Internal-jugular-vein Puncture with a Margin of Safety

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Percutaneous puncture of the internal jugular vein for the passage of a plastic catheter to measure central venous pressure or provide a route for intravenous hyperalimentation is an attractive alternative to the subclavian, basilic or cephalic approach. However, in the descriptions of the various techniques employed for internal-jugular-vein cannulation, carotid arterial puncture has been mentioned as a complication.[2, 3] We describe below a technique that increases the safety of this procedure.

METHOD

With the patient supine and in a mild Trendelenburg position, the head is turned to the left. The internal jugular vein on the right is preferred because it offers the shortest and most direct route to the superior vena cava. The area is prepared surgically. The operator uses sterile gloves. Local anesthetic solution is injected into the site of needle entry. The point selected is 5 cm above the clavicle approximately 1 cm inside the lateral border of the sternocleidomastoid muscle. We use a standard intravenous assembly, consisting of outer 14-gauge needle and an inner plastic catheter which can be threaded through the needle into the vein lumen once venipuncture is accomplished. The inner plastic catheter is removed and a 22-gauge spinal needle is introduced through the empty 14-gauge needle. A small syringe for aspiration is attached to the hub of the spinal needle (fig. 1). The 14-gauge needle is used to puncture the skin and the smaller needle is then advanced directly through the lateral portion of the sternocleidomastoid muscle belly in a direction parallel to the anterior border of the muscle. The operator's hand is elevated 30 degrees so that the needle tip is directed posterior to the coronal plane. Entrance of the spinal needle tip into the lumen of the vein is confirmed by aspiration of blood (fig. 2). The large needle is then advanced using the spinal needle as a guide. The latter needle is removed and correct position of the 14-gauge needle is confirmed by aspiration of blood in this position. The plastic catheter is then threaded into the vein and the large needle retracted (fig. 3). The catheter is fixed to the skin with a suture. We use an organic iodide preparation and a sterile occlusive dressing over the puncture site.

DISCUSSION

The internal jugular vein can be conveniently cannulated for the introduction of catheters for intravenous hyperalimentation and determination of central venous pressure using this technique. In addition, we have used this route for percutaneous introduction of the Swan-Ganz flow-directed pulmonary-artery

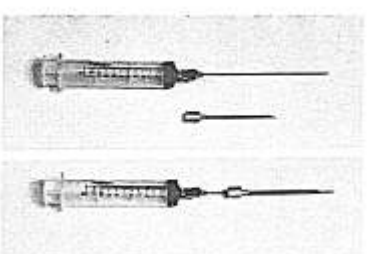

FIG. 1. Equipment used includes a 22-gauge spinal needle with syringe for aspiration attached and a 14-gauge needle from the through-the-needle type of venous catheterization set. The spinal needle is to be used to locate the vein by threading it through the larger needle.

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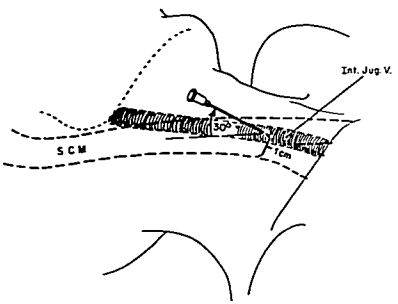

FIG. 2. Landmarks used for introduction of the needle: 5 cm above the clavicle, 1 cm within the lateral border of the sternocleidomastoid muscle. The needle is aligned so that it is parallel to the anterior border of the muscle. The operator's hand is elevated, directing the needle point approximately 30 degrees posterior to the coronal plane. This directs the needle through the muscle belly into the vein and lateral to the carotid artery.

FIG. 3. The spinal needle has been introduced into the vein lumen, as evidenced by aspiration of blood. The larger needle will be threaded over the inner spinal needle.

catheter, which requires a 12-gauge needle introducer,[1] which might create a rather sizable defect in case of inadvertent puncture of the carotid artery. In practice, with lessened fear of carotid-artery puncture, there was an increase of self-confidence which seemingly resulted in a higher success rate. Finally, we noticed that our apprehension diminished greatly when we were supervising others in the performance of this technique.

The ability to teach and use internal-jugular-vein puncture with greater safety should encourage wider application of this method for cannulating the large veins for intravenous hyperalimentation and measurement of central venous pressure.

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