The treatment of hypertension in pregnancy

Bobby Krishnachetty
Felicity Plaat

Learning objectives

After reading this, you should be able to:

- list the types and implications of hypertensive disorders in pregnancy
- understand the various treatment options
- manage acute severe hypertension and eclampsia in pregnancy

Abstract

Hypertension is the commonest medical condition encountered in pregnancy and pre-eclampsia/eclampsia is the second leading cause of maternal mortality in the UK. The precise cause of pre-eclampsia is unknown but the pathophysiology involves abnormal placentation with an exaggerated inflammatory response causing a multisystem disorder. The very presence of rising blood pressure in a pregnant woman should alert the clinician to look for the development of pre-eclampsia. Diagnosis and treatment of hypertensive disorders in pregnancy is vital as they are associated with both worse maternal and fetal outcome. One of the 'top 10' recommendations of the most recent report on the Confidential Enquiry into Maternal and Child Health (CEMACH 2003–05), is that all pregnant women with a systolic blood pressure greater than 160 mmHg must have immediate antihypertensive therapy and treatment should be initiated at lower pressures if the overall clinical picture suggests rapid deterioration. Regional anaesthesia is recommended for both labour analgesia and operative delivery. In the presence of compromised placental function and intrauterine growth restriction (IUGR), regional blockade has the beneficial effect of improving placental blood flow.

Keywords Hypertension; labetalol; magnesium sulphate; methyldopa; pre-eclampsia; pregnancy; proteinuria; regional anaesthesia

Hypertension is the commonest medical disorder encountered in obstetric practice. It complicates 10–15% of pregnancies. Pre-eclampsia and eclampsia occur in 4% of pregnancies and is the second leading cause of maternal mortality in the UK. Worldwide 160,000 women die each year and approximately 20% of special care baby unit (SCBU) cots are occupied by the offspring of women with these conditions.

Classification: hypertension is defined as a blood pressure ≥140/90 mmHg on two separate occasions, at least 4 hours apart.

Pre-existing or chronic hypertension: this is defined as hypertension diagnosed prior to pregnancy or before 20 weeks' gestation. Hypertension newly diagnosed during pregnancy but which does not resolve post-partum, is also classified as chronic hypertension. There is an increased risk of superimposed pre-eclampsia, intrauterine growth restriction (IUGR) and placental abruption, associated with this condition.

Pregnancy-induced hypertension (PIH): the term refers to hypertension occurring >20 weeks' gestation but without other features of pre-eclampsia, which resolves within 6 weeks of delivery. Fifteen per cent of women developing hypertension at >20 weeks will develop pre-eclampsia. PIH tends to recur in subsequent pregnancies. It is associated with better maternal and fetal outcomes than pre-eclampsia. The treatment of pre-existing hypertension and PIH is the same.

Pre-eclampsia and eclampsia: although the classic triad of hypertension, proteinuria and oedema denotes pre-eclampsia, the absence of one or more does not exclude the diagnosis (see also Figure 1).

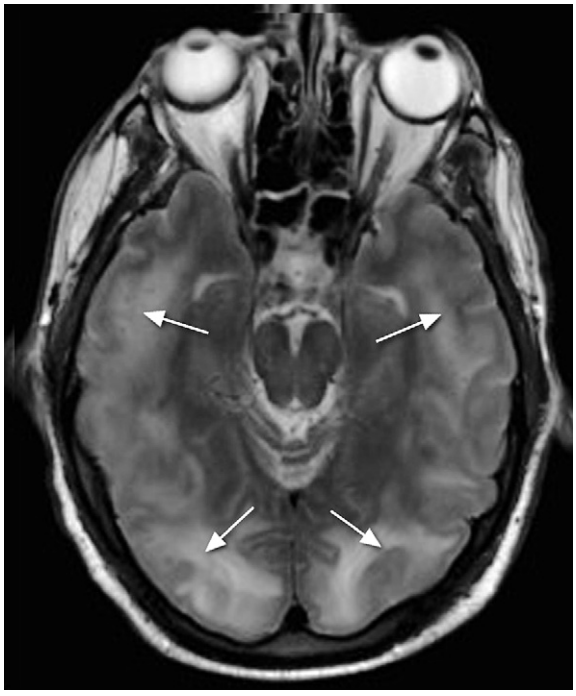

Figure 1 Magnetic resonance image showing multiple cortico-subcortical areas of hyper-intense signal (arrows) involving the occipital and parietal lobes bilaterally and pons in a patient with posterior reversible encephalopathy syndrome, a complication of eclampsia.

Bobby Krishnachetty *FRCA is a Specialist Registrar in Anaesthetics at Queen Charlotte's and Chelsea Hospital, London, UK. Conflicts of interest: none declared.*

Felicity Plaat *FRCA is a Consultant Anaesthetist at Queen Charlotte's and Chelsea Hospital, London, UK. Conflicts of interest: none declared.*

Mild/moderate pre-eclampsia: blood pressure ≥140/90 mmHg, proteinuria (>0.3 g/24 hours) without renal, hepatic or coagulation dysfunction.

Severe pre-eclampsia: blood pressure ≥160/110 mmHg, significant proteinuria (>1 g/litre), in the presence of biochemical evidence of renal, hepatic and coagulation dysfunction.

Eclampsia: one or more seizures occurring in the presence of pre-eclampsia.

Pathogenesis: the pivotal role of placenta in pathogenesis of the disorder has long been recognized, and the removal of placenta leads to the resolution of the disease. Abnormal placentation with inadequate trophoblast invasion of the spiral arteries is thought to cause placental ischaemia with the exaggerated release of circulating inflammatory mediators culminating in widespread endothelial cell dysfunction, affecting maternal renal, cardiovascular, hepatic, coagulation and central nervous systems as well as fetal growth retardation.

Management

General measures

Pregnant women with hypertension require closer antenatal surveillance to check for the development of pre-eclampsia (regular measurement of blood pressure, urinalysis for proteinuria, plasma urate levels and uterine artery Doppler blood flow analysis). Haemoglobin concentration, platelet count, coagulation function, plasma urea and creatinine and liver function tests should be regularly checked in women who develop pre-eclampsia.

Fetal monitoring in the form of fetal growth and biophysical profile with ultrasound scans to detect IUGR should be performed every 4 weeks after 24–26 weeks' gestation. These women should have an early referral to an obstetric anaesthetic clinic. Not only are they at increased risk of obstetric intervention, requiring anaesthetic input but also management of the condition itself may include regional blockade and this should be discussed antenatally.

Management of chronic hypertension, PIH and mild/moderate pre-eclampsia

In normal pregnancy blood pressure falls in the first trimester before the increase in cardiac output compensates for the decrease in systemic vascular resistance. Systemic blood pressure continues to decrease during the second trimester up to 22–24 weeks after which there is a steady rise to pre-pregnant levels by term. Because of the initial decrease hypertension may not be detected till late in pregnancy. A combination of antihypertensive agents is preferable to monotherapy to minimize side effects, for example labetalol or methyldopa with long-acting nifedipine.

The drugs used, their dose and route of administration along with the mode of action and side effects are given in Table 1.

Management of pre-eclampsia depends on prevention of seizures, blood pressure, and prevention of pulmonary oedema.

Prevention of seizures

The Royal College of Obstetricians and Gynaecology recommends that all maternity units should be equipped with a protocol for the management of eclampsia and acute severe hypertension and that regular fire drills should be conducted.[1] Magnesium sulphate is now the drug of choice for reducing the risk of seizures in severe pre-eclamptics, controlling new onset seizures and reducing the risk of their recurrence.[2] In eclampsia convulsions are thought to be a result of cerebral vasospasm and reduced cerebral blood flow and this is reversed by the vasodilator property of magnesium. Intracranial hypertension and vasogenic oedema may also occur.[3] The prophylactic use of magnesium in severe pre-eclampsia is associated with a trend towards lower maternal morbidity and mortality[4] and The World Health Organization (WHO) now recommends magnesium sulphate therapy for prevention of eclampsia in women with severe pre-eclampsia.

Fluid management

Because of the predisposition to pulmonary oedema, fluid input should be limited to 2 litres per 24 hours. It should be noted that although temporary renal dysfunction is common, the need for dialysis is rare, and permanent dysfunction extremely rare: fluid overload poses a much greater threat in this condition. Invasive monitoring (invasive blood pressure and central venous pressure) is indicated if there is uncertainty regarding fluid status (especially challenging when haemorrhage is superimposed on pre-eclampsia) and non-invasive monitoring is problematic and in severe cases where intensive care is likely to be required.

Colloid fluid challenges to maintain urine output at 0.5 ml/kg/hour should be given with caution and under central venous pressure control.

Control of hypertension

Recent reports on maternal mortality indicate that the foremost cause of mortality due to hypertensive disorders is intracerebral haemorrhage and inadequate management was the main type of substandard care identified. Hence the recommendation in the latest CEMACH reports that all pregnant women with a systolic blood pressure ≥160 mmHg should be immediately started on antihypertensive therapy.[5]

Management of these women should be in a high dependency area. Oral (labetalol) or intravenous (labetalol or hydrallazine) antihypertensives should be employed according to the clinical condition.

Delivery of the fetus

The severity of the condition will determine timing and hence mode of delivery.

Controlling maternal blood pressure with antihypertensives is essentially a holding mechanism for expectant management. There is fine balance at early gestations between delaying delivery in order to obtain the maximum possible maturity for the baby, and the risk of the worsening maternal condition.

Anaesthetic considerations (Box 1)

Recent evidence has allayed previously held fears that haemodynamic instability due to regional blockade would be exaggerated in the pre-eclamptics. A large multicentre trial showed that in severe pre-eclamptics, haemodynamic stability was no more clinically compromised with spinal compared with epidural blockade.[6] In fact pre-eclamptic patients show less hypotension