

Case Report

Maternal Atrioventricular Nodal Re-entrant Tachycardia During Pregnancy: Case Report

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Abstract

During pregnancy, the physiological changes predispose a woman for the development of new-onset or recurrent arrhythmia. Atrioventricular nodal re-entrant tachycardia (AVNRT) is a common supraventricular tachycardia (SVT) in reproductive age of woman. Although often it is benign in nature but concerning. Electrical cardioversion is safe during pregnancy. Electrophysiological study (EPS) and Radiofrequency ablation (RFA) can be performed in selected patients. Hereby, we report a case of a woman in her second trimester of pregnancy presented with diagnosed case of AVNRT. She was monitored by multidisciplinary team. Electrocardiogram (ECG) and Echocardiogram reveals normal changes. EPS and RFA was done one year back at the time of diagnosis. At her 37 weeks of pregnancy, she developed scar tenderness. Emergency caesarean section was done in presence of cardiologist. Maternal and perinatal outcome were good.

Keywords: Atrioventricular nodal re-entrant tachycardia, cardio-obstetrics, catheter ablation, radio frequency ablation, supraventricular tachycardia.

INTRODUCTION

Atrioventricular Nodal Re-entrant Tachycardia (AVNRT) is a prevalent form of supraventricular tachycardia (SVT) that is frequently observed in women of childbearing age. This SVT is characterized by a regular and rapid heart rhythm and happens due to the creation of a reentry circuit specifically within the atrioventricular (AV) node and the adjacent atrial tissue. AVNRT is sorted as a paroxysmal SVT (PSVT) because of its sudden onset and termination. It is more common in women compared with men.¹⁻³ AVNRT can present at any age, but as with AV reentrant tachycardia (AVRT) that involves an accessory pathway, it is more likely to begin in young adults.¹ There are no

reliable data on the incidence in pregnant women. In the general population, the occurrence rate is 35 cases per 100,000 person-years.² Over half of these patients are asymptomatic.

The main mechanism for the development of SVT is via reentry (atrioventricular nodal reentrant tachycardia in 60 % of cases and atrioventricular reentrant tachycardia in 30 % cases).³ The QRS complex in AVNRT is usually narrow (≤ 120 milliseconds), reflecting normal ventricular activation through the His-Purkinje system. However, during SVT, tachycardia with a broadened QRS complex can occur due to rate-related abnormal conduction or the presence of an underlying bundle branch block.

Nonetheless, during supraventricular tachycardia (SVT), irregular conduction related to heart rate or an existing bundle branch block can lead to a tachycardia characterized by a wider QRS complex. Incidents of SVT become more common, especially in the third trimester of pregnancy. This increased prevalence may be attributed to several proposed mechanisms, including the hyperdynamic circulation, hormonal changes, elevated levels of catecholamines in the bloodstream, heightened sensitivity of adrenergic receptors, and the expansion of the maternal effective circulating volume, which in turn stretches the atria.^{4,5} Potential risk factor in pregnancy is underlying congenital or structural heart disease.⁶ In most cases, there is no history of heart disease.

For hemodynamically stable patients, initial treatments such as sinus carotid massage or Valsalva maneuvers are attempted, followed by the administration of appropriate medications. If these measures prove ineffective, or if there is hemodynamic instability, more aggressive interventions, including electrical cardioversion or invasive procedures like radiofrequency ablation, may be necessary. However, it's essential to consider that these interventions carry potential risks for both the mother and the developing fetus. It's worth noting that there is a lack of comprehensive large-scale studies or randomized control trials that assess the safety of electrical cardioversion in pregnancy or identify optimal agents for achieving successful cardioversion in this specific population.⁷

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We present a diagnosed case of maternal AVNRT with hemodynamically stable with good maternal and fetal outcome.

CASE REPORT

A 27 year-old female G3P2 came at 1st time at her 26 weeks of pregnancy for antenatal checkup. She was a diagnosed case of AVNRT. At 2022, She complaints of sudden onset palpitations, uneasiness and dull aching chest pain. She had no prior medical history of significant illnesses, particularly any conditions related to the heart or

lungs. She was admitted, and the clinical examination showed a pulse rate of 220/min with electrocardiogram (ECG) showing presence of Atrioventricular nodal re-entrant tachycardia (AVNRT) but with hemodynamic stability (BP-140/70 mm of Hg). Anemia and hyperthyroidism were excluded. Cardiology consultation was taken. ECG and Echocardiogram was done and AVNRT was diagnosed. Then decision of EPS and radiofrequency ablation was taken and done successfully. Patient was reverted to normal sinus rhythm with the help of IV adeno-sine at that time.

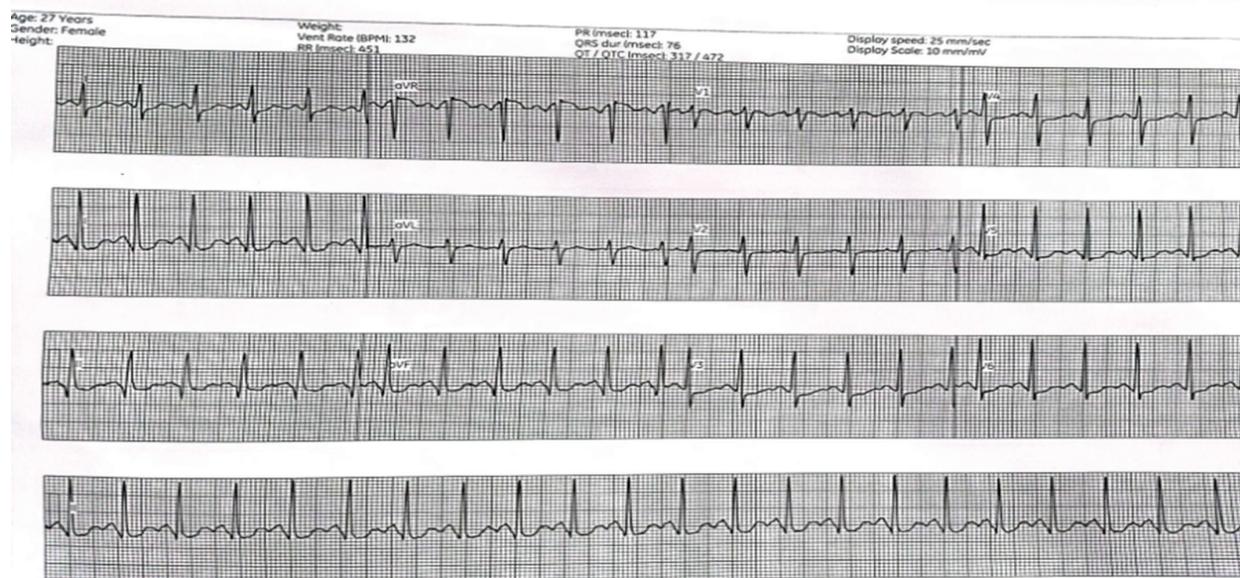
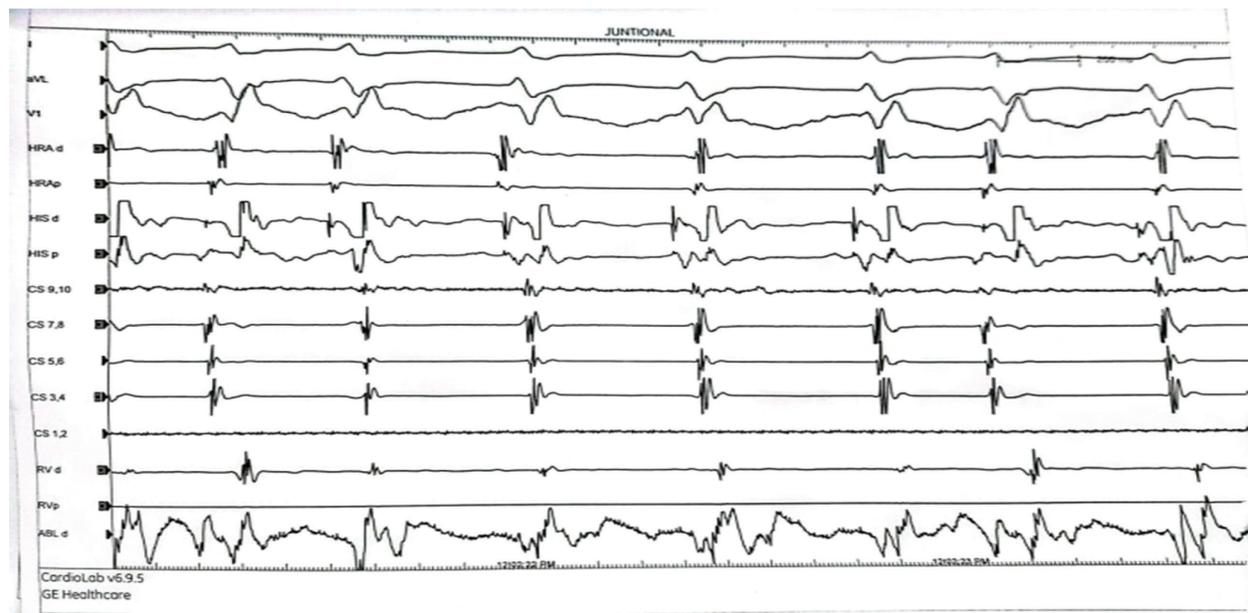


Figure 1: ECG showing AV nodal reentrant tachycardia

She was in regular antenatal checkup. Cardiology consultation was taken also regularly and suggested to take propranolol daily for 12 hourly. She has history of previous two caesarean section. At her 37 weeks of pregnancy she developed tenderness over the scar. Pulse was 115 b/min and Blood pressure was 120/70 mm of Hg. Emergency Caesarean section was performed. Cardiology consultation was taken and ECG was done.

On follow-up, patient and neonate, both were stable. No repeat episodes of SVT observed and discharged on her third postoperative day with advice.

DISCUSSION

The mechanism of increased arrhythmia increases burden during pregnancy is unclear, but it is likely because of a combination of hemodynamic, hormonal and autonomic changes. Increases in effective circulating blood volume of 30% to 50% are seen beginning at 8 weeks of gestation and peaking at 34 weeks.⁸

The occurrence of SVT during pregnancy poses risks to both the mother and the developing fetus. Exacerbate symptoms of SVT are shortness of breath, palpitations, dizziness and presyncope. Clinical assessment of vital signs and 12-lead ECG investigation are mandatory or an accurate diagnosis of arrhythmia.^{7,9} Echocardiography is indicated to exclude structural and functional heart diseases. Co-existence of organic heart diseases is an important risk factor for arrhythmias during pregnancy.

Early consultation with a cardiologist is advisable for the diagnosis of SVT and the identification of any potentially life-threatening underlying causes. Close collaboration between the cardiologist and the obstetrician is important throughout the pregnancy as well as puerperium to develop care strategies for potential recurrences of SVT.^{3,7,9} In our case along with cardiologist we continue the treatment.

Effectively managing SVT during pregnancy presents a complex clinical dilemma. The decision-making process should carefully weigh both maternal and fetal factors. Continuous monitoring of both the mother and the fetus should be maintained throughout acute treatment.

As per the 2019 guidelines for the management of individuals with supraventricular tachycardia, vagal maneuvers are recommended as the initial treatment approach for AVNRT in pregnant individuals. It is also recommended to avoid the use of antiarrhythmic drugs in pregnant women with mild symptoms or rare and short

episodes of arrhythmia.⁹ If symptoms are present and the arrhythmia is not tolerated by the woman, and if periodic disturbances in uteroplacental flow are present, treatment with a cardioselective beta-blocker should be considered, preferably after the first trimester of pregnancy. If there is no improvement after the treatment, the substrate of the arrhythmia may be ablated, preferably after the end of pregnancy.^{9,10}

Catheter ablation should be considered for arrhythmias detected prior to pregnancy to avoid arrhythmia exacerbation and the need for medical suppression during pregnancy.¹¹ Catheter ablation can be considered during pregnancy in cases of arrhythmia refractory to medical therapy, but this should only be considered in a center with experienced operators, and with strong consideration of a non-fluoroscopic approach, if available.¹²⁻¹⁴

CONCLUSIONS

Multidisciplinary approach, regular follow-up, prompt and correct diagnosis, proper use of physiological treatment and appropriate drugs can save the pregnant mothers from atrioventricular nodal re-entrant tachycardia and as well as the life of fetus.

CONFLICT OF INTEREST STATEMENT

All authors confirm that they have no conflicts of interest to disclose. Patient has given consent for publishing photograph, clinical history and management of the same and was assured that anonymity will be preserved.

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