Successful removal of a peripherally inserted central catheter fragment from the heart with a vena cava filter retrieval set

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Abstract

Many major complications related to peripherally inserted central catheter (PICC) lines have been reported in the literature. Of these complications, spontaneous catheter fracture is rare. Percutaneous retrieval avoids the need for surgery in these cases. A few percutaneous techniques have been reported, but very little has been published in the literature regarding the use of vena cava filter retrieval sets. Here, we report a case of a female patient with breast cancer who experienced a fracture of the PICC with subsequent migration of the catheter fragment through the superior vena cava and into the right atrium, the right ventricle and the main pulmonary artery. The catheter fragment was removed by retrograde femoral vein catheterization with a vena cava filter retrieval set.

Keywords: Radiology, interventional, complications, foreign bodies

Introduction

Peripherally inserted central catheters (PICC) are widely used to provide central venous access in chronically ill patients with long-term intravenous access requirements. Many major complications related to both the insertion and the maintenance of PICC lines have been reported in the literature [1]. Typical complications include pneumothorax, hemopneumothorax, malposition, migration, catheter-associated infection and venous thrombosis. Of these complications, spontaneous catheter fracture is rare. Percutaneous retrieval avoids the need for surgery in these cases. A few percutaneous techniques have been reported, but very little has been published in the literature regarding the use of vena cava filter retrieval sets [2,3]. Here, we report a case of a female patient with breast cancer who experienced a fracture of the PICC with subsequent migration of the catheter fragment through the superior vena cava and into the right atrium, the right ventricle and the main pulmonary artery. The catheter fragment was removed by retrograde femoral vein catheterization with a vena cava filter retrieval set.

Patient data

A 43-year-old woman was hospitalized for chemotherapy for cancer of the right breast. A PICC was placed through the left

cubital vein to the superior vena cava for this purpose (Figure 1). The PICC was removed two months after the completion of chemotherapy, but it was not found to be intact. Emergency chest radiography confirmed a catheter fragment in the area of the right atrium, the right ventricle and the main pulmonary artery (Figure 2). In view of the patient's risk for embolism, it was decided to remove the embolized catheter fragment. Using a percutaneous right femoral venous approach, the 11 F coaxial retrieval sheath system of a vena cava filter retrieval set (WILLIAM COOK EUROPE, Sandet 6, DK-4632, Bjaeverskov, Denmark) was advanced to the right atrium over the wire guide; then, the inner coaxial catheter and the wire guide were removed. The position of the coaxial retrieval sheath system was verified by the injection of contrast medium. The retrieval loop system was introduced through the coaxial retrieval sheath system, and the PICC fragment was removed intact and without complications. A follow-up chest radiograph excluded the presence of any residual fragments in the superior vena cava and the right atrium (Figure 3). The patient was discharged in stable condition on the 4th day after the transcatheter procedure.

Discussion

A broken catheter can migrate distally through the bloodstream to finally lodge in the vena cava, the right atrium, the right

Figure 1. Chest radiograph showing the peripherally inserted central catheter placed through the left cubital vein to the superior vena cava.

Figure 2. Chest radiograph showing the embolized catheter fragment lodged in the right atrium, the right ventricle and the main pulmonary artery.

ventricle, or the main pulmonary/artery or one of its branches. In this case, the catheter fragment was finally located in the right atrium, the right ventricle and the main pulmonary artery.

It has been reported that centrally embolized foreign bodies may be associated with serious complications, including

Figure 3. Chest radiograph after percutaneous retrieval of the embolized catheter fragment, demonstrating the absence of any residual fragments.

myocardial or valvular perforation, myocardial infarction, arrhythmia, cardiac arrest, endocarditis, pulmonary embolism and secondary infection of thrombus or pulmonary abscesses [4]. Although some patients may be completely asymptomatic or may suffer no complications from the retained catheter fragment for many years [5], the risk of such complications is considerable [6]. In view of these risks, an attempt should be made at removal [4]. If percutaneous retrieval fails, surgical retrieval may be necessary. Percutaneous retrieval can be performed using loop snares, Dormia baskets, hooked guide wires, and Fogarty balloon catheters. In this case, we successfully used a vena cava filter retrieval set to remove the catheter fragment.

Conclusion

Percutaneous retrieval is the preferred method for the removal of intracardiac catheter fragments. Our experience demonstrates that vena cava filter retrieval sets are useful equipment for the removal of PICC fragments from the heart.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

Authors' contributions	NDM	HX	LY	XMZ	YJR	KL	XLN
Research concept and design	✓	✓	✓	✓	✓	✓	✓
Collection and/or assembly of data	✓	✓	✓	--	--	--	--
Data analysis and interpretation	✓	✓	✓	✓	✓	✓	✓
Writing the article	✓	✓	✓	--	--	--	--
Critical revision of the article	--	--	✓	✓	--	--	--
Final approval of article	✓	✓	✓	✓	✓	✓	✓

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