Case Report

Cardiac Perforation by Permanent Pacemaker Lead, One Year after Implantation — An Unusual Occurrence and Its Management

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Delayed Cardiac Perforation by Permanent Pacemaker lead beyond one year of implantation is rare. It is also rarer in passive fixation lead, compared to active fixation lead. There is no Universal consensus regarding management of such cases with percutaneous *versus* surgical removal of the lead followed by re-implantation. Here we report a case of Right Ventricular (RV) perforation by a passive fixation permanent lead, in an 81-year-old lady, 14 months after implantation, who presented with Pacemaker capture failure but in hemodynamically stable condition. Pacemaker lead had migrated up to the Lower Lobe of Left Lung, Perforating Right Ventricle, pericardium and Left Pleura. We managed this case with open lead removal under direct vision by Lower Median Sternotomy, followed by implantation of an Epicardial Lead and Pacemaker.

[*J Indian Med Assoc* 2022; **120(3):** 66-7]

Key words **: Permanent Pacemaker, Cardiac Perforation, Epicardial Pacemaker Implantation.**

Device based therapies are becoming popular due to their excellent result and in most cases, non-availability of any alternate therapy. Complications due to such therapy are also becoming frequent. Iatrogenic Cardiac Perforation by Pacemaker or implantable Cardioverter Defibrillator leads is rare, accounting for 0.3% 0.8% of all pacing procedures[1]. Most of the cases occur within 24 hours of Device Implantation. But late onset (more than 1 month afterwards) Cardiac Perforations, which are even rarer, have also been described. Elderly, female sex and active fixation leads[2] are risk factors for such complications. Most studies have described it to be more frequent with active fixation (screwing) leads, where few others claimed it to be equal in frequency with passive fixation (tined) leads[1]. Due to its rarity, there is no Universal consensus regarding managing these patients with percutaneous-procedures *versus* Surgical removal of perforated leads followed by re-implantation. Here we report a case of Right Ventricular (RV) apical perforation and migration of a passive fixation Permanent Pacemaker lead into the Left Pleural Cavity, more than one year after successful implantation. Given the potentially life threatening complications due to Transvenous Lead removal, this patient was successfully treated with surgical off pump lead extraction, repair of the perforation followed by placement of Epicardial Pacemaker Lead.

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Received on : 26/01/2022

Accepted on : 14/02/2022

Editor's Comment :

- Delayed perforation of Heart by Pacemaker lead is an extremely rare occurrence.
- Extraction of the culprit lead by open Surgery followed by implantation of Permanent Epicardial Pacemaker can be done safely and is a life saver.

Case Report

This patient, 81-year-old lady had undergone single chamber Permanent Pacemaker (Medtronics, VVI-R) implantation with passive fixation (tined) lead, placed percutaneously through Left Subclavian Venous Route, for symptomatic complete Atrio-ventricular Block. The Permanent Pacemaker lead was placed in Right Ventricular Floor. On Echocardiogram, she had structurally normal Heart with Normal Biventricular Systolic Function. Postoperative pacemaker parameters were satisfactory. She had routine follow up visit at 'Pacemaker Clinic' after one week, one month, three months and six months of implantation. All pacing parameters were satisfactory and patient was doing well.

After 14 months of implantation, the patient returned to the Emergency with Recurrent Syncopal Attacks. Electrocardiogram at Emergency Room showed Heart rate of 40 beats per minute with Pacemaker capture failure. She was immediately put on Temporary Pacemaker. Chest X-ray and subsequently Computed Tomography (CT) scan of Thorax had been done and Permanent pacemaker lead tip was found in Left Pleural Space touching the base of Left Lung, perforating through the RV Apex, Pericardium and Left Pleura.

Anticipating life threatening complications with transvenous lead removal, open surgical removal of the Pacemaker lead, was planned. After a Manubrium-sparing Lower Median Sternotomy, perforation site was identified and a pledgeted 4-0 Polypropylene Purse-string Sutures was taken around it. There were no collections in

Fig 1 — Initial Postoperative Chest X-Ray done after implantation of Permanent Pacemaker done 1 year ago.

Fig 2 — Chest X-Ray done 1 year later shows cardiac perforation by the permanent pacemaker lead (White arrow). The temporary pacemaker lead is also seen (Red arrow).

Fig 3 — Perforation of the cardiac apex caused by the permanent pacemaker lead (Yellow arrow) can be seen. The culprit lead then proceeds to perforate the pericardium and penetrate the left pleural space.

Pericardial and Pleural Sacs. The lead tip was carefully withdrawn from the Left Pleural Cavity, cut and removed. At the same time, the Permanent Pacemaker pocket was explored in the Left Subclavicular Region. Pulse generator along with the remaining lead had been pulled out and removed gently. RV Apical perforation site was closed by the previously taken purse-sting suture. Subsequently another Epicardial permanent Pacemaker lead was implanted over the Right Ventricular Apex and its pulse generator was placed in a subcutaneous pocket created in the Epigastrium, approached through the same incision. After checking Haemostasis, an Intercostal Chest Drain was placed in the Left Pleural Cavity. The pericardium was closed using interrupted polyglactin sutures leaving multiple small pericardial windows. The Chest incision was closed in layers. Patient was extubated within a couple of hours after shifting to the Cardiac Surgery Postoperative Intensive Care Unit (ICU). The peri-operative period and follow up at 1 week, 15 day and 1 month were uneventful.

Discussion

Late onset Cardiac Perforation by Permanent Pacemaker lead, beyond 1 year of implantation is a rare event. At times, it may be life threatening. High index of suspicion is needed to diagnose such cases, especially if the presentation is subacute. It should be considered in cases that present with atypical symptoms and a sudden change in electrical parameters during pacing interrogation[3]. CT scan of Thorax, along with Electrocardiography and Echocardiography, is an excellent modality of investigation, not only for diagnosing but also to assess the risk and damage to the surrounding Mediastinal Structures[4]. There is no clear-cut recommendation regarding management of such cases till date. Many studies suggested that transvenous lead extraction has good outcomes and open extraction is rarely required[5]. But still there is a need to balance the risks of transvenous extraction against open extraction, as open extraction is relatively safer in term of repairing the perforation site under direct vision, identification and dealing with the damage to the surrounding Mediastinal Structures, if any.

Conclusion

Cardiac Perforation by permanent Pacemaker lead is extremely rare and delayed onset Cardiac Perforation by passive fixation lead is even rarer. CT Scan of Chest is an excellent modality for diagnosis. Extraction of the offending lead along with repair of the site of perforation and followed by implantation of a new permanent Epicardial Pacemaker can safely be done through Open Surgery.

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