

Case Report



Diagnosis of a missed central line guidewire using critical care ultrasound

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Abstract

Central venous catheterization, though an imperative tool in the management of critically ill patient, is associated with a variety of complications and some of which can be life-threatening. Here, we report an index case in the field of critical care of detecting a missed guidewire primarily using a bedside critical care ultrasound.

Keywords: Central line, critical care, missed guidewire, ultrasound

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Introduction

Central line insertion is one of the most common daily procedures in critical care and emergency medicine practice. However, despite being a routine procedure, its complication rate may be as high as 12%.^[1]

These complications may be mechanical such as carotid injury and pneumothorax or guidewire-related such as kinking, breakage, or loss of guidewire.^[2]

Herein, we report the first case of missed guidewire, which was diagnosed by a critical care physician using a bedside ultrasound.

Case Report

A 45-year-old male presented to our emergency department with a 5 days history of swelling in the right lower limb. Examination of the lower limb demonstrated tenderness and investigations revealed leukocytosis. A diagnosis of necrotizing fasciitis was made. Meanwhile,

the condition of the patient deteriorated, and he progressed to septic shock. A right internal jugular venous central line was placed and after initial volume resuscitation and treatment with antibiotics, an extensive debridement was performed. The patient was intubated, placed on mechanical ventilation and inotropic support, and immediately transferred to the Medical Intensive Care Unit (ICU).

A bedside ultrasonography was arranged to assess the fluid and volume status of the patient. Surprisingly, an intraluminal hyperechoic shadow was seen, which raised the suspicion of a missed guidewire [Figure 1 and Video 1].

An X-ray was ordered which confirmed the position of guidewire, extending from the right internal jugular vein up to inferior vena cava [Figure 2].

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Ultrasound examination of the central venous line revealed the guidewire in its external part.

A left femoral central catheter was inserted immediately, and inotropic infusion pump was shifted to the femoral line. Meanwhile, the right internal jugular line was clamped and successfully removed along with the guidewire. A repeat bedside ultrasound [Figure 3] documenting the removal of the guidewire.

Discussion

Percutaneous central venous puncture is a procedure requiring expertise, supervision, and meticulous attention during insertion. The loss of a guidewire is one of the rarely reversible complications of the central line insertion which carries risk, as well as medicolegal consequences to the patients and physicians.

Guidewire-related complications vary and the good thing about them that they are preventable provided taken the measures to prevent such complications.^[3]

Omar *et al.* proposed some useful tips both physician and technique related during the central line insertion to avoid this complication.^[4]

Complications due to missed guidewire can easily be prevented and avoided by paying attention to the step of advancing guidewire, having a checklist before the procedure and not allowing more than one guidewire per sterile field. In addition, holding on to the proximal tip of the wire at all times is fundamental in preventing this mistake.

Kute *et al.* presented a report concerning the loss of dialysis catheter guidewire and proposed certain tips to avoid this complication. They stressed on proper inspection of the catheter sets before their insertion and reiterated the importance of holding the proximal end of the guidewire at all times until removal from the vessel.^[5]

Many case reports were published regarding discovering the missed guidewire either immediately or within 2–6 months.^[6,7]

Unfortunately, there is a report of longer duration missed guidewire, which was discovered^[6] months after insertion. Uncomplicated removal was achieved in that case after 6 months, which is, to our knowledge, the longest reported interval for guidewire extraction.^[7]



Figure 1: Ultrasound picture of inferior vena cava intraluminal hyperechoic shadow raised the suspicion of a missed guidewire



Figure 2: Chest X-ray, which confirmed the position of guidewire, extending from the right internal jugular vein up to inferior vena cava

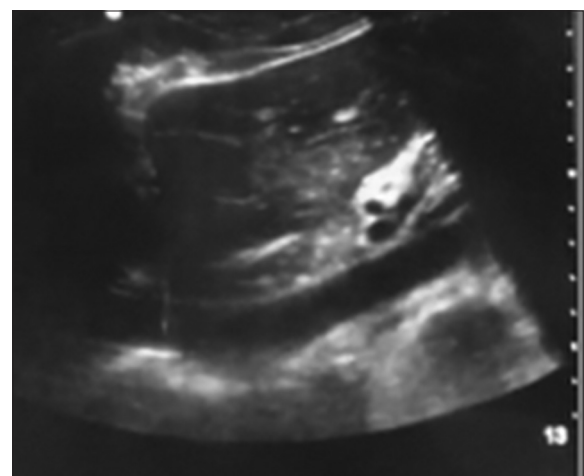


Figure 3: Ultrasound picture showing the inferior vena cava after the removal of the guidewire

A postprocedural chest radiograph is less frequently performed following cannulation of a femoral vein in

adult patients in the ICU and that might explain the missed guidewire staying unnoticed till a chest X-ray is ordered for a different reason.^[8]

Ultrasonography has become an invaluable tool in the management of critically ill and injured patients, which makes it imperative for critical care physicians to stay up-to-date with this advanced modality.^[9]

Critical care ultrasound increasingly used for localization of the central vein catheter and detection of postprocedural pneumothorax an alternative to chest radiography.^[10] Nowadays, interventional radiology is the preferred modality for missed guidewire removal in which snare or basket can be used to retrieve the wire under fluoroscopy guidance.

We report our case as an index case of a missed guidewire, which was diagnosed as early as during the procedure using a bedside ultrasound. This will for sure add to the uses of ultrasound during this procedure, hence minimizing its complication rate.

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Conflicts of interest

There are no conflicts of interest.

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