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Case Report
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Retrieval of a Broken Peripherally Inserted Central Catheter Migrated in the Right Pulmonary Artery in a Young Girl: a Case Report

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Abstract

We report a case of successful endovascular technique using a snare to retrieve a migrated, broken, peripherally inserted central catheter (PICC) in a 12-year-old girl treated with chemotherapy for lymphocytic leukemia. This patient received chemotherapy through a PICC line implanted into her left antecubital vein 9 months previously. Computed Tomography (CT) after admission showed migration of a broken PICC into the right pulmonary artery. The broken PICC was retrieved successfully through the right femoral vein using a snare. The endovascular technique is useful and should be considered initial procedure for retrieving migrated catheters.

Keywords

Rheumatic heart disease; Echocardiography; Child; Hand-carried cardiac ultrasound; Screening

Introduction

Nowadays peripherally inserted central catheter (PICC) is widely used in medical treatment, Catheter migration is reported as a delayed complication which may have serious consequences [1,2]. In cases of broken PICC migration, preferable treatments these days are percutaneous transcatheter retrieval, open thoracotomy, being reserved for unsuccessfully percutaneuos retrieval [3]. We report a 12-year-old girl with a 17-cm long broken PICC in the right pulmonary artery, while the proximal end was in main pulmonary artery. The migrated PICC was successfully retrieved by using a snare under fluoroscopy.

Case Report

A 12-year-old girl was hospitalized for regularly chemotherapy treatment of lymphocytic leukemia for which a PICC (Bard access system Inc, Salt Lake City, Utah USA) had been implanted via her left antecubital vein 9 months previously. Regular chest x-ray was performed every 3 months in follow-up. Chest x-ray in the latest admission showed the PICC was broken. The proximal end was shown in the main pulmonary artery, while the distal end in the basal branch of right pulmonary artery. The catheter stump was located in the subclavian vein (Figure 1). CT examination confirmed migration of a broken PICC into pulmonary artery. The distal end of the migrating PICC was in the basal branch of the right pulmonary artery and the proximal end was adjacent to the left wall of the main pulmonary artery (Figure 2). After initial diagnosis, the patient received anticoagulants with warfarin (1mg/day) according to her age and weight.

The patient was transferred to our department for retrieval of PICC. On admission, patient was in stable condition with normal laboratory data.

The retrieval of the broken migrating PICC was performed 2 days after admission. Under local anesthesia, using an ultrasound-guided percutaneous right femoral venous approach, a 6-F catheter sheath (Terumo, Tokyo, Japan) with a 5F pig-tail catheter (Cook, Bloomington, IN, USA) was advanced to the main pulmonary artery. Pulmonary angiography revealed that there was no thrombus in the pulmonary artery, and reconfirmed the position of the broken catheter while the proximal end lay adjacent to the left wall of the main pulmonary artery bifurcation (Figure 3). We decided to grasp the migrating PICC at the proximal end of the catheter. With the 6-F guiding catheter (Cordis, Miami, USA) exchange placed, a snare (Amplatz GooseNeck, EV3 Covidien, Mansfield, MA, USA) was inserted and

grasped the proximal end of the broken PICC under fluoroscopy (Figure 4) and successfully retrieved it through the catheter. The broken PICC segment was 17cm in length (Figure 5). Angiography of the catheter stump in the left upper limb showed a few small thrombus in the antecubital vein.

Figure 1: Chest x-ray showed the PICC was broken. The proximal end was shown in the main pulmonary artery (white arrow head), while the distal end deep in the right pulmonary artery (white arrow). The catheter stump was in the subclavian vein (white curved arrow).

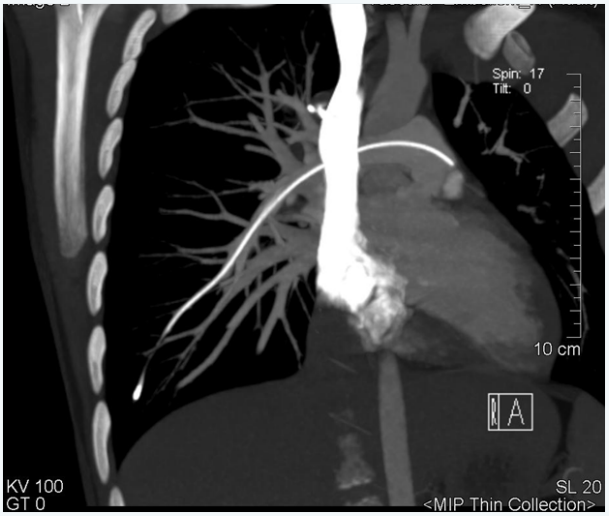

Figure 2: CTA showed the distal end of the migrating PICC in the basal right branch of the pulmonary artery (white arrow) and the proximal end adjacent the left wall of the main pulmonary artery (white arrow head).

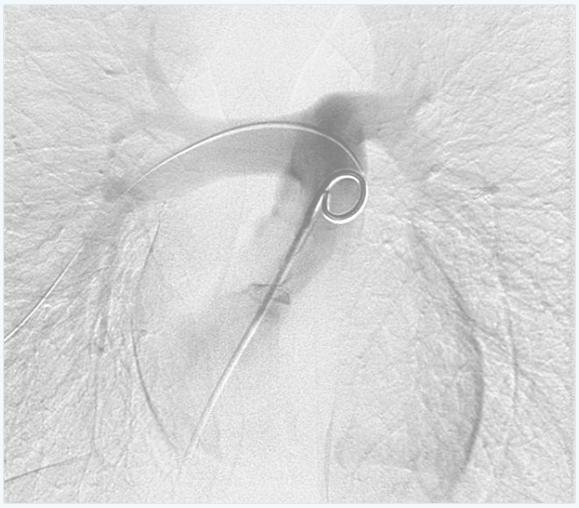

Figure 3: Pulmonary angiography confirmed the position of proximal part of migrating catheter in the main pulmonary trunk (black arrow head).

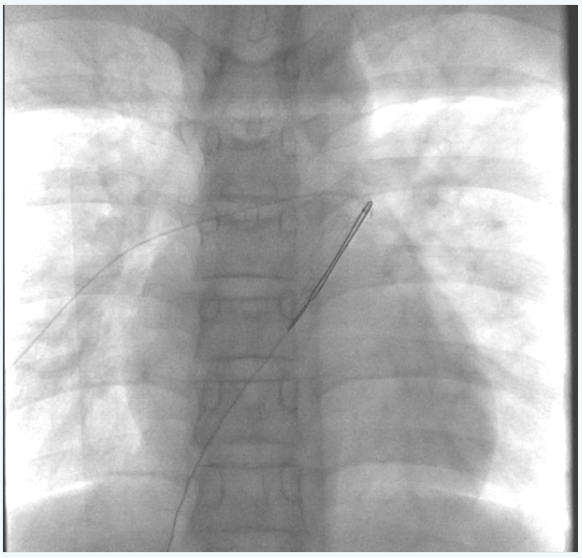

Figure 4: Under fluoroscopy the proximal end of the broken PICC was grasped by snare(black arrow).

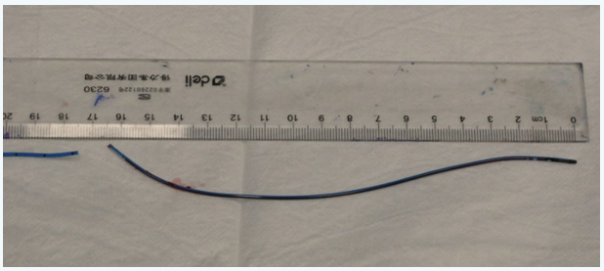

Figure 5: The broken PICC segment was 17 cm in length.

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During the procedure, arrhythmia was present a few seconds, and reverted to normal spontaneously. After the procedure, the patient was treated with anticoagulant therapy: Warfarin (1mg/day) and aspirin (50mg/day). After 2 days, the coagulation function was examined: prothrombin time was 15.10 s and activated partial thromboplastin time was 42.10 s. Computed tomographic angiography (CTA) on the third day after the procedure showed no thrombus or foreign bodies in the pulmonary vascular or subclavian vein, after which the patient was discharged. We contact the local hospital and advice the physicians to continue to treat the patient with Warfarin (1mg/day) for two more weeks for safety.

Discussion

Use of central and peripheral access devices is an integral part of modern oncology care for long-term infusion chemotherapy. In addition, PICC may be used for total parentral nutrition, administration of antibiotics and rehydration therapy. With proper maintenance, they can remain in situ up to one year. Optimal usage of PICC requires periodic (weekly) dressings and flushing. Majority of the complications can be avoided by proper maintenance. Common complications include phlebitis, vein thrombosis with embolization, catheter occlusion. Catheter damage can occur with any PICC, sometimes due to defective products but more often from improper care. Migration of a broken catheter has been reported as a delayed complication of PICC insertion [4,5].

Catheters can migrate at an estimated rate of 0%-3.1% within 1.5 years [6]. Migrated PICC may cause an increased incidence of thrombosis. Cases of fatal cardiac tamponade following migration of a broken catheter and pulmonary artery perforation have been reported [7].

The migrated broken PICC of our patient was located in the right branch of the pulmonary artery; it was a consequence of migration that shifted the catheter from the insertion point into the vein. As previously reported, this situation may have been caused by physiological arm movement combined with the action of the administration of fluid or frequent flushing [8,9]. The final site of lodgment depends on the length, weight, and the material stiffness [3].

Regular chest radiography is the common choice to ensure the safety of the inserted PICC. If it was found broken on chest x-ray, a CT scan should be performed to find out the exact position of the migrated PICC. Migrating PICC management includes percutaneous transcatheter retrieval, open thoracotomy, and long-term anticoagulation therapy. Always percutaneous endovascular technique should be attempted first, thoracotomy being reserved for unsuccessfully cases.

CTA and/or pulmonary angiography are necessary to exclude thrombus formation and to assist the interventional physician to decide on which end of the catheter to grasp. In this case, the proximal end showed on CT was adjacent to the left wall of the main pulmonary artery, the angiography during the procedure showed it was situated in the left wall bifurcation of the pulmonary artery and anatomical position facilitate to grasp the proximal end with a snare.

A relative short anticoagulant therapy was recommended in view of the young age of the patient, presumably normal vessels and immediately lyses of small thrombus at the end of catheter. In conclusion, the technique of percutaneous retrieval of a migrated broken PICC is useful and should be considered by interventional physicians for retrieving migrated catheters.

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