Tr. J. of Medical Sciences
29 (1999) 81–84

Short Report

Ahmet MEMİŞ
İsmail ORAN
Vahit ÖZENER

Percutaneous Retrieval of Broken Port Catheter Entrapped in the Right Atrium

Department of Radiology,
Ege University Medical School, İzmir-Turkey

Received: September 15, 1997

The rapidly expanding use of endovascular devices has necessitated new techniques to remove misplaced or migrated devices. Retrieval of foreign bodies may occasionally be difficult, and additional maneuvers with specialized devices must be performed to allow their extraction. We report two such cases in which a broken implantable venous access catheter entrapped in the right atrium was pulled down into the inferior vena cava (IVC) and then removed from the body percutaneously.

A 35-year-old man with non-Hodgkin lymphoma was reevaluated by surgeons because of the dysfunction of the implanted venous access port on the right upper thoracic wall. The port catheter (5-French) had been placed in the right subclavian vein 6 months earlier. His most recent chemotherapy course was 1 month prior, and he was doing well clinically except for a diffuse hepatosplenomegaly. On further questioning, he did not recall any chest trauma. These port systems consist of a reservoir placed in a subcutaneous pocket with a self-sealing silicone septum that permits repeated percutaneous needle insertion. The reservoir is attached to a distal catheter, which is tunneled in the subcutaneous tissue before it is inserted into the subclavian or jugular vein. A plain chest x-ray revealed that the port catheter had fractured at the level where the catheter passes just below the clavicle and that the faintly radiopaque distal segment had embolized into the right atrium (Figure 1).

Figure 1. Spot chest radiograph shows the faintly radiopaque catheter fragment embolized into the right atrium (arrow).

A 24-year-old man with Ewing sarcoma and lung metastasis was admitted for chemotherapy treatment. The port catheter was placed in the left subclavian vein. At the third chemotherapy session (three months later), routine chest x-ray revealed the fractured port catheter at the junction of the first rib and clavicle. The distal segment had embolized into the right atrium. The patient also reported no any chest trauma (Figure 2).

The retrieval technique used was the same in both patients. A preliminary x-ray before the procedure

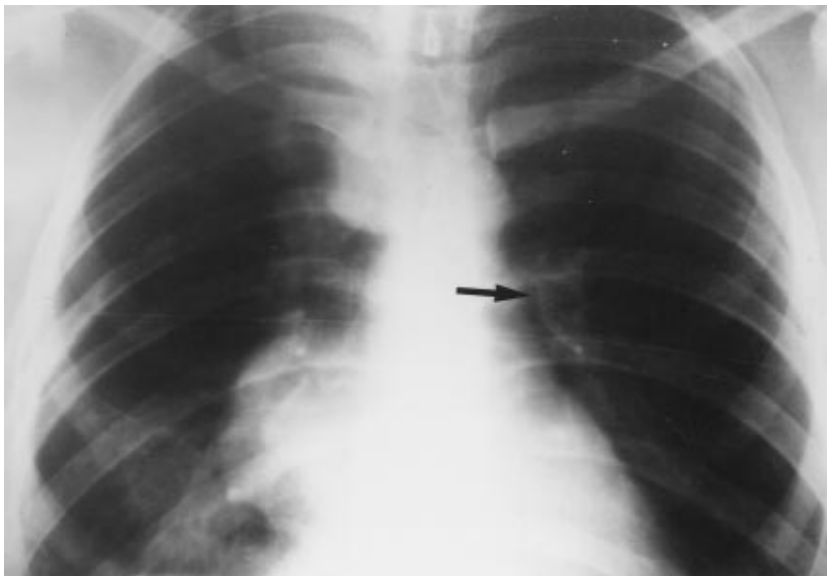

Figure 2. Chest roentgenogram reveals that one end of the embolized catheter fragment lies in the left pulmonary artery (arrow).

Figure 3. Spot radiograph shows the free catheter end being grasped by the Amplatz snare in the IVC.

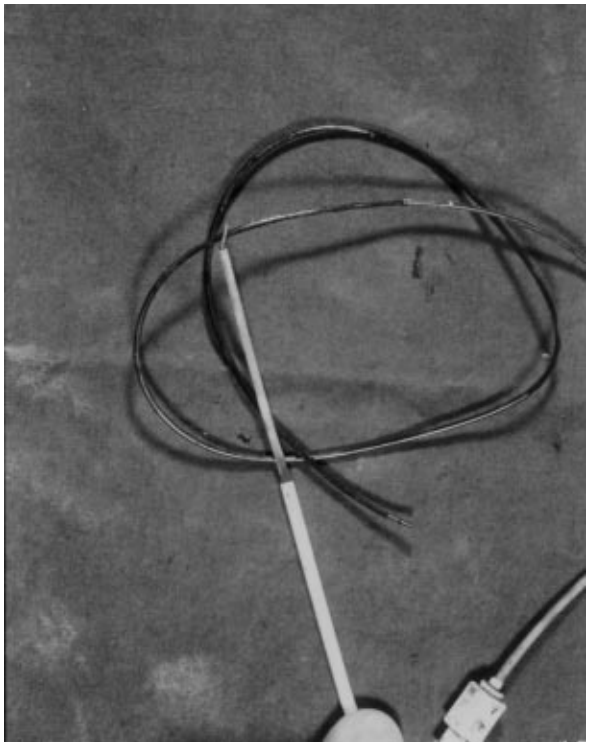

Figure 4. The catheter fragment, still grasped by the snare, is seen.

revealed a totally entrapped catheter fragment (50-cm and 40-cm) in the right atrium looped over itself several times, creating multiple loops of different sizes. A right common femoral vein approach was employed, and a 9-F vascular sheath was introduced. A 5-F side-winder catheter (Medi-tech/Boston Scientific, Watertown, Mass USA) was advanced through the IVC into the right atrium, and the usual hooked configuration was formed by using standard maneuvers. The catheter curve was then placed around one loop of the broken catheter fragment in the right atrium and carefully pulled down into the IVC. With this maneuver, one free end of the catheter fragment,

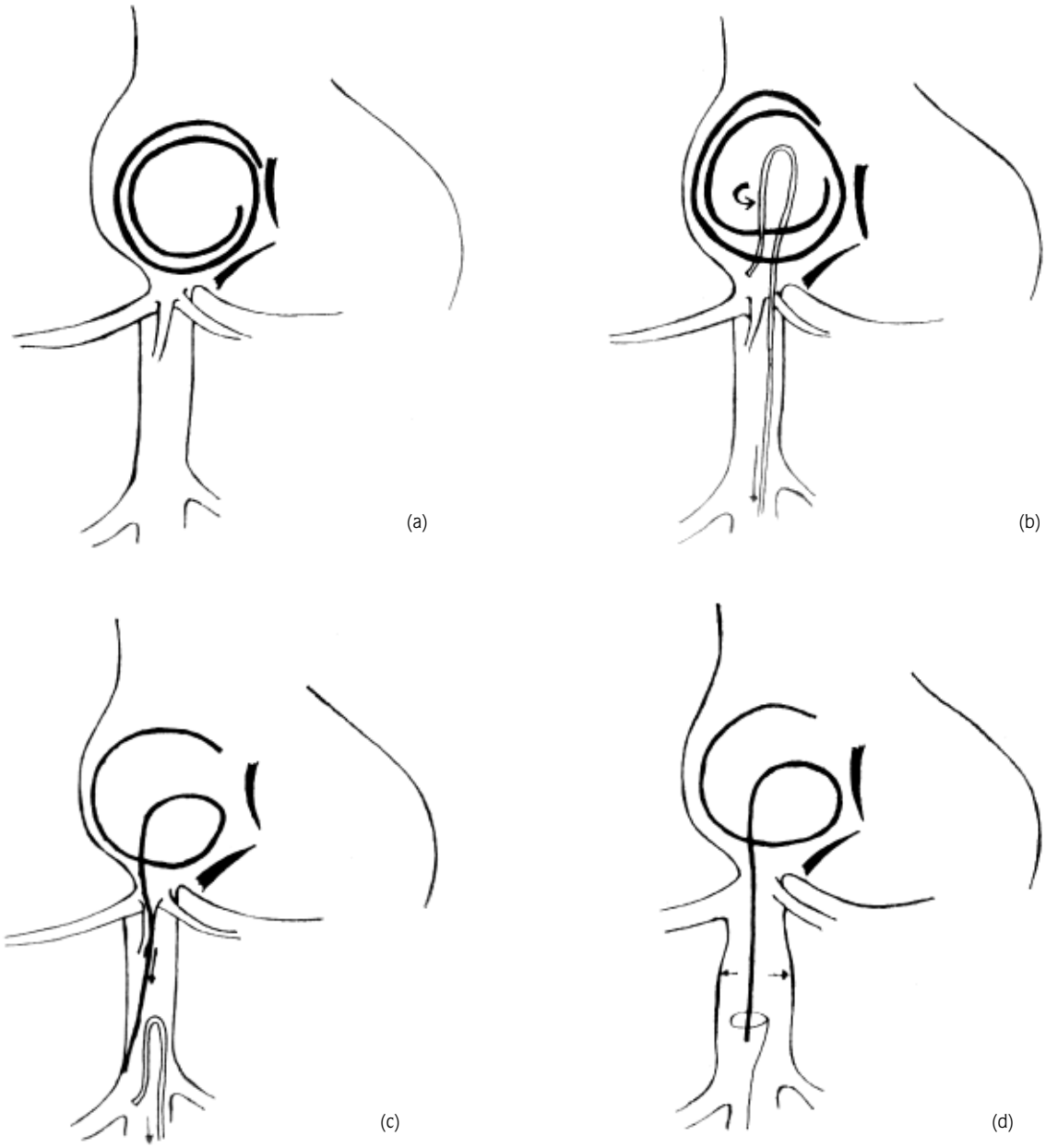

Figure 5. Diagrammatic description of the technique. (a) Broken catheter fragment is entrapped in the right atrium. The catheter is looped over itself several times, which make it difficult to grasp. (b) The bent tip of the side-winder catheter is placed over the loop of the foreign body. (c) Gentle traction is applied on the side winder catheter until one end of the foreign body is withdrawn into the IVC. (d) Simple Valsalva's maneuver results in luminal widening of the IVC (arrows) for a few seconds. Thus, transient release of the catheter fragment from the vessel wall allows for its retrieval by the snare.

which was entrapped in the right atrium, was finally released in the IVC, while the other end remained in the right atrium. The side-winder catheter was slipped over a wire, a 20-mm Amplatz gooseneck snare (Microvena, Vadnais Heights, Minn USA) was then advanced through the femoral sheath and opened around the free floating catheter tip in the IVC. During the retrieval maneuver, care was taken not to knot the intracardiac part of the catheter. Once the complete catheter was seen in an intracaval position, it was easily removed without any complications (Figures 3-5).

Discussion

Foreign body retrieval has become a common practice in interventional radiology department. Devices such as baskets, forceps, and snares have been used for foreign body retrieval. Wire snares, however, are the most commonly used retrieval device. Recently, the Amplatz gooseneck right angle snare has been adopted as the first-line therapy for all foreign body removals (1). This device has been used successfully in various cases, since Yedlicka et al. (1-7). In some cases, however, snare removal of a foreign body may be extremely difficult, especially when both ends are fixed or entrapped and thus impossible to grasp (6, 8). In such instances, one may attempt to release one end of the foreign body to provide beter access for the snare. This may be accomplished by means of a catheter with a bent tip (e.g., pigtail, side-winder). It was not pissible, in our patients, to advance the snare over one end of the "ball" of the catheter entrapped in the right atrium. Therefore, we successfully used the side-winder catheter to release one end of foreign body in the IVC. If, however, both ends of the foreign body are adherent to the vessel wall or are fixed inside a thrombus, technical success may be possible only with additional maneuvers, described elsewhere (6, 8).

Spontaneous fracture and embolization of implanted port catheters has occassionally been reported (9, 10). It may be related to a chest trauma (10), or it may be caused by compression of a catheter between the first rib and clavicle (pinched-off) (9, 11). In a recent study, by Krutchen et al., however, it was suggested that catheter kinking under the medial clavicle is due to the embedding of the catheter in the muscular ligament complex (subclavius muscle) rather than pinching between the clavicle and the first rib (12).

Catheter embolization remains a potential complication of indwelling lines in patients with neoplastic disease. In the event of this complication, the percutaneous approach offers a simple and advantageous method of retrieval.

Corresponding author:

İsmail ORAN

Ege Üniversitesi Tıp Fakültesi

Radyoloji Anabilim Dalı

TR-35100, Bornova, İzmir-Turkey

References

1. Cekirge S, Weiss JP, Foster RG, Neiman HL, McLean GK: Percutaneous retrieval of foreign bodies: experience with the nitinol goose neck snare. JVIR 4: 805-810, 1993.
2. Yedlicka JW, Carlson JE, Hunter DW, Castanedo-Zuniga WR, Amplatz K: Nitinol goose neck snare for removal of foreign bodies: experimental study and clinical evaluation. Radiology 178: 691-693, 1991.
3. Siegel EL, Robertson EF. Percutaneous transfemoral retrieval of a free-floating titanium Greenfield filter with an Amplatz goose neck snare. JVIR 4: 565-568, 1993.
4. Saeed M, Knowles HJ, Brems JJ, Takiff H. Percutaneous retrieval of a large Palmaz stent from the pulmonary artery. JVIR 4: 811-814, 1993.
5. Dixon GD. Nitinol snare for removal of abscess debris. JVIR 5: 647-648, 1994.
6. Ferral H, Kimura Y, Amplatz K: Retrieval of an entrapped guide wire with a braiding maneuver. JVIR 5: 649-651, 1991.
7. Lipton M, Cynamon J, Bakal CW, Sprayregen S: Percutaneous retrieval of two Wallstent endoprostheses from the heart through a single jugular sheath. JVIR 6: 649-472, 1995.
8. Grabenwoeger F, Dok W, Pinterits F, Appel W: Fixed intravascular foreign bodies: a new method for removal. Radiology 167: 555-556, 1988.
9. Lafreniere R: Indwelling subclavian catheters and a visit with the "pinched-off sign". J Surg Oncol 47: 261-264, 1991.
10. Rothman A, Kung FH: Percutaneous retrieval of an embolized Mediport catheter in a patient receiving therapy for Hodgkin's lymphoma. Pediatr Hematol Oncol 10: 179-182, 1993.
11. Hinke DH, Zandt-Stastny DA, Goodman LR, Quebbeman EJ, Krzywda EA, Andris DA. Pinch-off syndrome: a complication of implantable subclavian venous access devices. Radiology 177: 353-356, 1990.
12. Kurtchen AE, Bjanason H, Stackhouse DJ, Nazarian GK, Magney JE, Hunter DW. The mechanisms of positional dysfunction of subclavian venous catheters. Radiology 200: 159-163, 1996.