

Successful percutaneous transvenous removal of a fractured port catheter via novel technique: Balloon-supported retrieval 🎬

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Introduction

The totally implantable venous access device (TIVAD) is widely used for drug access or infusion during cancer treatment (1). A central venous catheter can improve the quality of the patient's life by administering chemotherapy agents and drugs. Sometimes, several complications associated with the use of these devices can be seen. Fracture of the catheter may be the most serious complications, which could lead to pulmonary embolism, arrhythmic events, endocarditis, and perforation of the myocardium; although it occurs in around 1% of the patients (2). About 90% of foreign materials can be extracted by percutaneous transcatheter removal technique, a minimally invasive approach (3). Forceps, basket, gooseneck snare, and triple loops snare were reported to retrieve the fractured catheter successfully (4). To the best of our knowledge, herein, we report the first case of successful percutaneous transvenous removal of a fractured chemotherapy port catheter with a novel technique, balloon-supported retrieval.

Case Report

A 59-year-old male patient with lung cancer was scheduled for chemotherapy, and a port catheter was implanted three years ago. During routine computed tomography scanning of the patient, it was found that the chemotherapy catheter has fractured and migrated to the inferior vena cava. The patient was referred by the cardiovascular surgeon for extraction of the fragmented port catheter using endovascular method. He did not have any symptoms, and cardiopulmonary physical examination was within normal limits. The 12F sheath and snare system was not available at that time in the catheter laboratory. Only an 8F sheath was available as the largest. Under these circumstances, we had a dilemma on how to remove the fractured catheter endovascularly. We aimed to pass through the fractured catheter with a 0.014 inch guidewire and remove the catheter with coronary balloon support. An 8F sheath was inserted into the femoral vein in the catheterization laboratory. Fluoroscopy showed the fractured port catheter at the level of the inferior vena cava. The 7F JR 4

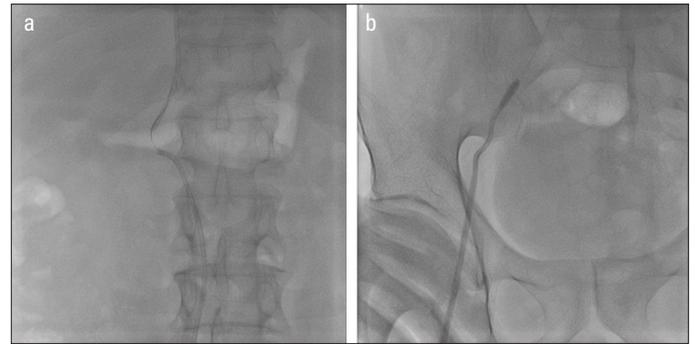


Figure 1. The 7F JR 4 guiding catheter was advanced to the proximal end of the port catheter. a) The lumen of the port catheter was passed through with the 0.014 guidewire. b) The 4.0×15 mm balloon was inflated after exiting the distal end of the femoral sheath

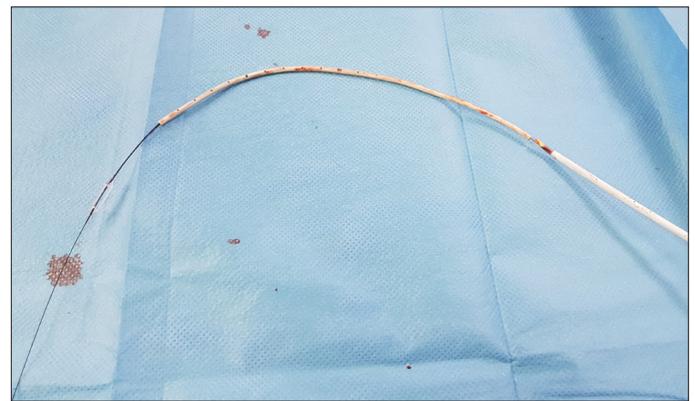


Figure 2. The system consisting of femoral sheath, port catheter, coronary balloon, and guidewire was removed by retracting them gently

guiding catheter was advanced to the proximal end of the port catheter. The lumen of the port catheter was passed through with the 0.014 inch guidewire (Fig. 1a). The 4.0×15 mm coronary balloon was then inflated to 12 atm (nominal pressure) after exiting the distal end of the port catheter. We did not encounter any difficulties during passage with the 0.014 inch guidewire and during balloon passage. With balloon support, the port catheter was brought up to the distal end of the femoral sheath, and the ends of the port catheter and femoral sheath were brought into contact with each other (Fig. 1b, Video 1). Finally, this system consisting of femoral sheath, port catheter, coronary balloon, and guidewire was removed by retracting them gently (Fig. 2). No vascular complications were observed during the procedure.

Discussion

Connection problems of the chemotherapy port catheter to the port chamber, improper catheter placement, continuous drug administration, and chronic compression of the port catheter between the clavicle and the first rib (pinch-off syndrome) (5) may cause catheter fracture.

Catheter fragmentation is a long-term complication of TIVAD (6). Cardiac rupture, endocarditis, and various arrhythmias may occur as a result of embolization of a fractured catheter (7). Once the fractured catheter is confirmed, it should be retrieved as soon as possible to prevent the serious complications.

Removal techniques of fractured catheters range from endovascular approaches to surgical procedures (8). Percutaneous removal of fractured catheters has become the first choice because of high procedural success and low complication rates. Gooseneck snares are the most used retrieval devices for percutaneous removal of intravascular fractured materials (9).

In the literature, we came across only one case presented by Lee et al. (10), in which a fractured catheter was removed with balloon support without using a retrieval system such as a gooseneck snare. They presented a patient with a fragmented dialysis catheter, which was successfully removed using a balloon inflation technique.

The balloon-supported retrieval strategy has certain advantages when compared with other invasive approaches. During the snaring of small-sized foreign bodies or in cases of blunt withdrawal, the objects may get further fragmented and lost in the vein during the retrieval phase. The balloon-supported retrieval system would minimize the risk for further complications by not localizing the traction to any particular point on the catheter or vascular wall.

In our patient, we demonstrated that the fractured chemotherapy port catheter can be retrieved percutaneously without retrieval systems such as gooseneck snare and large lumen sheaths such as 12F. To the best of our knowledge, this is the first case in which a fractured chemotherapy port catheter was removed by the balloon-supported retrieval method, which is a new technique. We believe that this balloon-supported retrieval can be used in emergency situations in the absence of necessary retrieval systems rather than elective procedures.

Conclusion

Fractured port catheters in the circulatory area should be removed quickly to avoid serious unwanted complications. Balloon-supported retrieval technique can be used when retrieval systems such as gooseneck snares are not available in the catheter laboratory.

Informed consent: Written informed consent for publication was obtained from the patient.

Video 1. Percutaneous retrieval of the fractured chemotherapy port catheter using a coronary balloon

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