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Case Report

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Iatrogenic complications: a line's share

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ABSTRACT

Encountering foreign bodies in clinical practice is not uncommon. More so are intra-vascular foreign bodies. Foreign bodies encountered vary in different scenarios depending on the person; children, elderly or mentally retarded or the cause; iatrogenic as in our case. In clinical practice vascular foreign bodies are the most commonly encountered iatrogenic foreign bodies. Fracture of intravenous catheter is one of those iatrogenic vascular foreign bodies. Here we describe a case report on a vascular foreign body due to fracture of intravenous cannula in the cephalic vein and which has migrated proximally.

Keywords: Foreign body, Iatrogenic, Intravenous cannula, Venotomy

INTRODUCTION

Vascular foreign bodies are not uncommon. Majority of them are iatrogenic. Fracture of intravenous catheter is one of those iatrogenic vascular foreign bodies. Intravenous (IV) cannulation is one of the easiest methods for venous access.[1] But this benign procedure is not devoid of complications and in daily practice can be associated with serious complications, such as catheter rupture and embolism.[2]

Here we describe a case report on a vascular foreign body due to fracture of intravenous cannula in the cephalic vein and which has migrated proximally.

CASE REPORT

A 37 year old female, G2P1L1 was admitted at term pregnancy for safe confinement. Labor was induced and later on she was taken for emergency caesarean section for fetal distress under spinal anesthesia. Her intra-operative and immediate post-operative period was uneventful and was managed with IV fluids, antibiotics and analgesics in post-operative ward. Twelve hours post caesarean oral fluids were started and she was transferred to the postnatal ward. As a usual procedure after tolerating orals, the intravenous catheter which had been inserted pre-operatively to maintain intravenous access was removed by the nursing staff. After an attempt at withdrawing the IV cannula from the skin it was immediately recognized that the intravenous cannula portion was missing. Immediately a venous tourniquet was placed proximal to the insertion point. Physical examination revealed a probable cord-like object palpable under the skin proximal to the insertion point (Cephalic vein over the left wrist). The limb was mildly edematous and palpation cannot be considered satisfactory. Location of cannula was properly visualized by radiographic and imaging modalities. X-ray of the left forearm AP and lateral view was taken to visualize cannula if possible (Figure 1), but it was not helpful for visualizing the cannula. Then ultrasound was done and cannula was located (Figure 2).

Figure 1: X-ray of left forearm antero-posterior and lateral view.

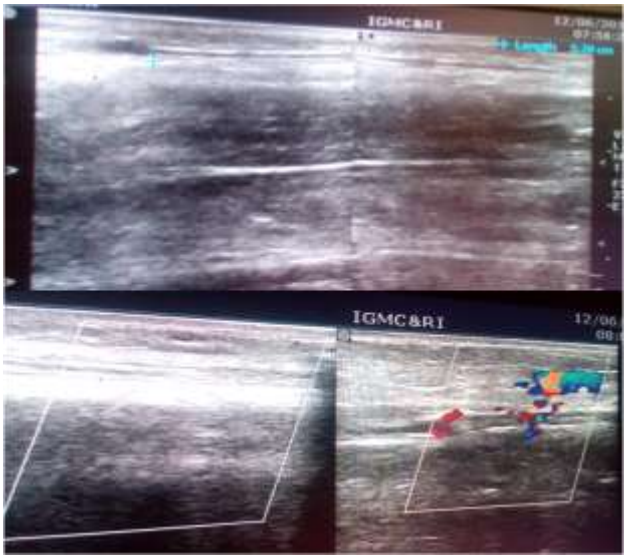

Figure 2: High frequency ultrasound demonstrating the intravascular 'foreign body'.

The bottom image in Figure 2 actually shows the turbulent flow proximal to the cannala location in the vein. The distal end of the cannula had migrated four inches from the insertion point. Surface marked the "foreign body in the vein" (Figure 3) and patient was taken up for removal of foreign body surgically under local anesthesia in OT. The forearm was cleaned and draped. Under local anesthesia, a vertical incision was made over skin overlying the proximal portion of the foreign body. Vein was dissected and controlled. Transverse venotomy made and using a curved hemostat the foreign body was grasped from lumen of the vein (Figure 4) and extracted in toto (5.1cm-long catheter was recovered).

Thrombus from distal and proximal ends of the vein was removed by milking and then vein ligated with 3-0 silk. Skin incision closed with 3-0 ethilon. Figure 5 shows the entire broken peripheral intravenous cannula. On day 7 the sutures were removed and patient discharged. She had no intravenous complications post-operatively.

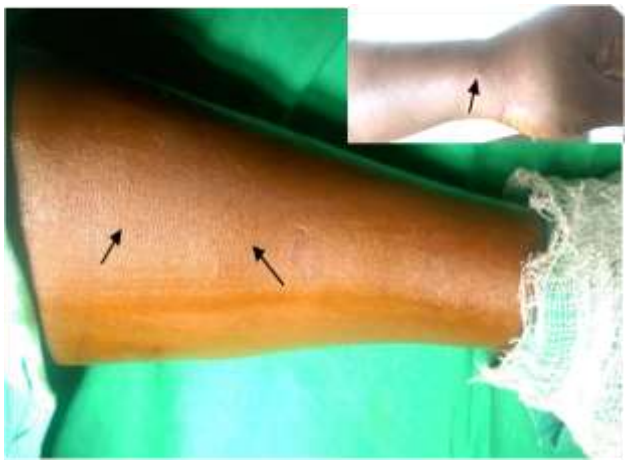

Figure 3: Migrated new position of the cannula (inset pic: original cannula insertion site).

Figure 4: Extraction of the foreign body after venotomy; right inset pic: vein control, left inset pic: extracted iv cannula (5.1cm)

Figure 5: Peripheral intravenous cannula showing the broken tip.

DISCUSSION

Encountering foreign bodies in clinical practice is not uncommon for both clinicians and surgeons. Foreign bodies encountered vary in different scenarios depending on the person; children, elderly or mentally retarded or the cause; iatrogenic as in our case.[3] In clinical practice vascular foreign bodies are the most commonly encountered iatrogenic foreign bodies. Intraluminal materials including partially fractured venous catheters, guide wires, a stent and even vena cava filter have been removed from various locations.[1]

Insertion of peripheral intravenous (IV) line is a key component for almost every patient who arrives in labor. It's one of the easiest methods for venous access for sampling of blood as well as administration of fluids, medications, nutrition and blood products.[1] Though a simple procedure they are not devoid of risk both during placement and while *in-situ*. It can be associated with complications such as infiltration, thrombophlebitis, venous spasm, hematoma, air embolism, catheter-associated blood stream infection, and also injury to tendon and nerve.[2] Furthermore, there can also be serious complications, such as catheter rupture and embolism. Hypodermic needles can also constitute foreign bodies in blood vessels especially in drug addicts.[4]

Spontaneous fracture and migration of intravenous cannula is a known complication. The reasons would be repeated failed attempts of insertion, inadequate expertise, loss of structural integrity due to repeated attempts with the same cannula or inferior quality of intravenous cannula or prolonged peripheral intravenous cannulation which is contrary to protocols for intravenous access.[5] Significant complications with an embolic catheter fragment include sepsis, endocarditis, cardiac perforation, air embolism, pneumothorax, myocardial infarction and atrial or ventricular arrhythmias.[6] Dreaded complications are more common with central venous catheters rather than peripheral venous catheters. So, whatever may be the cause it necessitates immediate removal.

Glassberg conducted an after action investigation following catheter fracture and reported that the probable cause was partial transection from either trying to reinsert the needle into the already advanced catheter or advancing both catheter and needle with the needle partially withdrawn. According to him, this may have been further complicated by the anatomic curve in the vein. Similarly in our case, the catheter might have been weakened during entry probably due to repeated attempts as evidenced by extravasations and limb edema and the act of removal would have likely completed the transection, leaving behind the intravascular fragment.

Only physical examination was not helpful in locating the foreign body and required imaging modalities for confirmation. In our case X- ray was not very helpful as the intravenous cannula portion is not radio opaque. One study has still detected the foreign body at the level of axillary vein by x-ray and confirmed by CT scan. So x-rays might help but not always. In our case ultrasound of the forearm confirmed the position of the cannula. A CT scan might seldom be required for locating the vascular foreign especially in cases where it has migrated more proximally.[8]

Emphasis should be placed on avoiding reinsertion of a needle into a catheter that was advanced even partially off the needle to prevent breakage and to look for the completeness of the catheter while removing. If incomplete should immediately apply a proximal venous tourniquet at first suspicion of catheter fracture to minimize the likelihood of fragment embolism. Even when the cannula portion had broken off rapid recognition by the nursing staff and application of a venous tourniquet have prevented dreadful complications of proximal migration and embolism. Learning points are as below.

Learning points

- Check whenever you remove a cannula from anywhere for the completeness of the removal of the same
- Document difficulties or repeated attempts of the insertion or removal
- Trust patient's "Foreign body" sensation
- Batch reporting?
- May not be palpable clinically
- Proximal migration is real danger
- X-rays will not help
- High frequency ultrasound probe will pick up rarely accurate
- CT scan can definitely confirm and locate position and guide approach for extraction

CONCLUSION

Fragmented intravenous cannulas are dangerous intravascular foreign bodies that can cause wide range of serious complications if not identified and treated at the earliest. These types of events are significantly underreported and hence it's essential to educate health care providers potential risks of catheter fracture and the proper emergency interventions required. Imaging modalities are of tremendous help in these scenarios. The case has not been reported for the technical aspects of extraction of an intravascular foreign body but to give importance to the complications that can arise even out of the simplest of an invasive procedure.

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