Seeing is believing: ultrasound guidance for central venous access in clinical anesthesia

Gyu-Sam Hwang

Department of Anesthesiology and Pain Medicine, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

For anesthesiologists, central vascular cannulation is a fundamental clinical skill and is a vital component of the management of the hemodynamically unstable patients. Although obtaining central vascular access is generally not found to be a problem in the majority of patients with experienced hands, this procedure can have major and minor complications; its success rate depends highly on patient anatomy, combined disease status, and operator skill [1].

It has been reported that more than 5 million central venous catheters are placed each year in the United States, with an associated complication rate of > 15% [2], and that mechanical complications, such as arterial puncture and pneumothorax, are seen in up to 21%, and up to 35% of insertion attempts are not successful [3,4]. In this issue of the Korean Journal of Anesthesiology, Ahn et al. [5] present a report on phrenic nerve palsy after internal jugular venous catheter placement in their letters to the editors. The authors are to be congratulated on their persistence, having employed electrophysiological studies, to discover the cause of the postoperative dyspnea and atelectasis on the right lobe. The authors suggested the possibility that phrenic nerve palsy can also occur from the nerve being pressed by blood clots, or, from a successfully inserted central venous catheter pressing against the phrenic nerve, which moves along the superior vena cava [6]. Nonetheless, the possibility of direct needle injury cannot be ignored because they did not use ultrasound guidance for internal jugular venous cannulation.

The ultrasound machine has evolved from a large and

puzzling device to a laptop computer-like machine that is compact and easy to use, thus providing comfortable mobility and brilliant imaging of structures of interest. Historically, ultrasound-guided vascular access has been in clinical practice for more than 30 years and has been increasingly used to diminish complications and raise success rates during vascular cannulation [1]. Based on the results of multiple clinical studies showing significantly improved safety, effectiveness, overall success as well as reductions in complications, the Agency for Healthcare Research and Quality (AHRQ) recommended the use of ultrasound for the placement of central venous catheters as one of their 11 practices to improve patient care in 2001 [3]. However, the successful and safe incorporation of this tool into clinical anesthesia practice requires additional training and experience. Of the viewing methods, continuous visualization of the needle during its “in-plane” long-axis approach is most appropriate when the major cannulation risk is to penetrate the posterior wall of the vein. On the contrary, an “out-of-plane” technique may be suitable to small target vessels or when target vessels are close to the vital structures [1]. There is a general consensus that the “in-plane” puncture technique may require more training.

In conclusion, ultrasound guidance for central vascular cannulation should be routinely performed in clinical anesthesia. If ultrasound guidance is not available routinely, then multiple landmark-based attempts should be discouraged immediately, because of a high complication rate and risks to the patient. In such situation, an ultrasound machine should

Corresponding author: Gyu-Sam Hwang, M.D., Ph.D., Department of Anesthesiology and Pain Medicine, Asan Medical Center, University of Ulsan College of Medicine, 86, Asanbyeongwon-gil, Songpa-gu, Seoul 138-736, Korea. Tel: 82-2-3010-3989, Fax: 82-2-3010-6790, E-mail: kshwang@amc.seoul.kr

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be brought without delay to visualize and to demonstrate the visibility of a patent vessel. Obviously, the more we can see directly, the more we can do for the safety of patients easily and precisely.

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