Spontaneous migration of central venous catheter tip following extubation

Balaji Prabaharan, Sara Thomas
Department of Anesthesia and Critical Care, Belhoul Speciality Hospital, Al Baraha, Deira, Dubai, UAE

Address for correspondence:
Dr. Balaji Prabaharan,
Department of Anesthesia and Critical Care, Belhoul Speciality Hospital, Al Baraha, Deira, P.O. Box: 5527, Dubai, UAE.
E-mail: balaji@doctor.com

ABSTRACT
Migration of the tip of central venous catheters is not an uncommon event and the mechanism for this is not clear. Increased intrathoracic pressure due to coughing, sneezing or weight lifting, changing the body position or physical movements such as abduction or adduction of the arms is thought to be the cause of such migration. We present here a case of a patient with a port catheter tip that migrated from the left subclavian to the superior vena cava following extubation.

Key words: Central venous catheterization, extubation, migration

INTRODUCTION
Central venous catheterization (CVC) is performed to measure central venous pressure (CVP), which is a simple, relatively inexpensive method of assessing a patient’s circulating blood volume, cardiac status and vasomotor tone. It is essential to be aware of the inherent fallacies and inadequacies of the information derived. Inaccurate measurements or inability to obtain an ideal waveform tracing are suggestive of a migration of the catheter tip. Spontaneous migration of CVC tip is reported, but literature on spontaneous migration of CVC tip following extubation is not found. We report a rare spontaneous migration of CVC tip following extubation.

CASE REPORT
We report a case of spontaneous migration of CVC from left subclavian vein (SCV) to the superior vena cava (SVC) following extubation. A 38-year-old 56 kg female with diagnosis of cystadenoma pancreas was scheduled for hemi pancreatectomy. Under all aseptic precautions a 7 Fr triple lumen (arrow international), CVC was inserted in the right SCV and fixed at 12 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. Resuscitation with 1 L of normal saline was done. The measurement still did not increase, but the heart rate and blood pressure were stable. Intraoperative the patient remained hemodynamically stable. She was shifted to the intensive care unit (ICU) on the ventilator for elective ventilation and further management.

On chest X-ray, CVC was found crossing the midline (necklace pattern) and seen inside the left SCV [Figure 1]. Since patient was hemodynamically stable and was planned for extubation the next day, removal or redirection of CVC was not done. Chest X-ray performed post-extubation showed CVC in the SVC [Figure 2]. This corresponded to a normal CVP trace also. Then, a good CVP trace was seen in the monitor.

Since post-operative period was uneventful, CVC was removed on 4th post-operative day (POD), patient was discharged from ICU to the ward on the 5th POD and from the hospital 1 week later without any complications.

DISCUSSION
CVC are routinely placed in patients undergoing major surgeries where expected volume and hemodynamic disturbances are likely consequences and/or for multiple infusion administration during surgery or later for parenteral nutrition post-operatively. Anesthesiologists
usually place the lines in the operating room pre-operatively and the chest X-ray is done post-operatively to confirm the correct position several hours later. Because incorrect placement can lead to serious complications, which may be categorized as early or late.[1] Early complications include procedural complications directly related to catheter placement, such as hematoma, arterial puncture or injury, venous rupture, pneumothorax, hydrothorax, hemothorax, chylothorax, hydromediastinum, six air embolism, primary malpositioning and catheter transection. Late complications include catheter-related infection, catheter occlusions or thrombosis, catheter fracture and migration. Migrations are rarer than primary malpositionings.[2] Both malpositionings and migrations are often detected by a chest radiograph control. On a chest X-ray, the tip of the CVC should be located to the right side of the midline, ideally just above the level of the right atrium, overlying the anatomical position of SVC. Radiological examinations play an important role in confirming the correct placement of a CVC, confirming the wrong position of a catheter, the repositioning of a misplaced catheter and in retrieving a migrated intraluminal catheter.

Migration of the tip of an intact CVC is not uncommon. Reported sites of migration include the opposite brachiocephalic vein, the jugular vein and the azygous veins. The incidence of spontaneous migration of a port catheter is reported to be about 0.9-1.8%, yet the mechanism of migration is not clear. Malposition of a CVC may occur at the time of insertion or later as a result of spontaneous migration due to anatomic positioning or pressure changes within the thoracic cavity induced by coughing, sneezing, straining or weight lifting.[3] A high infusion flow rate can also make the tip migrate. A case of tip migration after the catheter flushing has been reported.[3] Some authors have reported spontaneous migration of the catheter from the SCV into the ipsilateral jugular vein.[4] Wu et al.[5] reported two cases of implantable port catheter tip migration in patients with severe cough.

Different landmarks, Peres formula (height [cm]/10), right atrial electrocardiogram (ECG)[6] and transesophageal echocardiography also have been used to ensure the correct placement of CVC. In intra-atrial ECG technique, the intra-atrial positioning of the tip of the CVC is detected by the configuration of P wave on 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 optimal position of the tip of the CVC.[7]

So the take home message is that when the central venous waveform could not be obtained despite the change of the transducer, the cable, flushing the unit and repeated zeroing, a strong suspicion of misplacement of CVC to be kept in mind. The ability to aspirate blood freely from the catheter lumen does not necessarily confirm a proper placement. Awareness of this possibility and careful review of the CVC tip position on X-ray pictures in suspicious cases are important. If it is not possible to get chest X-rays with fluoroscopy done immediately or after insertion, then use of intra-atrial ECG technique to ensure correct placement of CVC tip should be done.

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