Angled Posteroanterior Fluoroscopy for L5-S1 Discography: A Technical Note

Nabil A. Ebraheim, MD, Nakul Karkare, MD, Jiayong Liu, MD,
Rongming Xu, MD, and Clément M. L. Werner, MD

Abstract

Lumbar discography, a useful modality for evaluating patients with lower back pain, is performed under fluoroscopy with posteroanterior and lateral fluoroscopic imaging. Despite use of fluoroscopy, needle placement into the L5–S1 disc may be difficult, especially in the presence of degenerative changes. We describe use of angled posteroanterior fluoroscopy with the fluoroscopy beam directed 30° to 40° caudally in a prone patient for clear visualization of the L5–S1 disc space. Use of this radiographic view aids in accurate needle placement and might decrease both procedure duration and fluoroscopic exposition.

Lumbar discography has been one of the common diagnostic modalities for evaluating patients with lower back pain, though its application remains controversial.[1] Discography is a valuable test in selected patients, especially as it provides physiologic information about the role a given intervertebral disc plays in a patient's symptoms.[2,3] The main values of discography may include direct determination of internal disc rupture and its correlation with associated symptoms, which may not be detected by T_2-weighted magnetic resonance images.[4]

Dr. Ebraheim is Professor and Chair, Dr. Karkare is Visiting Assistant Professor, Mr. Liu is Visiting Clinical Scholar, and Dr. Xu is Visiting Clinical Scholar, Department of Orthopaedic Surgery, University of Toledo Medical Center, Toledo, Ohio.
Dr. Werner is Fellow, Visiting Clinical Scholar, Department of Orthopaedics, University of Maryland Medical Center, Baltimore, Maryland.

Requests for reprints: Nabil Ebraheim, MD, Department of Orthopaedic Surgery, University of Toledo, 3000 Arlington Ave, Toledo, OH 43614 (e-mail, nebraheim@meduohio.edu).

Am J Orthop. 2007;36(7):380-381.

Lumbar discography is performed under fluoroscopy with both anteroposterior (AP) and lateral fluoroscopic images.[5] Needle placement guided by the AP image at the L3–L4 and L4–L5 levels is easy. However, inserting the needle into the L5–S1 disc is difficult because of overhang of the iliac crest and lordosis of the lumbosacral (LS) junction, especially in patients with advanced osteoarthritis. A curved needle has also been used to access this disc space.[6] We present our experience in using angled posteroanterior (PA) fluoroscopy with its beam directed 30° to 40° caudally[7] and the patient prone for clear visualization of the L5–S1 disc space.

"...inserting the needle into the L5-S1 disc is difficult...especially in patients with advanced osteoarthritis."

Technique Description

The patient is placed in the prone position on a fluoroscopy table (Figure 1). The entrance point for needle insertion for the L5–S1 disc is marked 5 centimeters lateral to the L5 spinous process (Figure 2). After the skin is prepared, it is anesthetized with 1% lidocaine. The fluoroscopy beam is then oriented caudally at approximately 30° to 40° with respect to the table (Figure 1). This

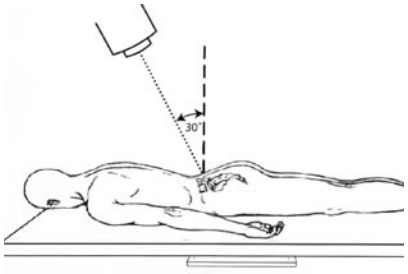

Figure 1. X-ray beam angulation in the angled posteroanterior fluoroscopic image of the lumbosacral junction. The angle of the beam is parallel to the L5–S1 disc.

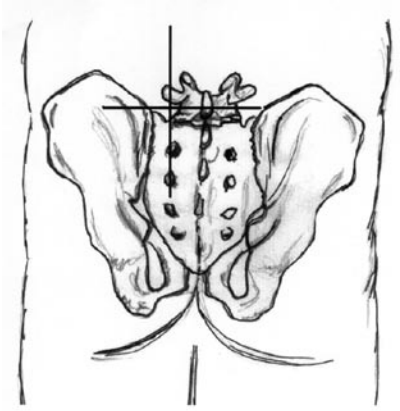

Figure 2. The entrance point for needle insertion for L5–S1 discography can be marked 5 centimeters lateral to the L5 spinous process.

view best displays the height and contour of the L5–S1 disc. With angled PA fluoroscopic control, a left paramedian approach can be taken to insert a 22-gauge spinal needle directly into the L5–S1 disc (Figure 3). Lateral fluoroscopic imaging can be used to confirm needle placement. After needle placement is confirmed, contrast medium is injected into the L5–S1 disc.

Discussion

Needle placement for discography at the LS junction remains a technical challenge because of the unique anatomy of the region. There is a transition in the curvature of the spine from a lordosis of the lumbar spine to a kyphosis of the sacrum. A standard AP plain film of the LS junction shows the superimposition of the anteroinferior portion of the LS vertebral body, L5–S1 disc and of the posterosuperior portion of the S1 vertebral body. This view therefore represents the oblique view of the LS junction and may result in a false sense of accurate needle position. A needle that seems to be in the L5–S1 disc on PA fluoroscopic imaging may not be in the disc space on the angled PA view because of the anteroinferior inclination of the L5–S1 disc.

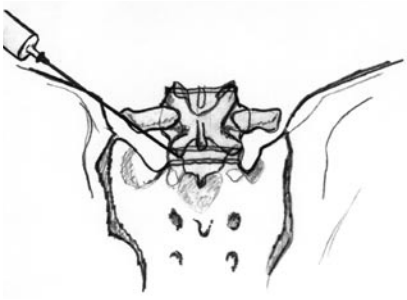

Figure 3. With the fluoroscopy beam tilted cranially approximately 30° to 40°, the L5–S1 disc space is delineated without overlap. A 22-gauge spinal needle can be directly inserted into the L5–S1 disc using a left paramedian approach.

The angled PA view of the LS junction, with the x-ray beam directed at the center of the L5–S1 disc and parallel to the inferior endplate of the L5 vertebra or the superior endplate of the S1, represents the true PA view of the LS junction. This fluoroscopic imaging best displays the height and contour of the L5–S1 disc space and allows accurate placement of a needle into the L5–S1 disc. It also decreases discography and fluoroscopy duration and avoids unnecessary injury to surrounding tissues from repeated needle placement.

Authors' Disclosure Statement

The authors report no actual or potential conflict of interest in relation to this article.

References

1. Bogduk N, Modic MT. Lumbar discography. *Spine.* 1996;21:402-404.
2. Grubb SA, Lipscomb HJ, Guilford WB. The relative value of lumbar roentgenograms, metrizamide myelography, and discography in the assessment of patients with chronic low-back syndrome. *Spine.* 1987;12:282-286.
3. Troisier O, Cypel D. Discography: an element of decision. Surgery versus chemonucleolysis. *Clin Orthop.* 1986;206:70-78.
4. Kornberg M. Discography and magnetic resonance imaging in the diagnosis of lumbar disc disruption. *Spine.* 1989;14:1368-1372.
5. Bontrager KL, Lampignano J. Lumbar spine, sacrum and coccyx. In: Bontrager KL, Lampignano J, eds. *Textbook of Radiographic Positioning and Related Anatomy*. New York, NY: Mosby; 2005.
6. Kumar N, Agorastides ID. The curved needle technique for accessing the L5/S1 disc space. *Br J Radiol.* 2000;73:655-657.
7. Leone A, Cerase A, Lauro L, Cianfoni A, Aulisa L. Postoperative lumbar spine. *Rays.* 2000;25:125-136.