Case Report

The successful withdrawal of a migrated central venous catheter

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Abstract

Background: Central venous catheters (CVCs) have been used widely in clinics. These catheters are also recommended for children and infants receiving chemotherapy and total parenteral nutrition (TPN) and etc. In this paper, we present migrated fractured control line of the heart of a girl.

Case Presentation: A 2.5 year old girl with migrated of the fractured central line into the heart. In the catheterization laboratory, first we placed a long sheath (8 F) into the inferior vena cava via femoral vein and then trapped the foreign body by pigtail catheter and wire 0.035 inch and pulled it down to make its proximal free. After that, we snared the catheter by snare-catheter and pulled it into the femoral vein, and then the cardiac surgeon bridged it out by cut-down successfully.

Conclusion: A rare complication in the use of central catheters is fraction and cardiac embolization. We offer gentle bringing out of the catheter lines under fluoroscopy guide in all of the cases, if this is technically possible and safe.

Keywords: Central Venous Catheter, Foreign body, Cardiac embolization, Snare

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Central venous catheters (CVCs) have been used widely in clinics. These catheters are recommended for children and infants receiving chemotherapy and total parenteral nutrition (TPN) and permit the safe infusion of hypertonic solutions and vasoactive agents that can produce severe peripheral soft tissue damage if they extravasate from peripheral line into local tissue. Rapid infusions of large volumes of fluids or blood products are also possible (1). CVCs may be inserted from different sites; including the femoral, subclavian, external jugular, internal jugular, antecubital and, rarely, saphenous veins. The line should terminate at the atriocaval junction to minimize cardiac tamponade. Immediate complications of CVCs include dysrhytmias, pneumothorax, hydrothorax, hemothorax, air embolism, shearing of the vessel, bleeding, apnea, oversedation, and airway obstruction. Central line migration has been described in less than 1% of the patients having central lines. Other complications including fracture and migration or infection may have a higher incidence (2-6). In this article, we present migrated fractured control line of the heart of a girl.

Case presentation

A 2.5 year old girl with acute lymphoblastic leukemia (ALL) had a CVC inserted in subclavian vein previously for chemotherapy, in Boali Hospital, Sari, Iran. The CVC broke during takedown after finishing the course of chemotherapy and then migrated into the heart. In the first chest radiography (P.A view) and fluoroscopy, it was kinked in PA with the proximal and distal tips in the hepatic veins and right ventricular outflow tract (RVOT) (figure 1, 2).

There is complicity of the case because, both tips of the catheter were out of reach and we could not snare them. In the catheterization laboratory, first via femoral vein approach, we placed a long sheath (8 F) into the inferior vena cava and trapped of the foreign body by pigtail catheter and wire 0.035 inch and pulled it down to make its proximal site free. After that, we snared the catheter by snare-catheter and pulled it into the femoral vein, and then the cardiac surgeon brought it out by cutting -down successfully (figure 3, 4).

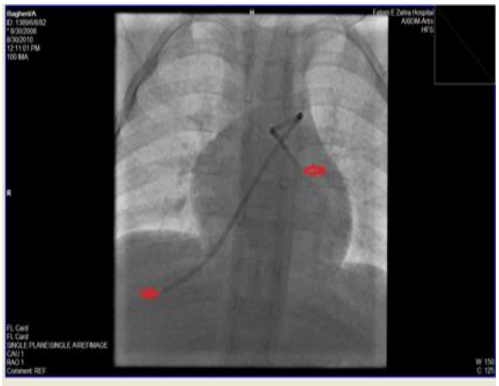

Figure 1: The localization of proximal and distal tip of catheter in the fluoroscopy

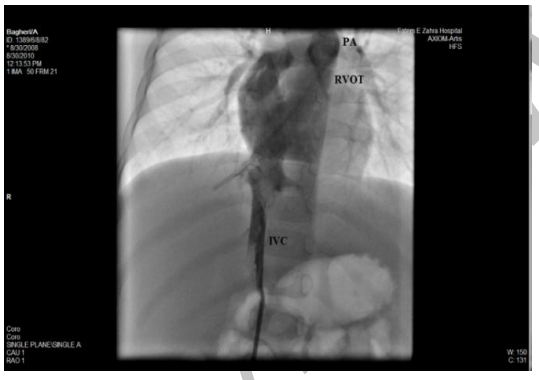

Figure 2: The localization of proximal and distal tip of catheter after the injection of angiography dye contrast.

Figure 3: The snaring of the catheter.

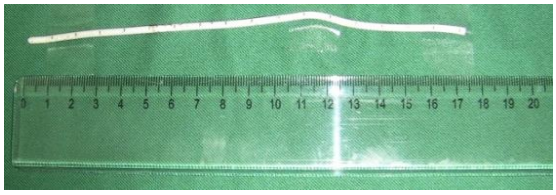

Figure 4: The removed catheter

Discussion

In appropriate manipulation due to a lack of experience in basic techniques of inserting and removing a catheter or cutting a catheter by mistake during removal may result in retention of residual fragments inside the body (7-11) A first case of a polyethylene catheter as a foreign body found in the right atrium at autopsy was reported in 1954 (12). Since then, there have been many reports of unretrieved intravascular devices. The first case of a broken guide wire was reported in 1962, and then reports of similar incidents increased with the introduction of advanced catheter intervention procedures (11, 13-16).

In 1964, the first successful percutaneous removal of a broken guide wire from the right atrium using bronchoscopes forceps was reported, and some similar reports followed (13, 15-17). Nowadays, a variety of catheter devices, including the loop snare catheter, basket catheter, and grasping/biopsy forceps, are developed. By using these devices, foreign bodies could be retrieved safely and promptly.

Loop snare catheters such as the goose-neck snare and Curry's loop snare are widely used (18-20). Loop snare catheters have the advantage of being flexible, allowing them to follow the intravascular configuration to the ventricular, pulmonary artery, or peripheral arteries, while their disadvantage is weak gripping. Basket catheters have a powerful grasp and are capable of withdrawing relatively large foreign bodies. The diameter of the basket can be adjusted according to the vessel diameter. This catheter is preferred in situations where a foreign body is attached to the vessel wall without a free edge (21). Grasping forceps can reach into small vessels, and their griping power is advantageous in removing a foreign body strongly adhering to the vessel wall; however, controlling the catheter head is difficult (22). Nowadays, transcatheter retrieval is used in more than 90% of cases of removal of foreign bodies (21, 23-25).

The specific type of retrieval catheter used is determined by the size of the patients, the type of foreign body, and

exactly how and where the foreign body is situated within the vascular system. Then, directly through the sheath or through a catheter delivered trough the sheath, the particular retrieval device is advanced to the foreign body and manipulated to grasp it. Once firmly grasped, the foreign body material is withdrawn into the large sheath and out of the body through the sheath. With the use of the large, long sheaths with these retrieval devices, it is usually no longer necessary to perform a venous cut down even for the final removal of the foreign body from the vessel or skin entry site (26).

Advanced devices have improved the success rate of foreign body retrieval, however when percutaneous intravascular removal is not successful for example when the foreign bodies are large and risk of severe complication during retrieval (e.g., arrhythmias, perforation of vessel wall and ventricles, artery spasm, thromboembolism, or vessel damage) is high, extracorporeal circulation is used for retrieval (27). Large fragments should be repositioned to the femoral vein and removed by surgical cut-down (28).

Unfortunately, because of the small size of the child, our used sheath was not large enough for the migrated catheter and it could not be retrieved through the sheath. Thus, we pulled it into the femoral vein and then removed it by performing a cut-down.

In conclusion a rare complication in the use of central catheters is fraction and cardiac embolization. These can be retrieved safely using a percutanous snare-catheter. We offer gentle bringing out of the catheter lines under the guide of fluoroscopy in all of the cases, if this is technically possible and safe.

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