

CASE REPORT

IMPLANTATION OF THE PERMANENT PACEMAKER; FROM SUPERIOR VENA CAVA IN A PATIENT WITH FIBROSIS OF BOTH SUBCLAVIAN VEINS

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Overall life span has increased with improved management of cardiac diseases all over the world which has opened the door of degenerative cardiac diseases. On the other hand, stat of the art corrective congenital cardiac disease also increased the volume of adult living with treated congenital heart diseases. Both these factors lead to a new epidemic in cardiology of complete heart block (CHB). Permanent pacemakers (PPM) implantation is a life-saving procedure for CHB. Permanent pacemakers are usually implanted from upper limb veins. But at time upper limb veins are not suitable for implantation due to various anatomical and pathological reasons, so alternative methods are used for implantation of devices. We are reporting a case of PPM implantation from Superior Vena Cava (SVC).

Keywords: Permanent pacemakers; Complete heart block; Superior vena cava

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INTRODUCTION

A permanent pacemaker is commonly implanted from the subclavian,¹ axillary,² or cephalic vein³. In young children where the subclavian area is not suitable or in adults if these veins are not suitable due to any reason the pacemakers are implanted in the abdominal cavity using epicardial leads.⁴ There are reports of implantation of permanent devices from femoral vein.^{5,6} Femoral veins are exposed to trauma, infection⁷, dislodgment of lead⁸ and restricting the daily activities of the patient⁹ up to some extent. Therefore, if the subclavian, axillary or cephalic veins are inaccessible due to any reason and access is establish with the cardiac chambers through SVC, then the PPM can be safely implanted in the upper portion of the body which make life easy for the patient on the one hand and facilitate the box change on depletion of battery on the other hand. We are sharing our experience of implanting the device from SVC for the first time at Hayat Abad Medical Complex Peshawar Pakistan.

CASE REPORT

A 55 years old patient with pacemaker, presented to our unit with displaced ventricular pacemaker's lead. The patient was on ventricular escape rhythm of 35 bpm. Twenty-five years back he was implanted pacemaker in the left subclavian area which got infected about 6 years after implantation due to fall of the patient and some minor injuries on the chest. The device was explanted but due to fall on the chest the lead got damaged. The lead was detached from the battery, but we were unable to de-screw it. So, it was left inside the body and the external end was cut

down. The new device was implanted on the right subclavian area, which was a tined lead, but unfortunately, it also got infected after 5–6 years of implantation due to unknown reason.

Therefore, a temporary wire was passed from the right femoral vein, and subclavian leads were tried to be pulled out, but there was severe fibrosis around the leads both outside and inside the vein, therefore the intravenous leads were cut down at the insertion site in the veins. The outer end stabilized in the tissue and the distal ends inside the venous system were left in the body. The patient was stabilized using a temporary pacemaker so to let the subclavian area clear of infection.

The left side was clear from infection now. A venogram performed to see whether we could do implantation on this side now. The vein was badly fibrosed and implantation of device on this side was not possible (Figure-1). Now we had to wait till the area on the right side is clear from infection while the temporary wire is in cito.

But the temporary wire got fractured and divided into two portions. The reasons for this unfortunate and strange event remain astonishing. The distal end of the lead inside the patient body totally separated from the external end. The cut end inside the inferior vena cava can still be seen inside the body which was also not pulled out because we were unable to snare it and patient was not willing for extra surgical procedure. (Figure-3).

The right subclavian area was still not suitable for implantation due to the infection. So, without any further delay patient was shifted to cardiac surgeon

for abdominal implantation. The abdominal device can be seen in figure 2.

After 10 years of implantation the abdominal pulse generator depleted. Patient came for box change. Both the subclavian areas were clear of infection by now, but the left upper limb veins were fibrosed and blocked (figure 1 right), so the pacemaker was implanted on the right subclavian area again. But after a couple of years of implantation the lead got displaced and the patient presented with ventricular escape rhythm. Temporary pacemaker (TPM) implanted for backup. Patient was shifted for procedure but now the right-side subclavian veins were also fibrosed (figure 1 left) and blocked. A Percutaneous coronary intervention (PCI), guide wire failed to negotiate the blockage for dilatation and re-implantation. Now both the upper limbs were

draining through collaterals and both sides were unsuitable for implantation.

So, we took the patient to catheterization laboratory and also arranged for surgical suit and general anaesthesia. The previous implanted PPM explanted successfully. Surgeon did thoracotomy and exposed the SVC. SVC was entered by Seldinger's technique and sheath introduced. Pacemaker lead was position at right ventricle apex and screwed. Threshold checked and chest closed. Now the Sheath was coming out through the thoracotomy wound. Subcutaneous pocket constructed in the usual method for pulse generator in the right subclavian area. Pacemaker's lead introducing sheath was peeled and battery attached with the lead and wound closed in layers. Patient when recover from GA shifted to ward.

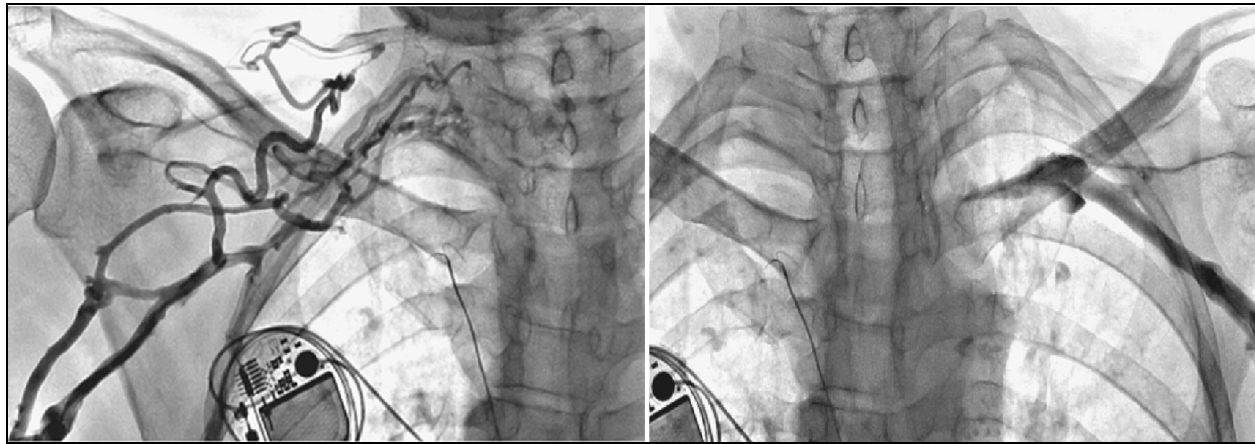


Figure-1: Blocked veins visible on both sides, collateral is visible

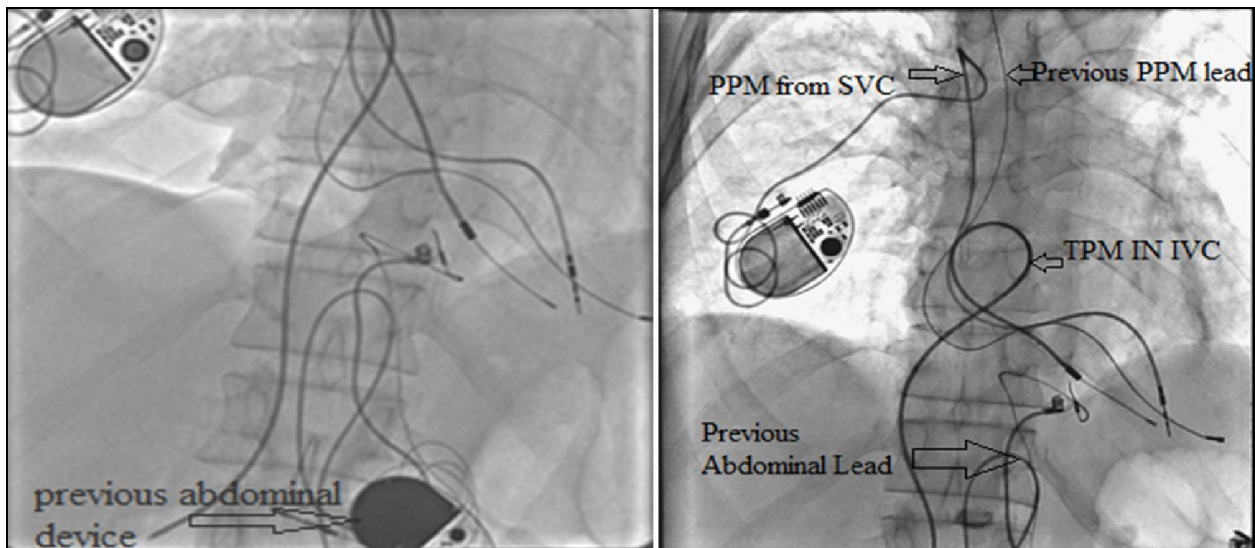


Figure-2: Position of previous PPM, PPM leads, TPM lead still hanging in IVC and abdominal device visible

Figure-3: Newly Implanted PPM from SVC

DISCUSSION

Permanent pacemaker (PPM) implantation is one of the commonest procedures both in general cardiology and electrophysiology. PPM is implanted in the subclavian area in adult with help of local anaesthesia. These patient needs re-implantation frequently depending upon the age of the patient and time since implantation, as the pulse generator depletes at a time period of eight to ten years on average. Patients who get their first implantation in the very early age, they may need seven to eight implantation or more in their life time. Though the same leads may be used again and again but as lead fracture, insulation break, lead dislodgment, lead penetrating the myocardium through and through and infection are the well known complication¹⁰ for which the retrieval of the previous lead is required.

The lead explantation is very difficult in tine leads which are mostly not in use in today implantation practice. However, some time, the screwing leads explantation may be difficult due to fibrosis and adhesions.¹¹ The fibrosis of the veins may be so severe that it may impede the normal blood flow as we have seen in our patient. Patients develop collateral with time, and they remain pretty asymptomatic from the limb's circulation point of view but re-intervention in the same veins is almost impossible.

Therefore, alternate implantation site like abdominal implantation under general anaesthesia using epicardial lead may be used. Since it is not one-time procedure and time again patient will need laparotomy for box change or device replacement. So, to avoid repeated laparotomies, we decided to put the device in the subclavian area and access the SVC so that the patient will need only limited procedure with local anaesthesia next time for box change.

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