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Drugs and therapeutics, including contraception, for women with heart disease

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Cardiac disease remains the leading cause of maternal death in the UK, and data from the Centre for Maternal and Child Enquiries have shown that the numbers of women dying from cardiac disease have steadily increased over the past 30 years. The incidence of acquired heart disease is increasing because of older age at first pregnancy, as well as a higher prevalence of cardiovascular risk factors, such as hypertension, diabetes and obesity. The number of women with congenital heart disease who are of childbearing age is also increasing. Significant cardiovascular changes occur in pregnancy even from an early gestation. This can affect the types and doses of medications used in pregnancy. The main aims of management are to optimise the mother's condition during pregnancy, to monitor for deterioration, and to minimise any additional load on the cardiovascular system from pregnancy, delivery and the postpartum period.

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Introduction

Cardiovascular disease (CVD) complicates 0.2–4% of all pregnancies in the Western world [1]. It remains the leading cause of maternal death in many developed countries, including the UK [2].

Data from the Centre for Maternal and Child Enquiries (CMACE) have shown that the numbers of women dying from cardiac disease has increased from 7.3 per million maternities in the 1982–1984 triennium, to 23.1 per million maternities in the 2006–2008 triennium [2]. Fifty-three maternal deaths from cardiac disease occurred between 2006 and 2008. The leading cardiac causes were found to be sudden adult death syndrome, myocardial infarction, dissection of the thoracic aorta, and cardiomyopathy, most commonly peripartum cardiomyopathy. It is important not to forget that the numbers of pregnant women who have had corrective or palliative surgery for congenital cardiac diseases, and those who have had pacemakers or prosthetic heart valves fitted, is increasing. In addition, the incidence of acquired heart disease is increasing because of older age at first pregnancy and a higher prevalence of cardiovascular risk factors, such as hypertension, diabetes and obesity.

Significant cardiovascular changes occur in pregnancy from an early gestation [3]. This can affect the types and doses of drugs used in pregnancy. Peripheral vasodilatation, probably related to progesterone, is the primary event that leads to a fall in the systemic vascular resistance, and, to compensate for this, cardiac output increases by 40% during pregnancy. The heart can increase in size by up to 30%. Pregnancy induces a series of haemostatic changes, with an increase in coagulation factors, fibrinogen, and platelet adhesiveness, as well as reduced fibrinolysis. This leads to a hypercoagulable state and an increased risk of venous thromboembolism. Also, venous return is obstructed by the enlarging gravid uterus, causing stasis and a further increase in thrombosis risk.

Physiological changes that occur during pregnancy can affect absorption, excretion, and bioavailability of all drugs [4]. Higher dosages of drugs may be required to achieve therapeutic plasma concentrations. This is partly explained by the increased intravascular blood volume. In addition, the raised renal perfusion and the higher hepatic metabolism increase drug clearance. The altered pharmacokinetics of drugs vary in magnitude during different stages of pregnancy, making careful monitoring of the patient and dose adjustments necessary.

Many different factors have to be taken into account when prescribing a drug to a pregnant woman. These factors include the gestational age of the fetus, route of drug administration, whether and how effectively the drug crosses the placenta, and the necessary effective dose of the drug [5]. Awareness of the unique physiological changes of pregnancy that affect the pharmacokinetics of medications used by pregnant women is of paramount importance in deciding the dosage and frequency of administration and monitoring. A major concern is the potential harm to the fetus but, perhaps more importantly, is the assessment of potential harm to the mother from withholding a drug or using an insufficient dose. The question of whether the benefits outweigh the risks has to be asked in each individual case.

Cardiac disease in pregnancy encompasses a breadth of conditions, ranging from disease causing only minor concern, to conditions associated with significantly increased risks of maternal morbidity and mortality [6]. In this chapter, we will discuss the use of drug treatment in pregnant women with congenital, as well as in those with acquired, cardiac disease. We will start by discussing the forms of contraception that may be appropriate to use. We will then discuss drugs specifically used to treat cardiac conditions in pregnant woman and their effect on the pregnancy. Finally, we will discuss the potential adverse effects of obstetric-specific drugs that act on the uterus, specifically uterotonics and tocolytics, when used in women with cardiac disease.

Contraception

All women with cardiac disease should be given advice about adequate contraception, so that informed choices about potential future pregnancies can be made. Pre-conception counselling is often invaluable to optimise the cardiac condition before pregnancy to ensure current drug treatment is compatible with pregnancy and to gain access to healthcare professionals who have expertise in managing women with cardiac disease in pregnancy. The Royal College of Obstetricians and Gynaecologists recommends that teenage girls, in particular, with congenital heart disease should have access to specialists who can advise on contraception and pregnancy [7].