



Case Report

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Percutaneous Endovascular Retrieval of an Embolized Chemotherapy Port-A-Cath Fragment from the Superior Vena Cava Utilizing a Snare System: A Case Report


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Running Title Vascular Retrieval of a Fractured Chemotherapy Port Catheter
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ABSTRACT

Port catheters are recommended for patients requiring long-term intravenous therapy, particularly in cancer patients who are debilitated and require administration of chemotherapy or cytotoxic drugs. Mechanical complications of port placement include port occlusion, displacement, and catheter fracture. In this case report, we present the endovascular retrieval of a fractured chemotherapy port catheter fragment from the superior vena cava using a snare device. A 60-year-old woman with metastatic breast cancer presented with infusion difficulty through her 18-month-old subclavian chemotherapy port. The surgeon noticed that the port had not been fully extracted, prompting an urgent consultation for intervention. Fluoroscopy-guided retrieval of an SVC catheter fragment was achieved via femoral access using an Amplatz snare after failed EN Snare attempts. The patient was discharged post-procedure without complications. Proactive chemotherapy port surveillance enables early complication management. Catheter fractures necessitate multidisciplinary care, where endovascular snare retrieval augmented by surgical excision demonstrates optimal safety and efficacy.

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Introduction

Port catheter systems are indicated for patients undergoing long-term intravenous therapy, especially in debilitated oncology populations requiring chemotherapy or cytotoxic agents, which often involve high-osmolality solutions [1, 2]. The preferred venous access sites for implantation are the subclavian and internal jugular veins. Despite their utility, these devices are associated with potential complications such as pulmonary embolism, arrhythmia, infection, and cardiac perforation, although the incidence of major events remains low (approximately 1%) [3]. Mechanical complications related to the device itself include port occlusion, displacement, and catheter fracture [3].

Catheter fracture with subsequent embolization is an uncommon but serious late complication. The dislodged fragment can migrate into the central venous circulation, lodging in the superior vena cava, right atrium, right ventricle, or pulmonary arteries [4]. This constitutes a clinical emergency, as retained intracardiac or pulmonary foreign bodies carry significant risk, necessitating prompt retrieval [5]. Historically, surgical removal was the standard treatment; however, endovascular retrieval techniques have now become the first-line approach due to their minimally invasive nature, high success rates, and favorable safety profile [6].

This case report describes the endovascular retrieval of a fractured chemotherapy port catheter fragment from the superior vena cava using a snare device at Kosar Hospital in Semnan. We aim to detail the procedural technique and discuss the role of endovascular snaring as a safe and effective management strategy for this rare complication.

Case Presentation

A 60-year-old female with metastatic breast cancer and an 18-month-old implanted chemotherapy port in the subclavian region presented with difficulty during chemotherapy infusion. The patient's vital signs were checked and found to be stable. She was subsequently admitted for elective port removal. During the explantation procedure, the surgeon encountered significant resistance upon extraction of the proximal segment of the device. Subsequent inspection revealed that only the port reservoir and its attached segment had been successfully removed, while the distal catheter fragment remained in situ. An emergent interventional radiology consultation was subsequently requested for endovascular retrieval

of the retained fragment. It is important to note that routine radiographic imaging is not standard practice nor required for the explantation of a fully intact and functional port system.

Following informed consent acquisition from the patient, the patient was transferred from the general operating room to the catheterization lab. After initial evaluation, fluoroscopy revealed a fractured catheter fragment remaining in the superior vena cava (SVC). Under fluoroscopic guidance, femoral venous access was obtained, and a 7-French sheath was inserted. A 180-cm, 0.035-inch guidewire was advanced into the inferior vena cava (IVC), and an EN Snare was introduced into the right atrium to capture the dislodged end of the chemotherapy port catheter. After several attempts, the catheter was freed but could not be securely grasped, leading to its movement across the tricuspid valve and right ventricle. The retrieval strategy was then switched to an Amplatz GooseNeck snare, which successfully captured the embolized fragment. The port catheter was promptly retrieved (Figures 1, 2), and the patient was transferred back to the surgical ward. Post-procedural imaging confirmed complete removal of the chemotherapy port catheter (Figure 3). The procedure was successfully completed within 30 minutes. The patient recovered without complications and was discharged the following day. Informed consent for the publication of the case report and accompanying images was obtained from the patient.

Discussion

The subclavian and internal jugular veins represent the most frequently utilized sites for long-term venous access, primarily due to their consistent anatomy, ease of implantation, and relatively low immediate complication rates. However, this choice of access is not without risk. While major complications such as pulmonary embolism, arrhythmia, infection, and cardiac perforation are reported in approximately 1% of cases, they carry significant morbidity [3]. Mechanical complications related to the device itself, including port occlusion, displacement, and catheter fracture, constitute another critical concern and often present as late sequelae. The choice of implantation site itself may influence complication risk; for instance, subclavian access has been associated with a higher incidence of catheter pinch-off syndrome, a known precursor to fracture, compared to the internal jugular approach.

The management of catheter fracture and embolization has evolved considerably, as illustrated by recent case reports demonstrating the efficacy of endovascular retrieval. A 2023 pediatric case by Bonitto et al.

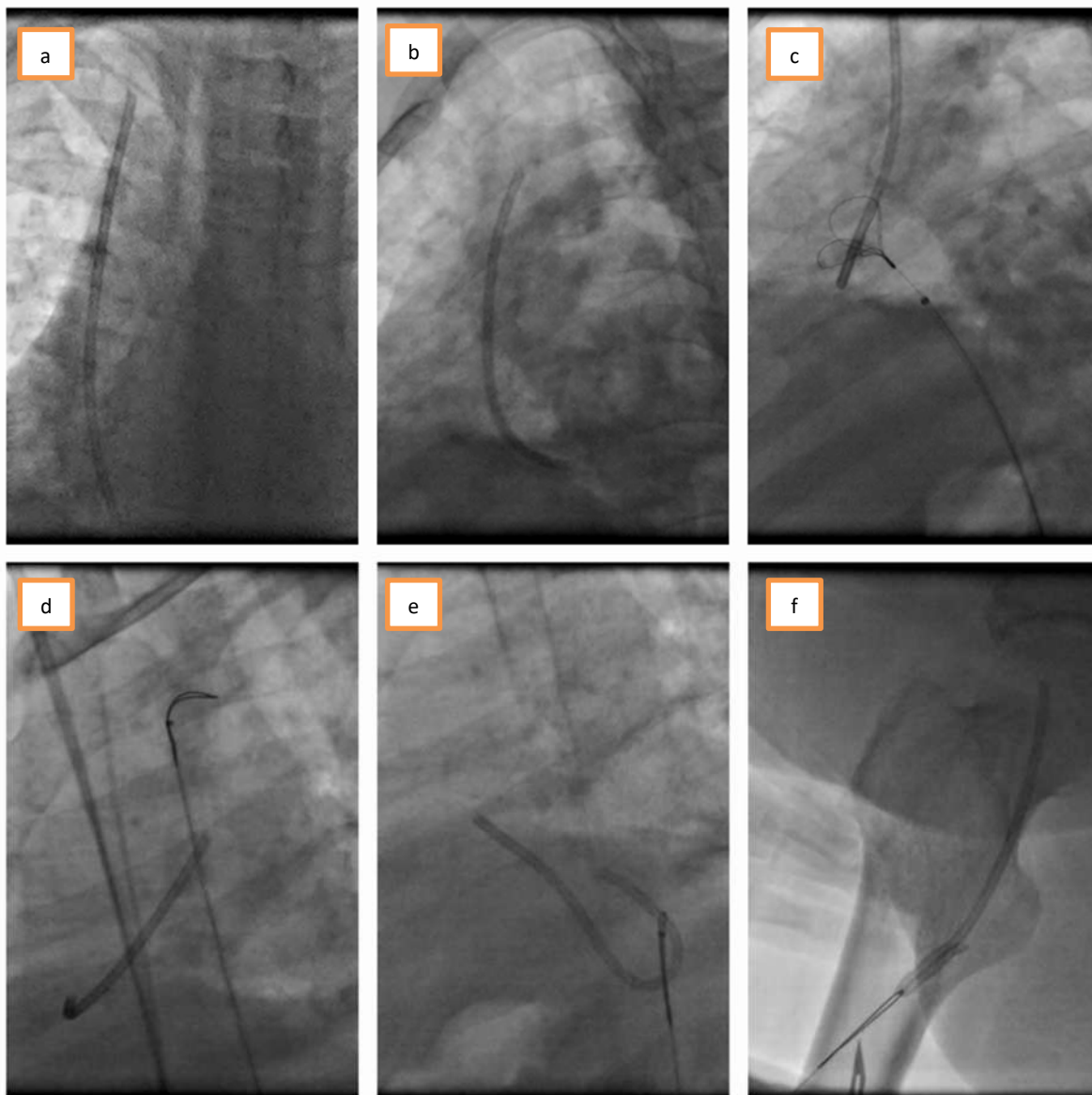


Fig. 1. Fluoroscopic images (AP view) demonstrating:)a) The distal fragment of the chemotherapy catheter ;)b) Catheter migration into the right ventricle (RV) through the tricuspid valve;)c) Failed capture attempts using an EN snare;)d-e) Successful retrieval using a GooseNeck snare during tricuspid valve prolapse into the RV;)f) Final extraction via the IVC and femoral vein.



Fig. 2. Removal of the chemotherapy port catheter

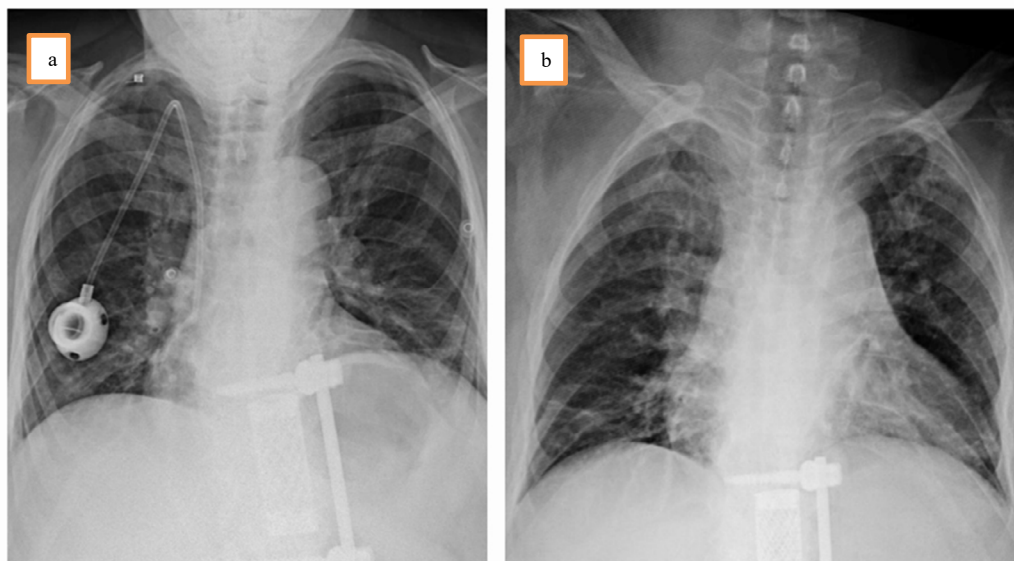


Fig. 3. Chest radiograph showing (a) port catheter fracture/kinking and (b) successful percutaneous retrieval

involved a fracture during the removal of a left-sided port, with the fragment located in the SVC [7]. This case underscores that fracture can occur not only during use but also as a removal complication, even in younger populations. In contrast, a 2021 report by Sudhakar et al. from India described a more complex scenario where the fragment had migrated to the coronary sinus and right ventricle [8]. Their successful use of a pigtail catheter to first reposition and straighten the fragment prior to snaring highlights a crucial technical nuance: adapting the retrieval strategy to the fragment's location and orientation is paramount for success. Further demonstrating procedural adaptability, a 2017 case from Turkey by Kalyoncuoğlu et al. reported the retrieval of a fragment from the challenging location of the left pulmonary artery using a triple-loop snare via femoral access [9].

Collectively, these cases highlight several key analytical points relevant to our presented case. First, they confirm that catheter fracture, while rare, is a complication with diverse presentations in terms of patient age, timing (during use vs. removal), and ultimate fragment location—from the SVC to the cardiac chambers and pulmonary arteries. Second, they establish percutaneous endovascular retrieval as the universally preferred first-line intervention across these diverse scenarios, having replaced surgical removal. Third, and most importantly, the technical variations between these cases—using adjuvant tools like pigtail catheters for manipulation or selecting specific snare types (e.g., triple-loop) for different vascular territories—demonstrate that there is no single universal technique. Instead, successful management requires a tailored approach based on precise imaging localization and an understanding of the available interventional armamentarium. This

analysis directly informs the procedural decision-making in our case, where the fragment's position in the SVC led to the selection of a specific snare device, the rationale for which is elaborated in the following section.

Conclusions

The management of totally implantable venous access ports (TIVAPs) demands a proactive and vigilant approach beyond superficial care. Adherence to a regimen of regular surgical follow-up is paramount for the surveillance and early detection of latent complications. When port dysfunction occurs, basic diagnostic imaging modalities, principally chest radiography and ultrasonography, serve as first-line investigations to elucidate the underlying etiology. The identification of a fractured catheter constitutes a medical emergency, necessitating immediate, coordinated multidisciplinary management. In such cases, endovascular snare retrieval has established itself as a safe and highly effective minimally invasive technique for the removal of embolized fragments from the central vasculature. This procedure is optimally performed in conjunction with the surgical explantation of the residual subcutaneous port chamber, representing a definitive integrative therapeutic strategy.

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Ethical Considerations

Ethics approval

The study was approved by the Ethics Committee of Semnan University of Medical Sciences (ethics code: IR.SEMUMS.REC.1404.024).

Authors contributions

Study conception and design by: Rahime Eskandarian and Mohammad Sadegh Vashvashadi; draft manuscript preparation by: Maryam Ezzedin. All authors reviewed the results and approved the final version of the manuscript.

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Conflict of Interests

The authors declare that they have no conflict of interest.

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