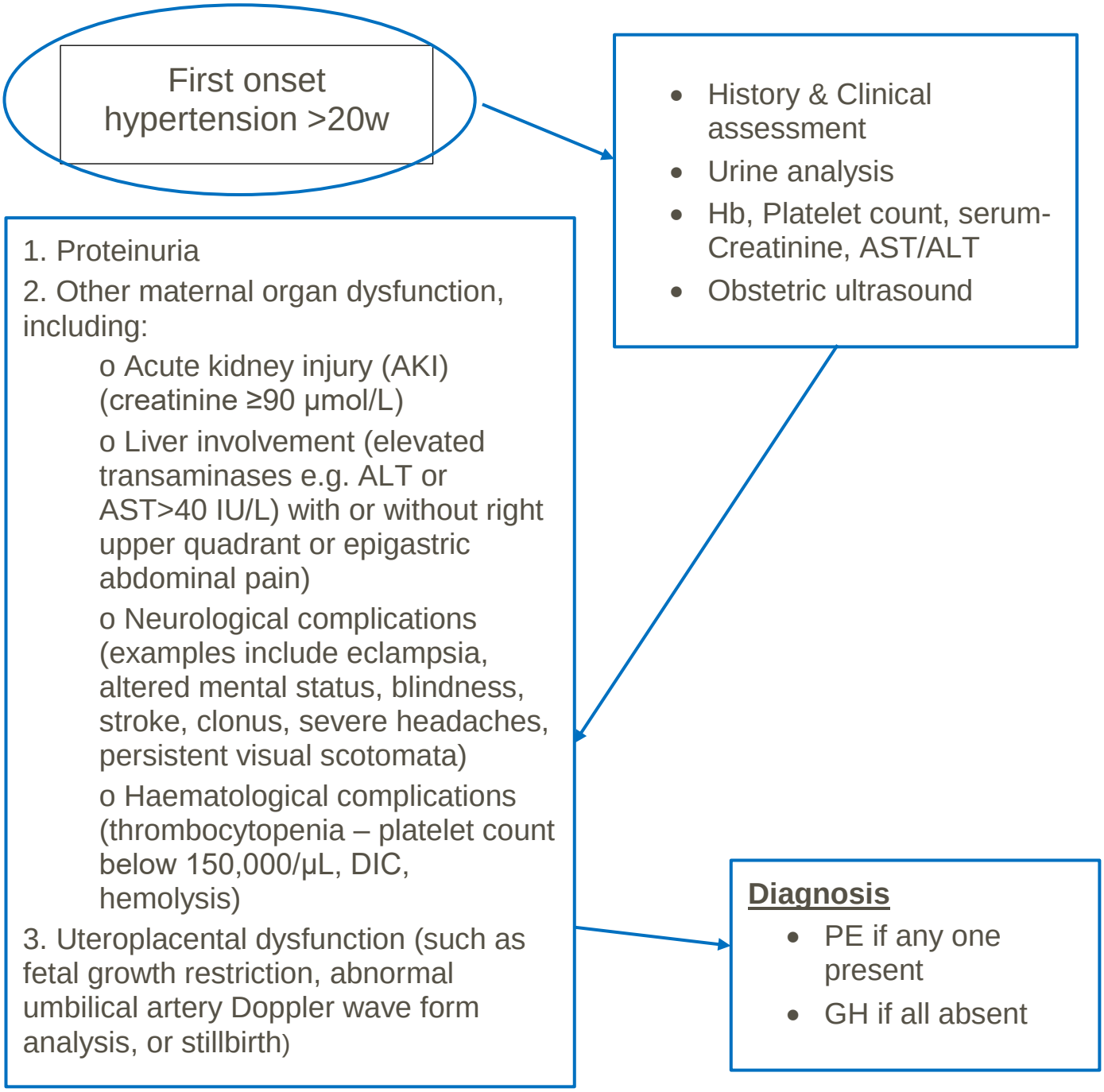
3. **Pre-eclampsia (PE)**

   A syndrome of new onset of hypertension and either proteinuria or end-organ dysfunction most often after 20 weeks of gestation in a previously normotensive woman and resolving within 6 weeks after delivery. Eclampsia is diagnosed when seizures occur.

4. **Gestational hypertension (GH)**

   - Elevated blood pressure (BP > 140/90mmHg) first detected after 20 weeks of gestation in the absence of proteinuria or other features of organ dysfunction in a previously normotensive woman.

It is very important to distinguish gestational hypertension from pre-eclampsia which has a different course and prognosis



5. Chronic Hypertension

- Pre-existing hypertension (BP > 140/90mmHg) that antedates pregnancy and is present before 20 weeks of gestation.

6. **Pre-eclampsia (PE) superimposed on existing hypertension**

    - This occurs in a woman with chronic hypertension who falls pregnant then develops worsening hypertension with new onset of proteinuria or other features of organ dysfunction consistent with pre-eclampsia,
    - In the absence of pre-existing proteinuria, new-onset proteinuria in the setting of a rise in blood pressure is sufficient to diagnose superimposed PE.

7. **Proteinuria**
    - Anything more than trace proteinuria warrants investigation
    - ≥ 0.3g total protein in a urine specimen collected over 24 hours or
    - Urinary protein/creatinine ratio ≥ 0.3

8. **Unclassified hypertension**

    - Hypertension in a patient who is seen for the first time after 20 weeks of gestation

B. Screening for and prevention of Preeclampsia

Blood pressure and dipstix urinalysis must be performed at every antenatal clinic visit to allow early diagnosis.

First trimester screening and preventative therapy for patients at risk of PE can reduce the incidence of PE and more especially early-onset PE.

Calcium supplementation (1000mg elemental Ca++) should be given to all pregnant women, with a 2-hour interval between calcium and Iron ingestion, starting at any gestation but preferably as early as possible

Low-dose Aspirin (150mg at night) for women at increased risk of PE is best commenced at 12w (or soonest thereafter) and continued until 36w of pregnancy.

1. **Risk assessment based on patient history and demographics**

    RCOG/NICE guidelines and also the South African National Department of Health recommend risk-factor-based screening (table 1) all women with ≥ 1 high risk factor or ≥ 2 moderate risk factors qualify for low-dose aspirin.

Table 1. Risk factors for preeclampsia

High Risk Factors	Moderate Risk factors
Hypertensive disease during a previous pregnancy	First pregnancy
Chronic kidney disease	Age ≥ 40years
Autoimmune disease such as SLE or antiphospholipid syndrome	Pregnancy interval > 10years
Type 1 or 2 Diabetes	Family History of PE
Chronic hypertension	Multiple Pregnancy
Assisted reproduction (IVF etc.)	
Maternal BMI > 35kg/m^2	

This form of screening is only recommended if it is not possible to use the Fetal Medicine Foundation (FMF) online tool (see No. 2. below).

2. **Multimodal screening for PE using the FMF Algorithm**

   Risks are derived from: maternal history/characteristics, biophysical measurements (mean uterine artery PI and mean arterial pressure (MAP)) and serum biomarker levels (PLGF or PAPP-A when PLGF is not available).

   Data is entered on the FMF website and calculation of risk will be provided based on built-in algorithms.

- **MAP must be done according to the FMF protocol with automated equipment that must be calibrated annually (protocol available on FMF website).**
- **Uterine artery Doppler PI only to be used if operator accredited by FMF (protocol available on FMF website).**
  https://fetalmedicine.org/research/assess/preeclampsia/first-trimester

A positive screen is a calculated risk of PE > 1 in 100.

C. Management

N.B. Taking a full history and awaiting results of all investigations before intervention is only advised if the patient is stable, has non-severe hypertension and no features to suggest severe PE or eclampsia.

1. **Normotensive with proteinuria on dipstick analysis**
   - Outpatient management
   - Urine specimen for MC&S
   - Urine for PCR (protein creatinine ratio) or quantify 24hr protein excretion
   - If significant proteinuria: consult physician
   - Check BP twice weekly if all normal

2. **Non-severe Hypertension and asymptomatic at ≥ 20w (BP ≥ 140/90 and < 160/110mmHg)**

- Urine dipstick analysis
- Quantify 24hr urine protein excretion/U-PCR
- Start Methyldopa (HyPoTone®) 500mg 8hrly
- Do Hb, Platelet count, s-Cr, AST/ALT
- Urine specimen for MC&S
- Umbilical artery Doppler
- If gestational hypertension is diagnosed and BP is well controlled, continue anti-hypertensive therapy and plan delivery at 38 weeks if all remains well in the interim
- If PE confirmed then:
    - Admit patient
    - If remote from viability the option of TOP can be discussed
    - If the fetus is viable and ≤ 33w6d and no indication for immediate delivery, the offer of expectant management can be made which includes:
        - In-patient management in a facility with 24hr OT, high care and NICU
        - A course of steroids to enhance fetal lung maturity +/- $MgSO_4$ for fetal neuroprotection according to institutional protocol
        - 4 hrly BP monitoring once stable
        - 6 hrly CTG monitoring
        - Twice weekly Hb, Platelet count, s-Cr, AST/ALT
        - Delivery end-points: patient declines expectant management, suspected fetal compromise, abruptio placentae, worsening renal function, HELLP syndrome, patient becomes symptomatic or develops eclampsia, uncontrolled hypertension, pulmonary oedema or any other obstetric indication.

    - If all remains well in the interim, delivery can be considered from 34w onwards

3. **Hypertension with symptoms or severe features**

- Call obstetrician
- Admit in High care unit and nurse in left lateral
- Insert urinary catheter and IV line
- Administer IV Ringers lactate (total volume of IV fluid administered should not exceed 80mls/hr)
- Start Magnesium Sulphate (see number 5 below)
- Control BP – if non-severe see number 2 above and if severe see number 4 below
- Perform an ultrasound (if indicated) or assess clinically to determine fetal viability, EFW (Estimated Fetal Weight) and liquor volume and, if possible and indicated, umbA RI
- If GA ≥ 34/40 or EFW ≥ 2200g expedite delivery
- If GA ≥ 26/40 and < 34/40, administer course of steroids to enhance fetal lung maturity
- If patient is stabilised, offer expectant management if < 34 weeks and eligible (see number 2 above)

- In cases of hypertension or PE with severe features, only monitor the fetus once the woman is stable
- Always remember to exclude molar pregnancy and multiple pregnancy

4. Acute severe hypertension (DBP ≥ 110 and or SBP ≥ 160)

- Administer Nifedipine (Adalat®) 10mg per os immediately (Alternatives if Nifedipine unavailable: Labetalol 200 mg PO, can be repeated after 1 hour; Methyldopa 1000 mg PO single dose)
- Start maintenance therapy with Nifedipine (Adalat XL®) 30mg orally (increase stepwise to maximum 120mg/day in 2 divided doses)
- Aim for DBP ≤ 110 and SBP ≤ 160mmHg
- If BP is still high after 30 minutes, repeat Nifedipine (Adalat®) 10mg orally – this can be repeated to a max of 3 times
- If 30 minutes after the third Nifedipine the BP is still high, then give Labetalol (Trandate®) 20mg IVI
- Check BP after 10 minutes if still high, give Labetalol (Trandate®) 40mg and arrange transfer to ICU for probable Labetalol (Trandate®) infusion – if not possible or while awaiting transfer administer 60 mg labetalol if BP still high after 10 minutes
- *NB Mother receiving Labetalol must be closely monitored with continuous ECG and BP monitoring if possible, and adequate nursing staff cover. The midwife may administer the first IV dose while the Doctor is en route and an ICU bed is being arranged.*

5. Magnesium Sulphate regimen

Loading dose: Magnesium Sulphate (MgSO4) 4g in 200ml Normal Saline 0.9% to be administered over 20-30 minutes.

Maintenance dose: Magnesium Sulphate 4g in 200ml Normal Saline 0.9% to be administered at 1g per hour for 24 hours **OR** 5gm 4-hourly IMI for 24 hours.

Post- partum: Continue Magnesium Sulphate infusion until 24 hours post-delivery or since the last fit.

Contra-indications: Myasthenia Gravis

Observation requirements

- I/2 Hourly BP and Pulse
- Indwelling urinary catheter
- Hourly urine output, if < 30ml/hr discontinue Magnesium Sulphate infusion and manage cause of oliguria
- Hourly Respiratory rate
- Check patella reflexes before commencing each bag of MgSO4, do not start new bag if reflexes absent
- Temperature check every 4 hours

Symptoms of overdose:

- Extreme thirst
- Hot flushes
- Decreased respiratory rate
- Dulled or absent reflexes
- Decreased urinary output
- Feeling weak and lethargic

Antidote: Calcium Gluconate 10%, 10ml IVI slowly over 2 – 3 minutes

N.B. If patient has further convulsions during maintenance, give further 2g MgSO4 IV slowly.

6. **Drug options for maintenance anti-hypertensive therapy during pregnancy**

- Nifedipine (Adalat® XL) start with 30 mg once daily, increase stepwise to 30 mg bd, then 30-60 mg and max 60-60 mg if BP still uncontrolled
- Methyldopa (HyPoTone®) start with 500 mg bd, increase stepwise to max 750 mg tds if BP still uncontrolled
- Labetalol (Trandate®) start with 100 mg bd, increase stepwise to max 400 mg tds if BP still uncontrolled
- Hydrallazine (Apresoline®) start with 25 mg tds, increase stepwise to max 100 mg tds if BP still uncontrolled – NOT FIRST LINE!

7. **Post- partum and future pregnancies**
   - All patients with PE must be monitored in a designated high care unit/high dependency area post-delivery for at least 24hours and longer if there were any complications
   - Stop Methyldopa and start medication patient was using prior to conception if she had chronic hypertension else consider enalapril, hydrochlorothiazide and/or amlodipine if patient is still requiring anti-hypertensive therapy
   - Ensure the provision of reliable contraception and counsel on planned future pregnancies if desired.
   - Post-partum visit must be done within 10 days of discharge

Definitions

Term, Acronym or abbreviation	Definition
FH	Fetal Heart
SBP	Systolic Blood Pressure
DBP	Diastolic Blood Pressure
SFH	Symphysis-Fundal Height

Term, Acronym or abbreviation	Definition
GA	Gestational Age
SROM	Spontaneous Rupture of Membranes
EFW	Estimated Fetal Weight
CTG	Cardiotocograph
IUFD	Intrauterine Fetal death
DUP	Daily Urine Protein
MUAC	Mid upper arm circumference
PAPP-A	Pregnancy associated plasma protein-A
PLGF	Placental growth factor

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Authorship

These guidelines were drafted by a clinical team from Mediclinic and were reviewed by a panel of experts from SASOG and the BetterObs™ clinical team and revised buy the Betterobs™ scientific subcommittee in 2022. All attempts were made to ensure that the guidance provided is clinically safe, locally relevant and in line with current global and South African best practise. Succinctness was considered more important than comprehensiveness.

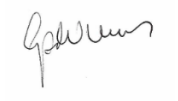
All guidelines must be used in conjunction with clinical evaluation and judgement; care must be individualised when appropriate. The writing team, reviewers and SASOG do not accept accountability for any untoward clinical, financial or other outcome related to the use of these documents. Comments are welcome and will be used at the time of next review.

Released on date: 2022 08 01

History and version control

Author	Version	Details of update	Effective date
Cape Gate Obstetrician Working Group	1	Initial Release	2017 10 01
Expert External Obstetrician	1.1	Validated	
A. Hall	1.2	Rebranded to Mediclinic Clinical Guideline, edited and drug names changed to active ingredients	2018 10 01
SASOG Scientific committee Dr C Groenewald	2.1	1. Name Change: Hypertension Disorders of Pregnancy 2. Multiple changes although basics stay the same 3. First trimester risk assessment based on patient history and demographics should be done on all patients only if it is not possible to use FMF online tool. Subsequent preventative aspirin treatment should be instituted if any of the 2 options confirms high risk. 4. Umbilical Artery Doppler is added for Non-Severe hypertension and asymptomatic at ≥ 20w 5. Magnesium Sulphate regime included in this guideline so Severe PET flow chart integrated into this guideline	2022 08 01

Approved by

Department/ Area/ Group/ Forum	Representative name	Signature	Designation	Date
Clinical Department	Dr Gerrit De Villiers		Chief Clinical Officer	2023 04 26