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Case Report

Permanent pacemaker implantation in Ebstein anomaly with metallic tricuspid valve

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ABSTRACT

Right ventricular endocardial pacing is partially contraindicated in the presence of mechanical tricuspid valve. Occurrences of atrioventricular block are commonly associated in postoperative period in Ebstein anomaly repaired with mechanical tricuspid valve. Coronary sinus (CS) pacing is the preferred site in this scenario. However, the anatomical variations in Ebstein anomaly leads to difficulties in hooking the CS. With the help of real time left coronary injection enabled in understanding the anatomical orientation of CS ostium take off, leading to successful CS lead implantation.

Keywords: Ebstein anomaly, Permanent pacemaker, CS, Metallic tricuspid valve

INTRODUCTION

Anatomical variations and tricuspid valve replacement lead to challenging problems for permanent pacemaker implantation in Ebsteins anomaly.[1] Unconventional sites for pacing were used in patients with inaccessible right ventricle like single ventricle, atresia of tricuspid valve, organic tricuspid valve disease and anomalous venous drainage. The two options for unconventional pacing are epicardial and CS pacing. Pacemaker lead implantation at epicardial site is usually associated with high pacing threshold and requires limited thoracotomy

The indications for Permanent pacemaker implantation in Ebstein anomaly included post-surgical repair or ablation, associated with familial atrial standstill, and third-degree AV block.[2-7] Most of the case series were on epicardial pacing in Ebstein anomaly.[8] CS pacing was described in only few reports.[9] We are presenting our experience of CS lead implantation in Ebstein anomaly.

CASE REPORT

This is a 10-year-old female child with Ebstein anomaly underwent tricuspid valve replacement with metallic prosthesis. She developed complete heart block in postoperative period. In view of tricuspid mechanical valve, we planned for lead implantation through CS.

Procedure

The structural anomalies of CS were ruled out by doing a left coronary artery injection visualizing the CS anatomy, branches and drainage prior to procedure. Under strict aseptic precautions left subclavian pocket was prepared and venous access was secured by modified Seldinger technique and "J" tipped wire positioned in inferior vena cave. 9F sheath was taken over the wire to the superior vena cave-right atrial junction. Through the sheath AL 1 diagnostic catheter was used to hook the CS. Then the sheath was advanced over the catheter and kept at the CS ostium. Over the wire, 6F Swan Ganz balloon catheter was

taken and occlusive CS angiogram was done for better visualization of proximal CS and branches to select suitable vein for lead positioning. CS screwing lead was inserted in posterolateral vein using 0.014-inch coronary wire. The lead was advanced to an apical position to afford maximal stability. In view of the patient's age, extra loop of lead was kept in right atrium (RA). After confirmation of acceptable parameters and no diaphragmatic pacing at high outputs the lead was fixed. A screwing RA lead was fixed at the septum.

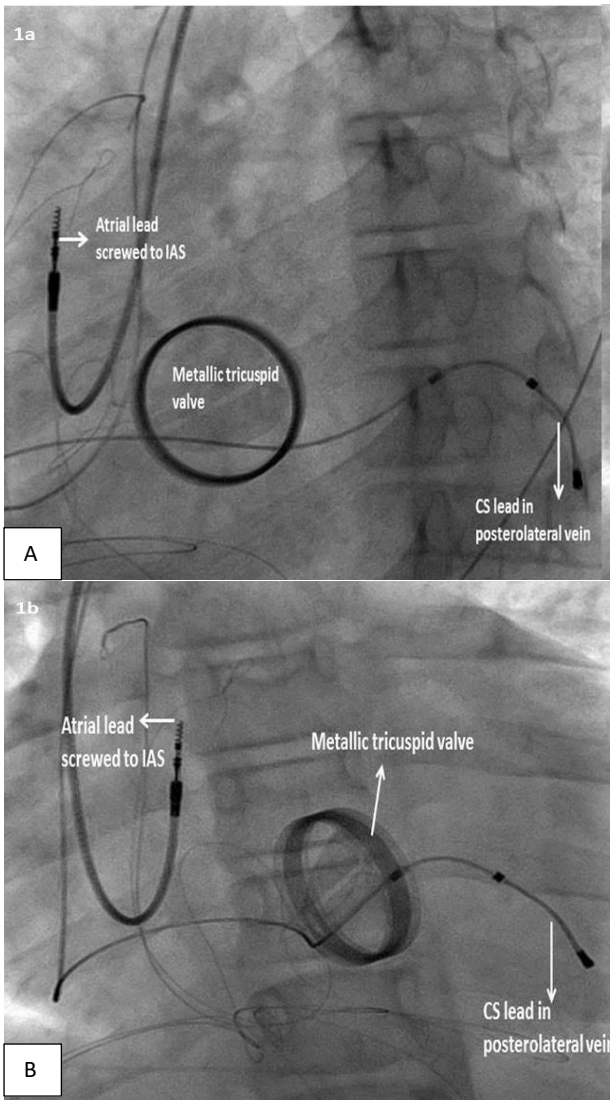

Figure 1 (A and B): Fluoroscopic images of CS lead and right atrial lead screwed to interatrial septum (IAS) with metallic tricuspid valve *in situ*. Left anterior oblique view and antero-posterior view.

DISCUSSION

In this case the structural problems we faced during the CS lead implantation was dilated RA, large CS and displacement of CS ostium take off, caused difficulty in hooking the CS catheter. Displacement of right ventricle (RV) apex by dilated RA such that RV projecting posterolaterally and the RA anteriorly leading to CS ostium takeoff more posteriorly.[1]

By taking the help of left coronary injection and visualization of CS ostium and tricuspid metallic prosthesis as a landmark, enabled the hooking of CS.[10] In this case we used active fixation leads for both atrial and ventricular leads. By keeping extra loop of ventricular lead in RA and using a screwing lead, would ensure the lead to be in stable position in a growing child. We faced abnormal pacing thresholds while placing the atrial lead in lateral wall, so decided to place a screwing lead at IAS.

CONCLUSION

CS pacing is the preferred site in patients with metallic tricuspid valve requiring pacemaker implantation. With the help of real time left coronary injection enabled in understanding the anatomical orientation of CS ostium take off, leading to successful CS lead implantation.

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Ethical approval: Not required

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