

Dislocation of a detached electrode from a pacing Swan–Ganz catheter in the hepatic vasculature

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To the Editor:

The pacing pulmonary artery catheter (PAC) is very efficacious in some cases, but it can be associated with a rare complication specifically associated with its placement. Here we describe the case of an electrode that became detached from the pacing PAC, only to be visualized later in the liver of the patient on the postoperative computed tomography (CT) images.

An 80-year-old, 35-kg woman presented for valve replacement for aortic stenosis, mitral regurgitation and annuloplasty for tricuspid regurgitation. Under general anesthesia, the right internal jugular vein (RIJV) of the patient was cannulated with a central venous catheter (8.5-French AVA 3Xi multi-lumen sheath introducer catheter; Edwards Lifesciences, Irvine, CA) with two infusion lumens and an introducer. A pacing PAC (model D205HF7; Edwards Lifesciences), which had five built-in electrodes integrated for atrial and/or ventricular pacing,

was inserted through the introducer. Repeated attempts to advance the PAC blindly failed. When the operator withdrew the PAC through the introducer, he felt light resistance and shortly thereafter noticed that the second electrode from the top for ventricular pacing was missing from the PAC (Fig. 1a, b). The introducer was immediately examined to determine the cause(s) of the detachment, but no cause was identified.

A second pacing PAC was inserted again through the introducer from the RIJV under mobile C-arm fluoroscopic guidance. Thereafter the patient successfully underwent the surgical procedure. The patient had an uneventful postoperative course, and subsequent CT imaging revealed that the metallic tip of the first pacing PAC was in the posterior region of the hepatic right lobe (Fig. 1c). The patient did not suffer from liver dysfunction during the postoperative course, and liver function has remained normal.

The electrode consists of elgiloy alloy (Co–Cr–Ni alloy) that is characterized by its high strength, ductility, corrosion resistance and excellent fatigue life over a wide temperature range. It is used widely to construct clips for cerebrovascular aneurysms, carotid arterial stents, among others. The dimensions of the electrode are 2×2 mm. At the time of detachment, catheter intervention would have been almost impossible because the electrode was caught in a fragment of the vein that was too small. We therefore chose medical observation and would have, if necessary, performed hepatectomy with its associated surgical risk.

A literature search of the PubMed databases revealed only two case reports comparable to our case [1, 2]. In these two reported cases, the three detached electrodes that remained in the body had gone into the pulmonary vasculature; in one case report, two electrodes were retrieved from within the introducer. In our case, the fragment was

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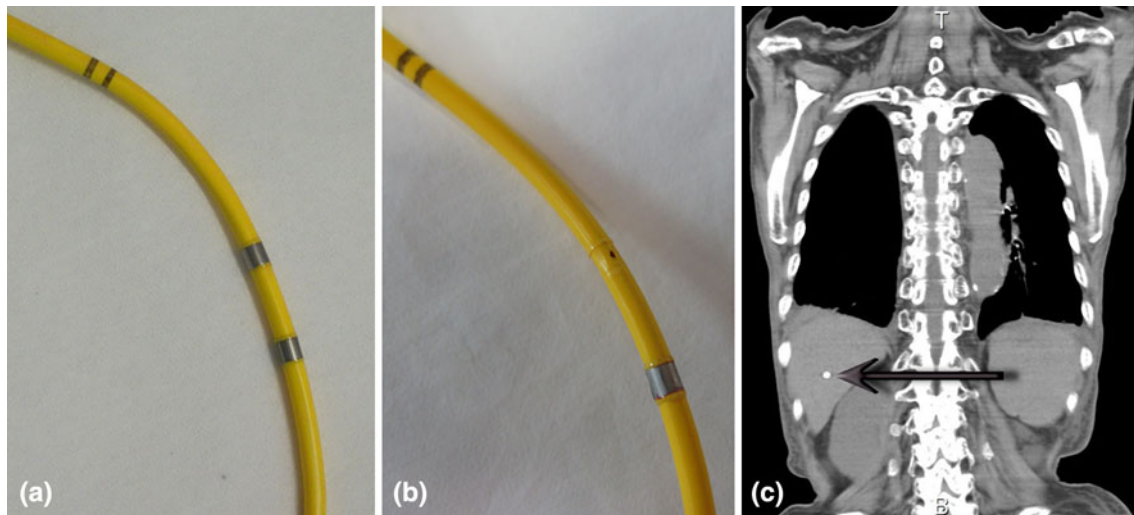


Fig. 1 **a** Two electrodes are bonded securely from the top of the catheter at 16.5 and 17.5 cm, respectively, for ventricular pacing of unused pacing pulmonary artery catheter (PAC). **b** The second ventricular pacing electrode was found to have detached after removal

visualized in the posterior region of the hepatic right lobe by CT although the PAC had been introduced via the RIJV. We conjecture that friction between the sheath introducer and the pacing PAC caused the second electrode to detach, subsequently dropping into the right atrium. The blowing jet of tricuspid regurgitation then delivered it to the hepatic vasculature.

Our case illustrates that the detachment of the electrode of a pacing PAC is a potential complication to this procedure. We also suggest that when using a pacing PAC, the surgeon should strictly avoid repetitive advance and withdrawal movements. Additionally fluoroscopic guidance is

of the PAC. **c** Chest computed tomography performed 15 days after the operation showed the metallic tip (*arrow*) in the posterior region of the right hepatic lobe in coronal view

useful for the efficient placement of PACs in patients such as the one reported here.

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