Hypertension in pregnancy

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Abstract

Hypertensive disorders of pregnancy remain a common complication of pregnancy and a major cause of maternal and perinatal morbidity and mortality worldwide. Hypertensive disorders range from mild gestational hypertension to early onset pre-eclampsia which remains a leading cause of maternal death worldwide. Although there have been major advances in understanding the pathophysiology of the disease in recent years, interventions to prevent hypertensive disorders in pregnancy have had disappointing results. Due to their unpredictable nature and potential poor outcomes, patients with hypertensive disorders of pregnancy warrant cautious care including consultant obstetric, neonatal and anaesthetic involvement to optimise both maternal and fetal outcomes.

Keywords eclampsia; hypertension; pre-eclampsia; pregnancy

Introduction

Hypertensive disorders of pregnancy are frequently encountered complications of pregnancy and have a number of possible aetiologies. In the United Kingdom, the number of maternal deaths from hypertension in pregnancy has fallen steadily over the past few decades, as have the associated complication rates. However, hypertensive disorders remain a major cause of maternal and perinatal morbidity and mortality worldwide.

Interventions to prevent hypertensive disorders in pregnancy, including pre-eclampsia, in the general antenatal population have been disappointing and the mainstay of treatment involves close antenatal supervision of mother and fetus and timely delivery to prevent deterioration of the condition and subsequent morbidity and mortality.

Case 1: risk and recurrence of pre-eclampsia

A patient is referred to you for pre-pregnancy counselling. She is 40 years old, smokes 20 cigarettes a day and has been taking treatment (enalopril 20 mg once daily) for hypertension for the past two years. This woman had one previous pregnancy six years ago which was complicated by severe pre-eclampsia and HELLP (haemolysis, elevated liver enzymes and low platelets) syndrome resulting in delivery by emergency Caesarean section at 27 weeks' gestation. Her mother and two sisters all had pregnancies complicated by pre-eclampsia. On examination her BMI is 38 and her blood pressure is 160/96 mmHg. The woman informs you she wishes to have another child as she is now in a new relationship.

Risk factors and recurrence

This patient has multiple risk factors for recurrence of pre-eclampsia. These include increased maternal age, poorly controlled hypertension, previous early onset pre-eclampsia (<34 weeks' gestation), raised BMI, family history of pre-eclampsia and new partner. Women with severe pre-eclampsia have an increased risk of recurrence in their next pregnancy (about 1 in 6 (16%) pregnancies) but the disorder is generally less severe and manifests 2–3 weeks later than in the first pregnancy. This risk increases to about 1 in 4 (25%) pregnancies if the pre-eclampsia was complicated by severe pre-eclampsia, HELLP syndrome or eclampsia and led to birth before 34 weeks' gestation. The risk of recurrence is about 1 in 2 (55%) pregnancies if the pre-eclampsia led to birth before 28 weeks' gestation. Considering her increased age and poorly controlled blood pressure this risk may be higher. Her risk of HELLP syndrome recurring is approximately 3–4%. Other risk factors for pre-eclampsia are presented in Table 1.

Management

The patient should be counselled to avoid pregnancy until her blood pressure is optimally controlled. A careful history should be taken and contact made with her general practitioner to ensure all causes of secondary hypertension have been excluded and the patient has been appropriately investigated (Table 2). Once a diagnosis of essential hypertension is made, blood pressure should be optimally managed. As the women wishes to conceive you may consider switching her to an alternative agent (see later section on management of hypertension) as enalopril, an Angiotensin Converting Enzyme (ACE) inhibitor is contraindicated in pregnancy due to teratogenesis (increased risk of cardiovascular and neurological malformations if used in the first trimester). As the patient is high risk for recurrence of pre-eclampsia low dose aspirin should be commenced once conception occurs. General obstetric advice such as weight loss, smoking cessation and pre-conceptual folic acid should also be given.

Case 2: chronic hypertension/pregnancy induced hypertension

A 35 year old woman attends your antenatal clinic at 12 weeks' gestation in her first pregnancy. She has a BMI of 22 and is a non-smoker. Her blood pressure is 150/95 mmHg. She is non-proteinuric and asymptomatic.

Classification and diagnosis of hypertension in pregnancy

Hypertension in pregnancy is classified according to the International Society for the Study of Hypertension in Pregnancy (ISSHP) as follows;

- Chronic hypertension
- Gestational hypertension
- Pre-eclampsia- *de novo* or superimposed on chronic hypertension
- White coat hypertension.

Pre-eclampsia is associated with significant maternal and perinatal morbidity and mortality. As such it is imperative that

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Risk factors for pre-eclampsia

Risk factor	Unadjusted relative risk (95% confidence interval)
Age ≥40 years, primiparous	1.68 (1.23–2.29)
Age ≥40 years, multiparous	1.96 (1.34–2.87)
Family history	2.90 (1.70–4.93)
Nulliparity	2.91 (1.28–6.61)
Multiple pregnancy	2.93 (2.04–4.21)
Pre-existing diabetes	3.56 (2.54–4.99)
Pre-pregnancy body mass index ≥35	4.29 (3.52–5.49)
Previous pre-eclampsia	7.19 (5.85–8.83)
Antiphospholipid syndrome	9.72 (4.34–21.75)

Table 1

every effort is made to accurately classify women with hypertension in pregnancy as having chronic hypertension, non-proteinuric PIH or pre-eclampsia as the aetiology and management of the three conditions is very different.

Measurement of blood pressure

Blood pressure should be measured with the woman rested and seated at a 45-degree angle with the arm at the level of the heart. It is imperative that an appropriately sized cuff should be used. To avoid incorrect measurement of blood pressure, if the mid-arm circumference is greater than 33 cm, a large cuff should be used. Korotkoff phase 1 should be used to measure systolic BP and Korotkoff 5 is appropriate for measurement of diastolic blood pressure. The method used to record blood pressure should be consistent and documented.

Pregnancy induced hypertension

Gestational or pregnancy induced hypertension is a rise in the blood pressure in the absence of proteinuria after 20 weeks' gestation. True non-proteinuric pregnancy induced hypertension does not appear to be associated with an increase in maternal or fetal morbidity. However, the risk of progression from pregnancy-induced hypertension to pre-eclampsia is approximately 20–30% and therefore vigilance is required. This rate increases to approximately 50% when pregnancy-induced hypertension develops before 32 weeks' gestation. As a result of this risk of progression to pre-eclampsia, weekly urinalysis and BP checks are generally recommended in women with pregnancy-induced hypertension.

Chronic hypertension

Chronic hypertension is defined as hypertension preceding pregnancy. Blood pressure falls in the first and second trimesters. Therefore women with high blood pressure before the 20th week of pregnancy are assumed to have pre-existing or essential hypertension. As many women of reproductive age present for blood pressure measurement for the first time when pregnant, chronic hypertension is often revealed in the first half of pregnancy. Approximately 90–95% of cases of chronic hypertension are considered to be essential. Secondary causes which account for approximately 5–10% are listed in Table 2. In women presenting with hypertension in the first half of pregnancy it is important to look for an underlying cause. These investigations should at least include:

- Urine analysis and protein creatinine ratio (looking for blood, protein or glucose and quantification of the degree of proteinuria).
- Urea and electrolytes
- Renal tract ultrasound

Women with underlying renal disease, particularly with raised pre-pregnancy creatinine are at significantly increased risk of poor pregnancy outcome and require multidisciplinary care.

Treatment of hypertension in pregnancy (Box 1)

The use of antihypertensive drugs in hypertensive women without renal impairment is considered by some to be beneficial in preventing sudden increases in blood pressure, cerebral haemorrhage or hypertensive encephalopathy. The Control of Hypertension in Pregnancy Study (CHIPS) is a randomised controlled trial in which women with hypertension in pregnancy were randomised to either 'less tight' control (aiming for diastolic BP of 100 mmHg) or 'tight' control (aiming for diastolic BP of 85 mmHg) of their hypertension. The trial demonstrated that women in 'less tight' compared with 'tight' control groups had similar rates of adverse perinatal (31.4% vs. 30.7%) and maternal outcomes (3.7% vs. 2.0%), despite higher mean diastolic blood pressures by 4.6 mmHg. However, severe hypertension (≥160/110 mmHg) developed more frequently in 'less tight' (vs. 'tight') control (40.6% vs. 27.5%). As a result tight control of blood pressure is advocated to prevent potential adverse maternal outcomes.

Both CMACE and NICE Clinical Guideline on Hypertension in pregnancy recommend that all pregnant women with a systolic blood pressure of 150 mmHg or more require antihypertensive treatment. Consideration should also be given to initialising treatment at lower pressures if the overall clinical picture suggests rapid deterioration and/or where the development of severe hypertension can be anticipated.

A systolic blood pressure greater than 160 mmHg should be considered a medical emergency and quick effective treatment is advocated to prevent haemorrhagic stroke.

Antihypertensive agents which may be used in pregnancy include;

- Labetolol; a combined β-adrenoceptor blocker that also blocks α-adrenoceptors. Ordinary β-adrenoceptor blockers are unsuitable for producing a quick antihypertensive effect because a quick fall in blood pressure triggers a compensatory sympathetic discharge that increases the peripheral vascular resistance via α-adrenoceptors. Blocking the β-adrenoceptors alone cannot prevent this compensatory response, but the addition of an α-adrenoceptor blocker can. It is this action that renders labetolol suitable for gaining quick control of the blood pressure. Labetolol, like all β-adrenoceptors, is contraindicated in women with a history of asthma.
- Nifedipine is a calcium channel blocker used in the treatment of chronic hypertension in pregnancy. Data suggest that it is safe, but cumulative evidence is not as extensive as with older drugs such as labetolol and methyldopa. The principal side effect is headache, which can be severe, lasts