A Safe Approach to Percutaneous Cannulation of the Internal Jugular Vein in Children

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The internal jugular vein (IJV) can provide an extremely reliable site for correct placement of central venous catheter. The average success rate using this approach is more than 95 percent[1]. However, percutaneous cannulation of the IJV has not been recommended in pediatric age group because of the low success rate in children under age 2[2]. Monitoring of central venous pressure (CVP) is quite useful in the management of children undergoing major surgery, so that a safe and sure approach to percutaneous cannulation is mandatory.

We describe an improved technique for the percutaneous IJV cannulation which, in our experience, has proven very reliable when attempting to identify the IJV.

Technique

The patient is placed in a 15 to 20 degree Trendelenburg position. The neck is slightly extended by placing a small rolled towel under the shoulder while the head is turned away from the site of puncture.

An ultrasonographic scanner (Echo Camera, Model SSD620, Aloka, Tokyo, Japan) equipped with a 7.5 MHz ultrasound transducer is used to obtain the real-time ultrasound images. Under sterile precautions, the probe is applied transversely to the neck (fig. 1). The IJV and carotid artery are identified as echo-free circle images (fig. 2). In inspiratory phase of intermittent positive pressure ventilation (IPPV) when the diameter of the IJV is enlarged, the IJV is directly punctured with the Arrow Safety Syringe (Arrow International, Inc. Reading, PA)[3]. After confirmation of puncture by aspiration of dark blood, a wire guide is inserted through the central channel of the plunger without detaching the syringe from the needle. Then, the IJV is cannulated using the catheter-over-guide wire technique.

Results and Discussion

Internal jugular cannulation is a more difficult technical procedure in children than in adults. The anatomical landmarks for the location are less apparent and there is more difficulty in inserting the catheter once the vein is punctured[4]. Our technique overcome these problems. The location of the IJV is confirmed by the real-time ultrasonography. The use of a specially designed syringe facilitates the insertion of a wire guide after venipuncture. The IJV cannulation with this combined technique was performed in 12 patients aged from 0–3 years. The IJV was located and cannulated successfully in 11 patients, but the carotid artery was punctured in one case.

In conclusion, a new technique for percutaneous cannulation of the internal jugular

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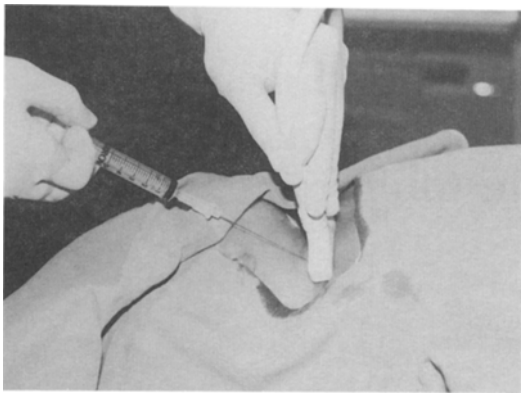

Fig. 1. Puncture of the right internal jugular vein performed in a 2-year old child. T-shaped probe is used for the location, and the Arrow Safety Syringe is used for the puncture.

vein (IJV) is described. The ultrasonographic guidance is used for the precise location of the IJV. The following venipuncture is done with a specially designed syringe. Once the IJV is punctured, a wire guide is inserted directly through the syringe. This technique is especially useful in the IJV cannulation in children.

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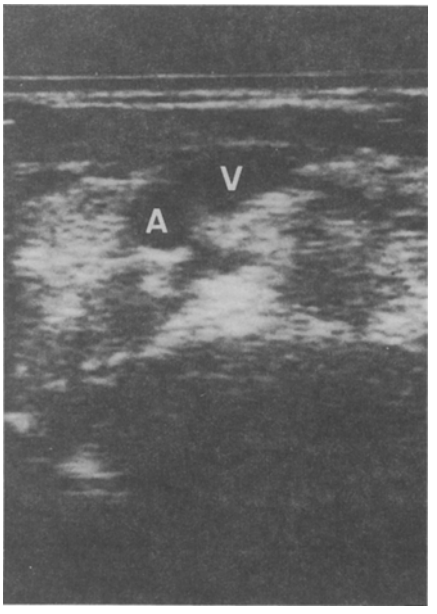

Fig. 2. The transverse ultrasonography of the right internal jugular vein in inspiratory phase.
A: Carotid artery, B: Internal jugular vein

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