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Case Report

Endovascular management of the peripherally inserted central venous catheter iatrogenic pinch-off syndrome: A case report

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ABSTRACT

The recent increase in the number of patients with implanted peripherally inserted central catheters (PICCs) requires physicians to be familiar with rare and unusual complication–pinch-off syndrome (POS). We present a case of a 40-years-old female with human epidermal growth factor receptor type 2 (HER2)–positive breast cancer and implanted Groshong PICC (BARD). The patient was admitted for an elective chest and abdomen CT angiography control after finishing her trastuzumab and paclitaxel chemotherapy course a month earlier. Immediately after the contrast media power injection, the PICC line was embolized to the right segmental pulmonary artery. Due to the low complications rate and early patient ambulation percutaneous foreign body retrieval is a primary option for the pinch-off syndrome, especially in frail, and vulnerable cancer patients. This case underscores the feasibility and

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safety of percutaneous venous interventions in patients with embolized venous infusion devices.

Introduction

A Peripherally Inserted Central Catheter (PICC) is a small gauge venous catheter inserted in peripheral vein with the tip mainly sitting in the lower third of the superior vena cava. PICCs are commonly placed at or above the antecubital space in the cephalic, basilic, or medial-cubital vein. PICC lines are suitable for situations when central venous access is limited or expected to last longer than 2 weeks, providing excellent ambulation. Common indications include compromised or inadequate peripheral access, infusion of irritant agents, hyperosmolar solutions, or solutions with high acidity or alkalinity or long-term intravenous therapy. Recent increase in the number of patients with an implanted PICCs requires specialists to be familiar with rare and unusual complication–pinch-off syndrome (POS). The retrieval of catheters from the right heart chambers, especially if it is embolized to the peripheral pulmonary artery is a relatively complex procedure. We present a case of successful removal of a PICC stuck in the right segmental pulmonary artery after the contrast media power infusion attempt during elective computed tomography angiography (CTA).

Case report

A 40-years-old female with human epidermal growth factor receptor type 2 (HER2)–positive breast cancer was admitted to the hospital for an elective chest and abdomen computed tomography (CT) angiography control. The patient had finished her chemotherapy regimen (trastuzumab and paclitaxel) a month earlier and had a Groshong PICC (BARD) implanted in the left basilic vein 3 month ago. The CT technician injected contrast media (CM) bolus directly into the PICC to skip peripheral venous catheter placement. Immediately after the CM injection with power injector, the patient complained of an acute right arm pain and heating, followed by prolonged cough and mild chest pain. The injection and tomography were stopped, the cough partially resolved after a few minutes, but her chest pain persisted. The contrast mostly went subcutaneously, the injection site was swollen and visually deformed. After an urgent inpatient consultation, the patient was referred to the observation room for catheter revision, which demonstrated a complete avulsion of the connected catheter from the proximal port, and the absence of the catheter within the skin. The proximal port was removed, and the patient was transferred directly to the cardiac catheterization laboratory for the embolized PICC search and retrieval attempt.

Direct fluoroscopy showed long PICC main body with proximal portion in the left subclavian vein and distal portion in the posterior basal segment of the right pulmonary artery. We proceeded directly to the intervention. 5F diagnostic Pigtail catheter (Cordis, Piscataway, NJ) was advanced into the right atrium via the right femoral vein using a 6F 90 cm introducer. The central portion of the embolized catheter was slightly pulled down with a Pigtail, 0.014" 300 cm BMW (Terumo, Tokyo, Japan) coronary guidewire was advanced into the catheter and pushed into the inferior vena cava (Fig. 1). Then the first guidewire was snared using handmade snare from another 300 cm guidewire, the whole system was pulled into the sheath and externalized (Fig. 2). The main body of the catheter was not fractured or damaged (Fig. 3).

After the procedure patient had stayed in the hospital for 24-hour observation due to the femoral vein hemostasis concerns and was discharged the next day. Her elective CTA was rescheduled, and she continued her cancer treatment.

Discussion

The modern development of chemotherapeutic regimens increased the number of the implantable venous infusion systems. A safe venous access is required for the majority of cancer treatment regimens and the benefits and potential risks of PICCs or port-systems implantation have to be accurately considered. PICCs are safe and reliable tool to deliver chemotherapeutic drugs, particularly during the first 3 months after implantation [1,2]. In the large study assessing the overall risk of PICC failure in patients under active chemotherapy, Bertoglio et al. report 15% of PICCs removal rate due to various complications before finishing the treatment [3]. The overall failure rate reported for totally implanted venous access devices (TIVAD) in cancer patients ranges from 5%-15% [4]. The major failure reasons are upper extremity deep venous thrombosis (UEDVT), central line associate bloodstream infection (CLASBI), sepsis of the exit site, occlusion, and dislodgement of the catheter, inadvertent removal, or pinch-off syndrome [5]. While the infusion catheter pinch-off syndrome is a relatively rare complication itself, iatrogenic pinch-off syndrome has been barely reported to date.

In our case, after the power injection and clear evidence of catheter dislodgement, we directly proceeded to endovascular venous approach. Percutaneous foreign body retrieval has been developed for decades and it is as effective as open surgical management [6]. If we had been unable to retrieve the embolized catheter, medical management likely would have failed due to residual symptoms leading this patient to eventual surgical removal of the PICC. Endovascular management is the primary option for this type of complication especially in frail and vulnerable cancer patients [5,7–11].

This case underscores the potential complexity of percutaneous venous interventions in patients with embolized

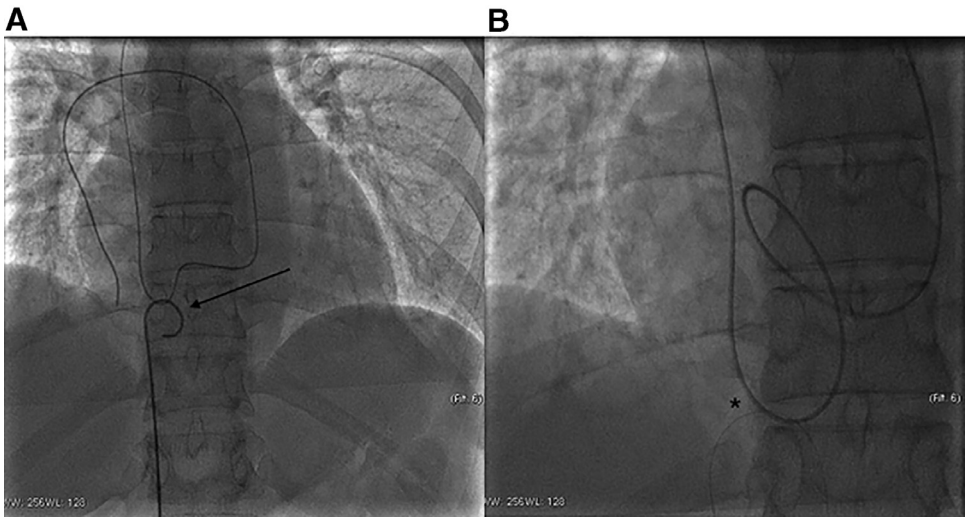

Fig. 1 – PICC captured and pulled down with 5F Pigtail catheter (arrow) (A). Snaring PICC with the 0.014" guidewire (asterisk) thought the Pigtail (B).

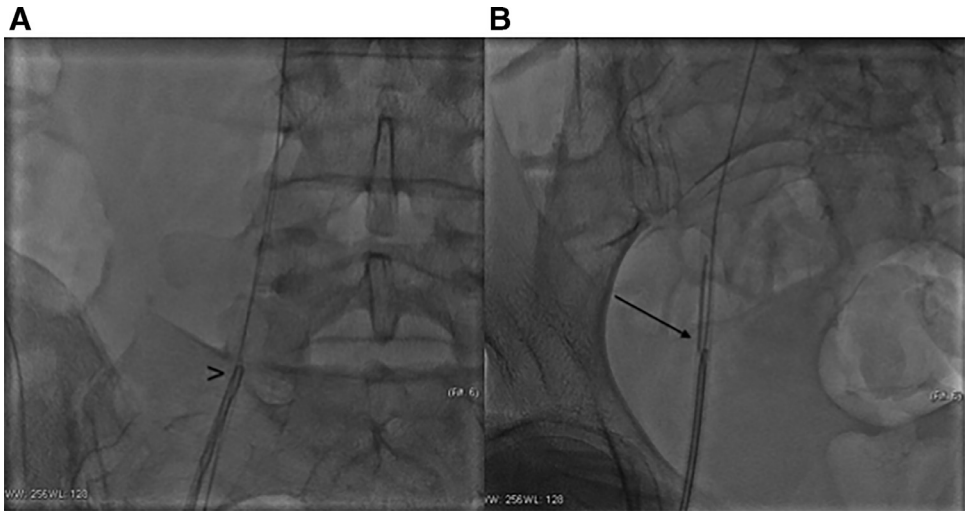

Fig. 2 – 0.014" guide wire tip snared and pulled into the sheath (arrowhead) (A). PICC captured and pulled into the introducer (arrow) (B).

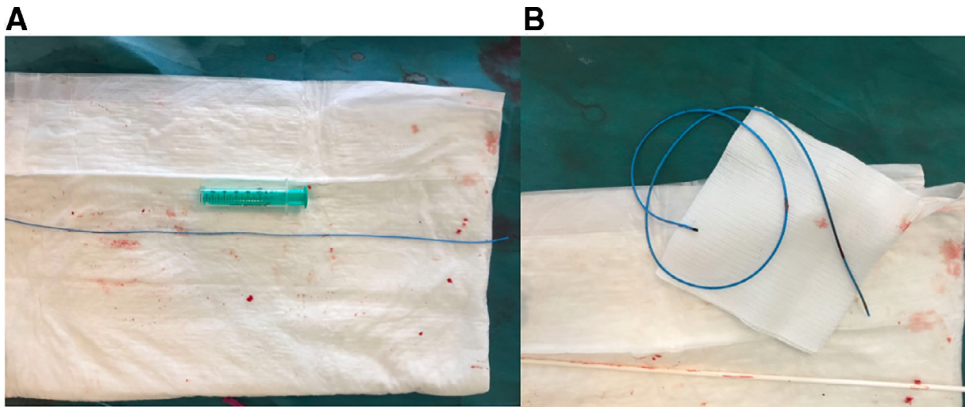

Fig. 3 – Successfully retrieved PICC (A.B).

infusion devices. While the implantable port-systems pinch-off syndrome is rare but familiar complication with the rate of 1%-3%, the iatrogenic PICC pinch-off is very uncommon. The necessity of high skilled operators, familiar with a variety of instruments, including dedicated commercially available snares and catheters, along with custom snares is crucial in beneficial role of endovascular foreign body retrieval.

Supplementary material

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2018.12.009.

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