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The important medical problems that complicate pregnancy have been reviewed recently [1]. Since then, a further report of the Confidential Enquiries into maternal deaths in the UK has been published [2]. The commonest causes of maternal death in the UK are shown in figure 1. Pulmonary embolism and cardiac causes are the most frequent. The commonest direct causes of maternal death (where the death is directly attributable to pregnancy) are pulmonary embolism and pre-eclampsia. (fig 2) Thromboembolism was less frequent than in the last report (Fig 3). Figure 4 lists the indirect causes (where pregnancy complicates a pre-existing medical condition): the commonest is heart disease. Thromboembolic disease may occur at any gestation, and requires a low threshold for investigation of leg and chest symptoms. A thromboembolic event occurs in 1/1500 pregnancies, more than six times more likely than in the non-pregnant. Antenatal deep vein thrombosis occurs in 0.06-0.09% of pregnant women, and is twice as common in women over 35. In the puerperium, venous thrombosis is related to age and mode of delivery. Pulmonary emboli are more common in the puerperium especially after caesarian section. Prophylaxis, diagnosis, and therapy of thromboembolism are described in ref 1. Women with cardiac disease are at serious risk from the circulatory changes that occur during pregnancy. The ability to tolerate pregnancy and delivery is related to the presence of cyanosis and pulmonary hypertension, the circulatory effects of the lesion, and the functional state of the patient. Congenital cardiac disease in pregnant women is becoming more common (about 25% of deaths) because of advances in corrective surgery. Risks are great when the right ventricle is the systemic pumping chamber and there is residual pulmonary hypertension. Acquired cardiac disease causes about half the deaths from cardiac disease in pregnancy, and ischaemic heart disease causes about one fifth. Patients with pulmonary hypertension and Eisenmenger's syndrome, severe aortic or mitral stenosis, Marfan's syndrome, or cyanotic disease should always be considered high risk.

FIGURE 1

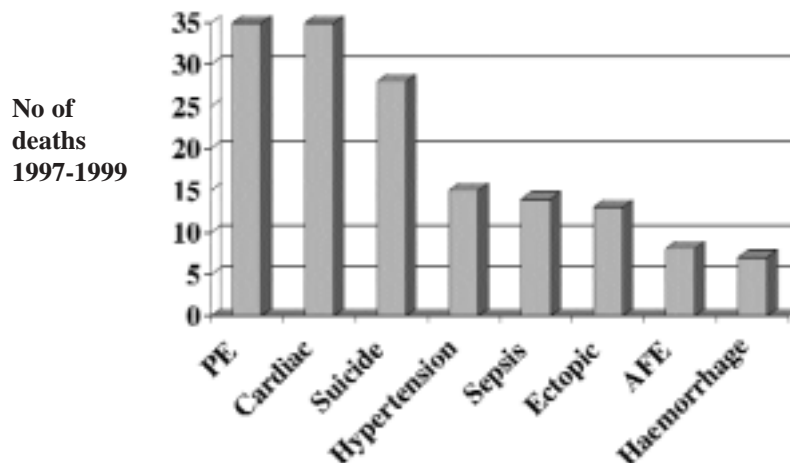


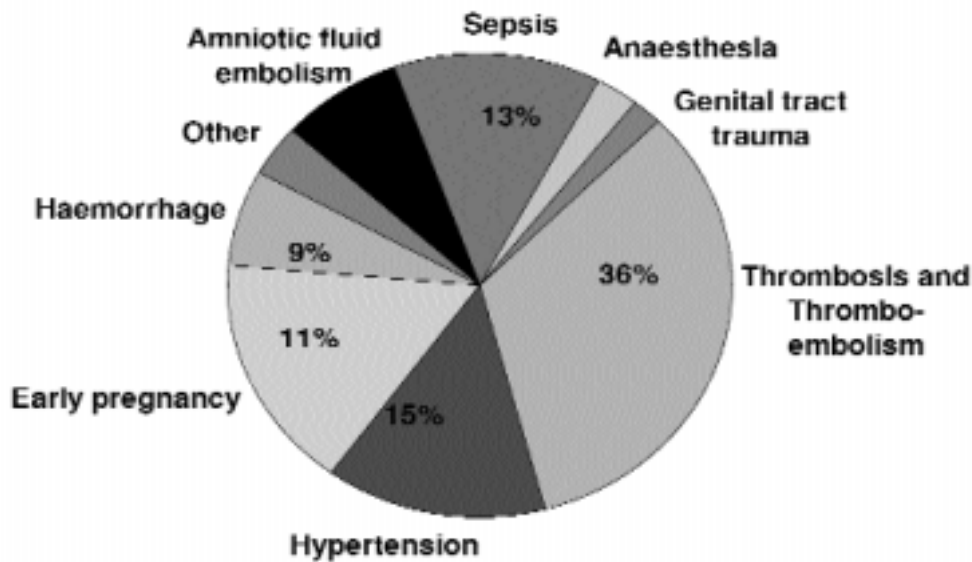
Figure 1. - Confidential Enquiries into Maternal Deaths (direct and indirect) in UK

HYPERTENSION AND PRE-ECLAMPSIA.

Pre-eclampsia complicates about 2% of all pregnancies. It is a leading cause of maternal mortality (5 women die each year in the UK from pre-eclampsia or eclampsia) [2], maternal morbidity [3], and is the commonest cause of iatrogenic prematurity. Hypertension causes 12-25% of all antenatal admissions. Much antenatal care in the second half of pregnancy is to detect pre-eclampsia. Hypertension in pregnancy can be broadly subdivided in to *pre-existing hypertension*, *pregnancy-induced hypertension*, and *pre-eclampsia*. [4]

In normal pregnancy, the blood pressure (BP) falls during the second trimester and rises again in the third to reach pre-pregnancy levels by term. There are several different definitions for hypertension in pregnancy, most with cut-offs of 140/90. Korotkoff phase V (disappearance) should be taken as the diastolic reading. Proteinuric pre-eclampsia is defined as hypertension plus > 0.3 g/24 hours proteinuria. Pregnancy-induced hypertension may run a benign course or progress to pre-eclampsia. Pre-eclampsia is more likely if the hypertension develops at earlier gestations.

FIGURE 2



CEMD, 2001

Figure 2. - Causes of direct maternal deaths UK; 1997-1999

Pre-eclampsia and intrauterine growth restriction both relate to poor placentation (occurring in the first half of pregnancy) and consequent placental ischaemia, but differ in the extent of the maternal response (developing in the second half of pregnancy). Risk factors include primiparity, age < 20 or >35, multiple pregnancy, obesity, family history of pre-eclampsia, birth interval > 10 years and previous pre-eclampsia. Fetal factors include hydrops and fetal trisomy. Pre-existing maternal conditions that increase the risk of pre-eclampsia are hypertension, renal disease, diabetes, thrombophilia and connective tissue disease.

Pre-eclampsia is characterised by hypertension, proteinuria and oedema. This is an over simplification since pre-eclampsia can also cause haematological problems, liver and renal dysfunction and eclampsia. The variety of features is because it is a generalized disease of vascular endothelial cells. Eclampsia complicates about 1 in 2000 (0.05%) pregnancies in the UK and Europe. Without prophylaxis, eclampsia occurs in about 1-2% of women with pre-eclampsia in developed countries. HELLP syndrome (haemolysis, elevated liver enzymes and low platelets) complicates about 4% of cases of pre-eclampsia.

Management of pre-eclampsia is by:

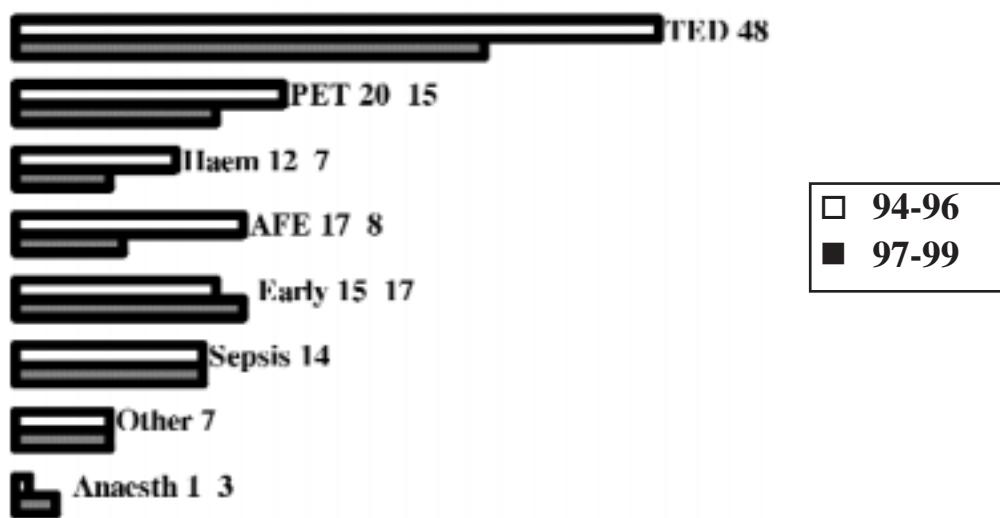
- Screening for high risk cases
- Diagnosis
- Treatment of blood pressure
- Foetal surveillance
- Timing of delivery
- Treatment and prevention of seizures
- Fluid management.

Women with new onset hypertension and/or proteinuria must have further assessment as an in-patient or a day admission unit to assess for pre-eclampsia. It is not sufficient to request a urine sample and review in one week. Hypertension should be treated in any respect regardless of the cause (pre-eclampsia, pregnancy-induced hypertension, essential hypertension), because of the risk of maternal cerebral haemorrhage. Methyl Dopa is the drug of choice. Second line agents include labetalol, nifedipine and alpha adrenergic antagonists. Delivery is the only cure for pre-eclampsia and this may be indicated for fetal or maternal reasons. Heavy proteinuria on its own is not an indication for delivery unless hypoalbuminaemia is severe.

A plan for each unit to manage severe pre-eclampsia and acute severe hypertension should be made and agreed by obstetricians, anaesthetists, and physicians. Oliguria may be normal, especially immediately after birth, from the stress response of delivery with increased ADH secretion, endogenous and exogenous oxytocin, vasodilation, and pain. After delivery, oliguria should not be treated with large volumes of intravenous fluids, unless there is clear evidence of volume depletion.

The treatment of choice for the prevention [5] and treatment [6] of eclamptic seizures is magnesium sulphate. Women with hypertension in pregnancy often require treatment after birth for 2 to 4 weeks, but methyl dopa should be avoided as it can cause depression. Normal maintenance antihypertensive therapy for women with pre-existing hypertension can replace methyl dopa after delivery, and these drugs are safe to use when breast-feeding. The proteinuria of pre-eclampsia may persist for several months following delivery.

FIGURE 3



CEMD, 1998, 2001

Figure 3. - Causes of direct maternal deaths 1994-1999

Women with previous early-onset pre-eclampsia should be offered screening for antiphospholipid syndrome (APS). [4] Even in the absence of APS, such women have a 20-40% greater risk of subsequent pre-eclampsia. Pre-eclampsia is associated with increased risk of hypertension and ischaemic heart disease in later life. [7]

The absence of a reliable early screening test for pre-eclampsia has hampered the assessment of possible prophylaxis. Recently, better understanding of the mechanisms of pre-eclampsia has enabled better predictions of those women likely to develop it and new possibilities for intervention. Low-dose aspirin reduces the incidence of pre-eclampsia by 15%./ About 90 women would need to be treated with low dose aspirin to prevent one case of pre-eclampsia. [8] More information is needed on which women should be treated, with what dose, and from what gestation. Meta-analysis suggests that perinatal mortality is reduced by 14% and prematurity by 8%. [8]

One study in high risk women found that antioxidants (vitamins C and E) reduce the risk of pre-eclampsia by 50% [9] but these observations need to be repeated in larger studies in different populations.

Pre-eclampsia may not be reliably prevented, but antenatal care can be directed to women at high risk of this potentially serious disorder, by frequently assessment for hypertension, proteinuria and other markers of pre-eclampsia. Prompt diagnosis and care in tertiary centres for severe early-onset disease allows management to reduce maternal and fetal morbidity.

FURTHER READING

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FIGURE 4

	94-96	97-99
Cardiac	39	35
Psychiatric	9	15
Infections	9	13
Neoplastic	2	11
Diabetes	2	4
Phaeo	5	0
SLE	4	2
PAPS	1	0
Haematol	2	4
CNS	47	34
Ruptured vessels	6	2
Respiratory	7	9
GI	1	7

Figure 4. - Indirect maternal deaths, CEMD 94-99

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