A Better, Safer, and Inexpensive Way to Open Glass Ampules

To the Editor.—A recent contribution to the correspondence section of ANESTHESIOLOGY discussed a potential patient care complication resulting from using the elbow of an anesthesia breathing circuit to open a glass ampule. During 25 yr of anesthesia practice, I have observed and used many different techniques in opening glass ampules. All of these have at one time or another resulted in failure, either allowing a spike of the ampule to penetrate the protective material and lacerate the practitioner or to permit pieces of broken glass to become airborne and threaten operating room personnel. The purpose of this communication is to describe a technique that I have personally used for more than 15 yr without injury. It involves using the barrel of an intravenous syringe (plunger removed) held over the small end of the ampule, close to the neck of the ampule, grasping the barrel with the thumb and forefinger of one hand and the large end of the ampule with the thumb and forefinger of the other hand (fig. 1). The barrel of a 10-cc syringe works best with larger ampules (10-20 cc such as propofol, saline, and 2% lidocaine), and the barrel of a 5-cc syringe works best with smaller ampules (1-2 cc such as epinephrine, epinephrine). The hardness of the plastic barrel prevents cut by penetration of glass from the ampule; the length of the barrel provides enhanced leverage for ease of breaking the ampule neck, and the capacity of the barrel allows the neck of the ampule and any associated glass particles to be trapped within the safety of the hard plastic barrel. Keeping the thumbs and forefingers of both hands close to the neck of the ampule (as pictured), allows the maximum of force to be delivered at the neck of the ampule. It is advisable that when using this technique, the hands and device be pointed away from the practitioner, the patient, the surgical field, and any operating room personnel to enhance safety. Placing a single gauze 4 x 4 over the syringe barrel and ampule junction would provide added safety from airborne glass.

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Reference

1. Gallacher BP, Kelly M, Mora RR: Failure to ventilate due to glass ampule fragment occlusion of the breathing circuit. ANESTHESIOLOGY 1997; 87:180

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Central Venous Access via the Distal Femoral Vein Using Ultrasound Guidance

To the Editor.—Central venous (CV) catheters are typically inserted via internal jugular, subclavian, or antecubital veins. The femoral vein also has been used, but its use at this site is sometimes problematic as a result of anatomic abnormalities, hematoma, and so on. Ultrasonic guidance recently has been reported as a useful aid for internal jugular or subclavian cannulation. Accordingly, we have developed a new technique for inserting CV catheters at a new distal femoral vein site.

After institutional approval, 20 patients undergoing neck, facial, and brain surgeries were selected for this study. After the induction of general anesthesia, a femoral vein catheterization was performed by the same staff anesthetist, who was familiar with standard femoral
Fig. 1. Insertion point for the distal femoral vein. **line-A**: artery and vein conformed longitudinally; **line-B**: where cross sections observed most easily to advance. **C**: Crossing point of A and B. **d1 = 2 cm** lateral from A, **d2 = 2 cm** lower from B. **D**: distance from the inguinal ligament to the femoral vein actually inserted.

vein access methods but who had no previous experience of catheterization with ultrasonic guidance. Ultrasound was performed using a color Doppler (SSD-2200®, Aloka Co. Ltd., Tokyo, Japan) with a 7.5-MHz probe (UST-5524,7-5, Aloka Co. Ltd.). First, using a probe, we chose the insertion point where the relation of the artery and the vein was evaluated to be easier to advance a needle. As the artery always overlaid the vein at this site, the insertion point was defined as figure 1 to avoid the arterial puncture, and their locations were marked on the skin with dry ink. Markings were done longitudinally in the direction of vessels' traveling (line-A) and transversely at the point where their cross-sections could be observed most easily to advance the needle (line-B). The needle was inserted at a point 2 cm lateral from line-A and 2 cm lower from line-B. At this point, the artery always is pulsatile and is not easily compressed by the probe. On the other hand, the vein is compressed easily by pressing.

Then, the marked area was sterilized, and the probe was wrapped in a sterile cover containing ultrasound conductive medium. Standing on the right side of the patient, the operator used ultrasound to image the femoral vessels as cross-sections in the short axis. While observing the femoral vein with the probe held in his left hand, the operator held a syringe with an attached needle from a CVP catheter kit (14-gauge, UNITAKA LTD., Osaka, Japan) in his right hand. The needle was placed at an approximately 30°–40° incline to the skin. No exploratory punctures were performed in any of the cases. The operator advanced the needle with negative pressure applied to the syringe. Although the needle tip was rarely observed by monitor, the direction of its advance could easily be confirmed by stretching movements of subcutaneous tissue in advancing the needle. After confirmation of blood aspiration to the syringe, the catheter was introduced through the outer sheath of the needle and advanced about 45–55 cm.

The ages and heights of patients ranged from 24 to 67 yr and from 152 to 175 cm, respectively. The distance from the inguinal ligament to the actual puncture site was 12.5 ± 2.2 cm (mean ± SD), and the depth from the skin to the vein at the punctured site was 2.4 ± 0.6 cm (that of at the inguinal region was 1.6 ± 0.4 cm). The time for catheter placement was 15 min in the first case and decreased rapidly after the first 3 cases. The mean time of last 10 cases was 67 s. The catheter was placed with one pass in 18 cases, and the rest required two passes. No arterial punctures observed. A chest radiograph was used to confirm that the catheter tips were properly placed. No evidence of hematoma was observed at the puncture site in any of the patients. Patients had no complaints of pain or neurologic symptoms in their right extremities.

The results show that ultrasonically guided, distal femoral CV catheter placement is a fairly simple technique even for an anesthetist unfamiliar with ultrasound apparatus. The catheter placements in the present study, after the first 3 cases, were rapid and without any obvious complication. At the actual punctured site, the artery always overlaid the vein, and the vein was almost at the lateral side of the artery (75%). However, in five patients (25%), the vein was just beneath the artery. After the catheter placement, we found that the distances from the inguinal ligament were less than 10 cm in these patients. According to these results, we recommend that the needle be inserted at a point more than 10 cm distal from the inguinal ligament.

In conclusion, we have developed a technique of CV access via the distal femoral vein using ultrasound guidance and demonstrated its ease of mastery.

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References


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