CASE REPORT

Malposition of Haemodialysis Central Venous Catheter: Case Report

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ABSTRACT

Background: Central venous catheterization is a common procedure done to access a large vein for obtaining blood in haemodialysis, monitoring of central venous pressure and administration of fluids and drugs. Complications such as malposition of the CVC may occur following catheterization. **Case Summary:** We report a case of a 12-year-old male child managed for end stage kidney disease who had malposition of CVC into the left internal jugular vein after left subclavian vein insertion. **Conclusion:** Complications following CVC insertion are common. Real-time ultrasound guidance and post procedure chest radiograph are useful means for prevention and early detection of complications.

Key words: Malposition, central venous catheter, haemodialysis

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Introduction

Central venous catheterization (CVC)is the process of inserting a catheter into a large vein in the internal jugular vein, subclavian or femoral vein[1]peripherally inserted central catheter PICC. It is one of the basic procedures performed on patients for corrosive drugs and large volume fluid administration, total parenteral nutrition in intensive care units. Central venous catheters are also used in End stage renal disease patients for haemodialysis access[2]. The procedure of CVC insertion is commonly associated with complication such as malposition, arrhythmia, infection, artery perforation, pneumothorax and haemotharax[2]. Malposition of the CVC is a frequently encountered complication occurring in 3 to 15% of patients[3]. Although malposition can occur when either side are cannulated, it is more frequently seen when the procedure involves the left internal jugular or subclavian veins probably due to anatomic differences[4].

We report the case of a 12-year-old child with malposition of the left subclavian vein haemodialysis catheter migrating into the internal jugular vein.

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Case Summary

A 12-year-old child with End stage renal disease on maintenance haemodialysis, who had previous multiple subclavian cannulations. After routine monitoring, the neck and infra-clavicular region were cleaned with antiseptic solution, the site was infiltrated with local anaesthetic agent and via indirect (Seldinger) technique, left subclavian vein catheterization was done through the left subclavian vein. The procedural needle was inserted immediately inferior to the clavicle midpoint (1cm inferior to the junction of the medial and middle third of the clavicle) through the skin at approximately 45-degree angle, the plunger of the syringe was then pulled to suction/create negative pressure. Immediately blood entered the syringe further advancement of the needle was stopped and the needle stabilised with the non-dominant hand while the syringe was removed to noticed blood coming out of hub of the needle that was neither pulsating nor bright red as that would be concerning for placement into an artery. Thumb of the

hand was placed over the hub of the needle to prevent blood loss and air entering the needle to cause air embolism. The guide wire was inserted and advanced, the needle/trocar was then removed leaving the guide wire in place. Distal aspect of the catheter was placed over the tip of the guide wire and advanced until the guide wire came out of the catheter. The catheter was advance into the vessel and fixed at 8 cm through the guide wire. As the catheter was noticed to be in the vein, the guide wire was pulled out gently. Placement of the catheter was checked using syringe to verify blood return and the flushed with normal saline. About fifteen minutes into the commencement of dialysis the catheter was noticed to be malfunctioning and swelling was noticed around the neck. The session was suspended and a control postero-anterior chest radiograph of the patient was obtained. This radiograph revealed that the tip of the catheter was fixed in the left internal jugular vein (Figure 1). The catheter was removed and pressure applied at site. Patients' vital signs checked and were normal.

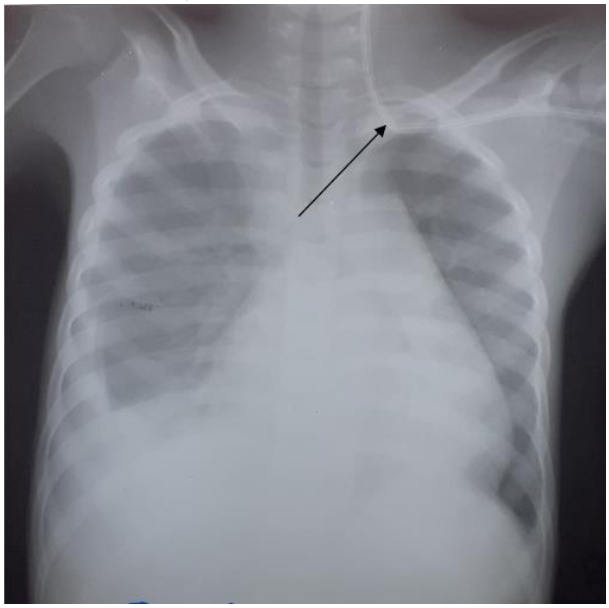

Figure 1: Chest Radiograph showing double lumen central venous catheter inserted by left subclavian vein with the tip reaching the ipsilateral Internal jugular vein (Arrow).

Discussion

Central venous catheter insertion is a common procedure used in drugs administration, monitoring central venous pressure (CVP) and as an access for haemodialysis. Central venous catheters also known as central lines can be centrally or peripherally inserted; however, the commonly preferred technique is the centrally inserted internal jugular or subclavian veins[5]. The incidence rate for catheter-related or procedure-related complications has been found to be 1-42%[6]. These complications include arterial puncture, pneumothorax, injury to veins and nerves, infection, thrombosis, malposition, folding of the catheter, haemothorax, cardiac tamponade, air embolism, arrhythmia, and death[7].

Indications for CVCs in paediatric patients can either be for surgical or medical reasons. Although it's use in children are similar to the adult patients, attaining central venous access in children is more difficult because of the smaller vessel dimensions and sharper more angulated routes to the subclavian and internal jugular veins. Janik et al reported a rate of 7.3% for this complication in children under the age of five[7]. The most common reason for early dysfunction of the catheter is the improper location of the catheter tip, which can be determined through radiography. Malposition of CVC is more common in subclavian approach. Some studies have reported a slightly higher risk of malposition in the approach through the right subclavian vein compared to the left subclavian vein, although others found no such difference[8]. More commonly, malposition happens in the ipsilateral internal jugular vein. An Incidence of up to 60% is noted in some case series[5]. However, the catheter tip is rarely inserted into brachiocephalic, azygous, superior intercostal veins, or the internal and subclavian veins of the opposite side.

Prevention of malposition of CVC can be achieved by using real-time ultrasound to guide insertion of catheters and can detect the catheter with the guide wire in situ within the superior vena cava. This helps to detect complications such as malposition before removal of guidewire. Availability of such equipment is restricted especially in poor resource setting such as ours.

Conclusion

CVCs remain the sole access in majority of patients and an important means to obtain venous access (VA) as a bridge to the placement and maturation of an arteriovenous fistula (AVF) or arterio-venous graft (AVG)[1].CVC insertion is still a blind process, use of ultrasound-guided insertion has advantage in terms of improved accuracy of insertion site. Assessing the location of the tip of the catheter is still a challenge during insertion[9]. Transoesophageal echocardiography can detect the location of the tip of

the catheter in relation to the Superior Vena Cava (SVC) and Right Atrium (RA), but its availability as a bedside tool is very limited. Chest radiograph should be performed after the procedure to confirm appropriate placement of the catheter tip and early of complications.

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