TRANSSEPTAL APPROACH FOR ABLATION OF LEFT SIDED PATHWAYS

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ABSTRACT

Objectives: *To highlight our experience of transseptal approach for arrhythmias for the left side pathways.*

Methodology: *Electrophysiology (EP) studies and ablation conducted in electrophysiology laboratory Lady Reading Hospital Peshawar from September 2006 to May 2009. The study was conducted on Bard EP Lab, Bloom stimulator and Cordes EP shuttle. After explaining the procedure to the patient, beta- blockers were stopped 5 days and patients were fasted for six hours before the procedure. Five standard wires passed two from left femoral that is for coronary sinus and His and three from right femoral side that is for high right atrium, right ventricle and ablation. Pigtail catheter was placed in aortic root from left femoral artery. Septal puncture was done in the left lateral projection. Ablation catheter was passed in the sheath after withdrawing the needle, pathway was identified and ablated.*

Results: *Total 295 consecutive patients underwent electrophysiological studies and ablation. Out of which pathways were 131 (124 patients were having Wolff-Parkinson-White (WPW) and orthodromic reciprocating tachycardia 7).Among pathways Left sided pathways were 70. In all cases successful septal puncture and ablation was done. Overall success rate for atrial septal puncture and ablation was 100%. No complication was seen during and after the procedure. Average time for procedure of ablating left sided pathways was 25 minutes.*

Conclusion: *Trans-septal approach is safe and is well approachable for far lateral pathways ablation.*

Keywords: *Arrhythmias, Accessory pathways, Transseptal*

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INTRODUCTION

Cure in cardiology is rare but radiofrequency catheter ablation for narrow complex and most of the wide complex tachycardia provide definite cure. Recurrence rate is less than 5 % and patient remains symptoms free for ever without medication.

Describing origin and mechanisms of arrhythmias was possible in 1967; the main stay was anti arrhythmic drugs. This modality of treatment was subjected to poor compliance because the patient used to start these medications from very early age and was compelled to take for life. Beside the compliance the patient was prone to the side effect of these medications which were very toxic at time like causing pulmonary fibrosis in the case of amiodarone which remain the drug of choice among cardiologist and is causing long QT exposing patients to other lethal arrhythmia "Torsade de pointes".

It was in 1983, when for the first time radiofrequency catheter ablation was described[1,2]. Since then there has been considerable experience and success in the ablation of arrhythmias. Supraventricular tachycardias makes 70% of these ablations and among them pathways Wolff– Parkinson–White syndrome (WPW), orthodromic reciprocating tachycardia (ORT) and atrio-ventricular reentry tachycardia (AVNRT) are the most ablated arrhythmias. Pathways may

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be from the right side or the left side of the heart.

These are also known AS accessory pathways. The right side pathway are ablated form the venous side, passing catheter via the vein to the right atrium and identifying the pathway and ablating them but for left sided pathways retrograde transaortic approach is used for very long[3,4] . In this approach the catheter goes to the left atrium via the femoral artery. However complication rate of 2.1% and a procedure related death rate of 0.2% were observed for retrograde approach[5].

The other approach is, to go to the right atrium and then through the trans-septal approach access to the left atrium and ablate the pathway. Several centers have reported high success rates and few complications using the transseptal approach for left sided accessory pathways[6,7]. In this paper we are sharing our own experience in transseptal procedure.

METHODOLOGY

Two hundred and ninety five patients underwent radiofrequency ablation procedures, of these 70 had a trans-septal approach. Before diagnostic electrophysiological testing, patients presented with either Wolff-Parkinson-White syndrome or paroxysmal or incessant supraventricular tachycardias (PSVT) were classified on history and 12 lead ECG. Patients with Wolff-Parkinson-White syndrome had manifest left anterolateral (LAL), left posterolateral (LPL), or left posteroseptal (PS) accessory pathways were further separated. Of patients with PSVT, 7 had ortho-dromic tachycardia using a concealed accessory pathway, and 5 had an ectopic atrial tachycardia.

Procedure was explained to the patients, patients were fasted for at least six hours. Both inguinal areas cleaned and draped. Standard five catheters were passed from the femoral veins. Two Quadripolar catheters one in right atrium (RA) and one in right ventricle (RV) were placed from the right femoral. A decapolar catheter was positioned in the coronary sinus and Octapolar catheter was positioned to record the His potential. The diagnostic electrophysiological study was done which confirmed a left sided accessory pathway or ectopic atrial tachycardia focus in all cases. A pigtail catheter in the aortic root was placed as landmark.

The His-catheter is put just a few millimeters from the aortic valve, providing another safe fluoroscopic marker.

Patients were kept well hydrated with a continuous infusion of normal saline, receiving at least 500 ml before the transseptal procedure. The transseptal procedures were performed using a standard Brockenbrough needle and a Mullins sheath .The needle was connected to a standard catheterization manifold by a short length of flexible tubing, so that contrast could be injected and pressure could be displayed and recorded. Biplane fluoroscopic projections were used in all cases, providing PA and LAO views of the interatrial septum respectively.

The transseptal sheath/dilator was placed in the superior vena cava and then the dilator, sheath & needle combination was withdrawn inferiorly in the PA projection until the tip of the dilator "popped" into the fossa ovalis. Positioning was always checked in the left anterior oblique projection. It was ensured that the tip of the needle & sheath assembly was pointing directly away from the plane of vision and slightly anterior. A test injection of contrast was delivered through the dilator in the left anterior oblique projection to check for "tenting" of the fossa at the intended puncture site. The needle was then advanced and a second test injection was made following needle advancement to check that the needle had entered the left atrium; left atrial pressure was then recorded. The sheath/dilator was advanced over the needle into the left atrium. Once the dilator was well into the left atrium, the sheath was advanced over the dilator.

Patients then received 5000 units of heparin, and with a further 2500 units being given if left sided deployment lasted more than one hour. The ablation catheter was passed from the right side through the sheath into the left atrium and positioned on the mitral annulus.

Care was always taken to flush the sheath during catheter advancement to avoid entrapment of air. Suitable ablation sites were obtained using conventional criteria. After successful ablation, transseptal sheaths were withdrawn across the interatrial septum with the ablation catheter tip

Table 1: Detail of Electro-physiological Studies

Pathways	131
Wolff–Parkinson–White syndrome	124
Orthodromic Reciprocating Tachycardia	7
Atrio-ventricular Reentry Tachycardia	133
Mahaim Fiber Tachycardia	2
Idiopathic Ventricular Tachycardia	15
Atrial Tachycardia	5
Normal	9
Total	**295**

protruding slightly.

This technique was employed to avoid inadvertent displacement of adherent coagulum from the catheter at the sheath tip.

RESULTS

Total 295 consecutive patients underwent electrophysiological studies and ablation at our center at Lady Reading Hospital Peshawar. Out of which pathways were 131 (124 patients were having Wolff-Parkinson-White (WPW) and orthodromic reciprocating tachycardia7), atrial tachycardia (AT) 5 and 133 were atrio-ventricular reentry tachycardia (AVNRT). Among pathways Left sided pathways were 70. There were 2 Mahaim and idiopathic ventricular tachycardia (ILVT) 15, normal studies were 9 (Table 1).

DISCUSSION

Radiofrequency catheter ablation of left sided accessory pathways has been most commonly performed using a retrograde transaortic approach[3,8,9]. There are reports of experience using the transseptal approach in other centers[6,7,10-13].

There were no important complications with the transseptal approach, but success rates are comparable to others. There are several reasons for the lack of complications including extreme care, use of biplane fluoroscopy to ensure accurate needle or sheath assembly placement, accurate contrast injection, and minimization of the time spent in the left side of the heart are all important considerations.

There are various advantages of the transseptal technique over the retrograde approach. The rove or ablation catheter is much more easily positioned in the left atrium owing to the absence of the subvalvular apparatus; the mitral annulus is quite well formed on the atrial side, providing a stable target for catheter positioning.

Duration of fluoroscopy and a reduction in total procedure time is the advantage with the transseptal technique[7].

The sheath facilitates manipulation of the ablation catheter along the mitral annulus and provides added benefit even if a patent foramen ovale is present. The retrograde approach usually requires catheter placement underneath the mitral valve leaflets. In contrast, in the transseptal approach, energy is delivered on the atrial side. This is also helpful as the physical irritation of ventricular myocardium by the ablation catheter, with resultant troublesome ventricular ectopy, is avoided. No important sequelae of the transseptal technique was observed.

Using the retrograde transaortic approach, problems have been reported in relation to arterial access, problems related to catheter manipulation within the coronary Ostia, and catheter manipulation across the aortic valve [7,8,11].

In one study retrograde catheter ablation of left sided accessory pathways four cases of aortic regurgitation out of 25 were noted. Although three were only detectable using Doppler echo-cardiography, and occurred early in the series[12]. Complications related to the aortic valve and

coronary ostia should be avoided with the transseptal approach.

Potential arrhythmogenic radiofrequency energy on ventricular myocardium is also avoided by approaching the mitral annulus from the atrial side[13-16]. There are potential problems with the transseptal technique, including inadvertent puncture of the aorta. Adequately supervised training in this technique is mandatory.

We believe that the key to success and safety is proper training, good supervision, and attention during procedure.

A stable catheter position during radiofrequency energy application was confirmed by fluoroscopy. The number of energy applications was recorded.

CONCLUSION

In our experience the trans-septal approach was very safe. There was good approach to the far lateral pathways on the left side and the catheter position was very much stable. Moreover there was no irritation of the left ventricle and the aortic and mitral valve remained safe. The catheter movement was free and there is no danger of stick around of the catheter in chordae tendineae.

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CONTRIBUTORS

BS conceived the idea and planned the study. A compiled the data & helped in writing the manuscript. Both the authors contributed significantly to the research that resulted in the submitted manuscript.