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 screen for and prevent hypertensive disorders of 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. The International Society for the Study of Hypertension in Pregnancy (ISSHP) classifies hypertension in pregnancy as follows: chronic hypertension, gestational hypertension, pre-eclampsia- *de novo* or superimposed on chronic hypertension; or white coat hypertension. 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 and are responsible for 14% of total maternal deaths 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.

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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. She also tells you that she has heard about a test that she can take which will tell you if she will get pre-eclampsia in this pregnancy again, and would like more information.

Risk factors and recurrence

This patient has multiple risk factors for recurrence of pre-eclampsia. These include increased maternal age, poorly controlled chronic 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. Given her age, this should be done in a timely, efficient and safe manner. 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.

Prediction of pre-eclampsia

In terms of prediction, women can be categorised as high risk (as this woman is) and low risk. She should be reassured that she will be followed closely during pregnancy to monitor for signs of

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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

pre-eclampsia, but that there is no test which reliably predicts pre-eclampsia. A combination of maternal risk factors, Placental Growth Factor (PIGF) and uterine artery Doppler may identify women who would benefit from treatment with aspirin to prevent pre-term pre-eclampsia as shown recently in the ASPRE study but this screening approach has not yet been universally accepted or implemented.

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.

Diagnosis of hypertension in pregnancy

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

Causes of secondary chronic hypertension and key diagnostic tests

Idiopathic	Essential hypertension	Key diagnostic test/clinical clues
Vascular disorders	Renovascular hypertension	Renal ultrasound
	Aortic coarctation	Hypertension in upper limbs/diminished or delayed femoral pulses; Echocardiography
Endocrine disorders	Diabetes mellitus	Adrenergic symptoms (tremor, pallor, tachycardia, palpitations) and symptoms of hypoglycemia (fatigue, lethargy, headaches, drowsiness, coma); glucose tolerance test
	Hyperthyroidism	Anxiety, weakness, tremor, palpitations, heat intolerance, increased perspiration; Thyroid function tests
	Hypothyroidism	Weight gain, lethargy; Thyroid function tests
	Phaeochromocytoma	Headache, palpitations, sweating: Measurement of 24-h urine fractionated catecholamines and metanephrines
	Acromegaly	Macrognathia, enlargement of hands and feet; Measurement of serum insulin-like growth factor-1
	Cushing's syndrome	Cushingoid facies, central obesity, proximal muscle weakness and ecchymoses; Initially measurement of ACTH
	Primary hyperaldosteronism	Hypokalaemia, metabolic alkalosis; measurement of plasma renin and aldosterone concentrations.
Renal disorders	Renal failure resulting from: Diabetic nephropathy	
	Reflux nephropathy	History of urinary tract infections.
	Chronic glomerulonephritis	
	Nephritic and nephrotic syndrome	Nephrotic syndrome: heavy proteinuria (>3.5 g/day). Nephritic syndrome: variable degrees of proteinuria with the presence of red cells and/or white blood cells.
	Polycystic kidney	Family history
Connective tissue disorders	Systemic lupus erythematosus	Malar rash, photosensitivity, discoid rash, oral ulcers, arthritis; raised protein creatinine ratio, presence of Anti-dsDNA, Anti-Sm and/or ANA
	Systemic sclerosis	Skin thickening; anti-topoisomerase I (anti-Scl-70), anti-centromere, and anti-RNA polymerase III antibodies
	Polyarteritis nodosa	General symptoms such as fatigue, weight loss, weakness, fever, arthralgia, skin lesions. Systemic signs such as hypertension, renal insufficiency or neurologic dysfunction.
	Rheumatoid disease	Inflammed painful joints; rheumatoid factor

Table 2

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