Correspondence on BIP Test

1. To the Editor:

I enjoyed reading the BIP test by Carden and Ori describing a modified loss of resistance technique for confirming epidural needle placement (1). In the modern era, even though interventionalists prefer to do all the procedures under fluoroscopy and deliver the medication target-specifically, we still depend on some of the old techniques to get to the target. One of these is interlaminar epidural injections, either in the lumbar epidural space, thoracic epidural space, or cervical epidural space. Since the initial description of Dogliotti (2), numerous techniques have been described to identify the epidural space without using too much air, saline, or contrast (1, 3-9).

Whenever there is false loss of resistance, the BIP test has been extremely useful in deciding whether we need to inject further contrast or look at a different view under the fluoroscopy. As the authors describe, even in an operating room with the use of fluoroscopy, it is extremely valuable. Since the publication of this article, I have heard many anesthesiologists specializing in interventional pain management describe various techniques and some have used similar techniques. However, this is the first time that I am aware of that it has been published as a BIP test. I was certainly not aware of this technique prior to this publication. I have always used either the sodium chloride solution or contrast to evaluate false loss of resistance under fluoroscopy. The BIP test has added another valuable aspect to my technique.

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2. To the Editor:

The small advances in clinical science are often some of the most important to the clinical practitioner and Drs Carden and Ori (1) have made a worthy contribution regarding their modification of the loss of resistance technique in locating the posterior epidural space. A few comments are proffered:

It is noted the authors state the technique "may be used where single shot epidurals are being given without fluoroscopy." This would include the frequently employed non-fluoroscopically guided interlaminar epidural steroid injection. However there are important clinical differences in the administration and subsequent confirmation of the effect of a single shot analgesic/anesthetic and an epidural steroid injection.

The loss of resistance technique is used as an initial approximation of the epidural space for anesthesia/analgesia via single shot and catheter techniques, and

for epidural steroid administration. In the situations involving subsequent delivery of epidural analgesia or anesthesia, the needle or catheter placement is confirmed through immediate clinical observation of pain reduction or anesthesia. Failure to provide adequate anesthesia or analgesia suggests malpositioning of the catheter or needle that is rapidly rectified through catheter withdrawal/repositioning or reinsertion of an epidural needle or catheter. However, for interlaminar epidural delivery of corticosteroids following loss of resistance at the initial approximation of the epidural space, no subsequent confirmation of the location of the steroid injection is immediately available unless radiographic imaging equipment is used. Without the use of fluoroscopy including contrast, the clinically demonstrated failure to enter the epidural space is quite high ranging from 14% to 31% (2-5).

Even if the epidural space is reached through use of the first approximation loss of resistance technique, this does not ensure the steroid will reach the target (6-8) or will not be inadvertently injected subdural (9,10) or subarachnoid (11). Therefore contrast fluoroscopy used by competent physicians is the only reliable confirmation method that will demonstrate epidural entry, lack of vascular/subdural/subarachnoid placement, and adequate steroid delivery. Operating suite C-arm fluoroscopy is likely to be available in the vast majority of the 5,764 U.S. acute care hospitals. It is also available in some of the 4,500 U.S. ambulatory surgery centers and in some pain physician offices. Given the availability of fluoroscopy and the documented rates of erroneously placed epidural steroids when depending on the loss of resistance technique for confirmation of placement, it is perplexing why physicians would not use contrast fluoroscopy to ensure accurate delivery of epidural steroids. Therefore, it is more appropriate to limit your suggestion that BIP "confirms" needle placement to BIP serves as a first approximation of the location of the epidural space that should subsequently be confirmed through fluoroscopy in the case of interlaminar epidural steroid administration, or via the development of surgical anesthesia/pain reduction for the other uses described.

While BIP is a compelling method, it would be helpful to demonstrate its utility and accuracy via comparison with standard loss of resistance technique delivery using a verifiable production of anesthesia. Similarly, demonstration of the accuracy of the technique compared with contrast fluoroscopy would be a very useful exercise. Perhaps the authors of the BIP technique will further its development through secondary confirmation and statistical analysis.

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