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Challenging Arrhythmia-Truth after Electrophysiology Study and Radio Frequency Ablation

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Abstract*: It is evident that arrhythmias, particularly paroxysmal supraventricular tachycardia (PSVT), pose a significant burden on cardiac health, often leading to complications like cardiomyopathy and heart failure if left untreated. In my view, early diagnosis and intervention are key in managing PSVT, with electrocardiography (ECG) and electrophysiology studies (EPS) playing a central role. This case series examines three patients diagnosed with PSVT, each successfully treated with radiofrequency ablation (RFA), a technique that has gained considerable traction due to its high efficacy and safety profile. The findings suggest that RFA not only provides immediate relief but also significantly reduces recurrence rates, making it a preferred treatment option over long-term antiarrhythmic therapy. Notably, all patients in this study exhibited no post-procedural complications or recurrence upon follow-up, reinforcing RFA's role as a definitive solution for PSVT. This suggests that, in the absence of underlying ventricular scarring or idiopathic conditions, RFA could be a game-changer in the management of arrhythmias. The broader adoption of this technique could contribute to lowering arrhythmia-related mortality and improving patient quality of life.*

Keywords: PSVT, radiofrequency ablation, electrophysiology study, arrhythmia treatment, cardiac intervention

1. Introduction

Arrhythmias are the abnormal rhythms of heart, which may lead to comorbidity. As of now, 31% of the burden of cardiac diseases is contributed by arrhythmias. Arrhythmias can lead to cardiomyopathy and eventually to heart failure, if not treated. Arrhythmias can be tachycardia or bradycardia, which further classifies on the location, area of disturbed electrical activity, origin, transmission means and associated syndromes. Paroxysmal supraventricular tachycardia (PSVT) describes the narrow zone of tachycardia. In contrast to other arrhythmias, PSVT involves ventricular response, which leads to intermittent episodes and sudden termination.

PSVT has been successfully seen to be diagnosed using electrocardiography (ECG) and specific study is done by electrophysiology study (EPS), which is further treated by radiofrequency ablation (RFA).

In the past decades, the use of RFA has significantly increased due to successful treatment of various arrhythmias such as Wolff-Parkinson-White-syndrome, cavotricuspid-dependent atrial flutter, PSVT and atrioventricular (AV) nodal reentrant tachycardia.

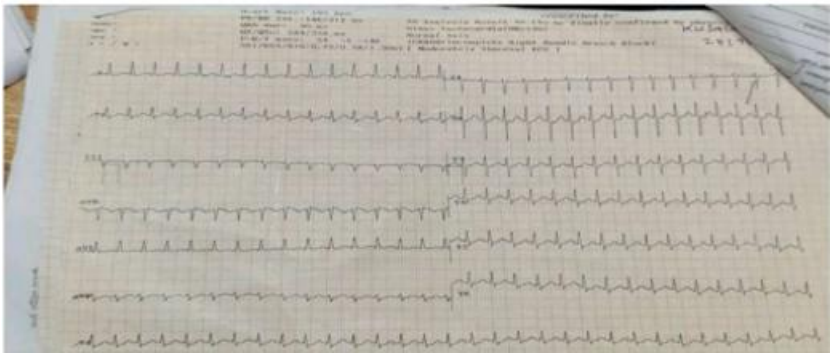
Furthermore, the use of RFA is seen to have a significant efficacy and holds a good safety record. Complications of PSVT can be easily prevented using RFA and reduce the chances of reoccurrences of PSVT.

In the following case presentation, series of three cases will be used for creating panorama of existing knowledge of PSVT, along with diagnostic approach through EPS, and finally, the use of RFA as a treatment method will be demonstrated.

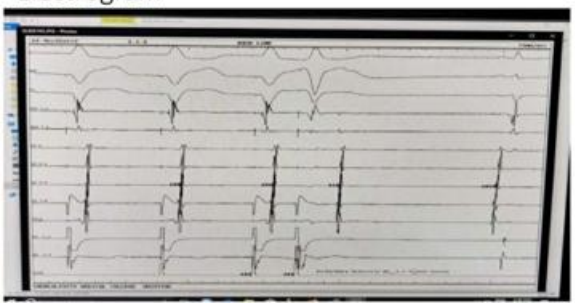
Case 1:
A 48 Yrs Female admitted with complaints of palpitations, chest pain since morning. O/E patient conscious, oriented, BP 130/60 mmHg, PR 193/min, spo2 97% with RA, CVS -S1, S2 + no murmur, RS - bilateral airway entry +, P/A -soft ECG was done shows -SVT and managed with inj ADENOSINE 12 mg IV.she responded well with given treatment.2D ECHO was done - normal LV Function.

EPS was done - Typical AVNRT
AH-81ms, HV-35ms, AH JUMP-180ms with ECHO beats at 600/550ms.
RFA performed 60W 60S each, 65deg cutoff.

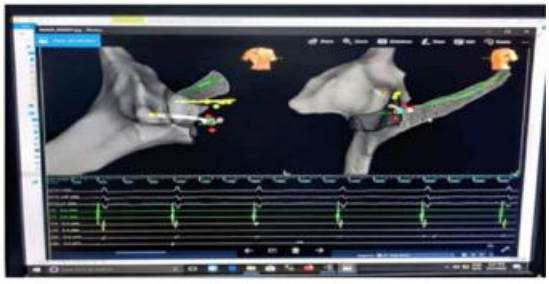
Initial ECG



Electrogram

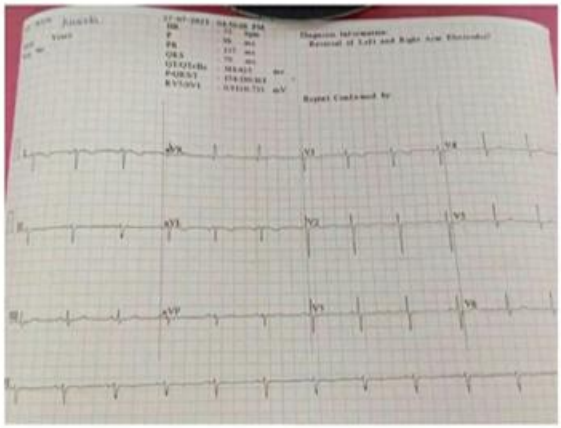


EP Study 3 D



Fluro image

Post Ablation ECG



Case 2:

A 53 Yrs Male patient known case of T2DM /SHTN on treatment and admitted with complaints of palpitation and giddiness since morning. BP -110/70 mmhg,HR 140/min, spo2 96% with RA. ECG was done - shows SVT and treated with inj ADENOSINE 6mg IV and reverted to sinus rhythm. Rpt ECG taken shows -WPW syndrome, Left Sided Pathway

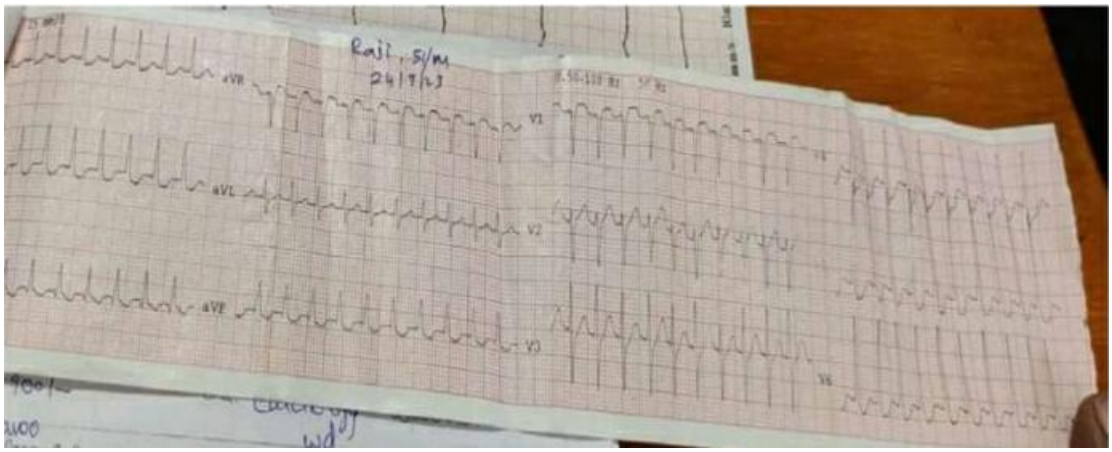
2D ECHO was done -LVH +, EF-60%, Normal LV function

EPS was done- Right lateral accessory pathway

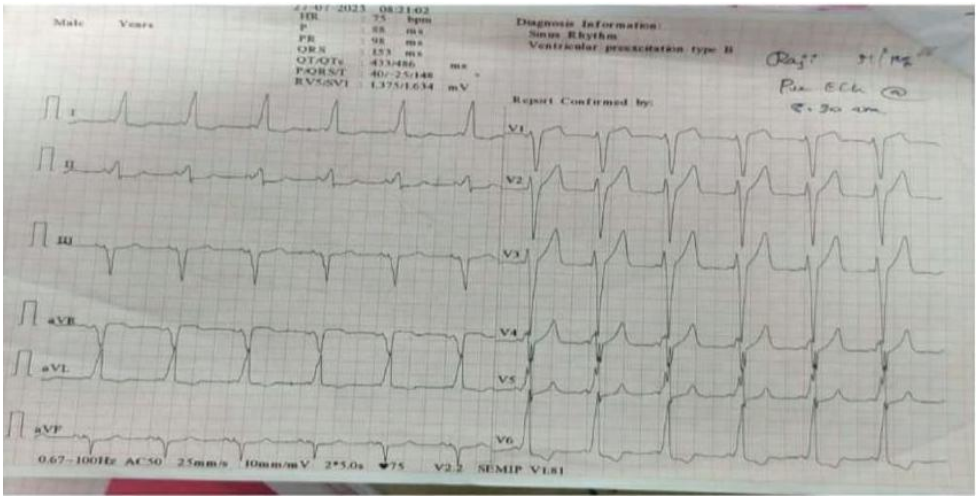
EPS study AH-76ms, HV-15ms preexcitation present+ maximal anterograde preexcitation LBBB V1 late transition present in inferior leads. Electro anatomical mapping right side.

RFA performed.

Intial ECG



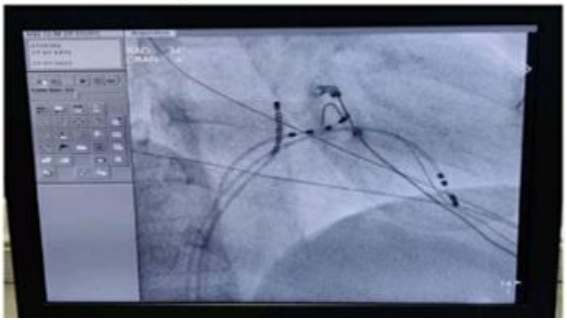
Preabalation ECG



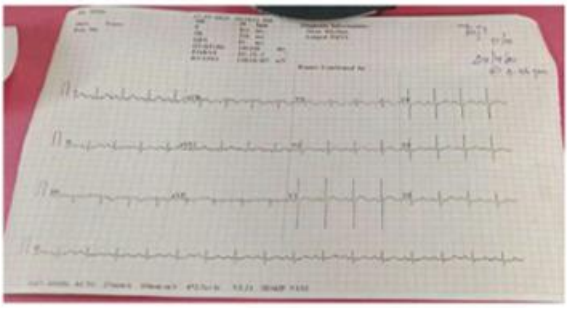
Electrogram

3D mapping

Fluoro image



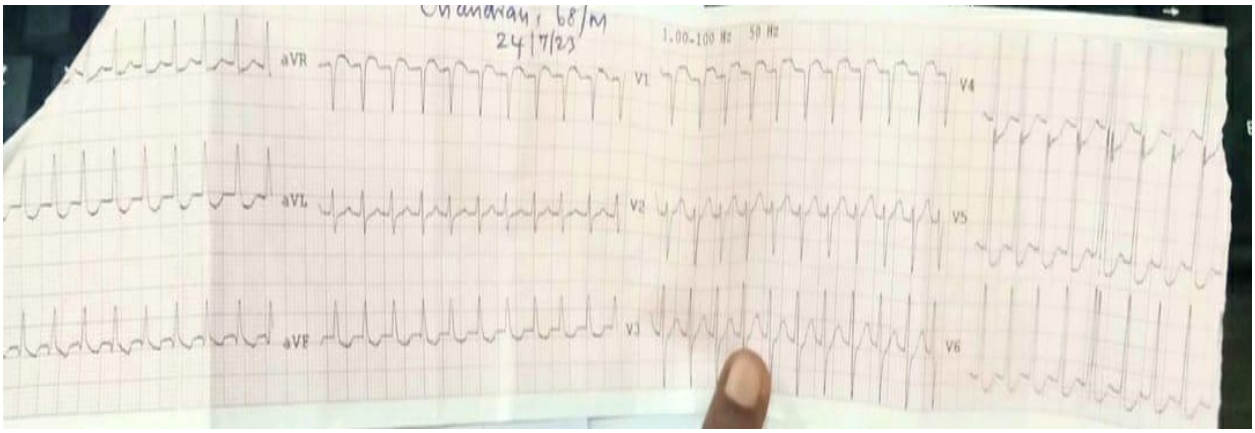
Post Ablation ECG



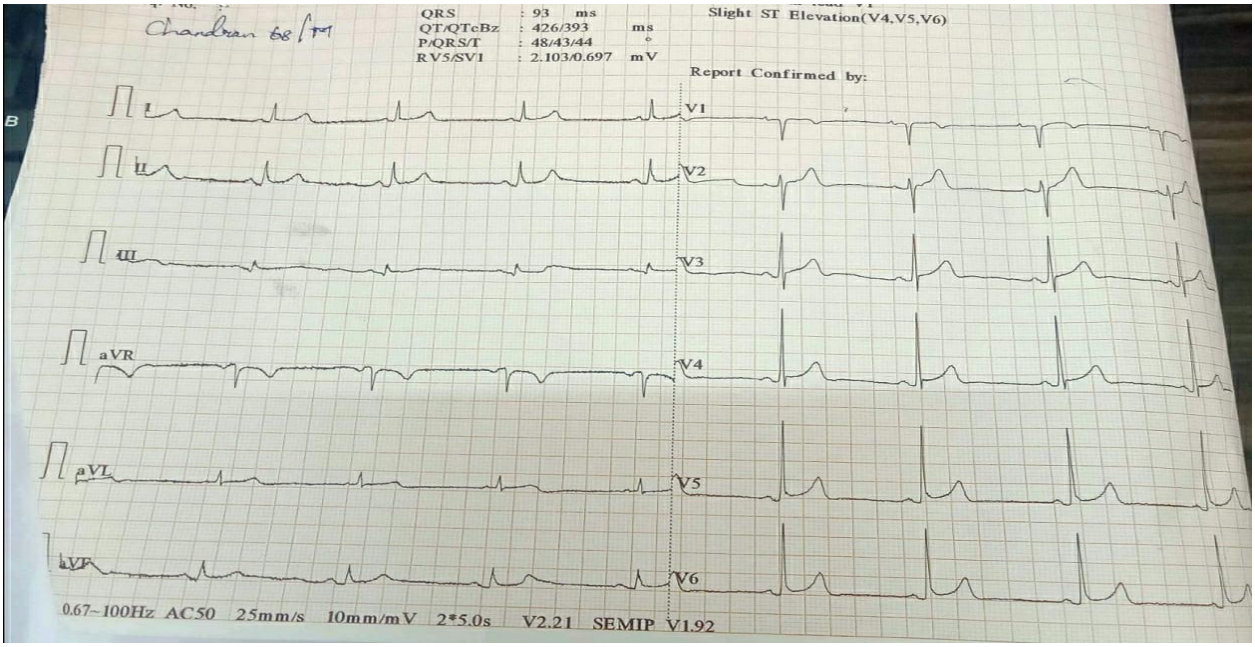
Case 3:
A 68 Yrs Male Patient no previous comorbidity admitted with complaints of palpitations, sweating, excessive sweating since morning. BP 120/80mmHg, PR 142/min, spo2 99% with RA. ECG was taken features suggestive of SVT and reverted to sinus rhythm with 6mg inj ADENOSINE.

2D ECHO done - NO RWMA, EF 64%, normal LV function. EPS was done and RFA done.

INTIAL ECG



POST ABALATION ECG



2. Discussion

The presented case series involves three patients had PSVT and undergone EPS followed by RFA, which marked the reduction of incidence and burden of ventricle, which will further not lead to PSVT. Patients after the RFA, when presented for follow-up, presented with no history or reoccurrence; furthermore, the EPS and RFA were completed within an hour. Furthermore, patients were later asked to stop antiarrhythmic drugs as they presented normal electrical activity and sinus rhythm.

The use of catheter RFA has been increasing worldwide to treat the ventricular arrhythmias, Wolff-Parkinson-White syndrome and cavotricuspid-dependent atrial flutter.

RFA is much more effective in absence of ventricular scar or idiopathic ventricular tachycardia. Toward its excellent prognosis, RFA has shown nearly zero incidences of PSVT episodes in the 1st year of treatment.

The rare reoccurrence may be due to triggers like poor prognostic heart failure. Furthermore, the use of RFA leads to reduction of mortality rate due to arrhythmias by four to six folds AVNRT.

3. Conclusion

All the three patients with PSVT were treated with technique of RFA. This had no adverse effect on patient and was minimally invasive. Furthermore, RFA is very much effective. Thus, this technique of EPS is very specific in diagnosing the PSVT and RFA is much more efficient to treat PSVT. The use of RFA has significantly proven to reduce the reoccurrence of PSVT episodes in future.

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