

## LETTERS TO THE EDITOR

# On the Geometry of Fluoroscopy Views for Cervical Interlaminar Epidural Injections

To the Editor:

I'm writing this letter in response to the article "On the Geometry of Fluoroscopy Views for Cervical Interlaminar Epidural Injections," published in *Pain Medicine*, Volume 13, Number 1, 2012, pp. 58–65.

It cannot be overstressed that "blind" cervical epidural steroid injections (ESIs) "have been associated with spinal cord injury as a result of penetration of the spinal cord by the needle or from injection of air or other material into the spinal cord," and that "fluoroscopic guidance ensures that the needle is not inserted too far, before any material—air, contrast, medium, local anesthetic, or corticosteroids—is injected."

The authors advocate using contralateral oblique fluoroscopy views for confirming needle epidural penetration with cervical injection, as it "may provide superior information to that afforded by a lateral view." Later, they explain that: "the lateral views, although reassuring, [do] not properly indicate the depth of insertion. For insertion at or near the midline, the lateral view is equivalent to the contralateral oblique view and shows minimal depth of insertion. However, for more lateral insertions, the lateral view exaggerates the depth of insertion; the needle appears slightly deeper than it does in the corresponding contra-lateral oblique view."

I'm one of the "readers of medical literature, who [is] more accustomed to rules that are empirically derived from observations." I run a very busy Pain Practice and the principle "do not harm" is the most important rule for me. It is not the purpose of this letter to discuss the advantages or disadvantages of different fluoroscopy views for localizing the depth of the needle while doing cervical interlaminar epidural injections, it is rather to describe some concerns about contralateral oblique fluoroscopy:

1. Inserting the needle anywhere but medially or close to medially at the cervical spine could be dangerous.
2. True lateral fluoroscopy views may be obtained at almost any cervical epidural injection.

I would not agree on lateral needle placement while approaching epidural space at the neck, for the following reasons:

1. Epidural space is bigger at the midline and gets progressively smaller toward the periphery of the spinal canal.
2. The ligamentum flavum is thickest at the midline and gets thinner away from the center [1, pp. 227–8, 283].

In other words, there is more chance for inadvertent dural puncture and subsequent spinal cord penetration when the needle is located anywhere but medially or paramedially. Loss of Resistance (LOR) is more pronounced if you enter epidural space medially since epidural space is almost nonexistent at the periphery of the spinal canal.

Knowing this, I would not put my patient at risk if I see my needle going laterally on an anterior-posterior (AP) fluoroscopy view. I would withdraw the needle and reposition it medially or paramedially.

I would make sure I see the depth of the needle on the lateral fluoroscopy while doing a cervical epidural. I do cervical epidural injections in the seated position. I prefer a seated position to a prone position for my "cervicals" for several reasons:

1. It allows me to see the depth of the needle in the lateral view as low as T1-T2. For the last 3 years when I had done neck injections in the seated position there was not a single case in which I could not get a satisfactory lateral fluoroscopy view of the cervical spine. I do on average of 10 to 15 cervical ESIs a week. Seating a patient prevents his shoulders from obstructing my fluoroscopy view. By pushing the shoulders down and forward, or backward, one can get shoulders out of the same plane as the cervical spine, thus "opening" the fluoroscopy view of the posterior elements of the cervical spine.
2. The seated position gives me more "freedom" with neck bending, thus "opening" the epidural space.
3. And last but not least, the LOR is more obvious in the seated as opposed to the prone position. This can be explained by physics: gravity and negative pressure caused by downward movement of the diaphragm creates more negative pressure in the cervical epidural space when the person sits up or stands up as opposed to when he lays down. "Old school" anesthesiologists used the "Hanging Drop" technique for cervical epidurals in the seated position [2, p. 235].

It is not a goal of this letter to convince Pain Medicine readers to do their cervical injections in the seated position, but rather to state that there is no need for contralateral oblique views while performing cervical injections if one can escape the risk of lateral needle placement, and can obtain a reasonable lateral fluoroscopy view for needle depth visualization.

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**References**

- 1 Cramer GD, Darby SA. Basic and Clinical Anatomy of the Spine, Spinal Cord, and ANS, 2nd edition. St. Louis, MO: Elsevier; 2005.
- 2 Morgan GE, Mikhail MS. Clinical Anesthesiology, 2nd edition. Stamford, CT: Appleton & Lange; 1996.