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Case Report

Covid-19 and a lost guidewire: A misty tale of misery!

Parul Tripathi¹, Suman Tiwari¹, Malvika Gupta¹, Abhijit Kumar^{1,*}, Amit Kohli², Deepak Kumar²¹Dept. of Anaesthesiology and Intensive Care, VMMC and Safdarjung Hospital, New Delhi, India²Dept. of Anaesthesiology and Intensive Care, Maulana Azad Medical College, New Delhi, India

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ABSTRACT

Background: Central venous catheterization (CVC) is a routine procedure in patients admitted in Intensive Care Units (ICU) worldwide. Most commonly, seldinger technique is being practiced irrespective of the site of insertion. Though considered very safe, guide wire related complications have been reported in the literature and incidence has increased in the COVID era where intensivists have to work in personal protective equipment (PPE).

Case Report: We are reporting about a patient of severe COVID-19, admitted in ICU. His right femoral venous catheterization was done to start vasopressors. The guide wire accidentally slipped inside the femoral vein during the procedure. It was immediately detected and managed with the assistance of interventional radiologist under fluoroscopic guidance.

Conclusion: Complications like misplacement of guide wire can be catastrophic during CVC. We have discussed the measures that can prevent or reduce such complications while working in PPE in COVID ICUs.

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1. Introduction

Central venous catheterization (CVC) is an indispensable procedure which is frequently required both in intensive care units as well as operating rooms. Important indications include need for invasive haemodynamic monitoring, fluid resuscitation, inotropic support, parenteral nutrition, dialysis, chemotherapy and multiple drug administration. Different sites of catheterisation had been practiced by clinicians, out of which Internal jugular vein (IJV) and Subclavian vein are being preferred over Femoral vein but in COVID ICUs femoral catheterisation is frequently being attempted as it is easy to cannulate by intensivist in personal protective equipment (PPE) and fraught with lesser cardiopulmonary complications. Regardless

of the site, various complications have been reported during & after central venous catheterisation procedure such as arterial puncture, failure to place the catheter, misplacement of guidewire, pneumothorax, hemothorax, infection and many more.¹ Incidence reported was as high as 12%.^{2,3} Other than vascular and cardiopulmonary complications, guidewire related issues have been reported during CVC such as guide wire being completely inserted within vessels, breakage, knitting or kinking due to forceful guide wire insertion.^{3,4} A seemingly routine procedure becomes challenging in COVID ICUs as anaesthesiologists have hectic work schedules under PPE thus contributing to higher incidence of human error. Here, we are describing a case of loss of guide wire completely within the femoral vein during insertion of a Femoral venous catheter in COVID ICU in PPE kit which was recognized immediately and successfully retrieved under fluoroscopic guidance.

* Corresponding author.

E-mail address: abhijit.kumar999@gmail.com (A. Kumar).

2. Case History

A 60-year-old male presented to emergency department in gasping state. His rapid antigen test for COVID-19 was positive and presented with history of high-grade fever as well as shortness of breath for one day. His oxygen saturation at time of presentation was 52% on room air. He was immediately shifted to COVID ICU where he underwent endotracheal intubation in view of worsening respiratory distress and falling oxygen saturation. His chest X-ray showed bilateral peripheral radiodensities and consolidation suggestive of COVID-19. In COVID ICU, due to hemodynamic instability and unavailability of peripheral venous access, femoral venous catheterisation was planned. In the absence of ultrasound in ICU, other sites were not attempted as patient was already hypotensive and in a compromised state. Right femoral vein was catheterised using Seldinger technique by an anaesthesiologist with five years of experience. The anaesthesiologist was already working in COVID ICU in PPE for last 5 hours. The procedure was uneventful with no difficulty in cannulation and back flow from all three ports were present. At the end of the procedure, it was found that the guide wire was missing in the tray. During the procedure, the guide wire was not gripped properly due to poor tactile control (wearing two gloves) and visual insufficiency (fogging of goggles).

Intervention radiology is the recommended method for retrieval of lost guidewire.⁵ After initial stabilisation of ventilation and haemodynamic parameters, the patient was shifted to interventional radiology suite following appropriate protocols. In presence of interventional radiologist, the patient underwent exploration of right femoral vein under fluoroscopy. Proximal end of the guidewire was seen at the level of common iliac vein (Figure 1) and the distal end (J end) was seen in neck, at the level of right IJV (Figure 2). Right femoral vein was accessed by a 7 French sheath and an angled wire loop retriever (CloverSnare[®] vascular retriever by Cook medical). Venography was performed via sheath which revealed normal common iliac vein & inferior vena cava and guide wire in situ. Then, 0.035-inch snare was introduced through the guiding catheter and the guide wire was hooked by snare (Figure 3). Finally, the whole assembly was extracted via sheath. Post guide wire removal, repeat venography revealed normal common iliac vein and inferior vena cava. The sheath was then removed from femoral vein and entire procedure was uneventful. The patient was later shifted back to COVID ICU for further management after performing a chest x-ray (Figure 4).

3. Discussion

CVC was brought into attention in 1929 by Dr Werner Forssmann who self-inserted a ureteric catheter into

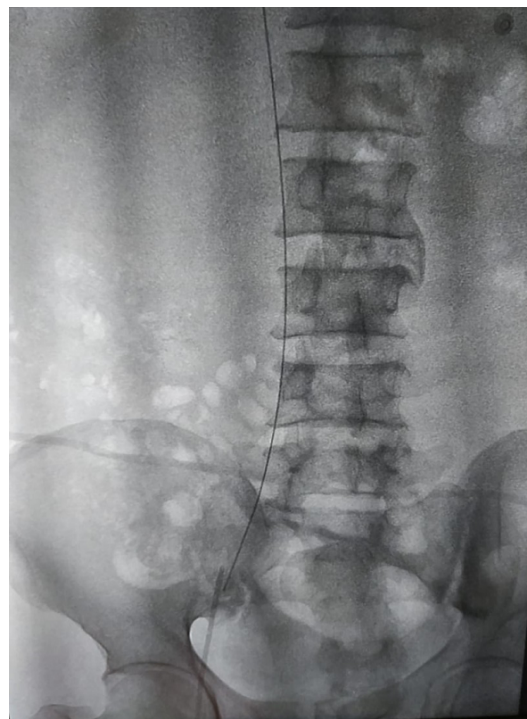


Fig. 1: Lower end of guidewire

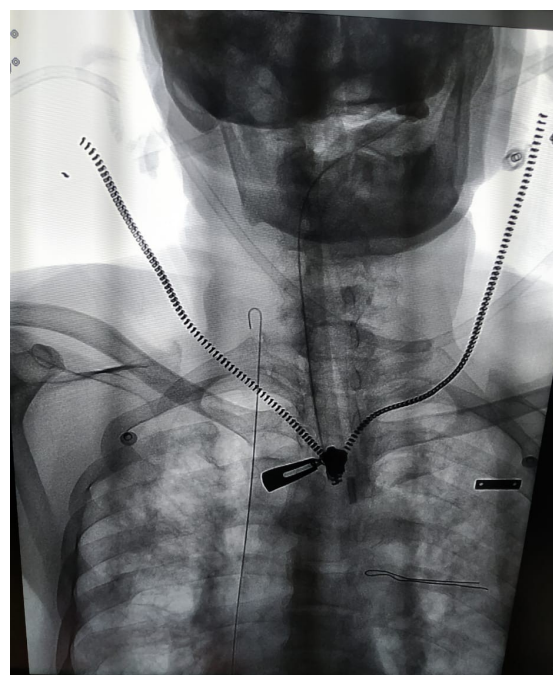


Fig. 2: Upper end of the guidewire



Fig. 3: Retrieval of guidewire

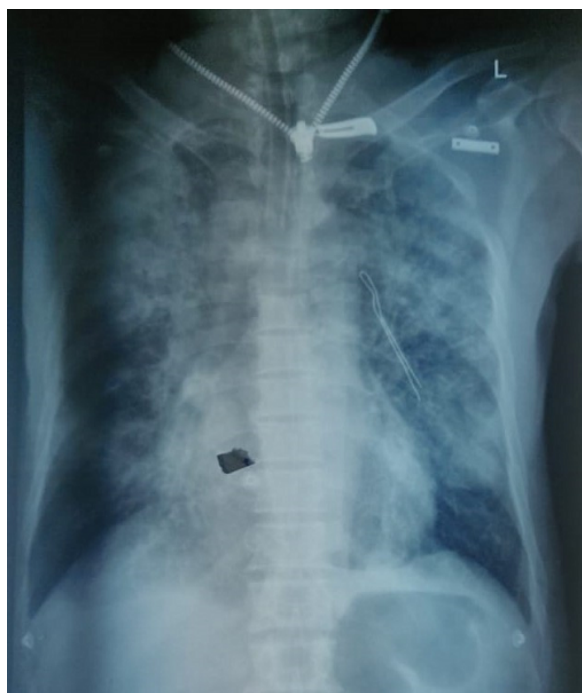


Fig. 4: Post procedure X ray

right heart through his cubital vein and then various modifications have come into the world of CVC. Though CVC has various beneficial effects but is fraught with variety of complications such as infection, arterial puncture, haematoma formation, pneumothorax moreover the failure rates are still at a decent number.¹ However with the advent of guiding modalities like ultrasound, incidence of complications has drastically reduced but it's availability in ICUs is a major limitation. Incidence of "misplacement of guide wire" during catheterisation is very low in non-COVID areas but chances of this complication is higher in COVID ICUs due to use of multiple gloves which limit dexterity and frequent fogging of goggles, limiting visibility. In addition, limited manpower had led to burn-out and long working hours leads to burnout for resident doctors working in COVID ICUs. Longer working hours induce heat stress and easy fatiguability inside COVID ICUs. In addition, viewing foils of face-shields reflect and refract the light leading to poor focus and eye fatigue.⁶

There are many factors responsible for misplacement of the guidewire during CVC, like lack of guiding modality, improper working condition, over exhausted healthcare worker working in PPE, inadequate supervision and inexperience.⁷

The mishap can easily be identified by looking at signs of lost guidewire; e.g. missing guide wire in the tray, no or decreased backflow from catheter ports and visible guide wire in x-ray or ultrasonography.⁸ Guidewire once placed completely inside a central vein, should be retrieved immediately to avoid serious complications like cardiac arrhythmias, conduction abnormalities, vessel injury, perforation of heart, breakage of guide wire tip, embolization and kinking or knotting of guide wire inside vessel.^{8,9} If missed, prolonged retention can lead to thrombosis, septic thrombophlebitis, endocarditis, pulmonary embolism, arrhythmias and vascular damage. Percutaneous approach using vascular loop retriever under fluoroscopic guidance is the technique of choice in such cases.²

In this case, the complication could be attributed to prolonged working hours in PPE which limits the competency of healthcare provider. However, use of PPE is must for protection of healthcare workers but it comes with the cost of fogging of goggles, tiredness, excessive sweating, dehydration, skin irritation, dizziness and even breathlessness.¹⁰ Magnitude of such problems also depends on quality of PPE and ambient ICU temperature.

Authors suggest that any invasive intervention like CVC should be done by most experienced anaesthesiologist and that too preferably in the beginning hour of the work shift. Checking CVC tray before and after the procedure should be mandatory so as to detect guidewire issues at the earliest. By following the common steps and applying common-sense, we can avoid the catastrophes.

4. Conclusion

Guide wire related complications during CVC in COVID ICU may occur frequently due to problems faced by anaesthesiologists in PPE. These problems can be averted if

1. Shorter work shifts with constant supervision of senior doctors is there.
2. Invasive procedures should be performed immediately after donning of PPE.
3. Checking CVC tray before and after insertion to look for guide wire should be mandatory.
4. Use of ultrasound is must for CVC in COVID areas.

5. Conflict of Interest

None.

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Author biography

Parul Tripathi, Senior Resident

Suman Tiwari, Senior Resident

Malvika Gupta, Senior Resident

Abhijit Kumar, Senior Resident  <https://orcid.org/0000-0001-5724-8603>

Amit Kohli, Associate Professor

Deepak Kumar, Senior Resident

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