Case Report

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A Case of Foreign Body Retrieval in An Extremely Low Birth Weight Infant

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ABSTRACT

We present a case of a 5-day-old Extremely Low Birth Weight (ELBW) infant requiring retrieval of an embolized Peripherally Inserted Central Catheter (PICC). This 690-gram infant underwent percutaneous retrieval of the embolized foreign body through femoral venous access. This case adds to a very limited body of evidence that demonstrates feasibility of foreign body retrieval in ELBW infants.

Keywords: Infant, Low birth weight, Hemorrhage, Arrhythmia, Thrombosis

Abbreviations: ELBW: Extremely Low Birth Weight; PICC: Peripherally Inserted Central Catheter; IVC: Inferior Vena Cava; NICU: Neonatal Intensive Care Unit; RA: Right Atrium; SVC: Superior Vena Cava; PA: Pulmonary Arteries

1. Introduction

Peripherally Inserted Central Catheter (PICC) lines are widely used in neonatal intensive care units to provide reliable venous access for parenteral nutrition, medications, and blood products. Although generally safe, PICCs can still lead to complications like malposition, thrombosis, infection, and, less commonly, mechanical failure such as catheter fracture and embolization[1,2]. When a catheter fragment embolizes, it may migrate into the central venous system or cardiac chambers, where it can cause arrhythmia, thrombosis, infection, or hemodynamic instability[1-3].

Catheter fragment embolization has been reported in locations including the Right Atrium (RA), Right Ventricle (RV), Pulmonary Arteries (PA), and Inferior Vena Cava (IVC)[2,3]. Management typically depends on the fragment's location and the infant's size, and can range from percutaneous snaring to open surgical removal[3,4]. Extremely Low Birth Weight (ELBW) infants are particularly difficult to manage because of their extremely small vessel caliber, limited vascular access options, and heightened sensitivity to blood loss and procedural stress[3]. This case describes successful transfemoral snare retrieval of a PICC fragment in a 690 g ELBW neonate and highlights procedural considerations relevant to this high-risk population.

2. Case Presentation

2.1. Clinical presentation

A premature infant born at 27 weeks 0 days gestation and weight 690 g (ELBW) required intensive neonatal support for respiratory distress syndrome, apnea of prematurity, slow

feeding, and increased risk for hyperbilirubinemia and sepsis. Because prolonged intravenous therapy was anticipated, secure long-term vascular access was needed.

At 5-days-old, a right upper extremity PICC placement was attempted to provide durable venous access. During the procedure, the catheter fractured, and the distal segment embolized intravascularly, prompting immediate evaluation. Radiography showed the fractured PICC segment extending from the infrahepatic Inferior Vena Cava (IVC) into the Right Atrium (RA). Due to the risks of thrombosis, arrhythmia, and potential interference with the tricuspid valve, the decision was made to retrieve the embolized PICC fragment.

2.2. Procedural details

The procedure was performed in the cardiac catheterization laboratory under general anesthesia. After sterile preparation, the right common femoral vein was accessed under ultrasound guidance, and a 4 French sheath was advanced into the IVC. Due to the infant's extreme prematurity and high risk of intraventricular hemorrhage, systemic heparin was withheld.

A 4 French Glide catheter was advanced into the RA over a soft 0.035" wire. The embolized fragment extended from the intrahepatic IVC to the roof of the Right Atrium (RA). Once in the RA, the 0.035" was exchanged for a 5 mm snare (Figure 1A). Initial attempts to capture the fragment's distal end were unsuccessful. Gentle manipulation repositioned the fragment more inferiorly, with the distal end sitting at the IVC-RA junction (Figure 1B). This allowed for successful snaring of the distal end of the PICC line by simply pulling our snare into the IVC. The 6 cm PICC segment was retrieved through the femoral sheath without resistance. Estimated blood loss was approximately 2 ml, and no arrhythmias, hemodynamic instability, or other intraprocedural complications occurred.

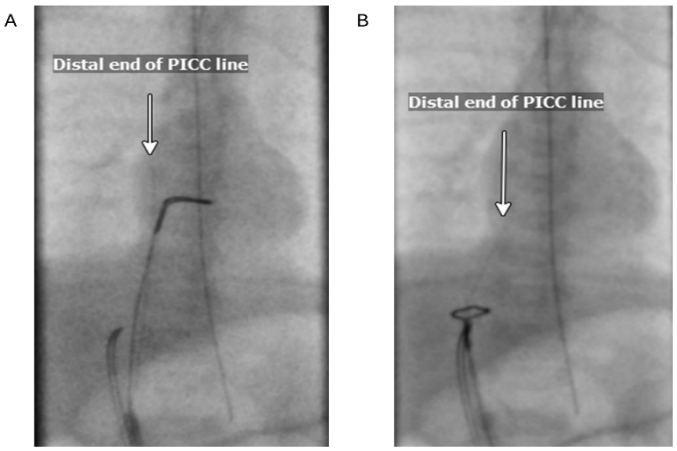

Figure 1: (A) Fluoroscopy showing the 5 mm snare in the RA with the distal tip of the PICC line siting at the roof of the RA. (B) After gentle manipulation, the distal tip of the PICC is seen at the IVC/RA junction where snaring was easier.

2.3. Post-procedure course and outcomes

The patient remained intubated and was transferred to the Neonatal Intensive Care Unit (NICU) in stable condition. The access site remained clean with intact distal pulses. Post-procedure radiography confirmed complete fragment removal. The infant remained clinically stable without arrhythmia or desaturation.

3. Discussion

Mechanical failure may occur during insertion, manipulation, or removal of the catheter and can result in embolization of the fractured segment into the central venous system or cardiac chambers, where complications such as arrhythmia, thrombosis, and infection have been reported, making early recognition essential[1-3].

The use of a snare to retrieve a foreign body is an established procedure, though reports of its use in extremely low birth weight infants, particularly those less than 700 grams, are exceedingly rare[5]. The present case contributes to this limited body of evidence by demonstrating successful transfemoral snare retrieval of an embolized PICC fragment in a 690-gram ELBW neonate.

Several procedural considerations in this case warrant discussion. First, although an umbilical venous catheter was present, the team elected not to use umbilical venous access for retrieval. The embolized PICC fragment extended from the roof of the RA atrial into the infra-hepatic IVC. Approaching from the umbilical vein would have necessitated snaring the PICC line from the distal end. We felt it would be advantageous to have the option to snare from the distal or proximal ends, which made a femoral approach more appealing. Umbilical venous access can be used when the embolized fragment needs to be engaged in the RA, RV, SVC, or PA. Using an umbilical venous approach prohibits engaging an embolized fragment in the IVC.

Second, fragment manipulation played an important role in procedural success. Initial attempts to snare the distal end of the catheter within the RA were unsuccessful, likely due to limited mobility of the fragment and the geometry of the chamber. By repositioning the fragment more proximally at the IVC-RA junction, we were able to simply pull our snare into the IVC over the distal end of the PICC line, which facilitated capture.

4. Conclusion

This case illustrates that percutaneous snare retrieval of an embolized PICC fragment can be safely performed even in extremely low birth weight infants. Successful removal in a 690 g neonate highlights the feasibility of transfemoral access using low-profile equipment when guided by careful anatomical planning and meticulous technique. Continued reporting of similar cases will help inform best practices for managing catheter complications in this vulnerable population.

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