Management of Hypertensive Disease in Pregnancy

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1. Summary of recommendations

- Nearly 10% of pregnant women are affected by hypertensive disorders in pregnancy. (Systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg). Early identification and intensive treatment is recommended.
- Classify degree of hypertension as follows. Hypertension: blood pressure of 140/90-159/109 mmHg, Severe hypertension: blood pressure of 160/110 mmHg or more.
- Advise pregnant women with any of the high-risk factors for pre-eclampsia to take 75-150 mg of aspirin daily from 12 weeks, until the birth of the baby.
- Advise pregnant women with two or more moderate risk factors for pre-eclampsia to take 75-150 mg of aspirin daily from 12 weeks, until the birth of the baby.
- Stop ACE inhibitors, ARBs, thiazide, or thiazide-like diuretics and shift to safe alternatives in pregnancy. (Increased risk of congenital abnormalities – alter as early as possible).
- Offer antihypertensive pharmacological treatment if BP remains sustained ≥140/90 mmHg. Aim for a target blood pressure of 135/85 mmHg.
- Consider labetalol to treat hypertension in pregnant women. Consider nifedipine or methyldopa in whom labetalol is not suitable or according to clinical relevance.
- Interpret proteinuria with full clinical picture, symptoms, signs, and other investigations for preeclampsia. Use an automated reagent-strip/dipstick screening wherever possible. (when dipstick screening is positive (1+ or more), use protein: creatinine ratio (UPCR) for quantification).
- When using UPCR to quantify, use 30 mg/mmol as the threshold for significant proteinuria.
- Consider the need for intravenous magnesium sulfate in women with preeclampsia. Use the collaborative eclampsia trial regimen for administration of magnesium sulfate.
- Carry out an ultrasound for fetal growth and amniotic fluid volume assessment and umbilical artery doppler velocimetry at diagnosis and if normal repeat every 2 to 4 weeks, if clinically indicated.
- If a woman has taken methyldopa to treat chronic hypertension during pregnancy, stop within 2 days after the birth and change to an alternative antihypertensive treatment.
- In women with chronic hypertension who have given birth: aim to keep blood pressure lower than 140/90 mmHg and continue antihypertensive treatment. Offer a review of antihypertensives 2 weeks after the birth. Offer a medical review 6 weeks after the birth.

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- ❖ In women with gestational hypertension who have given birth: continue antihypertensive treatment if required. Reduce/Stop antihypertensive treatment if their blood pressure falls below 130/80 mmHg.
- ❖ Offer women who have had gestational hypertension and remain on antihypertensive treatment, a medical review at 2 weeks.
- ❖ Offer all women who have had gestational hypertension a medical review at 6 weeks.

2. Introduction and epidemiology

Hypertension in pregnancy is an important cause of direct maternal deaths in Sri Lanka. Nearly 10% of pregnant women are affected by hypertensive disorders in pregnancy. Early identification, aggressive and intensive treatment of its complications is important in reducing the resulting morbidity and mortality.

3. Identification and assessment of evidence

Search strategy: Eternal guidelines, systemic reviews and Cochrane reviews were searched assessing available evidence and the best practices.

4. Definitions

Hypertension:

Systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg.

Severe hypertension:

Systolic blood pressure ≥160 mmHg and/or diastolic blood pressure ≥1l0 mmHg.

Chronic hypertension:

Women with pre-existing hypertension or hypertension detected before 20th week of gestation in the absence of trophoblastic disease and persisting more than 42 days post-partum.

Classification

- Hypertension known before pregnancy or present in the first 20 weeks:
  1. Chronic hypertension
     a. Essential
     b. Secondary
  2. White-coat hypertension
  3. Masked hypertension
- Hypertension arising de novo at or after 20 weeks:
  1. Transient gestational hypertension
  2. Gestational hypertension
  3. Pre-eclampsia*-de novo or superimposed on chronic hypertension

Gestational hypertension

A) Gestational hypertension:

New onset hypertension without significant proteinuria developing after 20 weeks of gestation and resolving within 42 days of delivery.

B) Pre-eclampsia:

Gestational hypertension associated with significant proteinuria (UPCR ≥30mg/mmo1 or 2+ or more on dipstick or 300mg/24 hours).

Proteinuria is not mandatory for a diagnosis of pre-eclampsia. Rather, this is diagnosed by the presence of de novo hypertension after 20 weeks' gestation accompanied by evidence of at least one other organ involvement. (biochemical and/or hematological impairment).

Evidence of maternal acute kidney injury, liver dysfunction, neurological features, hemolysis or thrombocytopenia, and/or uteroplacental dysfunction (such as fetal growth restriction, abnormal umbilical artery doppler waveform analysis, or stillbirth). Pre-eclampsia may develop or be recognized for the first-time intra-partum or early post-partum in some cases.

• Interpret proteinuria measurements for pregnant women in the context of a full clinical review of symptoms, signs, and other investigations for pre-eclampsia.

The clinical and biochemical features of pre-eclampsia (in addition to hypertension and proteinuria) are:

- Severe headache.
- Visual disturbances (blurring of vision or flashing before eyes or neurological symptoms such, altered mental status, blindness, stroke, or persistent visual scotomata).

* The term 'severe pre-eclampsia' should not be used in clinical practice routinely since it undermines the severity of pre-eclampsia.

- Epigastric or right hypochondrial pain, liver tenderness +/- nausea and vomiting
- Clonus (3 beats or more)
- Papilloedema
- Oliguria (less than 400 ml per day or 0.5 mg/Kg/ hour over a 4-hour period)
- Abnormal liver enzymes (ALT or AST rising to above 40IU/liter)
- thrombocytopenia (platelet count below 150,000/ microliter
- Renal insufficiency (creatinine ≥90micromol/liter)
- HELLP syndrome
- Uteroplacental dysfunction (fetal growth restriction, abnormal umbilical artery doppler waveform analysis, or stillbirth.)

Eclampsia:

Defined as the development of convulsions and/or unexplained coma during pregnancy or postpartum in patients with a background of pre-eclampsia or gestational hypertension.

5. Screening for hypertension and proteinuria during pregnancy

Blood pressure should be measured in every clinic visit by a Medical Officer and results recorded and plotted in the pregnancy record.

Proteinuria should be tested for at every clinic visit using dipstick test.

If blood pressure is more than 140/90 mmHg on two occasions at least 2 hours apart, refer for specialist care.

- Proteinuria should be assessed initially by an automated dipstick (If not available, careful visual dipstick urinalysis.
- If positive (≥ '1+', 30 mg/dl) then spot urine protein/ creatinine (UPCR) ratio should be performed.
- A UPCR ratio ≥30 mg/mmol (0.3 mg/mg) is abnormal.
- A negative dipstick test can usually be accepted and further UPCR testing is not required at that time.
- Proteinuria is not mandatory for a diagnosis of pre-eclampsia.
- Massive proteinuria (> 5 g/24 h) is associated with more severe maternal and neonatal outcomes.

6. Prevention of hypertensive disorders in pregnancy

Aspirin:

Advise women at high risk of pre-eclampsia to take 75-150 mg of aspirin at night daily from 12 weeks until delivery of the baby.

Women at high risk are:

Those with any one of the following high-risk factors:

1. Hypertensive disease during a previous pregnancy.
2. Chronic hypertension.
3. Chronic kidney disease.
4. Autoimmune disease such as systemic lupus erythematosus or antiphospholipid syndrome.
5. Pre-existing diabetes (Type 1 or type 2).

Or, two or more of the following moderate risk factors

1. First pregnancy
2. Age 40 years or older
3. Pregnancy interval of more than 10 years
4. Body mass index (BMI) of 30 kg/m^2 or more at first visit
5. Family history of preeclampsia
6. Multi-fetal pregnancy

Contraindications such as allergy, gastritis, peptic ulcer disease needs to be considered.

Advice women who have the above risk factors to ensure a higher intake of calcium to achieve a daily intake of at least 1000 mg. (Taking into account the average intake by Sri Lankan women the recommended supplementation dose is 600 mg.)

7. Management of chronic / young hypertension

Women with chronic hypertension are recommended to be managed in specialist units. Anticipate the

development of superimposed pre-eclampsia in these women. This combination adds risks to both the mother and the baby. ACE inhibitors, AR Blockers, thiazide diuretics, and spironolactone are recommended to be discontinued in women who are planning pregnancy and their use is avoided during pregnancy.

Labetalol, nifedipine and methyl dopa should be considered as standalone drugs or in combination.

Routine investigations for chronic/young hypertension should be arranged such as FBC, UFR, RFT, LFT, USS KUB and abdomen, +/- renal artery doppler, 2D echo and ECG when indicated.

8. Treatment of hypertension

Offer antihypertensive treatment to pregnant women if they have:

Sustained systolic blood pressure of ≥140 mmHg or sustained diastolic blood pressure of ≥90 mmHg.

When using medication to treat hypertension in pregnancy, aim for a target blood pressure of 135/85mmHg.

The goal of acute hypertension treatment is to lower BP to prevent cerebrovascular and cardiac complications while maintaining uteroplacental blood flow, until the delivery is affected.

Although antihypertensive treatment decreases the incidence of cerebrovascular problems, it does not alter the progression of preeclampsia.

9. Management of pre-eclampsia

9.1 General considerations

1. Preeclampsia can be a life-threatening condition.
2. The only known cure is delivery of the baby.
3. The immediate task is to determine the urgency to effect delivery.
4. Stabilization of the mother's condition within an acceptable time frame prevents maternal complications and may improve fetal condition.
5. The management must be individualized depending on the clinical condition and available resources.
6. The dangers will continue into the immediate postpartum period.

The basic outline of management

- Admit to hospital and inform Consultant
- Observe and monitor
- Control blood pressure
- Evaluate the need for $MgSO_4$
- Look for complications – such as HELLP/ pulmonary oedema/cerebral hemorrhage/AKI
- Strict fluid balance
- In-utero transfer where necessary evaluate the fetus
- Timing of delivery
- Continue vigilance postdelivery
- Followup

9.2 Specific management

Admit women with pre-eclampsia and inform the Consultant.

Treat hypertension if:

- Systolic blood pressure ≥140 mmHg, or if
- Diastolic blood pressure ≥90 mm Hg,

In case of pre-eclampsia with severe hypertension, aim for an initial realistic target around 140-150/90-100 mmHg.

The main cause of maternal death in severe pre-eclampsia is poorly controlled systolic hypertension causing cerebral haemorrhage.

A rapid fall in maternal blood pressure as a result of antihypertensive treatment may cause fetal heart rate abnormalities and compromise, especially in growth restricted/compromised fetuses.

Where resources allow, it is recommended to monitor fetal heart with continuous CTG during and for 60 minutes after commencing anti-hypertensive therapy. Aim to stabilize blood pressure before delivery.

9.2.1 Anti-hypertensive drugs

Severe hypertension should be treated as a medical emergency.

Emergency drugs tray should always be kept prepared in all maternity units for immediate access.

Oral anti-hypertensive medications may be used when the blood pressure is <180/110 mmHg. Blood pressure must be monitored at l5 minute intervals. Intravenous anti-hypertensives should be considered when an adequate response is not obtained within 30 minutes. The commonly used antihypertensive drugs for acute control are given below. One or the other may be used depending on availability and familiarity.

9.2.2 Labetalol orally or intravenously

This should be avoided in women with a history of bronchial asthma.

200mg orally stat. (only if blood pressure <180/110 mm Hg. If higher, Consider IV)

Check BP in 15 mins and 30 mins. Repeat dose in half an hour if no adequate response.

Recheck BP in 15 mins and 30 mins. If inadequate response, consider oral Nifedipine or IV labetalol regimens after senior advice.

- 20-50 g IV loading over two minutes.
- Record blood pressure after 10 minutes.
- If either value is still above 160 mmHg systolic and/ or 110 mmHg diastolic, repeat 20-50 mg IV over 2 minutes.
- Record blood pressure after 10 minutes.
- Repeat every 10 mins maximum up to 4 doses until BP controlled. (Max. cumulative dose up to 200 mg IV).
- If the blood pressure is still above 160 mmHg systolic and/or 110 mmHg diastolic, Consider IV labetalol infusion or IV Hydralazine.
- Maintenance IV labetalol infusion – starting at 20 mg/hr (4ml/hr), double the infusion rate at every 30 minutes intervals until BP is controlled. (Max Infusion rate 32ml/hr. Total of 160 mg/ hour max).
- Where these measures fail or clinically indicated, the patient must be moved to a high-dependency area or an intensive care unit.

If blood pressure is controlled by the above, continue monitoring the blood pressure at l5 minute intervals for I hour and at 30-minute intervals thereafter.

Additional bolus doses as described above may be administered if the blood pressure increases above 160 mmHg systolic and/or 110 mmHg diastolic.

9.2.3. Hydralazine intravenously

If labetalol and/or nifedipine have not been effective or are contraindicated, seek senior advice and consider IV hydralazine.

Hydralazine 5-10 mg IV bolus over 2 minutes.

This must be accompanied by a fluid bolus of 5ml/kg of 0.9% sodium chloride or Ringer's lactate solution over 30 min, started at the same time as iv hydralazine (Hydralazine is a direct vasodilator. Fluid bolus helps to overcome vasodilatation and prevents drastic hypotension. This should not be used in the presence of pulmonary oedema).

- Record blood pressure at 20-minute intervals.
- Repeat boluses of 5-10 mg IV after a 20-minute interval.may be given if necessary, up to a maximum of 20 mg (the effect of a single dose can last up to 6 hours).
- If no lasting effect with above boluses, consider an infusion of hydralazine 2.0 mg/hour increasing by 0.5 mg/hour as required (2-18 mg/hour usually required).
- If the response to above doses is inadequate, consider labetalol bolus doses as described above.

9.2.4 Oral nifedipine

- If the woman is asthmatic/labetalol has been not effective or not available consider, nifedipine.
- Oral nifedipine may be used where the blood pressure is <180/110mmHg, in asymptomatic patients. (Avoid sublingual administration as it can cause sudden hypotension and fetal compromise).
- Give 10mg orally.
- Repeat at 20-minute intervals up to a maximum of 40mg.
- If there is no response proceed to intravenous labetalol or hydralazine.

9.2.5 Prevention of convulsions

Magnesium sulphate

- Magnesium sulphate is the anticonvulsant of choice. Use the Collaborative Eclampsia Trial regimen for administration of magnesium sulphate.
- A loading dose of 4 g should be given intravenously over 5 to 20 minutes, followed by an infusion of 1g/hour maintained for 24 hours.
- If the woman has had an eclamptic fit, the infusion should be continued for 24 hours after the last fit. Recurrent fits should be treated with a further dose of 2-4 g given intravenously over 5 to 20 minutes.
- Women should receive MgSO4 if they have severe hypertension (≥160/110 mmHg) and proteinuria or if there have premonitory signs of eclampsia.

  (It should be considered in any woman with features of impending/imminent eclampsia (presence of ≥3 beats clonus, severe headache, visual disturbances such as scotoma, blurring or flashing before the eyes, papilledema, HELLP syndrome, platelet count falling to below 100×10^9 per litre, rising liver enzymes).

Loading dose:

- The loading dose may be given even when the status of renal function is uncertain, since it is unlikely that toxic levels of magnesium could be reached with this dose alone.
- Give loading dose of 4 G IV over 5-20 minutes. There are two methods of giving magnesium sulphate intravenously.

1. Via infusion pump or manually:

4 g , diluted to a total volume of 20 ml with 0.9% sodium chloride solution, given via an infusion pump or 'manually'. (20ml of the loading dose in a syringe pump and administered at a rate of 60ml/ hour, i.e. 4g will be given over a 20 minute period or 240ml/hour if given over 5 minutes in the case of an eclamptic fit).

2. Via burette set:

Diluted to a total volume of 80 ml with 0.9% sodium chloride solution via a burette.

Maintenance infusion:

- Immediately after the loading dose, start infusion of 1g IV per hour. Continue this infusion for at least 24 hours after delivery or from the last fit.

  (Maintenance infusion 10g in 50ml via a syringe pump: The 50ml syringe containing 50ml of the maintenance dose is to be attached to a syringe pump and administered on completion of loading dose; set rate at 5ml/hour which equates to 1g/ hour.

  When a pre-prepared syringe is unavailable remove 80ml of sodium chloride 0.9% from a 500ml bag of sodium chloride 0.9% and add 80ml of magnesium sulphate injection 50% (This produces 40g in 500ml). The 500ml bag to be attached to a giving set and administered on completion of loading dose set rate at 12.5ml/ hour which equals to 1g/hour).
- Where there are difficulties with intravenous access, magnesium sulphate may be administered intramuscularly. Give 5g deep intramuscularly into each buttock with 1 ml of 2% lignocaine in the same syringe.
- If intramuscular magnesium sulphate is continued as maintenance therapy, give 5g to alternate buttocks 4 hourly, with l ml of 2% lignocaine in the same syringe.
- Monitor the mother to ensure hourly urine output of 30 ml per hour, respiratory rate >16/ minute, oxygen saturation >90% and presence of patellar reflexes.
- These should be recorded every 30 minutes.
- Women receiving a magnesium sulphate infusion should have a medical review at least every four hours, including assessment and documentation of peripheral reflexes.
- Should signs of toxicity appear, the antidote is calcium gluconate, 1g intravenously (10ml of 10% solution), given over 10 minutes.

May need to check Mg levels if rate exceeds 2g/hr:

- ♦ Normal serum level 0.7-1.0mmol/L
- ♦ Therapeutic level 2.0-4.0mmol/L
- ♦ Disappearance of tendon reflexes at 5.0mmol/L
- ♦ Muscular paralysis and respiratory depression at 6-8mmol/L
- ♦ Cardiac arrest at 12mmol/L

- Do NOT sample from the arm where the MgSo4 infusion is given. Levels may be difficult to interpret with hypovolemia. Liaise with Consultant Anesthetist/ Obstetrician.

- **Discontinue infusion if:**
  - ♦ Urine output in the preceding 4 hours <100mls.
  - ♦ Absent patellar (knee jerk) reflexes.
  - ♦ Respiratory rate <12per minute.
  - ♦ Weakness, sensation of warmth, flushing, drowsiness, double vision and slurred speech.
- Magnesium sulphate may be used safely in women who have previously received nifedipine.

10. Fluid balance

- Limit maintenance fluids to 80ml/hour (1/ml/Kg/hr) unless there are other ongoing fluid losses (for example, haemorrhage).
- Accurate recording of fluid balance is essential.
- Selective volume expansion may be necessary prior to pharmacological vasodilatation to prevent maternal hypotension and fetal compromise or in oliguria with a low central venous pressure.
- The volumes of all drugs administered must be taken into account and appropriate reduction of the volume of crystalloids must be made.
- CVP measurement may be indicated where urine output falls and difficulty in maintaining fluid balance. If urine output falls to less than 0.5ml/kg/hr over 4 consecutive hours a Central Venous Pressure line is to be considered and fluid replacement done cautiously with joint Anesthetic and Obstetric review.
- Diuretics must be restricted to specific instances only

  eg. for women with pulmonary oedema.
- Avoid non-steroidal analgesia until fluid recovery.

11. In utero / neonatal transfer

- If the Unit does not have access to HDU/ICU or is unable to cope with maternal complications, or with maturity of the baby, it may be appropriate to consider antenatal transfer of the mother.
- However, maternal safety must not be compromised and each case should be considered on its clinical merits.
- Steps must be taken to bring down blood pressure from very high levels (e.g. using nifedipine).
- Women with imminent/impending eclampsia must be administered a loading dose of magnesium (1M or IV) before transfer (see 7.2.5).
- It is recommended that where possible telephone advice is obtained from the relevant specialist unit before transfer.
- The patient must be accompanied by a member of staff who is capable of dealing with a seizure while the patient is in transit. The required drugs and equipment must be made available.
- Full details of the case, including treatment given should accompany the patient.

12. Fetal surveillance in pre-eclampsia or severe gestational hypertension

- **Cardiotocography:** At diagnosis of pre-eclampsia or severe gestational hypertension. (Repeat if change in fetal movements reported, vaginal bleeding, abdominal pain deterioration in maternal condition or as clinically indicated).
- **USS at diagnosis:** Ultrasound for fetal growth and amniotic fluid volume assessment with umbilical artery Doppler velocimetry. (Repeat fetal growth, amniotic fluid volume and umbilical artery doppler velocimetry every 2 weeks or more frequently, as determined by the findings of these scans).

13. Delivery

- Urgency of delivery depends on the maternal and fetal conditions.
- Either caesarean section or induction of labour is appropriate depending on the urgency and favourability of the cervix.
- Institute adequate pain relief. Pre-eclampsia is not a contraindication for opioid or epidural anesthesia (see below). It is accepted that epidural anesthesia helps to bring down the blood pressure.
- Spinal or epidural anesthesia is safe in the presence of a platelet count >80,000/dl.
- Maternal condition should be optimized before delivery.
  - ♦ It is inappropriate to deliver an unstable mother for fetal reasons.
  - ♦ Ergometrine should not be used during the third stage.

13.1 Intrapartum care

- Continue use of antenatal anti-hypertensive treatment during labour.
- **Blood pressure:** During labour, measure hourly, in women with hypertension. Every 15-30 minutes until blood pressure is less than 160/110 mmHg in women with severe hypertension.
- **Fluid balance:** Should aim for euvolemia. Pre-eclamptic women have capillary leak but may have either reduced or increased cardiac output. To ensure euvolemia, insensible losses should be replaced (30 ml/h) along with anticipated urinary losses (0.5-1 ml/kg/h). We suggest not using more than 80-100 ml/h. to avoid risks of pulmonary oedema. There is no rationale to 'run dry' a pre-eclamptic woman as she is already at risk of acute kidney injury.
- **Hematological and biochemical tests:** During labour consider the same criteria as in the antenatal period. Take in to account the overall clinical picture, need for regional analgesia, mode of anesthesia for operative delivery when considering additional testing.
- **Second stage:** Do not routinely limit the duration of the second stage of labour in women with controlled hypertension. Consider operative or assisted birth in the second stage, for women with severe hypertension or whose hypertension has not responded well to initial treatment.
- **Mode of delivery:** Choose mode of birth for women with severe hypertension, severe pre-eclampsia or eclampsia (Induction of labour vs caesarean section) according to the clinical circumstances as well as taking woman's preference in to account whenever possible.

13.2 Post-delivery

- Maintain vigilance as a high proportion of eclamptic seizures occur after delivery.
- High dependency care should be provided as clinically indicated.
- Continue close monitoring, including fluid balance, platelets, liver enzymes and creatinine until they have returned to normal values.
- Magnesium sulphate if started should be continued for 24 hours after the delivery or after the last fit, whichever is later.
- Review anti-hypertensive medication as indicated. Some may need to continue oral medication for a few weeks. Methyldopa should be avoided following delivery because of its tendency to cause depression.

14. Antihypertensive treatment during the postnatal period and during breast-feeding

- Avoid using diuretics or angiotensin receptor blockers to treat hypertension in women in the postnatal period who are breastfeeding.
- Most antihypertensives show very low levels in breast milk, since unlikely to have a significant clinical effect.
- However, consider monitoring the BP of babies, (especially those born pre-term) who have symptoms of low blood pressure for the first few weeks.
- When discharged home, advise women to monitor their babies for drowsiness, lethargy, pallor, cold peripheries, or poor feeding.
- Enalapril, (with monitoring of maternal renal function and serum potassium when indicated) nifedipine, atenolol, labetalol, amlodipine, can be considered to treat hypertension as single agents or in combination in women during the postnatal period.

15. Follow up

- A care plan must be clearly documented for women with pre-eclampsia prior to discharge to the community.
- Inform Public Health Midwife and/or Medical Officer of Health.
- Review in 1-2 weeks (instead of 4 weeks) if discharged on antihypertensives.
- Depending on the clinical picture, some patients may need:
  - ♦ Long term follow-up for blood pressure.
  - ♦ Hematological investigations for conditions such as anti-phospholipid syndrome, thrombophilia.
- Debrief the patient.

- Advice preconceptual counseling and check prior to the next pregnancy.
- Women may be advised regarding the risk of developing hypertensive disease in a future pregnancy as follows:
  - Risk of gestational hypertension – 53% (1 in 2)
  - Risk of pre-eclampsia – 16% (1 in 6)
  - Risk of pre-eclampsia if she had severe hypertension or HELLP syndrome or eclampsia or the birth occurred before 34 weeks – 25% (1 in 4); and 55% (1 in 2) if the birth occurred before 28 weeks gestation.
- Advice regarding the increased risk of cardiovascular disease in later life. Long-term follow-up of these women are recommended even though optimum method and duration is currently uncertain. (Increased risks of Metabolic syndrome cardiovascular disease, stroke, diabetes, venous thromboembolic disease (VTE) CKD, and death, compared with women who have had normotensive pregnancies).

16. Contraception

Having had hypertensive disease in pregnancy is not a specific contraindication for contraception. Individual medical eligibility criteria for each method should be taken into consideration in counselling these women for contraception.

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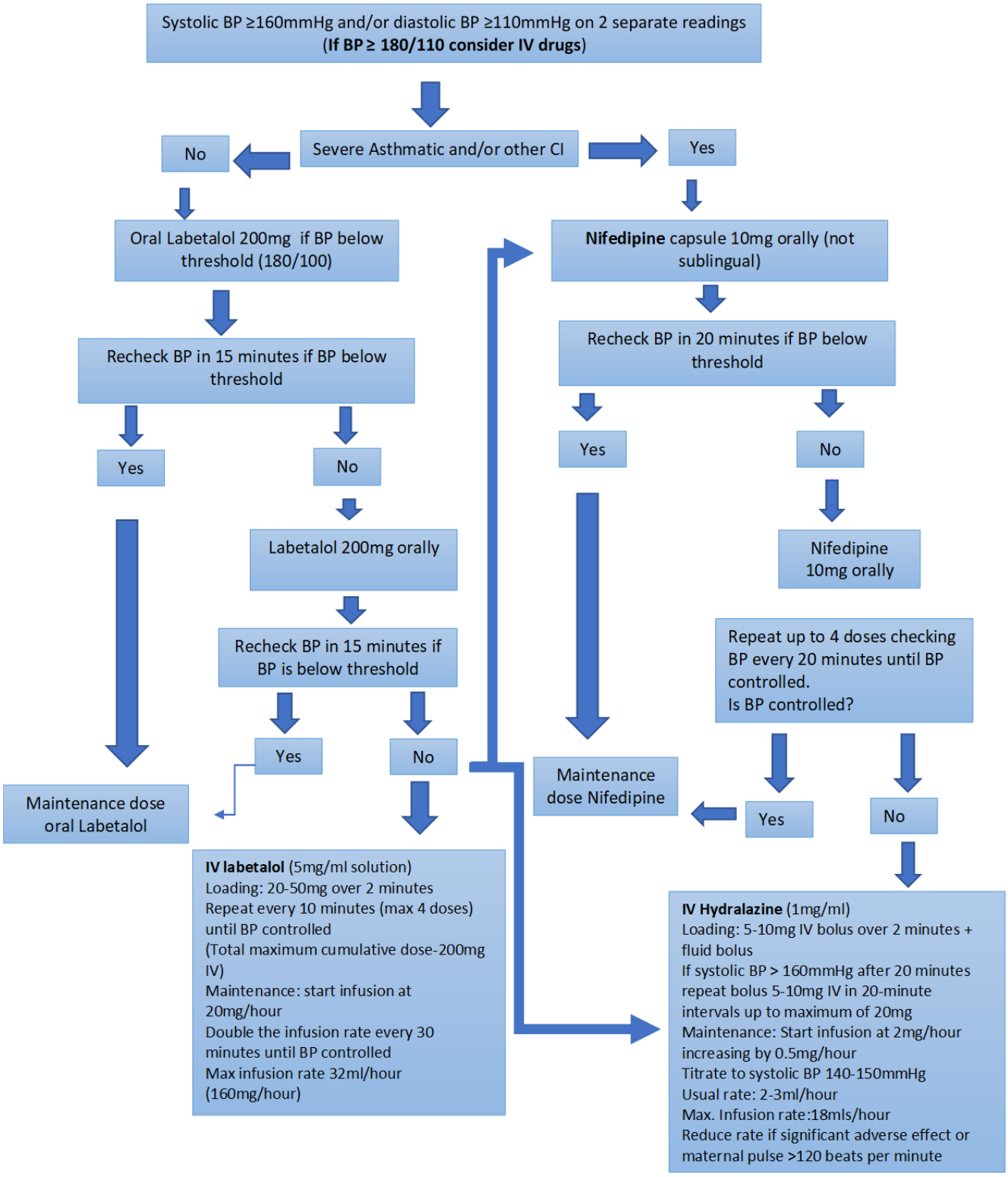
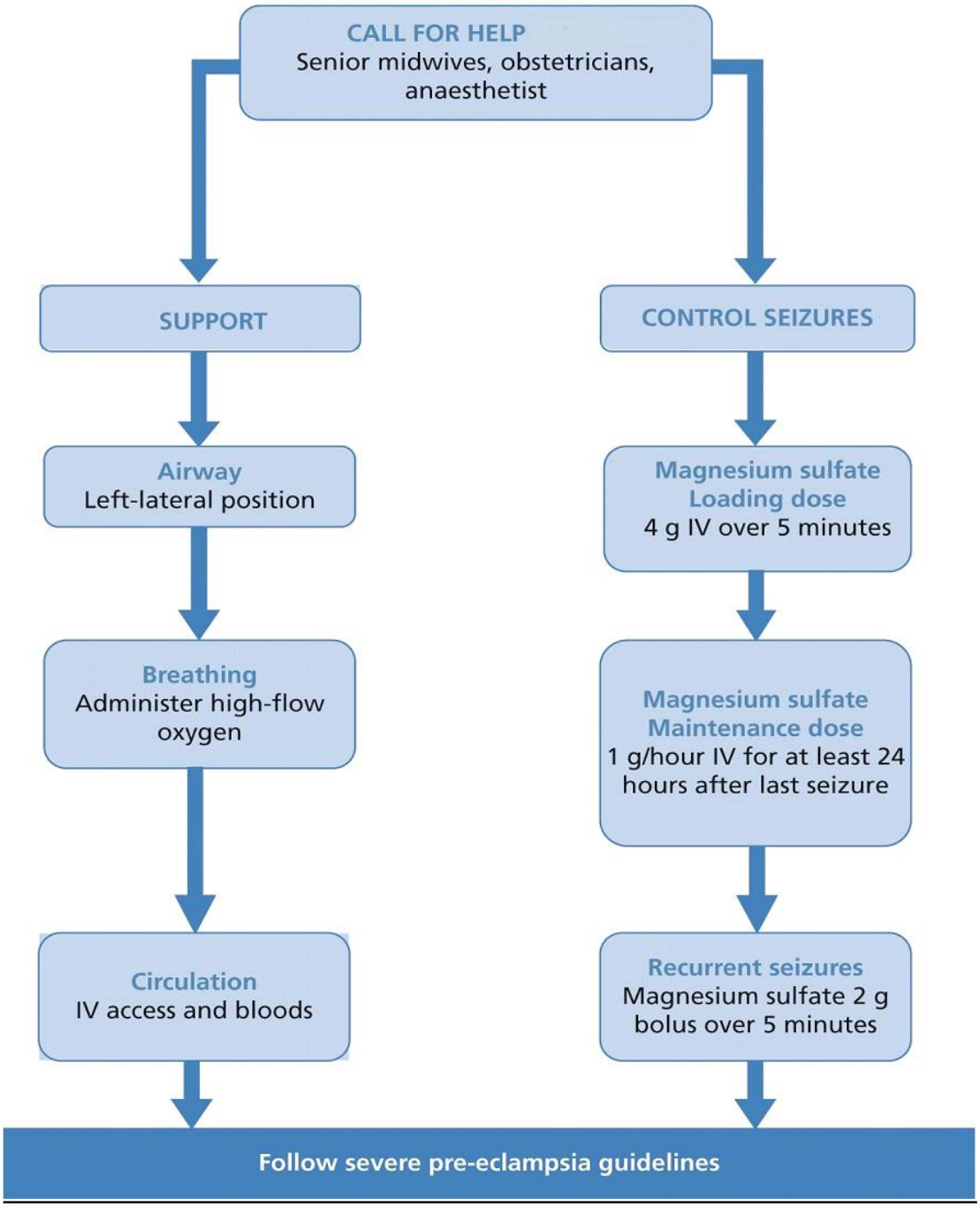
Algorithm for management of severe hypertension



Aim to keep systolic BP 140-150mmHg and diastolic BP 90-100mmHg initially. Caution: all three drugs have cumulative effect (peak at 30 minutes) and all three interact with Magnesium Sulfate. Nifedipine also increase the muscular blockade of Magnesium Sulfate

Management of eclampsia algorithm



Severe pre-eclampsia management algorithm