HEART DISEASE & PREGNANCY

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PATENT DUCTUS ARTERIOSUS

Background

A patent ductus arteriosus (PDA) is a vascular connection between the aorta and the pulmonary artery. It is an essential part of the fetal circulation, but closes after birth in the majority of cases. A PDA can occur in isolation or together with other abnormalities. In this section, only isolated PDAs are discussed.

The clinical significance of a PDA is dependent on its size. Small PDAs usually do not cause any symptoms. They are often identified when a continuous murmur is heard or they may be an incidental finding when cardiac imaging is performed for other reasons. Moderate sized PDAs are associated with more significant left to right shunting and this can result in exercise limitations, left ventricular dilation and dysfunction, clinical heart failure, or pulmonary hypertension. If a large PDA is encountered in an adult, it is commonly associated with Eisenmenger syndrome (see Eisenmenger syndrome).

In the majority of instances, PDAs are diagnosed and treated surgically or percutaneously in childhood. If closure occurs late, patients may develop progressive pulmonary hypertension.

Effects of Pregnancy-Related Hemodynamic Changes

Pregnancy is associated with hemodynamic changes including an increase in blood volume and cardiac output. Pregnancy can result in left ventricular volume overload. (see Hemodynamics in Pregnancy) These hemodynamic changes are usually well tolerated in women with PDA without pulmonary hypertension, with normal right ventricular systolic function, and with no associated defects. Women with moderate sized PDAs are at risk of developing heart failure. Women with a large PDA, severe pulmonary hypertension, and cyanosis tolerate the hemodynamic changes in pregnancy poorly and represent a high-risk group. Their management is discussed elsewhere. (see Eisenmenger syndrome)

Maternal Complications

In women with a small PDA the risk of cardiac complications is minimal. Women with moderate sized PDAs are at risk of developing heart failure, and arrhythmias. Other cardiac characteristics can have an impact on outcomes. (see Global risk)

Fetal Complications

Transmission of congenital heart disease to offspring should be discussed. The risk of transmission of congenital heart disease is approximately 5-10%, compared to a background risk of approximately 1% of having a baby with congenital heart disease.

Management Strategies

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Preconception Counseling/Contraceptive Methods

A comprehensive cardiovascular examination should be undertaken before embarking on pregnancy. This includes a careful history and physical examination with saturation by pulse oximetry on the hand and foot, an echocardiogram and an electrocardiogram.

Most women with a PDA can have a successful pregnancy. In the absence of ventricular dysfunction or pulmonary hypertension, heart-related complications are rare.

In general, contraceptive selection is not limited by a woman's heart condition. In the setting of a PDA with concomitant pulmonary hypertension, contraception choices are more limited and estrogen-containing birth control formulations are contraindicated. (see Contraception).

Medication use should be reviewed if a woman is contemplating pregnancy or is pregnant. The MOTHERISK website (http://www.motherisk.org) is an excellent resource.

Ante-partum Care

The place and frequency of antenatal visits depends on the cardiac status of the women, the degree of left ventricular dilation or systolic dysfunction, and the pulmonary artery pressures. Women without the high-risk characteristics listed above do not need to be followed in high-risk specialized centers.

In women with a large PDA, (significant ventricular dysfunction or pulmonary hypertension), antenatal care should be provided by a dedicated multidisciplinary team of experienced cardiologists, obstetricians, and anesthetists at a high-risk pregnancy center. In women without high-risk features, antenatal care and delivery can be performed at non-specialized centers.

Women should be offered fetal echocardiography at approximately 20 weeks gestation.

Labour and Delivery

In women with small PDAs, no special precautions are necessary.

In women with high-risk characteristics, labour and delivery should be planned carefully with a multidisciplinary team well in advance. It is important to communicate the delivery plan to the woman as well as other physicians involved in her care. The best delivery plan is not useful if information is not readily available when needed.

Vaginal delivery is preferred. Women with large PDAs with ventricular systolic dysfunction or pulmonary hypertension are at high risk for complications. In these women, decreased maternal expulsive efforts during the second stage of labour and forceps or vacuum delivery is often utilized. To decrease potential harmful complications from difficult mid cavity-assisted delivery, uterine contractions are often utilized to facilitate the initial descent of the presenting part.

Most women with PDAs do not require special monitoring. The need for maternal monitoring is dictated by the functional status of the woman, the systolic function of the left ventricle, the degree of pulmonary artery hypertension and the oxygen saturation.

In general, endocarditis prophylaxis at the time of labour and delivery is not recommended in women with PDA.

References

1. Whittemore R, Hobbins JC, Engle MA. Pregnancy and its outcome in women with and without surgical treatment of congenital heart disease. Am J Cardiol 1982; 50:641-51