



Unilateral Epidural Block: A Persistent Problem with No Good Solution

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Unilateral epidural analgesia is a common and persistent issue of incomplete analgesia. This phenomenon of one-sided epidural catheter placement was first described in 1967 through radiographic analysis [1], and examples of unilateral epidural analgesia continue to exist a half century later.

Clinically, it is important to better understand how to troubleshoot and even avoid unilateral analgesia in daily practice. This is especially important when stat cesarean delivery is involved. In 2015, Yeager, et al. showed that unilateral epidural catheter placement is associated with complicated postoperative courses [2]. To this end, efforts have been made to decrease the incidence of inadequate epidural block. These efforts include: improved epidural catheter design [3], comparing the use of saline versus air to find loss of resistance when placing catheters [4], and examining outcomes from shallow catheter placement (i.e. < 4 cm) in epidural space [5]. However, these solutions have not proven to be entirely effective.

In this editorial, we review a novel approach, proposed by Dr. Zhang, to increase the likelihood of bilateral epidural analgesia by using patient feedback during epidural catheter insertion and rotating the epidural needle to direct the catheter medially [6].

Several studies support this concept. One study used computerized tomography (CT) to investigate the positioning of epidural catheter tips and spread of injected radiocontrast, and correlated these findings with spread and laterality of sensory blockade. Far lateral catheter position was found to be the most common cause of unilateral block [7]. In another study, 7 out of 236 patients (3.0%) showed signs of unilateral block due to epidural catheter tips located either at the anterior epidural space (4 patients) or in the transforaminal passage (3 patients) [8]. Two studies investigating intentional rotation of epidural needles have found this to be an effective technique in targeting specific sides for analgesia/anesthesia. This suggests that needle orientation and rotation can contribute to unilateral blocks and may be important in avoiding these blocks [9,10].

Finally, imaging-guided epidural catheter placement has been routinely used to provide bilateral analgesia, with high success rates, in chronic pain management, suggesting increasing rates of centrally-placed catheters may decrease the incidence of unilateral block [11].

However, Zhang's approach raises three interesting questions: 1) Can all individuals feel their epidural catheter insertion and appreciate its laterality? 2) Is it a good idea to redirect catheters by rotating the needles and potentially "core out" the dura, or to repeatedly insert and withdraw the epidural catheter from the end of the epidural needle, with the risk of potentially shearing or otherwise damaging the catheter [9]? and 3) While this technique may increase likelihood of midline catheter placement initially, how often does subsequent catheter migration within the epidural space ultimately lead to a unilateral block?

Moreover, another study investigated 11 parturients with unilateral epidural analgesia and their epidurogram findings suggested at least three other explanations: 1) 5 cases with midline anatomical barriers, 2) 2 cases with spinal deformity, and 3) 4 cases with catheter malfunction [12]. Bolusing of local anesthetic was more effective than catheter manipulation at resolving unilateral block [13], and the use of programmed intermittent epidural bolus, rather than continuous epidural infusion, for maintenance of labor analgesia decreased the incidence of unilateral block 3-fold [14]. Interestingly, the incidence of right-sided block was approximately 4.2 times greater than the incidence of left sided-block [13]; this could potentially be attributable to preferential use of left uterine displacement of laboring women with patient-controlled epidural analgesia or continuous epidural infusion. Studies have also revealed that a previous history of unilateral block is a risk factor for the development of subsequent unilateral block, suggesting that that anatomic variations such as epidural septae may significantly contribute to this phenomenon [15]. In the other words, Dr. Zhang's method may not solve unilateral block issue completely.

In conclusion, while Dr. Zhang's approach has gen-

erated a hypothesis for future studies (with some outstanding concerns regarding safety and effectiveness), it is unlikely to be adopted as the standard of care under current conditions.

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