Combined Spinal-Epidural Technique in a Patient with PSVT: A Case Report

Case Report

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ABSTRACT

Introduction: Supraventricular tachycardia is a heterogeneous group of arrhythmias (prevalence of 2.25/1000 persons) with a female predominance of 2:1 across all age groups. The most common SVTs include atrioventricular nodal re-entrant tachycardia, atrioventricular re-entrant tachycardia, and atrial tachycardia. SVT increases patient morbidity, particularly when symptoms are frequent, and in a small cohort of patients with atrial fibrillation and ventricular pre-excitation, it can be life-threatening.

Case Presentation: Here, we report a case of previously diagnosed Paroxysmal Supra Ventricular Tachycardia (PSVT) who was on tab Diltiazem 30mg, 2 tablets thrice daily. She had a history of hypothyroidism for the past one and half years, for which she was on tab thyroxine 25 microgram OD. She was posted for abdominal hysterectomy, which was successfully done under low-dose combined spinal epidural anaesthesia (CSE) with volume extension technique.

Conclusion: Low-dose CSE with volume extension technique is a good alternative for spinal anaesthesia, in patients with PSVT posted for lower abdominal surgeries.

Key Words: Combined spinal epidural anaesthesia, Hysterectomy, Paroxysmal Supra Ventricular Tachycardia, Ropivacaine..

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INTRODUCTION

Supraventricular tachycardia (SVT) is a heterogeneous group of arrhythmias used to describe tachycardias that involve cardiac tissue at the level of the bundle of His or above [1]. The prevalence of SVT is 2.25/1000 persons with a female predominance of 2:1 across all age groups [2,3]. The most common SVTs include atrioventricular nodal re-entrant tachycardia, atrioventricular re-entrant tachycardia, and atrial tachycardia. SVT increases patient morbidity, particularly when symptoms are frequent, and in a small cohort of patients with atrial fibrillation (AF) and ventricular pre-excitation, it can be life-threatening. Recent European Society of Cardiology guidelines continue to advocate the use of vagal manoeuvers and adenosine as first-line therapies in the acute diagnosis and management of SVT. Alternative therapies include the use of beta-blockers and calcium channel blockers. Here, we report a case of a patient with previously diagnosed Paroxysmal Supra Ventricular Tachycardia (PSVT), who successfully underwent Total Abdominal Hysterectomy surgery with combined spinal epidural anaesthesia (CSE) with volume extension technique.

CASE REPORT

A 45-year-old 68kg woman was posted for Total Abdominal Hysterectomy with bilateral salphingo oophorectomy (TAH & BSO) (Figure 1). She was previously diagnosed with PSVT and was on tablet Diltiazem 30mg, 2 tablets three times a day. She had history of hypothyroidism for the past one and half years, for which she was on tablet thyroxine 25 microgram OD. She has a history of anxiety and palpitations on and off and has no history of dyspnoea, syncope, or chest pain. On examination, the pulse rate was 109 bpm and Blood pressure was 126/88mmHg. Cardiovascular system examination revealed normal S1 and S2. Her blood investigations were Haemoglobin 11.0g/dl, platelet count 2,37,000/mm^3 Total Leukocyte count $9.6\times10^3/\mu l$ and her TSH was in normal range. ECG revealed tachycardia, sinus rhythm, and narrow QRS complex (Figure 2). High-risk consent was taken, because of cardiac abnormality as per cardiologist reference.

The patient was shifted to the operation theatre, peripheral IV access was secured with a 20G cannula in

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the nondominant forearm, and Ringer lactate solution was started. Monitoring was done with a multi-monitor for NIBP, SPO2, HR, and ECG throughout the surgical procedure and was carried out in the post-operative recovery room. The patient was put in a right lateral position and under strict aseptic precautions, CSE was given. Injection 0.75% hyperbaric ropivacaine 1ml (7.5mg) with fentanyl 0.5ml (25 micrograms) was given intrathecally in 3-4 lumbar spaces, and epidural catheter was inserted and via that 10ml normal saline was given for volume extension. The patient was turned to a supine position gently. Sensory block up to the 10^{th} thoracic dermatomal level was achieved and surgery was started. The patient was administered 5 liters of oxygen per minute through a face mask throughout the intraoperative period. Injection Phenylephrine infusion of 20 micrograms per ml was prepared for the episode of intraoperative hypotension and was not required. Injection Phenylephrine bolus of 25 micrograms was given twice during the episodes of hypotension. Injection Adenosine and Injection Diltiazem was kept ready for management of intraoperative PSVT, but it was not required. Paracetamol infusion of 1gram IV was given for post-operative analgesia and 1000ml of Ringer lactate solution was given throughout the surgery. The patient's BP was maintained in the range of 90 to 130mmHg systolic and 50-80mmHg diastolic. Pulse rate was maintained in the 100-120/ minute range and SP02 of 100% throughout the surgical procedure (Figure 3). Adequate urine output was maintained. Normal saline in epidural for volume expansion is effective and the patient did not receive top up doses throughout the surgery of 45 minutes duration and the outcome of the surgery was uneventful. The patient was discharged after 7 days postoperatively.

Figure 1: The patient after insertion of the epidural catheter and before induction.

Figure 2: ECG of the patient before induction.

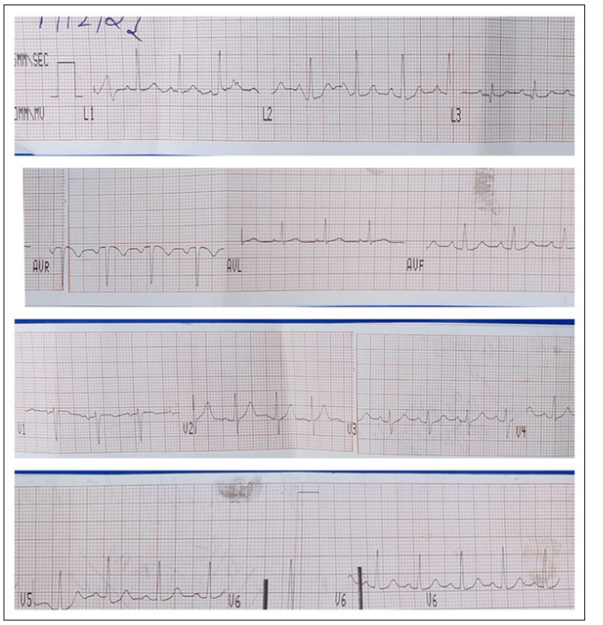

Figure 3: The patient's ECG during the procedure.

DISCUSSION

We employed CSE with volume extension technique with particular attention to the control of factors that may lead to sudden hypotension with resultant tachycardia and the potential for the development of acute heart failure, which would have been detrimental to the patient.

In the absence of left or right bundle branch block, SVTs are often referred to as narrow complex tachycardias with the most common SVTs being atrioventricular nodal re-entrant tachycardia (AVNRT), atrioventricular re-entrant tachycardia (AVRT) and atrial tachycardia (AT) [4]. AVNRT is the most common SVT in the general population and accounts for over 60% of patients undergoing invasive cardiac electrophysiology study [5]. The characteristic ECG shows tachycardia with regular, narrow QRS complexes (except in the case of pre-existing or functional

bundle branch block) without clearly distinguishable *P* waves or with a very short PR interval in the typical form, while atypical forms may present a longer PR interval [6]. Similar findings were seen in the ECG of our patient.

Close inspection of the surface ECG to identify markers of the underlying mechanism can reveal the diagnosis in up to 80% of AVNRT or AVRT cases, although an ECG in sinus rhythm is often required for comparison [4].

Spinal Anaesthesia is commonly used for patients undergoing lower abdominal surgeries. However, these techniques carry the risk of sudden and uncontrolled hypotension with unstable hemodynamics and the possibility of sudden arrhythmia in PSVT patients. Spinal anaesthesia causes sympathetic blockade and may reduce SVR; for this reason, single-shot anaesthesia is not encouraged in such patients [7]. Epidural anaesthesia may have the advantage of better hemodynamic stability compared to spinal block, but it is time-consuming and technically difficult and requires expertise. CSE is preferred to the spinal due to controlled and segmental block with better hemodynamic stability [8]. That's why we used CSE in our patient.

General anaesthesia (GA) has its disadvantages such as a difficult airway and intubation with pressor response leading to dysrhythmias, heart failure, and heart block. Intra-operative bleeding, perioperative nausea and vomiting, and postoperative pain are other concerns. Intermittent positive pressure ventilation has negative effects on hemodynamics, which has adverse effects on PSVT. Thus, GA was avoided in this patient.

In our case, we used CSE with a volume extension technique with a low dose of the spinal drug Injection 0.75% hyperbaric ropivacaine 1.0ml (7.5mg) with fentanyl 0.5ml (25 micrograms) with 10ml normal saline in epidural space for volume extension and hemodynamic parameters are maintained in the normal range. The major advantage of low-dose spinal is that it causes less hypotension as compared to the normal dose which is useful in patients with PSVT where hypotension is undesirable. We used Injection Phenylephrine for the management of hypotension and not Injection Mephentermine because the latter causes tachycardia which leads to adverse effects in patients with PSVT.

CONCLUSION

Low dose combined spinal epidural anaesthesia with volume extension technique is a good alternative for spinal anaesthesia, in a diagnosed case of Paroxysmal Supra Ventricular Tachycardia who is posted for Total Abdominal Hysterectomy with bilateral salphingo oophorectomy. Rate-controlling drugs such as Adenosine and Diltiazem should be kept ready for the management of intraoperative PSVT.

LIST OF ABBREVIATIONS

SVT: Supraventricular tachycardia; **PSVT:** Paroxysmal Supra Ventricular Tachycardia; **TAH & BSO:** Total Abdominal Hysterectomy with bilateral salphingo oophorectomy; **AVNRT:** Atrioventricular nodal re-entrant tachycardia; **AVRT:** Atrioventricular re-entrant tachycardia; **AT:** Atrial tachycardia; **GA:** General anaesthesia.

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AUTHORS' CONTRIBUTIONS

RKG is advisor or provided revisions to the scientific content of the case report. SM wrote most of the case report or drafted the case report. AS provided grammatical revisions to the case report. All authors read and approved the final case report.

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CONFLICT OF INTERESTS

There are no conflicts of interest.

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