A case of guidewire embolism during central venous catheterization: Better safe than sorry!

Sir,

Central venous catheterization (CVC) is a routine procedure in intensive care unit as well as in surgical patients requiring monitoring of hemodynamic variables, for medications and parenteral nutrition, hemodialysis etc. The incidence of complications ranges from 5% to 29%[1] such as arterial puncture, hemothorax, pneumothorax, nerve injury, air embolism or dysrhythmias. Guidewire embolism during CVC is a rare iatrogenic complication.[2] The Seldinger technique is commonly used to cannulate the vessels.[3] We report a case of lost guidewire following
internal jugular catheter placement and its successful management.

A 64-year-old male, weighing 67 kg, 176 cm height had c/o hematuria since last 15 days. Patient was suffering from chronic obstructive pulmonary disease, diabetes and hypertension. Ultrasound showed bladder mass lesion, enlarged prostate, and hepatomegaly. His serum creatinine was 5.07 mg/dl, total cholesterol-18,170/cmm, serum glutamic-pyruvic transaminase-122.0 and serum glutamic oxaloacetic transaminase-118.0. In view of acute renal failure and septicemia, CVC for fluid management and drug administration was advised. During a busy night shift, a 2nd year resident was assigned to perform the procedure. The left internal jugular vein was cannulated using double lumen (Polymed Novocent Duo, 160 mm) polyurethane catheter by central approach after local infiltration, under ultrasound guidance. A J-tipped guidewire (0.035 mm, 50 cm) was introduced through the needle followed by dilatation of the tract with a dilator (8.5 Fr, 4 inches) and insertion of the catheter on the guidewire. During this procedure, the guidewire was inadvertently pushed further ahead into the vein. This went unnoticed by the resident, who tried to aspirate blood from both the lumen to confirm proper positioning of the catheter. Due to inability to aspirate free flow of blood from one of the lumen, the resident flushed saline through that lumen, which could have resulted in embolization of the guidewire. After completion of the procedure, he realized that the guidewire was missing and informed the seniors. An urgent chest X-ray [Figure 1] and X-ray kidneys, ureters, and bladder [Figure 2] were done in which guidewire was clearly visible. It was removed by gooseneck snare device through femoral percutaneous approach under local anesthesia and fluoroscopic guidance without any complication.

For the management of guidewire embolism, if the guidewire has embolized systemically, chest X-ray and if required X-ray abdomen will determine the position of the guidewire. The percutaneous method of extraction has fewer complications for which interventional radiology techniques such as dormia basket, gooseneck snare, endovascular forceps are preferable. Cheddie and Sing describe a similar approach for guidewire extraction using a goose snare device.

Our take home massage is that, the complications of CVC should be kept in mind during cannulation. The guidewire should not be inserted too far as average distance from all access site is 18 cm. One should hold the guidewire tip firmly while introducing the catheter and should check the guidewire outside before flushing the percutaneous catheter. Without free flow of blood during aspiration, one should not flush the catheter. Gooseneck snare technique is safe for removal of embolized guidewire.

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Correlation of end-tidal and arterial carbon-dioxide levels in critically ill neonates and children

Sir,

We thank Jindal and Singha for having a keen interest in our article "Correlation of end-tidal and arterial carbon-dioxide levels in critically ill neonates and children" and bringing attention to a few important points.

First, we would address the typographical error. We had excluded 21 patients, including 6 patients having gestational age <32 weeks, not 9, as reported in theflowchart. In addition, 2 pairs of measurements were excluded due to contamination of samples with the line fluid. We thank the authors for bringing this to our attention. Study was limited to duration of 6 months, rather than the number of patients for feasibility issues.

Jindal et al., mentioned that a large surgical shunt is related to stiffer lungs, and higher respiratory resistance is makes end-tidal monitoring unreliable. Our 12% newborns had left-to-right shunts of varying size that may or may not have contributed to the severity of lung disease. It is a commonly encountered condition that we elected to include to represent the overall population of patients in neonatal intensive care unit for the purpose of generalizability of application of our results in this age group. We are looking at the impact of severity of lung disease on correlation of end-tidal and arterial carbon-dioxide levels irrespective of underlying etiology that may be cardiac or noncardiac. Jindal et al., have also stated that decreased pulmonary-to-systemic shunt ratio increases arterial to end-tidal carbon-dioxide difference secondary to pulmonary hypoperfusion. We would like to emphasize that left-to-right shunts do not decrease, but increase pulmonary-to-systemic shunt ratio (Qp/Qs). Cyanotic lesions with low Qp/Qs were not part of our study.

Jindal et al., had a concern that vasoactive therapy in 68% of newborns could have decreased the pulmonary blood flow and adversely affected the relationship of EtCO2-PaCO2. This was a reasonable assumption, since vasoactive agents may have differential influence on regional blood flows despite improvement in cardiac output, blood pressure and myocardial performance. However, authors did not provide us any evidence in favor of their assumption. Nevertheless, we would like to cite a study conducted in postoperative cardiac surgery patients to evaluate the stability of PaCO2-EtCO2 gradient during vasoactive therapy. Investigators reported a normal population distribution of the P(A–a)CO2 gradients. Thus, we do not concur with the idea that vasoactive agents could have adversely affected PaCO2-EtCO2 gradient.

The Jindal et al., presume that low tidal volume strategy would have been used in ventilating the neonates, and dead space of 6 ml in mainstream end-tidal monitor would have been large enough to confound the study results. We ventilated all our newborns with pressure-controlled ventilation strategy as it allows a more reliable compensation of breathing circuit compressible volume; tidal volume does not remain constant for obvious reasons.[3,4] Moreover, the mainstream analyzer gives a more accurate representation of the expired CO2 waveform in small children at rapid respiratory rates.[5]

We conclude that the inclusion of patients with left-to-right shunt was an appropriate methodological step; there is little evidence to suggest that vasoactive therapy could alter P(A–a)CO2 gradient; and pressure-controlled ventilation with mainstream analyzer is a good option to monitor EtCO2 in small subjects.

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