Correction of a Malpositioned Central Venous Catheter using Point-of-care Transthoracic Echocardiography

Sir,

A 75-year-old gentleman underwent combined aortic valve replacement and coronary artery bypass grafting surgery for severe aortic stenosis with triple-vessel coronary artery disease. Before anesthetic induction, a triple-lumen central venous catheter (CVC) and an 8.5-Fr single-lumen venous sheath were inserted uneventfully in the right internal jugular vein (IJV) under ultrasound (US) guidance following the confirmation of the presence of both the guidewires within the IJV lumen. On postoperative chest X-ray (CXR), however, the terminal 6-cm portion of the CVC was found to be looping back from the junction of the brachiocephalic veins toward the ipsilateral IJV [Figure 1a]. Although there was no problem with the infusion of fluid and inotropes through the lumens and there was only a minimal resistance in backflow, as the patient needed accurate central venous pressure and central venous oxygen saturation monitoring (which requires tip of the CVC to be in the distal portion of superior vena cava [SVC]) for assessment and management of hemodynamics and cardiac output (as the patient had poor left ventricular ejection fraction), decision to reposition the CVC was undertaken.

After strict aseptic preparation of the insertion site and sterile draping, the CVC was unfixed from the skin fixation site and was carefully withdrawn by 6 cm. A sterile guidewire was passed through its distal lumen carefully while holding the catheter stable. A point-of-care transthoracic echocardiography (TTE) was performed simultaneously through the subcostal region. The guidewire was advanced till its passage through the SVC into the right atrium (RA) could be observed in the subcostal bicaval view [Figure 1b]. Thereafter, the CVC was advanced over the guidewire and refixed at the same 15-cm mark, where it was fixed previously. A CXR done afterward confirmed proper position of the CVC tip within SVC [Figure 1c]. Although passing a guidewire through the distal port of an *in situ* CVC is controversial, the same was undertaken as the risk of significant bacterial colonization of the CVC was minimal within such a few hours' time. We also tried to avoid inserting a fresh CVC, as the procedure can itself cause complications.

Malposition of CVC is a widely reported phenomenon.[1] Although the use of real-time US guidance during CVC insertion is standard of care nowadays,[2] it cannot ensure malposition of the distal portion of the CVC, as was in our case. Different imaging techniques have also been described to correct the malposition of CVC, such as injecting saline through the distal lumen under fluoroscopic guidance,[3] use of Fogarty catheter, and snaring under fluoroscopy.[4] We, however, utilized a simple point-of-care TTE-guided technique, which enabled us to successfully reposition the CVC at bedside within a short time, without need of transferring the patient to catheterization laboratory. Although the use of subcostal bicaval view for detecting the passage of guidewire to RA during CVC insertion has been described,[5] it is not a standard practice in our institution and hence was not performed during initial placement of the CVC. However, the technique could be used successfully, without any difficulty, to reposition the malpositioned catheter.

We, therefore, found that apart from the already described role of the TTE-guided technique in ensuring correct positioning of CVC during insertion,[5] it can be used as a simple, bedside tool for repositioning a malpositioned CVC as well.

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Conflicts of interest

There are no conflicts of interest.

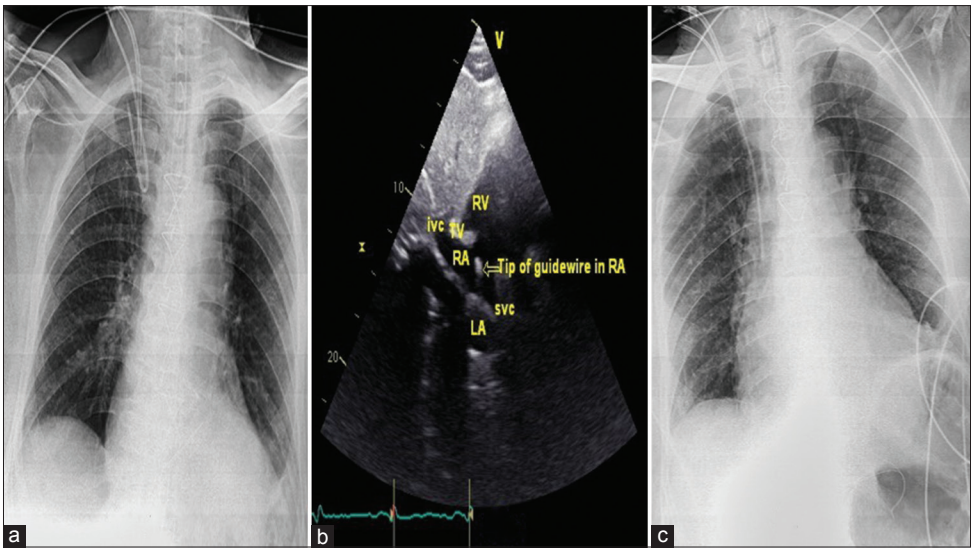

Figure 1: (a) Chest X-ray showing looping back of the right internal jugular vein central venous catheter. The right internal jugular vein venous sheath is seen lying properly within the right internal jugular vein; (b) transthoracic echocardiographic subcostal bicaval view showing the tip of the guidewire within right atrium; and (c) chest X-ray showing the tip of the right internal jugular vein central venous catheter lying properly within superior vena cava. RA: Right atrium, LA: Left atrium, TV: Tricuspid valve, RV: Right ventricle, SVC: Superior vena cava, IVC: Inferior vena cava

Indranil Biswas, Imran Hussain Bhat, Sunder Lal Negi

Department of Anaesthesia and Intensive Care, Cardiac Anaesthesia Unit, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Address for correspondence: *Dr. Indranil Biswas, Room No. 4016, Advanced Cardiac Centre, Postgraduate Institute of Medical Education and Research, Chandigarh - 160 012, India. E-mail: hreesheekombartta@gmail.com*

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