

An Itchy Lead: First Reported Case of Ventricular Pacemaker Lead Self-Extraction

Brent Klinkhammer¹, Mevan Wijetunga², Yassar Almanaseer²

¹University of North Dakota School of Medicine and Health Sciences, Grand Forks, ND 58202.

²Division of Cardiology, Altru Health System, Grand Forks, North Dakota 58201.

Abstract

We present a particularly rare case and the first ever report of a ventricular self-extraction in a 98-year old female. Our patient had a past medical history significant for severe Alzheimer's dementia, paroxysmal atrial fibrillation, and sick sinus syndrome who was admitted in clinically stable condition following the unwitnessed self-extraction the ventricular lead of her dual chamber pacemaker. This case highlights the potential risks and other clinical challenges of pacemaker and ICD placement in elderly patients and in patients with cognitive impairment.

Introduction

Cardiac pacemaker and implantable cardioverter-defibrillator (ICD) mechanical lead dislodgements are rare but potentially serious complications of cardiac device implantation. Although the overall rate of dislodgement of cardiac leads is believed to be decreasing, a previous review revealed that the rate of lead dislodgement could be as high as 2.4%^[1]. Most of the lead dislodgements occur within 24–48 hours of implantation, and are most commonly diagnosed through device interrogation showing intermittent undersensing, loss of capture, or post-procedure chest x-ray revealing macro or micro movements of the leads. Although perforations of the vascular structures or myocardium are considered rare, some reports suggest a higher incidence around 1% for pacemaker implantation and up to 15% subclinical perforations^[2,3]. Rarely, these perforations can lead to life-threatening cardiac tamponade, especially if the right ventricle is the site of perforation^[2]. The “risk factors” for pacemaker and ICD lead complications include operator experience, in that complications rates are inversely proportional to total cases by the operator and the yearly case rate^[1]. However despite proficient surgical technique, lead dislodgements and other late presenting mechanical complications still occur for uncontrollable and unpredictable reasons. To further illustrate this point we are presenting a rare case of a late presenting cardiac pacemaker “lead complication,” involving what we believe to be the first reported case of ventricular pacemaker lead self-extraction.

Case Report

Our patient is a 98-year old female with a past medical history significant for severe Alzheimer's dementia, paroxysmal atrial

fibrillation, hypertension, stage 4 chronic kidney disease and depression. She had recently moved to a local memory care facility. Approximately 6 months prior to her presentation, she received a permanent, dual chamber DDD (Boston Scientific Altrua®) pacemaker for sick sinus syndrome and a documented episode of syncope. EKG prior to pacemaker implantation showed sinus bradycardia without evidence of high grade AV block. Implantation of the pacemaker was performed by an experienced cardiologist and was completed without any evidence of periprocedural complications.

On the date of her acute presentation, she was transferred to our facility from her memory care unit after being found with a wire sticking out of her skin near the pacemaker pocket site. The patient remained hemodynamically stable on arrival with blood pressure of 147/62 and pulse rate of 87. Due to her late stage dementia, she was unable to provide a reliable history. The memory care unit staff stated that the patient was found with blood on her clothing and with the transected lead lying on the floor. Patient was unaware of anything bothering her on her chest. Her physical exam on presentation was remarkable for an irregular heart rhythm and left anterior chest pacemaker lead broken off and protruding from chest wall near her pacemaker pocket site. The skin near the area where the transected lead was protruding was markedly thin, mildly erythematous, and without any excoriations. Chest radiograph [Figure 1] showed extraction and transection of the patient's ventricular lead and undisrupted atrial lead. EKG on admission [Figure 2] showed atrial paced, ventricular sensed rhythm. Pacemaker interrogation revealed sudden change in RV lead impedance from 490 ohms to > 2500 ohms. Temporary cessation of pacing showed underlying sinus bradycardia with a rate of less than 30 bpm. She remained 91% atrial paced following the self-extraction of the lead. The patient was placed on levofloxacin for antimicrobial coverage given the concern for infection with disruption of the subcutaneous pacemaker pocket.

Key Words

Ventricular Lead, Self-Extraction, Atrial Fibrillation

Corresponding Author

Brent Klinkhammer, University of Nebraska 982055 Nebraska Medical Ctr Omaha, Nebraska, 68198-2055

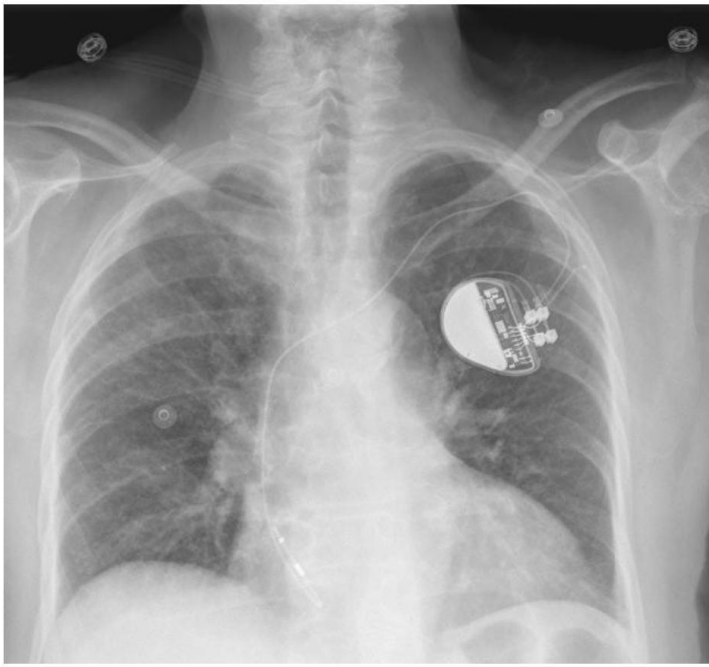


Figure 1: Admission chest x-ray showing transected ventricular lead and intact atrial lead

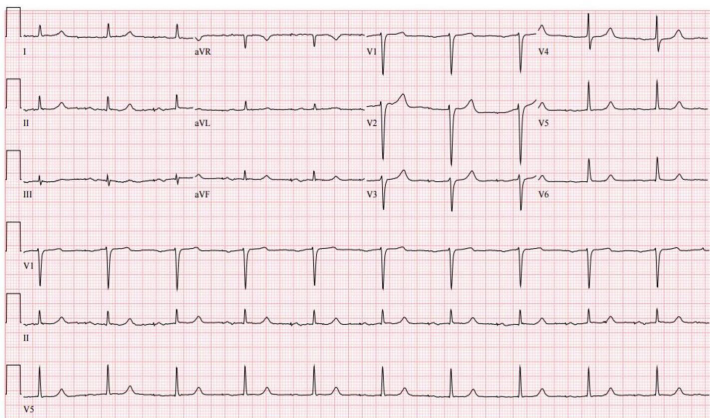


Figure 2: Admission EKG showing atrial paced rhythm after ventricular lead removal

On hospital day 2, the patient was taken to the OR for removal of the transected ventricular pacer lead and revision of a subcutaneous pocket with repositioning of the remaining atrial lead. Postoperatively, the patient recovered without incident. Her vitals remained stable throughout her hospital course and she was discharge on post-operative day 1 with her remaining atrial pacemaker in place.

Discussion

To the best of our knowledge this is the only the second report of pacemaker lead self-extraction and the first report of the self-extraction of a ventricular lead. In 2015, Yıldız et al reported a similar case of the self-extraction of atrial lead without any mechanical dislodgement of the ventricular lead^[4]. Much like our patient, the authors reported no apparent symptoms, hemodynamic instability, or signs of perforation related to the dislodgement of the lead.

Our case report is remarkable in that the patient self-removed the ventricular lead without disrupting the atrial lead and later transected

the ventricular without damage to the myocardium or vasculature. It is extraordinary that this event occurred while the patient remained nearly fully pacemaker dependant on the remaining atrial lead.

The findings of Yıldız et al and our case report suggest a need for further reconsideration of the risks of pacemaker and ICD placement in elderly patients, particularly those with cognitive impairment. The thin skin commonly found in patients in their eighth and ninth decade of life is likely to pose a physical obstacle to safe cardiac device placement^[4]. It has been previously reported that the thickness of epidermis decreases about 6.4% per decade, most notably in female patients^[5]. This suggests a need for a modification of common cardiac device implantation technique in this patient population and deep sub-fascial lead placement near the pocket site.

Our case report also suggests that there are additional risks of pacemaker implantation in patients with clinically significant cognitive impairment that need further consideration. We believe that the risks of self-extraction, unintentional pocket disruption, and mechanical lead dysfunction should be considered to be higher in this particular patient population. Closer post-procedural follow-up and caretaker/family education about these risks may be warranted, despite the rarity of this clinical phenomenon.

Advances in cardiac device technology, most notably “leadless” pacemakers, could be of increased value in patients of advanced age and/or cognitively impairment were clinically indicated. Although the patient we present here would not have been a candidate, “leadless” pacemakers are indicated in patients who need ventricular pacing support. Nanostim® leadless cardiac pacemaker (St. Jude Medical) and Micra® intracardiac transcatheter pacing system (Medtronic) are both implanted directly within the right ventricle and have been prospectively shown to be similar to traditional transvenous pacemakers in terms of function and safety^[6,7].

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