ENDOVASCULAR RETRIEVAL OF AN ACCIDENTALLY CUT CHEMOPORT CATHETER FROM THE HEART

Ashari MA[1], and Nik Fuad NF[1].
[1]Department of Radiology, Hospital Canselor Tuanku Muhriz, 56000 Cheras, Kuala Lumpur, Malaysia

Correspondence:
Muhammad Aminuddin Ashari,
Department of Radiology,
Hospital Canselor Tuanku Muhriz,
56000 Cheras, Kuala Lumpur, Malaysia
Email: aminuddin.ashari13@gmail.com

Abstract

A 40-year-old lady with underlying rectal adenocarcinoma presented to the angiography suite for an elective removal of an infected chemoport. The catheter was inadvertently cut during the procedure resulting in the dislodgment of the embolized fragment into the right side of the heart. Retrieval of the catheter using the endovascular approach described in this case was successful without any serious adverse events to the patient.

Keywords: Chemoport, Complications, Interventional Radiology

Introduction

Since first introduced in 1982, totally implantable venous access devices, or more commonly referred to as chemoports, have been widely used in oncologic patients due to their reliability and convenience (1). Chemoports can be inserted using the surgical cutdown technique or percutaneously via the Seldinger and modified Seldinger techniques (2). The device usually remains *in situ* until the completion of chemotherapy before being removed (3). Both insertion and removal of the chemoport are short procedures which can be done in a daycare setting.

Catheter embolization is an uncommon complication of this device which can be a result of pinch-off syndrome, catheter fracture, device fatigue, disconnection, abnormal angulation, and malposition (4, 5). From our literature review, there have been no reports of chemoport catheter embolization due to accidental incision. Herein is a case where we discuss the course of events and endovascular techniques employed to salvage this rare but preventable complication.

Case Report

A 40-year-old lady with underlying rectal adenocarcinoma (Stage IIIb, Duke C) post anterior resection was referred for removal of an infected chemoport inserted 2 months earlier. She was initially admitted to the oncology ward for the third cycle of her adjuvant chemotherapy regime. During the intravenous hydration and pre-medication administration via the chemoport, she complained of fever, chills, and rigors. Clinically, the chemoport scar was tender on palpation with pus discharge. The patient was started on intravenous Ceftriaxone and referred to the interventional radiology team for removal of the infected chemoport.

Investigations

Full blood count and absolute neutrophil count (ANC) were normal. Blood cultures taken from the chemoport had a mixed growth of two gram-negative and one gram-positive bacteria but the peripheral blood cultures were negative, confirming the diagnosis of device infection.

The patient presented to the angiography suite the week following her admission for the elective removal of the infected chemoport. A preliminary chest radiograph confirmed the catheter tip was *in situ* at the cavoatrial junction.

After obtaining the patient's consent and cleaning the right anterior chest wall, a skin incision was made over the pre-existing scar using a scalpel. There was bulging and pus discharge from the chemoport pocket with erythema of the surrounding skin. Unfortunately, the catheter was inadvertently cut near its hub while dissecting the superficial subcutaneous layers. The distal fragment could not be located surgically, so fluoroscopy was done immediately to locate the catheter fragment, which had embolized to the right side of the heart (Figure 1). The attending Interventional Radiology consultant was consulted and a short discussion on possible salvage methods ensued.

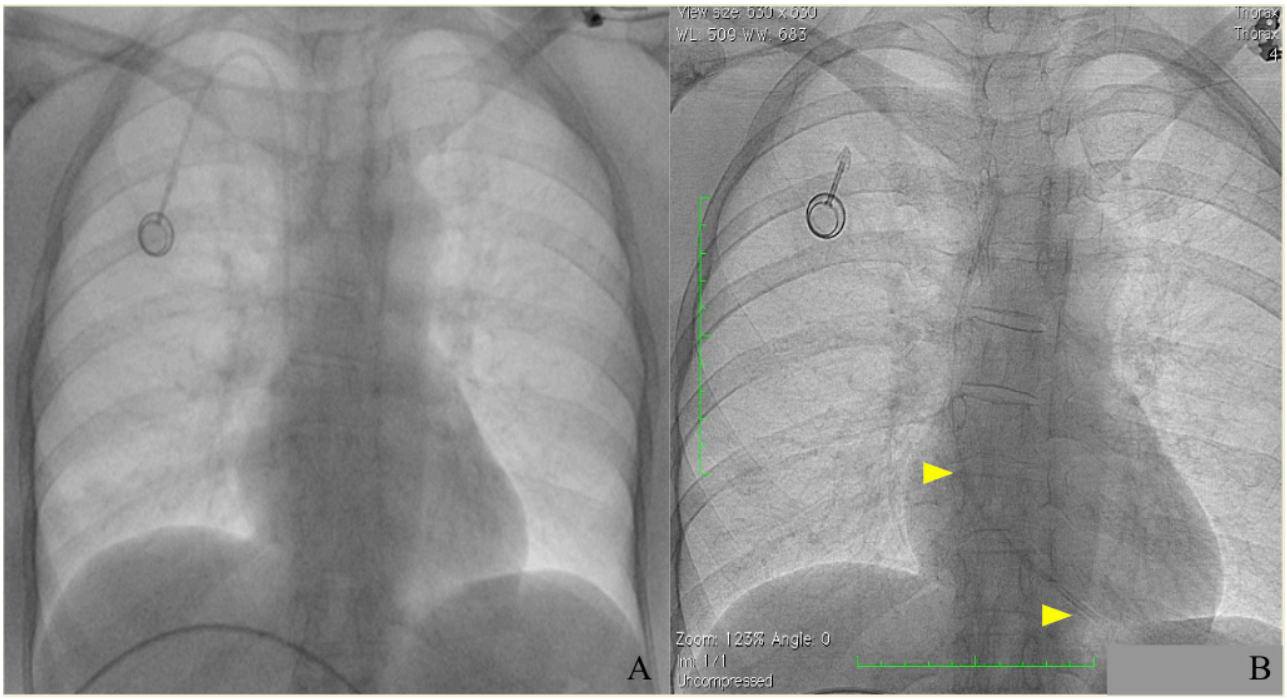

Figure 1: (A) Preliminary chest radiograph with chemoport in situ. (B) Yellow arrowheads denote the dislodged chemoport catheter.

Treatment

Firstly, an 18-gauge cannula was inserted into the right internal jugular vein for a central venogram. A 10 Fr sheath was then inserted via the right common femoral vein for larger venous access. A 5 Fr Pigtail catheter was inserted until the heart with the assistance of a 0.035-inch hydrophilic guidewire.

The coiled end of the pigtail catheter was manipulated until it hooks over the dislodged catheter securely and pulled into the inferior vena cava (IVC). The accessible end of the dislodged chemoport catheter within the distal IVC was snared with a Goose Neck snare and successfully retrieved via the femoral sheath (Figure 2).

Post removal chest fluoroscopic images showed no remaining catheter fragments within the heart or pulmonary vessels. The chest wall scar was packed and left to heal by secondary intention.

Finally, haemostasis at the puncture site was secured with manual compression. The whole procedure took approximately 50 minutes. The patient's vital signs remained stable throughout the procedure. ECG showed no evidence of cardiac arrhythmias.

Outcome

The patient was observed in the oncology daycare for a few hours before being discharged home on the same day. Her symptoms completely resolved, and the right chest wall scar healed nicely after a few weeks. The remaining doses of adjuvant chemotherapy were administered via peripheral venous cannulas. After completion of the chemotherapy, the patient continued to come for her regular oncology clinic follow-up every 6 months. The most recent surveillance CT scan showed no evidence of local recurrence or distant metastases.

Discussion

Chemoports negate the need for repeated peripheral venous cannulations and are associated with significantly lesser complications compared to other modes of central venous access such as peripherally inserted central catheters (PICCs) and Hickman lines (6). The most frequently encountered complications of this device are thrombosis and infection. Catheter embolization on the other hand is rare, accounting for less than 5% of late complications (7, 8).

Catheters can dislodge into the heart or as distal as the segmental pulmonary arteries which can potentially be hazardous to the patient. An old review by Fisher and Ferreyro (9) stated that the overall potential risk of death from serious complications as a result of retained catheter fragments is 71%. Embolized fragments can cause fatal arrhythmias, cardiac perforation, pulmonary embolism, or sepsis. Hence, removal should be attempted unless the patient is not fit for the procedure and the fragments are too small or embolized too distally (10).

One of the primary steps to remove a chemoport is to release the port from the surrounding fibrocellular sheath. Over time, multiple layers of this fibrocellular sheath would wrap around the chemoport and adhere to it tightly, requiring some exaggerated manipulation or cutting before the port can be removed. Bleeding, catheter fracture and

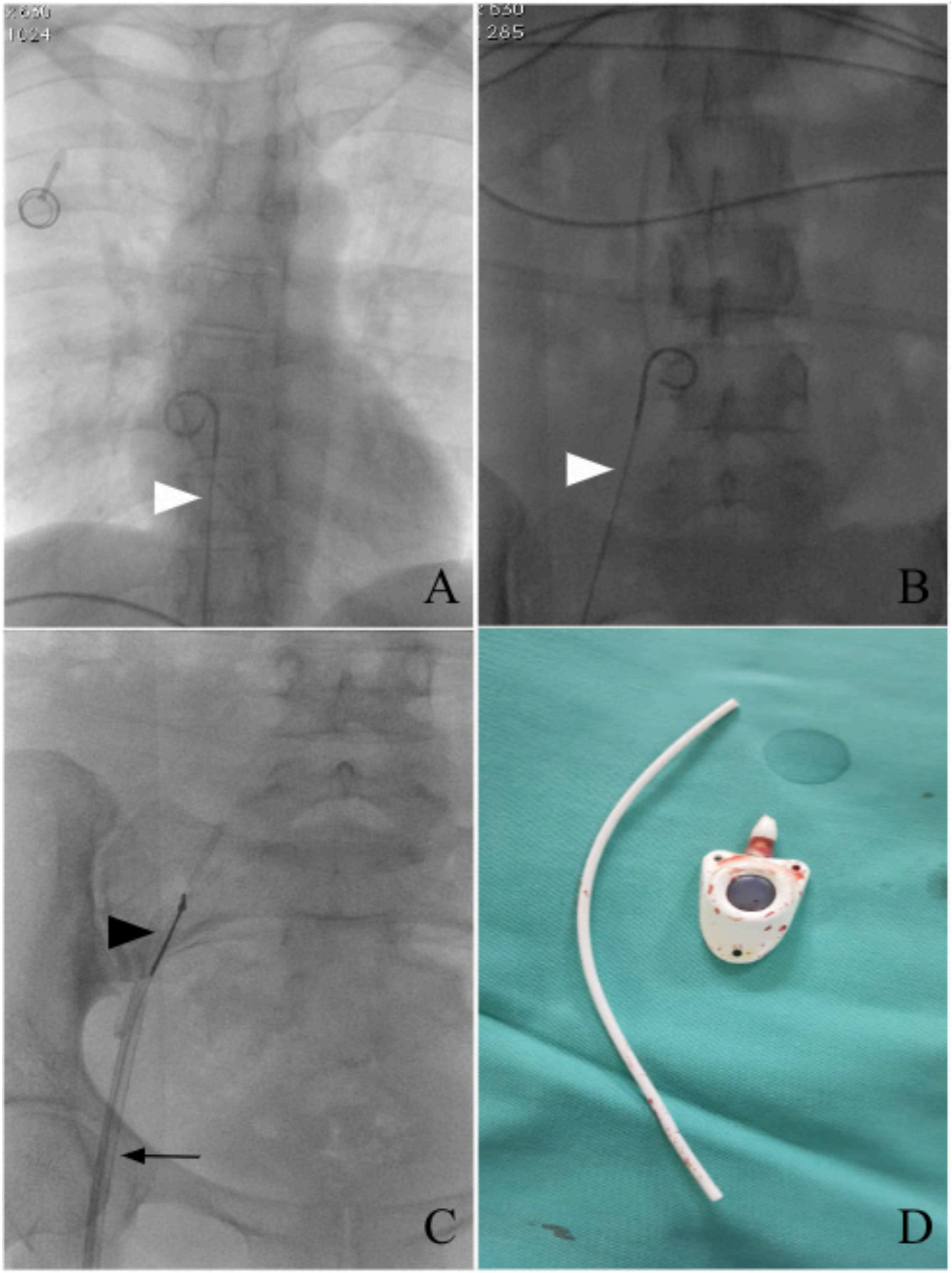

Figure 2: (A, B) Pigtail catheter (white arrowhead) used to hook the embolized catheter and pulled into the IVC. (C) Accessible end of the catheter snared using a Goose Neck snare (black arrowhead) and removed via the right femoral sheath (black arrow). (D) Successful removal of the chemoport catheter which was accidentally cut near its hub.

dislodgement can occur during this stage (11, 12). In our case, the catheter was accidentally cut with a scalpel during the initial stages of skin and subcutaneous dissection. The distal catheter fragment then embolized into the heart most probably due to the negative intrathoracic pressure during inspiration (13).

Endovascular techniques are usually applied before resorting to invasive surgical methods. Snaring the embolized catheter by far remains the most commonly used technique. Alternative devices which can be used include vascular retrieval forceps and helical stone baskets (14). Goose Neck snares are suitable when there is an accessible free end which was not applicable in our case. So, our team applied the "lasso technique" by manipulating a coiled end of a pigtail catheter with a guidewire to hook over the embolized fragment and pulling it into the inferior vena cava before the free end was snared. Variations of this technique have been shown to be effective in retrieving embolized fragments (3, 15-16).

This adverse event could have been prevented in the first place by limiting the use of scalpel or diathermy when performing the skin incision. Blunt dissection should be applied during subcutaneous exploration and fibrocellular sheath release. Operators should only cut when the field of view is clear, especially in the presence of pus discharge from the anterior chest wall pocket. Early consultation with an experienced Interventional Radiologist is crucial to ensure that swift and decisive actions are taken.

Conclusion

The minimally invasive techniques described in this case can prove to be very useful in retrieving embolized device fragments from the heart and avoiding potentially life-threatening complications.

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Competing interests

The authors declare that they have no competing interests.

Informed Consent

We hereby confirm that the patient involved in this case report has explicitly given her informed and voluntary consent for her case details to be documented and published. The patient has been informed of the purpose, nature, and potential risks associated with the publication of her case, and she understands that her identity will be protected through appropriate means. We have ensured that all identifying information has been carefully removed or modified to maintain patient confidentiality.

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