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Manuscript Title: A Novel use for the precordial doppler to verify central venous access

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Running Title: Precordial Doppler for central line placement

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A novel use for the precordial Doppler to verify central venous access

- Letter to the Editor -

This communication discusses a case demonstrating a novel use for the precordial Doppler (Versatone®, MedaSonics, USA) to verify the intravenous placement of a central venous catheter. The precordial Doppler is otherwise commonly used during neurosurgical procedures to monitor for venous air embolism.

This recent case involves a 58-year-old morbidly obese female (body mass index = 58) presenting for a complex middle cerebral artery ruptured aneurysm clipping under mild hypothermia. Pre-operatively, a 22 g upper extremity intravenous catheter was placed requiring 3 attempts owing to poor venous targets. After induction of anesthesia, a similar lack of appropriate venous targets was noted even with extensive ultrasound imaging in both upper and lower extremities. A large bore central line sheath (9 French, 10 cm sheath, Arrow International, USA) was therefore indicated. The surgical team required the right side of the neck to be sterile for possible clamping of the internal carotid artery should aneurysm rupture necessitate gaining proximal control. The subclavian placement of the sheath was also deemed undesirable due to body habitus. A right internal jugular (IJ) attempt was made by the anesthesia resident, but an inadvertent carotid puncture produced a large hematoma that subsequently yielded no visualization of the internal jugular vein or carotid artery. The decision was then made to gain access to the femoral vein. Under ultrasound imaging, the right femoral vein was cannulated with the aforementioned sheath, the longest large bore intravenous line that was available at the institution. Its placement was verified with a CVP of 5 cmH₂O, a characteristic CVP waveform, and positive aspiration of dark non-pulsatile blood. However, concern existed for the migration of this line from the
vein during this long case due to the deep location of the vein (7 cm below surface of the skin) in combination with copious mobile adipose tissue that could possibly shift the line with bed position changes. Because of the decreased compliance of the patient’s abdominal skin and subcutaneous tissues it was likely that the line migrating out of the femoral vein would have been difficult to detect otherwise.

To monitor the intravenous placement of the line, a precordial Doppler was placed on the anterior aspect of the chest in the 2nd intercostal space on the right side. Intermittent rapid flushes of 10 ml saline were administered during the case, resulting in the characteristic turbulent acoustic signal thereby verifying the intravenous placement of the sheath. Just prior to aneurysm clipping, the intravenous placement of the line was again verified to aid in fluid and/or blood transfusion in the event of sudden massive blood loss. The line remained in the desired intravenous location during the case, and its position was again verified upon arrival to the ICU.

The correct placement of central venous lines can be verified by several techniques including X-ray, central venous waveform analysis, and ultrasound techniques [1,2]. The novel technique described has not previously been described, and can therefore be considered as a technique to verify the initial placement, and/or continuous placement of central venous lines.
References
