

Pulling out a broken catheter using interventional radiology in a preterm. Neonatal intensive care

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Abstract

There are different indications for the placement of a pleural drainage. It is indicated in a massive pneumothorax or a pleural effusion, and a tunnelled indwelling pleural catheter is put in place. As in any procedure, complications may occur. A broken catheter is a rare one, and when it occurs, it has to be removed by thoracoscopic surgery. This article describes the first case of a removal of a fractured pleural catheter in a preterm newborn with a bilateral pneumothorax using interventional radiology. We propose an alternative way less invasive that could enable a shorter recovery time with fewer complications.

Introduction

There are different indications to perform a pleural drainage. Thoracentesis is a procedure where the pleural space is accessed by a needle or a catheter, either for diagnostic purposes; obtaining liquid to analyze, or therapeutic; liquid or air drainage accumulated internally. In some cases of pleural effusion or massive pneumothorax, it is necessary to have a tunnelled indwelling pleural catheter (TIPC)¹⁻³ put in place.

Some complications related to the procedure can occur, such as the output of the catheter, subcutaneous emphysema, hemorrhage due to laceration of the rib vessels, infection, pulmonary edema, obstruction of the catheter, or the damage of organs, diaphragm or catheter.¹⁻³ A broken catheter is a fairly infrequent complication. It does occur usually during its extraction.⁴⁻⁶ We describe the first case of a removal of a fractured pleural catheter in a preterm newborn using interventional radiology.

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Consent for publication: The patient's guardians gave written consent to use the patient's personal data for the publication of this case report and any accompanying images.

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Case Report

We present the case of a preterm newborn (32 + 4 weeks), birth weight 2300 grams (p50-90). She is admitted to the neonatal intensive care unit with a clinical suspicious diagnosis of grade II-III hyaline membrane disease. She required two doses of endotracheal surfactant in the first 24 hours of life using minimally invasive surfactant therapy, known as MIST.⁷

The second day of life she showed a sudden clinical worsening and she required intubation and connection to invasive mechanical ventilation. She had a bilateral pneumothorax, which required a TIPC to be placed for a pleural drain (pleurocath 6 fr) with a beveled trocar, using the Seldinger technique. As an incident during the procedure occurred, the intrapleural catheter was ruptured and migrated inside the pleural cavity (Figure 1). We postulate it could have happened due to not introduce the trocar while the TIPC was being manipulated for relocation. Due to instability, extraction of the broken catheter was postponed until recovery. During her admission, she presented a left diaphragmatic paralysis due to a lesion of the phrenic nerve secondary to the placement of the thoracic drain and the time that remained inside.

Three weeks later, it was removed using interventional radiology. For this, a percutaneous approach was chosen using regional anesthesia, accessing through the mid-axillary line.

We get into the pleural cavity guided by ultrasound. We introduced a vascular catheter (6F introducer) with a valve, avoiding

pneumothorax during manipulation. It was tried to recover with a proximal loop (Figures 2 and 3), after with a distal loop, both without success, and when it was confirmed that the fibrin adherence prevented the loop from passing to capture the catheter, it was tried to solve it with a rotation of a vascular catheter with a pigtail curve around it (Figure 4).

None of these were effective, so it was taken advantage of the access to the pleura and it was used to put into an Adson tweezers with teeth pulling out the broken catheter (guided by direct scope) without an incident (Figure 5 and 6). The patient evolves favorably, recovering diaphragmatic mobility in the following days.

Discussion

The extraction of a migrated catheter is typically performed by thoracoscopy or thoracotomy.³

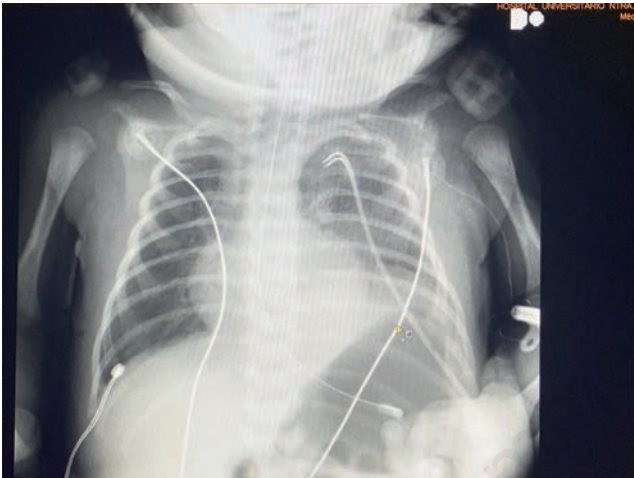


Figure 1. Chest x-ray. Fractured catheter placed in left thorax.

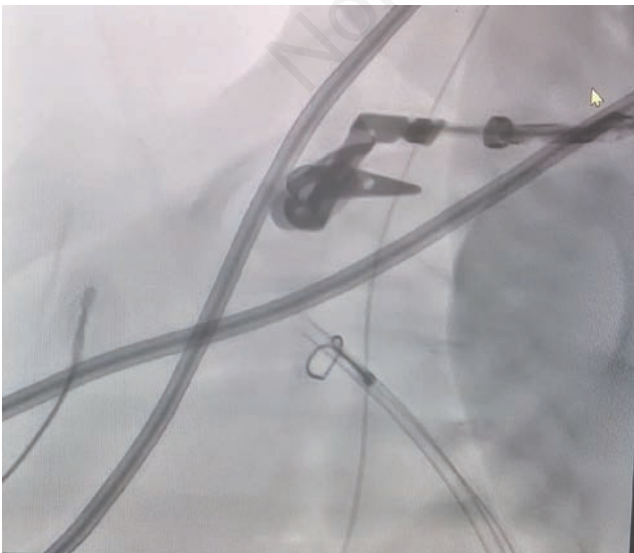


Figure 2. Proximal loop.

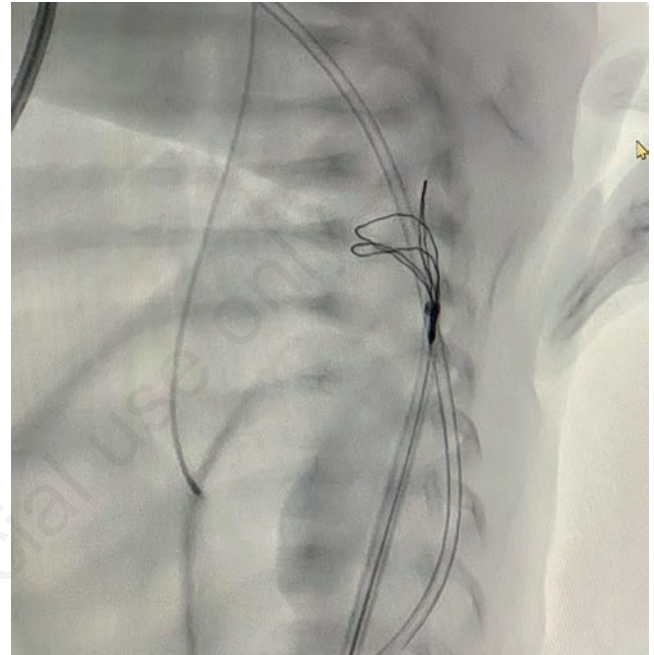


Figure 3. Proximal triple loop.



Figure 4. Tried with a rotation of a vascular catheter with a pigtail curve around it.

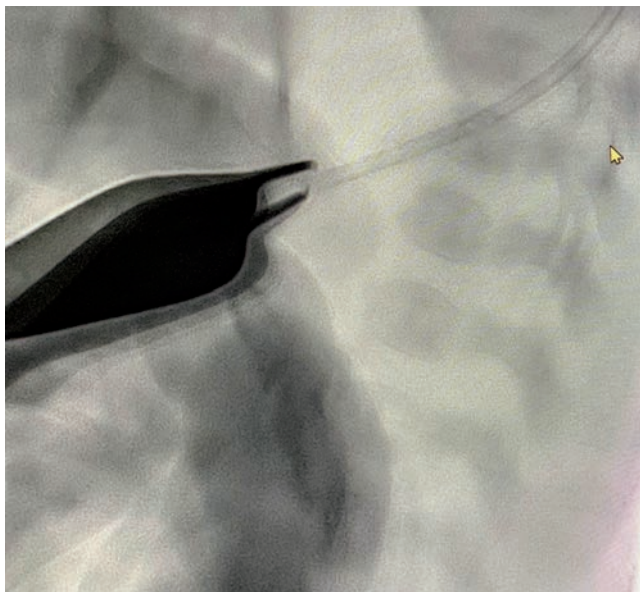


Figure 5. Extraction with tweezers of foreign body.

like empyema, thromboembolism, intrapleural hemorrhages and bronchopleural fistulas.²⁻⁹

TIPC use is safe and efficient but certain complications have been described. Catheter fractures can be avoided by performing a careful removal, using less traction force.⁹

At present, the use of other less invasive techniques for removing the ruptured TIPC is being considered. Experience in interventional radiology techniques in pediatrics is usually limited to those performed in the adult population. Some pediatric diseases benefit from interventional procedures at different levels: gastrointestinal, genitourinary, cardiovascular, locomotor system, central nervous system, and respiratory. In this last one stated, image-guided biopsies, localization of pulmonary metastases with a hookwire, and placement of tracheal and bronchial stents are usually performed.

The extraction with interventional radiology of the foreign body is guided by an ultrasound and fluoroscopy, as is the case we exposed. Success rates up to 88% have been reported with experienced hands.¹⁰

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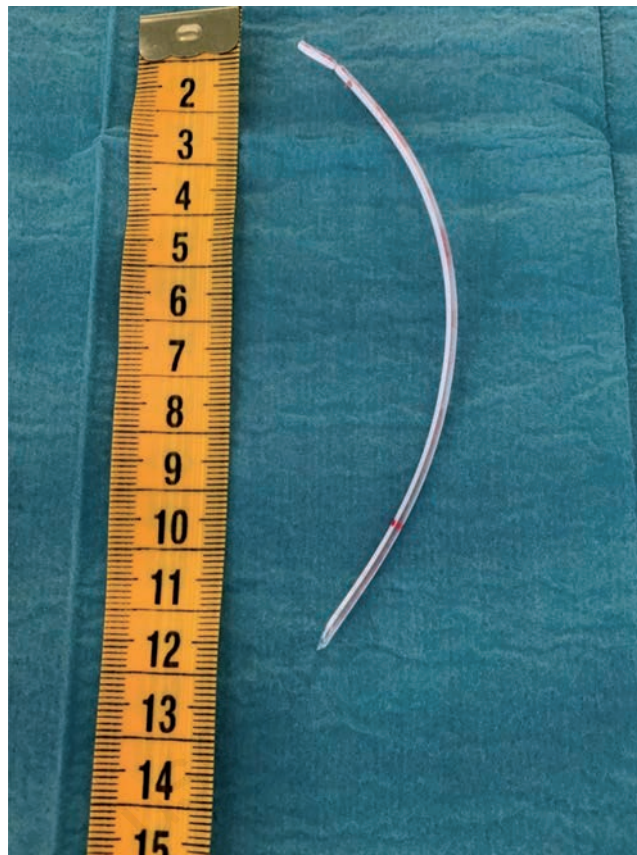


Figure 6. Fractured catheter.