Folding back of central venous catheter in the internal jugular vein: Methods to diagnose it at the time of insertion?

Sir,

The central venous pressure (CVP) monitoring is a useful tool for assessment of the status of intravascular volume. Malpositioning of the tip of the central venous catheter often leads to erroneous measurement, leading to an incorrect volume replacement and other serious complications, like cardiac tamponade or dysrhythmias, caused by the interaction with the wall of the vessel or the endocardium.[1-3]

We report a case of folding of central venous catheter (CVC) in the right internal jugular vein, which resulted in a false measurement of CVP. A 50-year-old 46 kg male with a diagnosis of perforation peritonitis was scheduled for emergency laparotomy. Under all aseptic precautions, a 7 Fr triple lumen (VenX™, B L Lifesciences Pvt. Ltd., India) CVC was inserted in the right internal jugular vein (IJV) and fixed at 10 cm mark and free flow of blood was obtained from the proximal, medial and distal ports and the distal port was connected to the transducer. The CVP tracing was normal, but the measurements remained low that is CVP = 4 cm H_2O. Resuscitation with 1 l of normal saline was done. The measurement still did not increase, but the heart rate and blood pressure were stable. The patient remained haemodynamically stable intraoperatively. He was shifted to the intensive care unit (ICU) on ventilator for further management.

On chest roentgenogram, CVC was found to be folded up inside the right IJV [Figure 1]. Under all aseptic precautions, it was removed and another catheter was inserted in the same vein [Figure 2]. The patient was in sepsis and developed multiple-organ dysfunction. We were planning to do a Magnetic Resonance Angiography to delineate the anatomy of internal jugular vein, but the patient's unstable condition did not allow the same. He did not respond to the standard treatment and did not survive.

The monitoring of CVP is useful for monitoring, fluid resuscitation, and ionotropic drugs administration. Numerous complications associated with CVC insertion are arterial puncture, pneumothorax, hematoma formation, laceration of the thyrocervical trunk, and carotid-jugular fistula. The correct position of the tip of CVC should be in the superior vena cava, above the level of pericardial reflection to obtain true CVP measurements.[1] An angle greater than 40° can cause perforation of wall of the blood vessel.[4]

Different landmarks, Peres formula (height (cm)/10),[2] right atrial electrocardiogram (ECG),[3] and Transesophageal Echocardiography have been used to

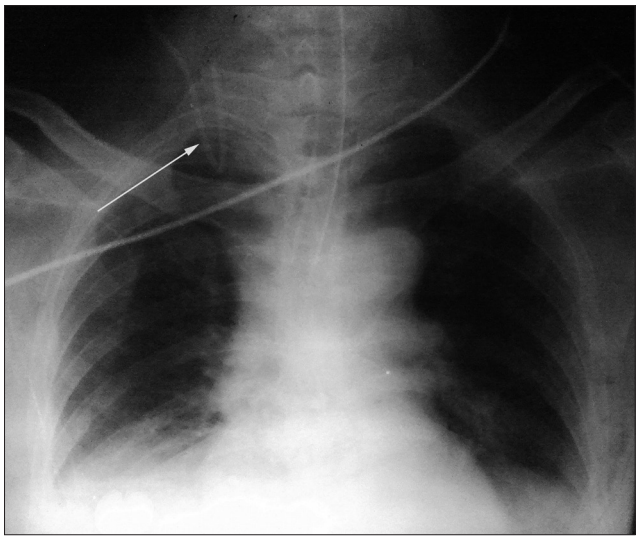

Figure 1: The folded central venous catheter in the right internal jugular vein

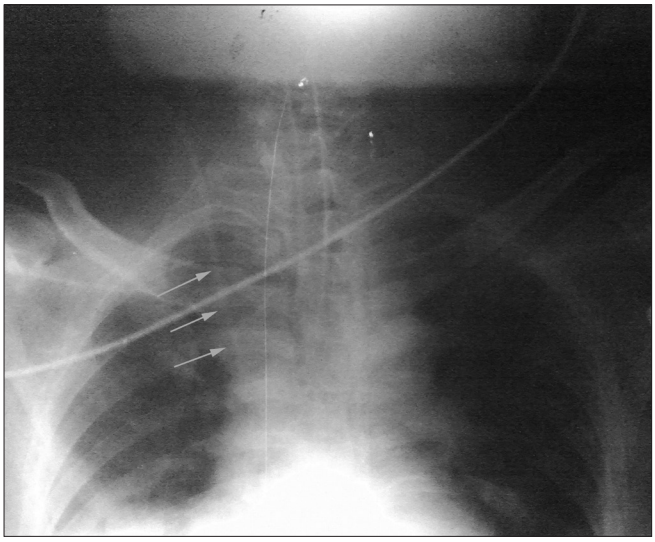

Figure 2: Repositioned central venous catheter in the right internal jugular vein

ensure the correct placement of CVC. In intra-atrial ECG technique, the intra-atrial positioning of the tip of the CVC is detected by configuration of P wave on the ECG, which initially increases in amplitude on advancement and becomes bifid when inside the right atrium and then withdrawn back to get a normal configuration P wave, which indicates the optimal position of the tip of the CVC.[3] Malpositioning of the CVC tip can occur during removal of the guide wire, shifting of the patient or even spontaneous migration of the catheter to the left or right mammary vein during mechanical ventilation,[5] due to pressure changes in the thorax. A similar case of folding back of the catheter in the superior vena cava has been reported.[6]

To conclude, we should ensure the correct placement of the CVC tip during insertion. Since, it is difficult to get chest X-rays or fluoroscopy immediately after insertion, we should ideally use intra-atrial ECG technique to confirm correct tip placement.

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