A Rare Complication of Central Catheter in an Infant with Intestinal Failure

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Key Words

Short bowel syndrome · Parenteral nutrition · Catheter · Cardiac complications

Abstract

Objective: To report the successful percutaneous transcatheter removal of a snapped intracardiac fragment of the central vein catheter in an infant. **Clinical Presentation and Intervention:** A 3-month-old infant with short bowel syndrome who required long-term parenteral nutrition via portacath central catheter was hospitalized. Two months after the insertion of the second catheter, the distal tip of the catheter snapped and became tangled in the heart. The catheter fragment was removed by a percutaneous femoral vein approach using a 10-mm diameter snare-loop catheter (Amplatz®). The procedure was performed under fluoroscopy; the fragment was removed after being released into the right ventricle by pulling the proximal tip with a pigtail catheter. No complications were observed and the patient was transported back to the intensive unit in stable condition. **Conclusion:** Central catheter-related complications may cause difficulties in patients with short bowel syndrome prior to intestinal transplantation. The percutaneous retrieval of the fragmented catheter using a snare-loop catheter is a safe and reliable technique and may be used instead of surgery especially in small infants.

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Introduction

Parenteral nutrition results in improved survival for patients with short bowel syndrome. Central catheters provide reliable and effective intravascular access and are essential for parenteral nutrition [1, 2]. Infectious complications are common and have high morbidity in these infants; mechanical complications may also cause life-threatening episodes. We report a rare mechanical complication of central venous catheterization in a 3-month-old infant which was successfully treated.

Case Report

A 3-month-old infant, who had undergone intestinal resection due to Waardenburg syndrome type 4 associated with total aganglionosis, was hospitalized in our Pediatric Gastroenterology, Hepatology and Nutrition Unit for enteral and parenteral nutrition and follow-up. Enteral nutritional support was not enough to provide all calorie requirements; he underwent portacath catheter insertion via the right subclavian vein. Three months later, a catheter was placed via the left subclavian vein because of occlusion of the first, with the tip of the catheter in the subclavian vein.

After an interval of 2 months, when because of the line occlusion the removal of the catheter was attempted, it was noticed that the tip of the catheter snapped and became tangled in the heart. Telecardiography showed that the distal tip of the catheter had snapped and was located in the right side of the heart. Cardiac

Fig. 1. Echocardiography revealed that the snapped fragment of the catheter was in the right ventricle (arrow).

echocardiography revealed that the fragment of the catheter was in the right ventricle with its distal tip in the pulmonary artery (fig. 1). After discussion with the pediatric cardiologist it was decided to remove the fragment via a percutaneous femoral vein approach. A snare-loop catheter (Amplatz®) with a loop diameter of 10 mm was used under fluoroscopic control. The fragment was released into the right ventricle by pulling the proximal tip with a pigtail catheter, and was then removed with the snare-loop catheter. No complications were observed and the patient was transported back to the intensive unit in stable condition.

Discussion

Parenteral nutrition is essential for short bowel syndrome and requires long-standing venous access. Although percutaneous intravascular central lines provide reliable and effective intravascular access for parenteral nutrition in small infants, they sometimes cause serious problems. Mechanical events such as occlusion, leakage and dislodgement are commonly seen [3]. Intravascular and intracardiac embolization of the catheter fragments is a severe and rare complication and accounts for <1% of all reported complications [4–7]. Risk factors for mechanical complications include multiple attempts to clear obstructions, a previous history of catheter insertion at the same site, the site of insertion, long duration of the central line, body weight <5 kg and age.

High pressure infusion and catheter damage by the introducer needle have been postulated to be possible causes of breakage of a percutaneous catheter. Khilnani et al. [8] reported that malposition of the catheter in the cardiac ventricle results in weakening of the catheter secondary to the movement of tricuspid valves and ventricular contraction. Bagna et al. [9] speculated that repeated strain on the same point of the catheter due to extension and flexion of the arm led to weakening of the catheter. It may be preceded by a phenomenon seen on radiological examination and called ‘pinch-off sign’, consisting of a compression of the catheter as it passes between the first rib and the clavicle. Early removal of the device is recommended if the ‘pinch-off sign’ is present [10]. Our patient did not have a ‘pinch-off sign’ in previous chest X-ray images.

Due to the direction of venous flow and negative inspiratory pressure in the thoracic cavity, the catheter fragment is gradually pulled into the right atrium and may attach to the atrium or ventricle wall. Owing to the high mortality of the wide range of complications that may result, it is important to remove the catheter fragment immediately unless contraindicated [11].

Of the two options, percutaneous and open surgery, available for the retrieval of catheter fragments from the ventricle, the former was preferred for our patient. He had comorbidities which increased the risk of a surgical approach which would have required cardiopulmonary bypass. These included chronic malnutrition, prolonged hospitalization and the need for prolonged discontinuation of enteral nutrition after surgery. Although our patient had risks associated with the percutaneous technique such as the small size of cardiac structures and vessels, dysrhythmias and perforation of cardiac structures, we had no complication during or after the intervention.

We conclude that complications related to inserted catheters may cause difficulties during the follow-up period in patients with short bowel syndrome. The percutaneous retrieval of a fragmented catheter using a snare-loop catheter is a safe and reliable technique and may be used instead of surgery especially in small infants.

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