Evaluation and Management of Maternal Cardiac Arrhythmias

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KEYWORDS

• Arrhythmia • Cardiac • Maternal • Pregnancy • Treatment

KEY POINTS

- Cardiac arrhythmias are common in pregnancy.
- A majority of women presenting with palpitations have a benign finding on clinical work-up and assessment for arrhythmia.
- Pregnant women with arrhythmias other than sinus tachycardia should be evaluated and comanaged with a cardiologist.
- For most cardiac arrhythmias, treatment is the same in the pregnant and nonpregnant populations. Special considerations for pregnancy predominantly include avoidance of certain medications and appropriate planning for the intrapartum and postpartum period.

INTRODUCTION

Palpitations, or the unpleasant awareness of an abnormally beating heart, are common symptoms during pregnancy.[1,2] These symptoms can represent the full spectrum from normal physiology to life-threatening arrhythmias. Arrhythmias in pregnancy can occur in isolation or with structural heart disease. Heart disease can be known prior to pregnancy or diagnosed during the pregnancy and can be congenital or acquired. Optimal management of maternal cardiac arrhythmia includes identification of the specific arrhythmia, diagnosis of comorbid conditions, and appropriate intervention. In general, management of maternal cardiac arrhythmias is similar to that of the general population. Special consideration must be given, however, as to the effects of medications and procedures on both the mother and fetus.

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NORMAL CARDIOVASCULAR CHANGES OF PREGNANCY

During pregnancy, maternal blood volume increases by approximately 50%. This is accompanied by an increase in cardiac output, which is mediated by an increase in stroke volume and a slight increase in heart rate.[3] The mechanism by which pregnancy predisposes women to arrhythmias has not been fully elucidated. As blood volume and cardiac work increase, there is thought to be atrial stretch that may result an increased predisposition to arrhythmia.[4,5] In addition, the higher resting heart rate in pregnancy may increase the risk of arrhythmia. Soliman and colleagues[6] found an elevated resting heart rate to be associated with triggers for ventricular arrhythmia in an unselected group of patients (N = 867) referred for Holter monitoring at a single center. In pregnancy, heart rate typically increases 10 beats per minutes (bpm) to 15 bpm above baseline.[5] Hormonal changes in pregnancy may also increase the risk of arrhythmia and promote the unmasking of new foci that result in arrhythmias.[7]

EPIDEMIOLOGY OF ARRHYTHMIAS IN PREGNANCY

Overall the incidence of arrhythmia in reproductive age women is increased during pregnancy.[8] In a large cohort of admitted pregnant women (N = 136,422), sinus tachycardia and sinus bradycardia were the most common rhythm disturbances, with a frequency of 104 per 100,000 pregnancies based on diagnostic codes.[9] Supraventricular tachycardia (SVT) was noted at a frequency of 24 per 100,000 pregnancies, with other arrhythmias potentially requiring treatment occurring at a much lower frequency. SVT accounted for approximately 14% of the women with documented arrhythmias in pregnancy. Atrial fibrillation, atrial flutter, and ventricular tachycardia (VT) each accounted for approximately 1% of admissions for maternal cardiac arrhythmia. The overall rate of pregnancy admission, however, for any maternal arrhythmia in the cohort was only 0.17%, indicating that admission for a cardiac arrhythmia in pregnancy is rare.[9]

RISK FACTORS FOR CARDIAC ARRHYTHMIAS

History of Arrhythmia

There are many risk factors for arrhythmias during pregnancy. A major risk factor is a history of arrhythmia prior to pregnancy. The risk of recurrence is highest for women who had paroxysmal atrial fibrillation or atrial flutter (52%) and SVT (50%).[10] It is lower for ventricular arrhythmias (27%).

Congenital Heart Disease

Structural heart disease is associated with arrhythmias in both pregnant and nonpregnant patients. Patients with congenital heart disease have a lifetime risk of atrial arrhythmias of approximately 50%.[11] The highest risk patients are those with Ebstein malformation of the tricuspid valve, transposition of the great arteries, univentricular hearts, atrial septal defects, and tetralogy of Fallot. Up to 35% of patients with Ebstein anomaly have greater than or equal to 1 accessory pathway.[12] The etiology of atrial arrhythmias in the other forms of congenital heart disease is likely scar-mediated and/or pressure and volume loading of the atria.[13] Patients with congenital heart disease are also at risk of ventricular arrhythmias, particularly if they have undergone a ventriculotomy as part of their repair or if they have ventricular dysfunction. In patients with tetralogy of Fallot, a population where both prior ventriculotomy and ventricular dysfunction is common, the prevalence of VT is 3% to 14%.[13]

Other forms of structural heart disease that are not traditionally classified as congenital, such as hypertrophic cardiomyopathy and arrhythmogenic right ventricular