Retrieval of an IV Catheter Fragment From the Pulmonary Artery 11 Years After Embolization*

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The use of a peripherally inserted central catheter (PICC) is occasionally complicated by intravascular fracture and central embolization of the catheter fragment. We present a patient in whom a PICC fragment was retrieved from the pulmonary artery 11 years after embolization following its incidental detection. Despite a history of IV drug abuse and mitral regurgitation, this patient remained asymptomatic and without complications. The catheter fragment was retrieved since the patient was believed to be at risk for endocarditis. This may be the longest duration reported of an embolized catheter fragment that was successfully removed. As the natural history of asymptomatic-retained central venous foreign bodies remains unclear, the decision to remove them should be individualized. In selected cases, these foreign bodies may be retrieved without complications even several years after embolization.

(CHEST 2000; 117:1209–1211)

Key words: foreign body embolization; indwelling venous catheters; IV foreign bodies; peripherally inserted central catheters

Abbreviation: PICC = peripherally inserted central catheter

Indwelling venous catheters are widely used for prolonged infusion therapy. Intravascular fracture and embolization to distal vascular sites may complicate their use. A case of central embolization of a catheter fragment that was extracted 11 years later is presented and the related literature is reviewed.

Case Report

A 40-year-old woman was hospitalized for IV antibiotic treatment of right foot cellulitis. A PICC was placed through the right antecubital vein for this purpose. Chest radiograph confirmed the PICC position with its tip terminating in the superior vena cava. Also noted on the chest radiograph was a catheter fragment in the left pulmonary artery that had no continuity with the PICC positioned in the superior vena cava (Fig 1). The PICC was immediately removed, inspected, and found to be intact up to the tip without any evidence of breakage.

Detailed history elicited from the patient revealed that she had had a PICC placed at another hospital 11 years earlier. On its removal, this catheter apparently could not be extracted in its entirety and its proximal portion was found to be severed off. Attempts to localize the broken catheter tip fragment were unsuccessful. This history was verified with the hospital where she had the first PICC placed. The patient failed to return for follow-up and did not advise other physicians of this condition, as she remained asymptomatic. Apparently this catheter fragment had embolized to the left pulmonary artery, where it remained until discovered incidentally on the chest radiograph performed at our institution.

The patient’s medical history was significant for IV drug abuse and mitral valve prolapse with regurgitation. In view of her risk

Figure 1. Chest radiograph showing the embolized catheter fragment (black arrowheads) lodged in the left pulmonary artery.
for endocarditis and her prior history of pulmonary embolism (occurred prior to the first PICC placement), it was decided to remove the embolized catheter fragment. Using a percutaneous right femoral venous approach, a 6F multipurpose catheter was advanced via the right heart to the left pulmonary artery. A 15-mm Nitinol snare was advanced through the multipurpose catheter, and the PICC fragment measuring 9 cm was retrieved intact without complication (Fig 2). A follow-up chest radiograph excluded any residual fragments in the left pulmonary artery (Fig 3). The postprocedural hospital course was uneventful, and the patient was discharged in a stable condition on the fourth day of hospitalization.

**DISCUSSION**

Inadvertent fracture and fragment embolization of indwelling venous catheters continues to occur despite the use of meticulous techniques. Catheter fatigue from prolonged use contributes to in situ fracture, fragmentation, and distal embolization. The catheter fragments migrate distally along the blood stream finally lodging in the vena cava, right atrium, right ventricle, or the main pulmonary artery or one of its branches. The final site of lodgment depends on their length, weight, and the material stiffness.

Centrally embolized foreign bodies may be associated with serious complications, but the true complication rate is unknown due to the lack of large studies. The possible complications include myocardial perforation or necrosis culminating in tamponade, myocardial infarction, valvular perforation, arrhythmia, and cardiac arrest. The foreign body can act as a nidus for thrombus formation with resultant pulmonary embolism. Infections complications include endocarditis, secondary infection of thrombus, mycotic aneurysm, and pulmonary abscesses. Mortality depends on the duration as well as the site of lodgment of the embolized foreign body. According to one study, mortality was the highest when the foreign body was lodged in the right heart, less when localized in the vena cava, and least when lodged in the pulmonary artery.

Our patient did not suffer any complication from the retained catheter fragment for 11 years, despite her IV drug use, which increases the risk of infectious complications. To our knowledge, this case may represent the longest catheter fragment embolization that was then successfully removed. There is one other case described in the literature in which a patient with an embolized guidewire in the pulmonary artery remained asymptomatic for 14 years, but extraction was not attempted in this case as the guidewire was adherent to the vascular wall. Interestingly, there were no adhesions in our patient and the catheter fragment was retrieved easily.

Percutaneous retrieval can be done using loop snares, Dormia baskets, hooked guide wires, and Fogarty balloon catheters. Before attempting percutaneous removal, angiography may be considered to exclude thrombus that may predispose to pulmonary embolism. Percutaneous extraction may be performed at a low risk, but if extraction fails, surgical retrieval may be necessary.

**CONCLUSION**

Centrally embolized foreign bodies may be associated with serious complications. The true rate of complication is unknown due to the lack of long-term follow-up data. In
selected cases, it may be possible to retrieve these foreign bodies at a low risk even several years after embolization. The decision to extract such foreign bodies should be individualized based on their location and the risk of possible complications.

REFERENCES