

Guides for Pain Clinicians?

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Although there have been debates and different practice guidelines on the indication of epidural blocks for pain management [1], there remain patients for whom few alternative options are available, including painless delivery and some postoperative patients. Even though the use of fluoroscopy is recommended for the correct localization of the epidural space, this procedure is not always possible in the above mentioned situations. We therefore have to rely solely on the loss of resistance technique using our hands. The problem with this method is that there is always a risk of puncturing the dura mater even with the most experienced hands. Some studies have previously indicated the presence of gaps in the human ligamentum flavum, causing apprehension in pain clinicians [2-4].

In the present issue of the Korean Journal of Pain, Yoon et al. [5] reports anatomic variations of the cervical and high thoracic ligamentum flavum. Having directly examined the ligamentum flavum from C3 to T6 in 15 human cadavers, they report that the incidence of midline gaps in the ligamentum flavum is 87%-100% between C3 and T2. The incidence decreases below this level and is the lowest at T4-T5 (8%). The incidences of midline gaps seem to be higher in this study than in prior studies. Among the levels presenting gaps, the location of a gap in the caudal third of the ligamentum flavum is more frequent than in

the middle or cephalic portion of the ligamentum flavum. Therefore, the authors warn that the midline approach for cervical and high thoracic epidural blocks could pose a risk of failure to recognize a loss of resistance. This risk can be further increased when the needle is inserted into the caudal portion of the intervertebral space.

Some investigators have tried to solve this problem using ultrasonogram. Lee et al. [6] wrote an article titled, "Sonoanatomy of the lumbar spine in patients with previously unintentional dural punctures during labor epidurals", and concluded that abnormal sonoanatomy of the ligamentum flavum may present anatomical variations of this structure, which may be related to an increased incidence of unintentional dural punctures during epidural placements. Another study looked into the sonoanatomy of the lumbar spine in pregnant women at term [7], and identified a grossly incomplete or absent ligamentum flavum. However, other authors have contended that the ligamentum flavum, epidural space, and posterior dura often appear as a single linear hyperechoic structure, which they have termed "the posterior complex", and that the posterior epidural space may not always be distinguishable or visible [8]. Yoon et al. [5]'s article contains helpful content reiterating the possibility of gaps in the ligamentum flavum when performing epidural blocks. Further research,

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combining this study with radiologic aids, so as to determine whether these gaps in the ligamentum flavum could be identified by ultrasonograms or epidurography before the dissection, would be of interest to the reader. There is also a possibility that the defects could change according to the posture of the patient [9] and this may be another area to investigate.

The practice of anesthesia has changed drastically with the progress of monitoring devices. Before the era of modern monitors, anesthesiologists relied on patients' chest excursions, and precordial stethoscopes. Nowadays, the anesthesiologists who were trained after the advent of the capnogram and pulse oximeter could not imagine practicing anesthesia without them. The practice in the field has evolved from the stethoscope to the capnogram and pulse oximeter – and now the ultrasound – improving patients' safety dramatically. As anesthesiologists or pain clinicians, all of us have had an experience of considering whether to push the Tuohy needle further in or not, sitting at the back of the patient. Similar to anesthesiology situations, we should be able to practice more safely with some guide directing us during the procedure. In the not too distant future, situation will change and practicing an epidural type of block without the aid of an ultrasonogram or fluoroscopy will be considered similar to practicing anesthesia without a capnogram or pulse oximeter today.

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