Correspondence

Early diagnosis of a nearly missed complication made by anatomical landmark guided internal jugular vein canulation

Sir,

Internal jugular vein (IJV) canulation for central venous pressure monitoring or venous access is a routine procedure in the operation theatre. Among the all-anatomical site, right IJV is the most preferred and technically favorable site because of its straight course. However complications are not unusual even with expert hands. Various vascular injuries are possible with blind technique. We are reporting an unusual complication of anatomical landmark guided catheter placement. We did not find similar complication in literature review.

A 45-year-old male patient (weight 60 kg height 168 cm) with peripheral vascular disease was scheduled for aorto-femoral bypass surgery. For monitoring of volume status and administering vaso-pressors if needed ultrasound guided central venous canulation was planned.

After induction of general anaesthesia and securing the airway patient was positioned for central venous canulation in right IJV. A shoulder roll was put & head was slightly turned to left side. Then head end was made slight Trendelenburg to increase the venous cross sectional area for easy canulation. As the ultrasound machine (Sono Site M-Turbo™, Sono Site Inc., Bothell, WA, USA) was getting used in another operation theatre we changed our plan to do the canulation by conventional anatomical landmark technique. Successful blood aspiration was got at a depth of 2.5 cm. Now triple lumen catheter (B Braun) was inserted by

Fig. 1. Arrow showing triple lumen catheter (B Braun). IJV-internal jugular vein, CA-carotid artery, BCV-brachiocephalic vein, a. High frequency probe placed over right side of neck longitudinally showing central venous catheter piercing both walls of internal jugular vein. b. Probe moved along the course of right internal jugular vein scanning it transversely. c. Postoperative chest X-ray.
Ultrasound scanning was done using high frequency linear probe (6–13 Hz). Probe was placed in right side of neck transversely distal to the catheter entry point. We could see the intraluminal location of catheter. Then ultrasound probe was placed longitudinally along the course of right IJV. Here the catheter was seen to pass through both walls of right IJV (Fig. 1a). Once again IJV was scanned transversely downwards till the sternal head of clavicle. Ultrasound probe was then little tilted to scan under the clavicle. Catheter was found entering the lumen of right subclavian vein just at the junction with IJV to form the brachiocephalic vein (Fig. 1b). Transducer was attached and blood gas analysis was done to rule out any artery puncture, as we were facing such complication for the first time. Transducer showed venous tracing and blood gas analysis also confirmed venous location. We did not remove the catheter intraoperatively; keeping in mind that use of unfractionated heparin in aorto-femoral bypass surgery may lead to haemotoma formation at the venous puncture site. Once surgery got over we did a chest X-ray to check the position of central venous line, which showed a normal appearing location with tip at right second intercostal space (Fig. 1c). Catheter was removed on first postoperative day after confirming the normal prothrombin time, partial thromboplastin time and international normalized ratio.

Complications of canulation ranges from internal carotid artery puncture, pneumothorax, vessel erosion, thrombosis, airway obstruction, malposition of the catheter, and infection. Absence of pulsatile flow or dark color of aspirated blood sometimes makes it difficult to diagnose the misinsertion. Malposition of central venous catheter has been reported frequently ranging from 1 to 33%. It may be because of anatomical variations, inaccurate technique or interoperator variability. Ultrasound has definitely increased the safety of canulation as well as diagnosis of misplaced catheter and complications. The practice guidelines for central venous access by American Society of Anaesthesiologists task force recommends the use of static ultrasound for prepuncture identification of anatomy and vessel localization. Real time ultrasound assisted canulation, increases safety and reduces complications. In this case it could have easily missed if we had not used ultrasound for confirmation. Anterior-posterior view chest X-ray after catheter placement can diagnose the malposition. However there are limitations to assess the true position because of 2D projections. Transjugular catheter placement may impair the venous drainage by obstructing the flow leading to haemodynamic instability. However in this case no such variations occurred. It is advisable to reposition, replace or remove the malpositioned catheter as soon as practical. However risk benefit ratio should be considered for keeping the catheter, in case of difficult venous access or chance of further complication. We did not remove the catheter to avoid any possible hematoma at the deeper venous puncture site. Retrospectively we analyzed to find any technical flaws that caused this complication. We came to a conclusion that the pressure exerted by left hand during canulation for pushing the carotid artery medially might have compressed the IJV, which resulted in decrease of effective depth between skin and subclavian vein. The laterally directed needle has punctured both walls of IJV and entered the subclavian vein. So we suggest ultrasound confirmation of IJV catheter should be done routinely.

References


Debesh Bhoi*, Manish Dey, Sanjit Naskar, Praveen Talawar
Department of Anaesthesiology, Pain Medicine & Critical Care, All India Institute of Medical Sciences, New Delhi, India

* Corresponding author.
E-mail address: debeshbhoi@gmail.com (D. Bhoi).

17 March 2017