

Intra-Operative Blood Sampling: External Jugular Venous Access Can Reduce the Need to Insert Arterial Lines

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Arterial lines (A-lines) are sometimes inserted for the primary purpose of enabling intra-operative blood sampling for both clinical and research needs. I suggest that in many patients in whom the only reason why an A-line is inserted is for intra-operative blood sampling, an IV inserted into the external jugular vein (EJ) may be an effective, and arguably a superior, alternative. After institutional approval, my last 40 cases where an EJ was placed for blood sampling (all were femoral-popliteal bypass or similar vascular cases under general anesthesia with positive pressure ventilation and 4-5 cm PEEP) were reviewed. In all cases, we were successful in withdrawing blood for repeated blood sampling (e.g., activated clotting times, hemoglobin/hematocrit, glucose, potassium, venous blood gases). The longest case was approximately 4 hours in duration. In no case was it necessary to increase PEEP nor to put the patient in the Trendelenberg position to facilitate blood sampling. Four cases had 16g IVs, the remainder had 18g IVs. There were no complications noted. Although not in this review, we've successfully used an EJ for parathyroid hormone sampling during a parathyroidectomy.

This communication is not intended to be a direct comparison of A-lines vs EJs. The goal is to bring to the attention of the readership an alternative technique for intraoperative blood sampling. With a virtual 100% success rate for drawing blood from an EJ, it would seem that the EJ would be at least as effective as an A-line for obtaining blood samples. Compared with a peripheral intravenous line (IV), A-lines may be more difficult to establish, are associated with rare but potentially severe vascular complications, and incur greater financial cost. Potential complications of an EJ insertion include carotid artery puncture, internal jugular vein puncture, hematoma formation, and air embolus. Further study is required to compare the complication rates of A-lines vs. EJs.

Sometimes, in order to withdraw blood via an EJ, either the head

needs to be turned to the contra lateral side and/or the catheter needs to be slightly pulled back, presumably to keep the wall of the vein from occluding the lumen of the catheter. On one occasion the catheter came out intra-operatively. In this case, the EJ was entered after most of the catheter was through the skin resulting in just a small length (estimate 2 or 3 mm) of catheter actually being in the vein. Most likely, the slight tension on the catheter or the head turn was enough to pull the catheter out of the vein. Once recognized, this problem was successfully avoided going forward by having a greater length of catheter in the vein. In this case, we were able to insert another EJ catheter.

One may get into the situation where the nature of the case chances and an unanticipated need to draw blood arises. Depending on the situation, it may be easier to access the neck for an EJ than the arms for an A-line. The use of an EJ has the additional benefit of providing additional intravenous access. In addition, for patients with progressing renal failure, it avoids potential trauma to an artery that could be in the future used for dialysis fistula creation.

In summary, for those patients in whom it is possible to insert an EJ, the use of an EJ seems to be an effective alternative to A-line insertion for intra-operative blood sampling in patients positioned supine (and presumably lithotomy) receiving positive pressure ventilation and 4-5 cm PEEP. Our clinical experience suggests there is no other peripheral IV site from which blood can reliably be aspirated. Further study will be required to determine if blood can be reliably withdrawn when a patient is breathing spontaneously. It is possible that transmitted subatmospheric intrathoracic pressure may cause collapse of the EJ thereby impeding blood withdrawal. If one encounters difficulty in withdrawing blood in a cooperative spontaneously breathing patient, it would seem likely that a Valsalva maneuver and/or Trendelenberg positioning would facilitate blood withdrawal from the EJ.

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