Case Report

New technique: repositioning of dislodged atrial pacing lead with a specially designed urological basket

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Introduction

Lead dislodgement requiring reoperation is a complication that raises the costs of pacemaker implantation surgery, while adding to patient discomfort. Migration of a dislodged lead can cause complications such as undersensing, loss of atrial capture, and loss of atrial function in patients who need AV synchrony. Once detected, the dislodged lead should immediately be repositioned.1,2

In recent years, percutaneous transcatheter repositioning of displaced permanent pacemaker leads has been advocated before consideration of standard repositioning by reopening the generator pocket. The procedure is easy and safe, allowing a reduction of the need for surgical lead revision and the associated morbidity and cost.3–5 In this report, we introduce a method with a specially designed urological basket to solve this problem in two patients.

Case 1

A 68-year-old man was admitted in January 2006 with dyspnoea, mild dizziness, and evidence of pacemaker malfunction due to atrial lead dislodgement. He had a history of coronary bypass surgery in 1985 and angioplasty (implantation of seven stents in two stenotic saphenous vein grafts) in 2003. In 2004, he experienced an inferior MI, after which he had transient complete heart block accompanied by respiratory arrest and cardiogenic shock, which was treated medically and the block resolved. In the next admission (4 months later) he had first-degree atrioventricular block and also had episodes of complete heart block accompanied by dizziness and exacerbation of dyspnoea. Electrocardiogram showed narrow complexes and old inferior MI. In the latest echocardiographic study ejection fraction was 40% and there was no evidence of significant dyssynchrony; we therefore decided to implant a dual chamber pacemaker.

The implantation was successful, and the patient was discharged in good condition in November 2005. At follow-up, pacemaker analysis showed no atrial sensing and pacing. Programming the pacemaker to VVIR mode did not relieve symptoms, and the patient was scheduled for repositioning of atrial lead, which was performed with this specially designed urological basket in February 2006.

Further description of specially designed urological basket (cardiac pacing lead hook)

This device is specially designed based on the non-metallic urological stone basket known as the Dormia basket that is used for removal of stones that are located in the 'lower ureter'.

By making changes, its function is altered so that instead of forming a basket, the operator can form a hook around the cardiac pacing lead by pulling the steerable inner line of the device. (Figure 1A–C).

In the next step the operator is able to reposition the lead by traction on the device.

To remove the hook, the operator releases the inner line; this will allow the hook to be straightened as it enters again into the delivery system (Mullins sheath).

Methods

To perform repositioning of the atrial pacing lead, the patient was brought to the catheterization laboratory in the post-absorptive...
non-sedated state. The Mullins sheath was placed around the atrial lead of pacemaker and by using deflectable ablation catheter. The sheath was then positioned over the loop of the atrial pacing lead (Figure 2).

After removal of the ablation catheter, the specially designed urological basket was passed over the loop of the J-shaped atrial lead. The deflectable part of this basket was passed through the tip of the Mullins sheath. By deflecting the tip of the basket, a hook was formed around the lead (Figure 3A–C). By pulling back the basket and Mullins sheath (Figure 3D), the tip of the atrial lead could be put in a new position in the atrium. Immediately, pacing analysis was performed, atrial pacing and sensing parameters were acceptable. By pulling back the basket catheter into the Mullins sheath (Figure 3F), all devices were removed.

Case 2
A 68-year-old man was admitted in January 2003 with dyspnoea and dizzy spells. His ECG showed complete heart block. Echocardiographic ejection fraction was 40%. Coronary angiography showed borderline lesions (about 50%) in the left anterior descending and circumflex arteries. A dual chamber pacemaker was implanted and the patient was discharged. Four weeks later he came to the pacemaker clinic because of diaphragmatic stimulation. He reported that this symptom began after a severe bout of sneezing. His chest X-ray revealed migration of the atrial lead of his pacemaker to the superior vena cava (SVC). By changing the pacemaker mode to VVIR diaphragmatic stimulation ceased, but the patient showed signs of pacemaker syndrome. We therefore decided to perform repositioning of the dislodged atrial lead using the specially designed urological basket. The dislodged atrial lead was repositioned into right atrium, but one day later this J-shaped passive fixation atrial lead migrated again into the SVC and the patient preferred his pacemaker problem to be corrected by reoperation. In the second operation session another atrial lead (an active fixation lead) was inserted into right atrial appendage.

Figure 1  (A–C) These show the specially designed urological basket and how it makes a hook. (By inactivating three lines of basket (arrow) only one line is active (arrow head) So by dragging the lines, the head bends towards the active line and makes a hook.

Figure 2  This figure shows how to position the Mullins sheath (single arrow head) over the loop of dislodged atrial lead of pacemaker (double arrow head).

Figure 3  These show how to reposition the dislodged atrial lead of pacemaker and how it makes a hook (Figure 3A–C). By inactivating three lines of basket (arrow) only one line is active (arrow head) So by dragging the lines, the head bends towards the active line and makes a hook.
Discussion

This experience highlights the feasibility of repositioning of pacemaker atrial leads without reopening the generator pocket by using a new device. The precondition for success is the presence of a passive fixation J-shaped atrial lead. There are reports of repositioning of dislodged atrial pacing leads by snare systems or deflectable catheters.\textsuperscript{3–5}

To reposition the dislodged atrial pacing lead by a snare system, the tip of the dislodged atrial pacing lead should move freely in the right atrium or SVC.

There are some devices such as Needle’s Eye\textsuperscript{\textregistered} snare that is designed to grasp objects without a free end, but these devices are used for percutaneous retrieval of cardiac leads and, to our knowledge, they have not been used for lead repositioning.

When the tip of a dislodged atrial pacing lead is attached to the wall of the atrium or SVC, deflectable catheters could be used; but if the tip of the displaced lead is tightly fixed, it may be impossible to detach the lead.

By using this new device (cardiac pacing lead hook), the operator was able to reposition the lead.

The results of this experience encourage us to use ‘the cardiac pacing lead hook’ in more cases and evaluate the results.

References