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Visual Case Discussion

Pacemaker atrial lead macrodislodgement in a 92 year old man

Jonathan Fong*, Alan Bloom, Anuj Vohra

Orange Regional Medical Center, Department of Emergency Medicine, Middletown, NY, USA

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A 92 year old man arrived to the emergency department for dizziness. He has had this dizziness since earlier this morning. He described the dizziness as a lightheaded sensation, occurring at rest, persistent, and worst with movement. Four months ago he had a dual chamber pacemaker placed secondary to sick sinus syndrome and had a scheduled post op visit with his electrophysiologist. The pacemaker was interrogated, found to have a high atrial threshold with inconsistent capture, reprogramed to a single chamber ventricular demand (VVI) mode, and told go to an emergency department if he felt dizziness. He denied any pain, nausea, vomiting, or focal weakness. He has been compliant with his medications. History was pertinent for hyperlipidemia and paroxysmal atrial fibrillation anticoagulated with Apixiban. Vitals included temperature of 36.8 °C , blood pressure of 106/91 mmHg, heart rate of 80 beats per minute, respiratory rate of 18, and an SpO2 of 98% on room air. During his physical examination he had a normal heart rate, a pacemaker felt at the left chest wall, no nystagmus, and tested negative for orthostatic hypotension. His laboratory work did not show signs of anemia, no electrolyte imbalances, and no elevated troponin. An electrocardiogram (ECG) was performed, Fig. 1, that showed a ventricular rate of 43, paced and bigeminy with a premature ventricular contraction (PVC) coupled with each ventricular beat, which was new when compared to a prior ECG shortly after his pacemaker was placed. A chest x-ray two views was performed and showed misalignment of the atrial lead when compared to a chest x-ray a day after his pacemaker was placed, Figs. 2 and 3. Lead dislodgement is the most common complication with pacemaker placement occurring around 2% for the atrial leads and 1% for the ventricular leads.[1] The causes are multi factorial and management should involve an electrophysiologist. When there is evidence of lead dislodgement with visual misalignment of a lead on the chest x-ray this is termed as "macrodislodgement.[2]" If there is evidence of lead dislodgement without visual misalignment on a chest x-ray it is termed micro-dislodgement.[2] A two view chest x-ray and ECG are necessary components for evaluation of pacemaker dysfunction.[3] After discussing with his electrophysiologist the current symptom of dizziness, ECG findings, and findings on the chest x-ray he was admitted for lead revision. His dizziness resolved afterwards and he was discharged to follow up with cardiology in a week.

* Corresponding author.
E-mail address: jfong@ormc.org (J. Fong).

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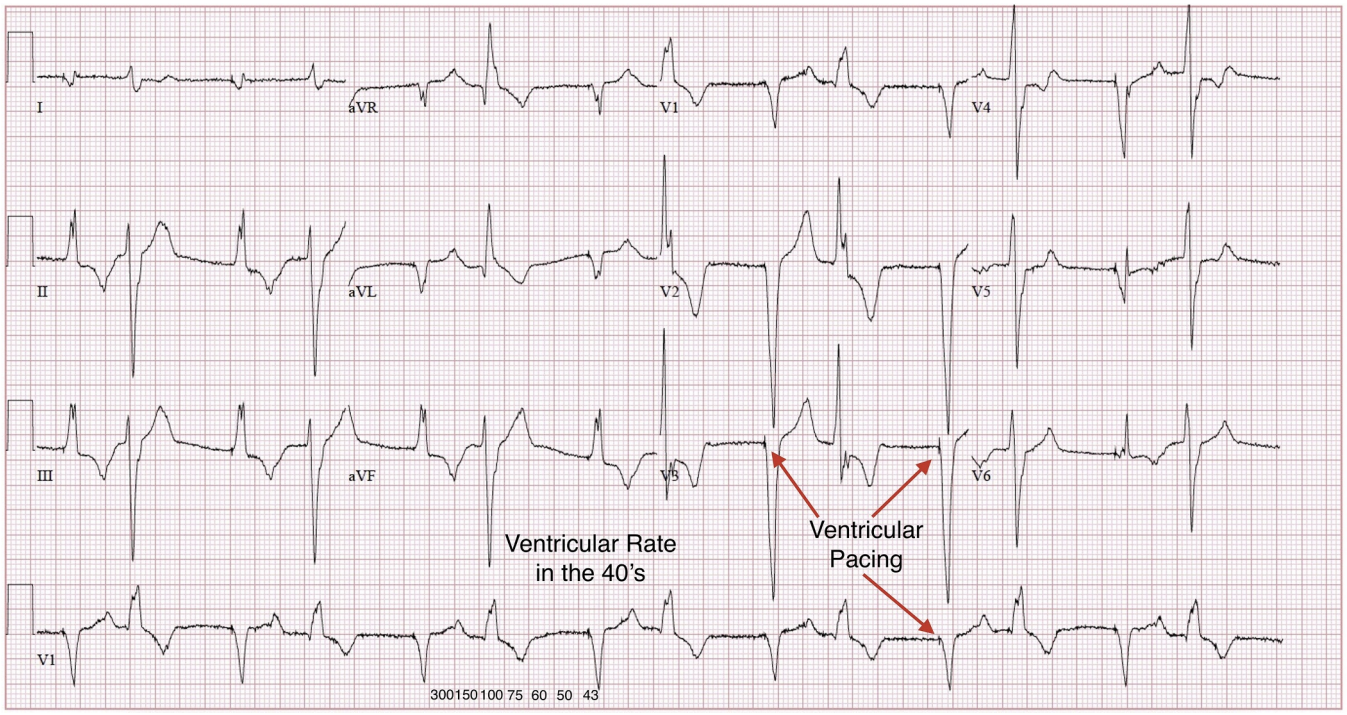

Fig. 1. Electrocardiogram showing a ventricular paced rhythm at roughly 45 beats per minute, premature ventricular complexes coupled with each paced beat consistent with bigemny.

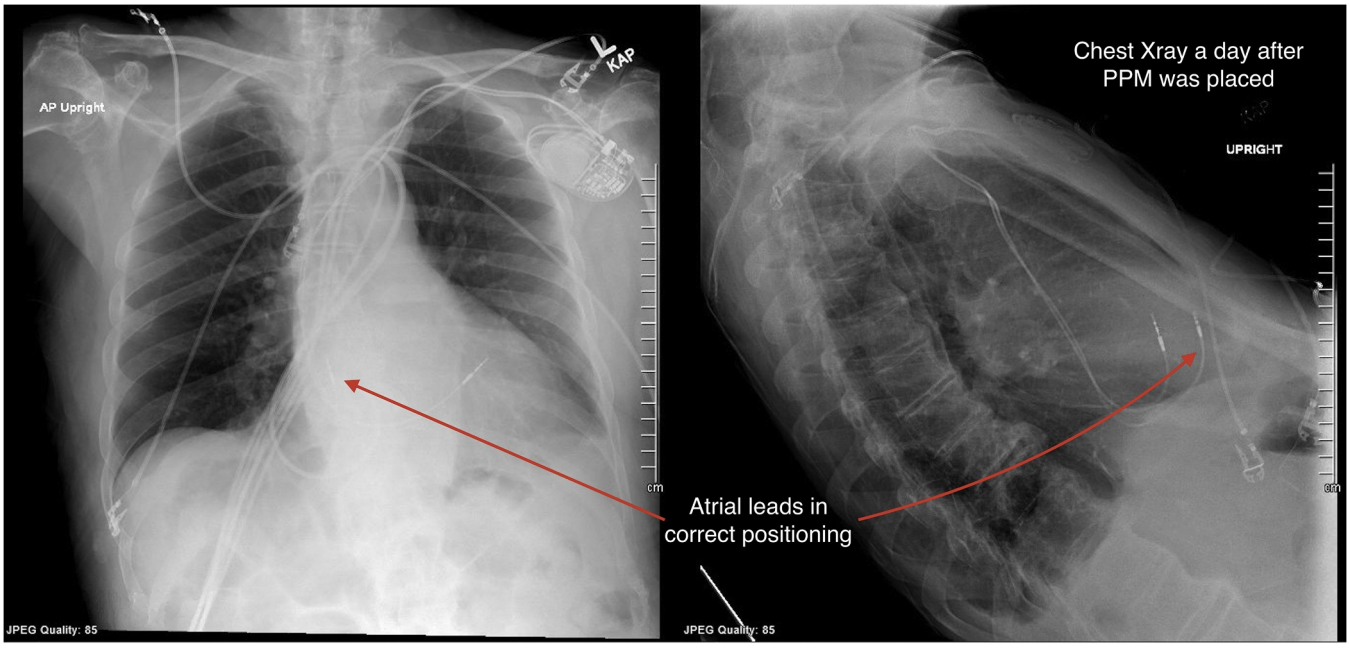

Fig. 2. Chest X-ray 2 views, one day after placement of the pacemaker 4 months ago showing correct positioning of the atrial and ventricular leads.

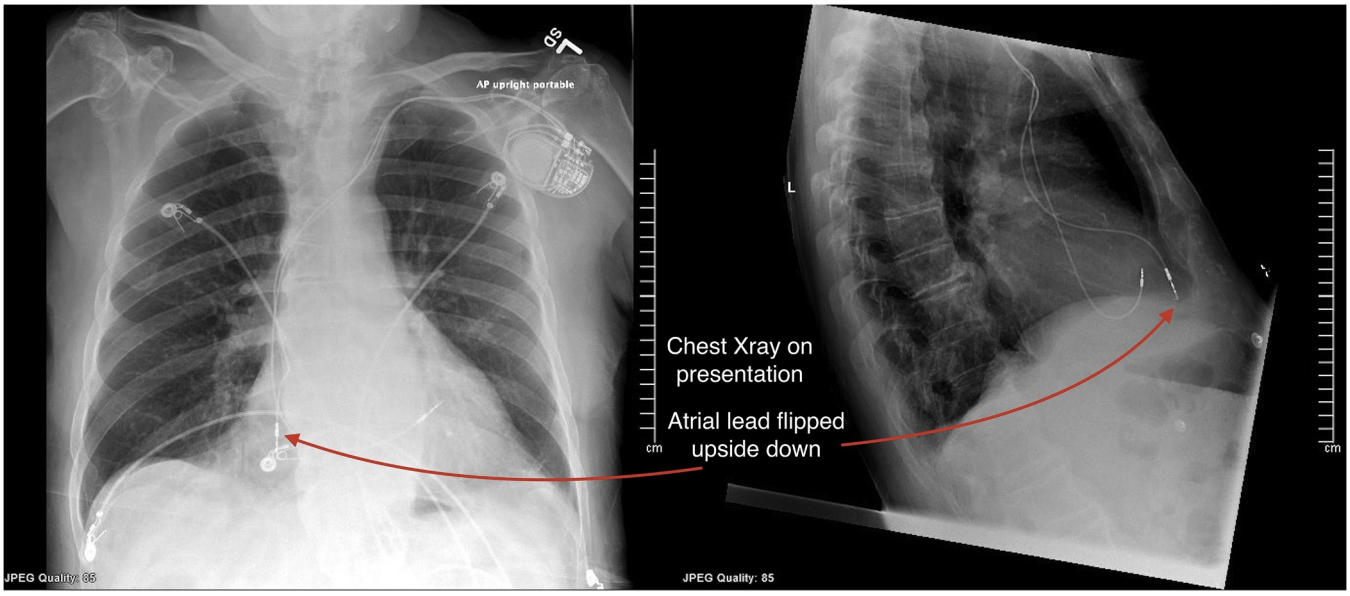

Fig. 3. Chest X-ray 2 views upon presentation showing the atrial lead upside down.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.visj.2018.12.004.

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Questions

1. What is the incidence of atrial lead dislodgment in pacemakers?
   a. 20%
   b. 50%
   c. 2%
   d. 8%
   e. 30%

2. What two diagnostic modalities are useful and cost effective for proper assessment of pacemaker functionality?
   a. EKG and 2 view Chest Xray
   b. EKG and troponin
   c. Chest Xray and troponin
   d. EKG and pacemaker interrogation

Answers

1. 2%. Explanation: Williams et al's book chapter on pacemaker complications references multiple articles,which support that atrial lead dislodgment is the most common reason for a pacemaker to fail to capture. Reference: Jeffrey L. Williams and Robert T. Stevenson (August 17th 2012). Complications of Pacemaker Implantation, Current Issues and Recent Advances in Pacemaker Therapy Attila Roka, IntechOpen, doi: 10.5772/48682.

2. EKG and 2 view Chest Xray. Explanation: An EKG can give show you whether there is a loss of lead capture. A 2 view chest X-ray can show you whether the lead is dislodged radiologically, macro dislodgment. Reference to imaging 24 hours after pacemaker placement is crucial to determine if the leads are dislodged. If there is no lead dislodgment on radiological imaging, but loss of lead capture suspected on EKG it could be a micro dislodgment. Pacemaker interrogation can help to make this diagnosis.[3]