CASE REPORT

Recurrent Paroxysmal Supraventricular Tachycardia in Pregnancy

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Abstract

Introduction: Paroxysmal supraventricular tachycardia (PSVT) represents a subset of supraventricular tachycardia characterized by regular tachycardia rhythm with abrupt onset and termination. Till date, there are no evidence-based guidelines for the management of PSVT in pregnancy. Its early diagnosis and prompt management is required to prevent adverse maternal and foetal outcomes.

Case description: A 21-years-old, G2P1L1 36.5 weeks, previous lower segment cesarean section (LSCS) with a known case of PSVT in previous pregnancy, presented with dyspnoea. Diagnosis of PSVT was confirmed on 12 lead ECG, with 2D echo showing no structural or functional abnormalities. This patient was managed with a combination of various treatment options like carotid sinus massage, anti-arrhythmic drugs (adenosine, diltiazem, metoprolol) to reverse and maintain the sinus rhythm. Elective LSCS was performed under spinal anaesthesia with good maternal and foetal outcomes.

Discussions: A patient with known case of PSVT presented in 3rd trimester with acute episode of PSVT. Pregnancy can precipitate new onset paroxysmal supraventricular tachycardia in patients with or without underlying heart disease.

Conclusion: To achieve good foetal and maternal outcomes in cases of PSVT in pregnancy, requires tertiary care centre with multidisciplinary approach

Keywords: Lower segment cesarean section, Paraxysmal supraventricular tachycardia, Pregnancy

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Introduction

Tachyarrhythmias are one of the most common cardiac complications occurring in the antenatal period. Pregnancy is a state characterized by hyperdynamic circulation, increased level of circulating catecholamines, and altered hormonal milieu, all of which can precipitate the occurrence of arrhythmias.[1] Supraventricular tachycardia (SVT) is defined as tachycardias (atrial and/or ventricular rates in excess of 100 bpm at rest), the mechanism of which involves tissue from the His bundle or above. These SVT's include inappropriate sinus tachycardia, AT (including focal and multifocal AT), macro re-entrant AT (including typical atrial flutter), junctional tachycardia, AVNRT, and various forms of accessory pathway-mediated re-entrant tachycardias. Paroxysmal supraventricular tachycardia (PSVT) represents a subset of SVT, characterized by the presence of regular and rapid tachycardia of abrupt onset and termination.[2] The commonest arrhythmia in reproductive-age women is paroxysmal supraventricular tachycardia.[3] The incidence in the general population is 35 per 1,00,000 person-years. Development of SVT is attributed to reentry, Atrioventricular nodal reentrant tachycardia in 60% of cases and atrioventricular reentrant tachycardia in 30% cases. It usually presents with palpitations, shortness of breath, pre-syncope.[3] SVT is a cardiac emergency during antenatal period which could lead to maternal and foetal compromise if not attended to promptly.The acute management of SVT in pregnancy presents a difficult clinical challenge because the available data is limited to case reports & observational studies and the guidelines published by the American College of Cardiology/American Heart Association are based solely on expert consensus.[3,6] Choice of treatment depends on the symptom severity, hemodynamic status of the patient, & consideration of both maternal and foetal well-being. Since none of the drugs is a category A drug, all of them have the potential to be toxic to the foetus. Hence the treatment of SVT is to be tailor-made to the patient and should entail co-ordination between the obstetrician & the cardiologist throughout the period of care in order to develop strategies for optimum management of current episodes & possible recurrences of SVT. We are presenting a case of k/c/o PSVT with previous lower segment caesarean section presenting with acute exacerbation of PSVT at term.

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Abbreviations:

PSVT – Paroxysmal supraventricular tachycardia

LSCS- Lower segment cesarean section

NYHA – New York heart association

I.V - Intravenous

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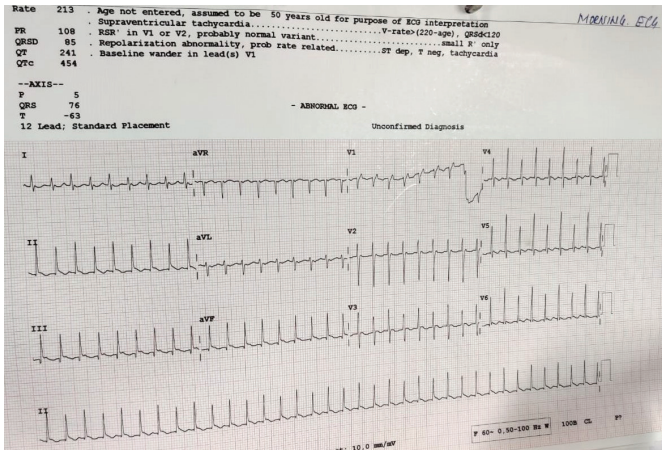
Case report

21year G2P1L1 previous LSCS 36.5 weeks gestation came to our institute Outpatient department with complaints of palpitation & dyspnea on exertion since 1-week. Patient had history of similar complaints 1 week back for which was prescribed oral Metoprolol 25 mg and verapamil 40 mg OD by a physician but the symptoms did not resolve. The patient had past history of PSVT in third trimester of previous pregnancy which was managed by antiarrhythmic drugs. In her interpregnancy interval patient was asymptomatic and was not on any medication. In her current pregnancy, 1st and 2nd trimesters were uneventful & patient experienced palpitation and dyspnea for the first time in her 35th week of gestation. On examination, her pulse was 220 bpm, B.P 110/70 mmHg, Spo2 98% recorded. Patient was admitted in cardiac ICU for further management. 12 Lead ECG was suggestive of PSVT. Conversion to sinus rhythm was achieved using 2 doses of injection diltiazem 2cc intravenous (i.v). For ongoing management of PSVT tab Metoprolol 25 mg OD. & Diltiazem 60 mg BD started. Patient continued having recurrent episode of PSVT even with oral antiarrhythmic drugs but were controlled with injection diltiazem. Patients thyroid profile (TSH 2.89, FT3 2.43, FT4 0.88), serum electrolytes (Na 142mmol/l, K 4.5mmol/l, Cl 106mmol/l) & Hgb 13.4 g/dl were within normal range. 2D echo did not show any structural abnormalities with LVEF 55%. USG Doppler done which was normal. During the cardiac ICU stay, patient continued to have recurrence of PSVT. In view of full-term gestation with previous LSCS with non-inducible cervix, decision for elective LSCS done in consensus with cardiologist. On table before spinal anesthesia, patient had an episode of PSVT with pulse rate of 220 bpm. To achieve normal sinus rhythm, she was given carotid sinus massage, Adenosine 6mg (i.v.) and Diltiazem 5mg (i.v). Cesarean section was uneventful with delivery of male baby weight 2.52kg with APGAR score 9. After 1 hour she had an episode of PSVT which was successfully managed with Injection Metoprolol 1 mg. Following this normal Sinus rhythm was maintained on tablet Diltiazem 60mg BD and Metoprolol 25mg OD. On postoperative day 3 patient developed bradycardia with pulse up to 50 bpm, tab Metoprolol was withheld and shifted to tablet Diltiazem CD 90 mg OD. Patient was asymptomatic and hemodynamically stable subsequently. Patient was discharged on postoperative day 6. On follow-up after 2week patient was asymptomatic & hemodynamically stable with normal sinus rhythm and patient was continued on tablet Diltiazem CD 90mg OD with advice to follow up for electrophysiological study followed by Radiofrequency ablation.

Figure 1: ECG pattern of the patient showing Supraventricular tachycardia.



Discussion

Pregnancy can precipitate new onset paroxysmal supraventricular tachycardia in patients with or without underlying heart disease.In a population-based cohort study in **Taiwan**, it was found that incidence of symptomatic PSVT during pregnancy peaked during the third trimester. It was also observed that women with a previous history of PSVT had a much higher risk of PSVT in current pregnancy than those in which PSVT occurred de novo.[4] In our case, the patient had a history of PSVT in her previous pregnancy. In the current pregnancy, her first & second trimesters were uneventful and patient was not on any medication. She experienced palpitations first time at 35 weeks of gestation, for which she on started on oral anti-arrhythmic drugs. She presented to our institute with palpitations and breathlessness on exertion at 38 weeks of gestation. Robin *et al.* in their study of 31,000 deliveries over a period of 8 years, found that incidence of symptomatic SVT during pregnancy was 1 in 8000.[5] Pregnancy is an arrhythmogenic state, there are multiple mechanisms postulated to lead to arrhythmias. The possible mechanisms include hyperdynamic circulation leading to increase of circulating blood volume and cardiac output, autonomic changes leading to increase in sympathetic tone, increased circulating levels of catecholamines, and emotional changes of pregnancy. There is increased risk to both mother and fetus when SVT occurs during pregnancy. There have been no deaths reported as a result of arrhythmias in the Confidential Enquiries into Maternal Deaths (CEMD) but two deaths might have been associated with them.[5] Adverse fetal events in SVT could be attributed to teratogenicity if anti-arrhythmic drugs are used in first trimester and prematurity if pregnancy has to be terminated early due to sustained arrhythmias. Diagnosis of PSVT is challenging as the presenting symptoms like palpitations, short ness of breath and light headedness can also be present in advanced gestational age during pregnancy. A woman presenting with arrhythmias should have a complete evaluation with detailed history, examination, 12 lead ECG, Echocardiography to evaluate for structural heart disease. Baseline laboratory investigations should screen for electrolyte imbalances, thyrotoxicosis, gestational diabetes and renal failure.

In our case, during acute episode of SVT, carotid massage was given, but it failed following which successful conversion to sinus rhythm was achieved with IV Diltiazem following

which patient was shifted to tab Metoprolol & tab Diltiazem for ongoing management of SVT. The **American College of Cardiology guidelines** recommend that vagal maneuvers are the first line of management of SVT. IV Adenosine is the first line drug used in case vagal maneuvers fail. If adenosine is not effective or feasible, in hemodynamically stable patients, IV Verapamil/ Diltiazem or IV Beta blockers (Metoprolol or Propranolol) are the 2nd line agents used. In hemodynamically unstable patients, Synchronized Electrical cardioversion is the treatment of choice.[2] In a review of literature between 1950-2010 by Ghosh *et al*., which included 38 English language studies, it was shown that Adenosine was the agent most commonly used in the management of SVT, with conversion to sinus rhythm in 84% cases after failure of vagal maneuvers, with adverse outcomes in mother and fetus in 8% & 6% respectively. The use of Beta blockers & Calcium channel blockers was reported in fewer cases with lower conversion rates (38% in Beta blockers, 44% in Diltiazem, 50% in Verapamil), with hypotension being the most common adverse event noted.[6] In postpartum period, our patient was started on Tab. Diltiazem and was advised EP study followed by ablation of the accessory pathway for definitive management of SVT.

Agrawal *et al*. report a case of SVT in pregnancy with intractable arrhythmias not responding to vagal maneuvers & adenosine, for which conversion to sinus rhythm was achieved successfully with Electrical cardioversion followed by an emergency caesarean section. On post operative day 3, radiofrequency ablation was done following with patient was stable. There were no repeat episodes of SVT were observed over a 2 years follow-up period.[3] Therefore, a collaborative approach, between gynecologist & cardiologist, with regular follow up, accurate diagnosis, & prompt management of episodes of SVT with vagal maneuvers, anti-arrhythmic drugs & ECV in eligible candidates, along with sound maternal & fetal monitoring will lead to a successful management of SVT in pregnancy with favorable maternal & fetal outcome.

Conclusion

The physiological changes occurring during pregnancy can predispose to occurrence of arrhythmias. In patients presenting with pulse more than 100 beats per min should be screened with 12 lead ECG and 2D ECHO for picking up pathological tachycardia early. Since there are no randomized controlled trials regarding management of SVT in pregnancy and practice guidelines based only on expert consensus, vigilance and sound co-ordination between obstetrician & cardiologist can reduce associated morbidity and mortality in the mother and fetus.

References

1. Kumare BD, Kawathalkar A, Vijay NR. Paroxysmal Supraventricular Tachycardia: A Complex Dilemma during Pregnancy. J South Asian Feder Obst Gynae 2015;7(1):44-47.
2. 2015 ACC/AHA/HRS Guideline for the Management of Adult Patients with Supraventricular Tachycardia, JACC VOL.67, NO.13, 2016 e27-115; ISSN 0735-1097
3. Agrawal R,Shintre H, Rani B; A Rare Case of Supraventricular Tachycardia During Pregnancy and Successful Management in Crisis Situation with Electrical Cardioversion and Radiofrequency Ablation; The Journal of Obstetrics and Gynecology of India (November–December 2016) 66(S2):S594–S597; DOI 10.1007/s13224-015-0836-0
4. Lee K, Chang S, Kuo C, Chiou M, Wen M; Incidence and time course of symptomatic paroxysmal supraventricular tachycardia during pregnancy: a nationwide database study; Acta Cardiol Sin 2020;36:44-49; doi:10.6515/ACS.202001_36(1).20190707A
5. K. Robins, G Lyons; Supraventricular tachycardia in pregnancy; Br J Anaesth 2004; 92:140-3
6. Ghosh N, Luk A, Derzko C, Dorian P, Chow C; The Acute Treatment of Maternal Supraventricular Tachycardias During Pregnancy: A Review of the Literature; J Obstet Gynaecol Can 2011;33(1):17–23