Semin Spine Surg 28 (2016) 14–19

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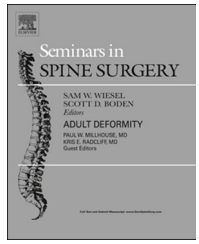

Surgical treatment for lumbar disc herniation: Open discectomy (indications, technique, outcomes, and complications)

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ABSTRACT

Lumbar microdiskectomy is one of the most common spine procedures performed. The most common indication is lumbar radiculopathy that is refractory to nonsurgical treatment. Other indications, such as progressive neurological deficit or cauda equina syndrome, are more rare. Open exposure affords excellent visualization of the nerve roots, safe dissection in the lateral recess, safe mobilization of the nerve roots, and ability to remove the offending fragment. The purpose of this article is to review the indications, technique, outcome, and complications of lumbar microdiskectomy.

1. Indications

When discussing surgical treatment for lumbar disc herniation, an absolute indication is progressive neurologic deficit. This is most commonly seen in the setting of cauda equina syndrome, which is a surgical emergency consisting of progressive, irreversible neurologic deficits. It is characterized by perineal sensory deficits, bowel or bladder incontinence, and either a new or a progressive motor deficit, and is most commonly caused by a herniated lumbar disc. The locations of the herniations most often are central; however, it has been seen with paracentral or lateral herniations. The syndrome presents itself more frequently in men in their 40s, and it is commonly found in the L4–5 disc.[1,2]

Relative indications for surgical lumbar discectomy vary, and they are surgeon and patient dependent. With proper patient selection, discectomy can produce symptomatic relief. There are certain requirements that a surgeon should have before deciding on operative treatment: radiologic imaging (Figs. 1 and 2), which demonstrates compressive pathology, and a correlative physical exam displaying motor or sensory (or both) symptomatology. An appropriate surgical patient would display both of these prerequisites, in addition to failure of nonoperative treatment. Other additional qualities that support positive results following surgical treatment would be a motivated patient with desire to return to work, a patient without a history of psychological issues, or a patient who is not involved in either litigation, worker's compensation, or disability issues. Of course, these are all very rarely present in a single patient, and the decision to move forward with surgery depends on the surgeon having an open discussion with the patient, weighing all benefits and risks associated with the surgery.

2. Technique

The operation begins with proper patient positioning. The patient is placed in the prone position after general endotracheal anesthesia is induced. Spine frames such as the Jackson (OSI) table (Mizuho OSI, Union City, CA) allow for flexion of the hips, which in turn widens the interlaminar space. This position also allows for the abdomen the pull downward freely, which in turn reduces the epidural venous pressure. The surgeon should be present to ensure that there

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http://dx.doi.org/10.1053/j.semss.2015.08.005
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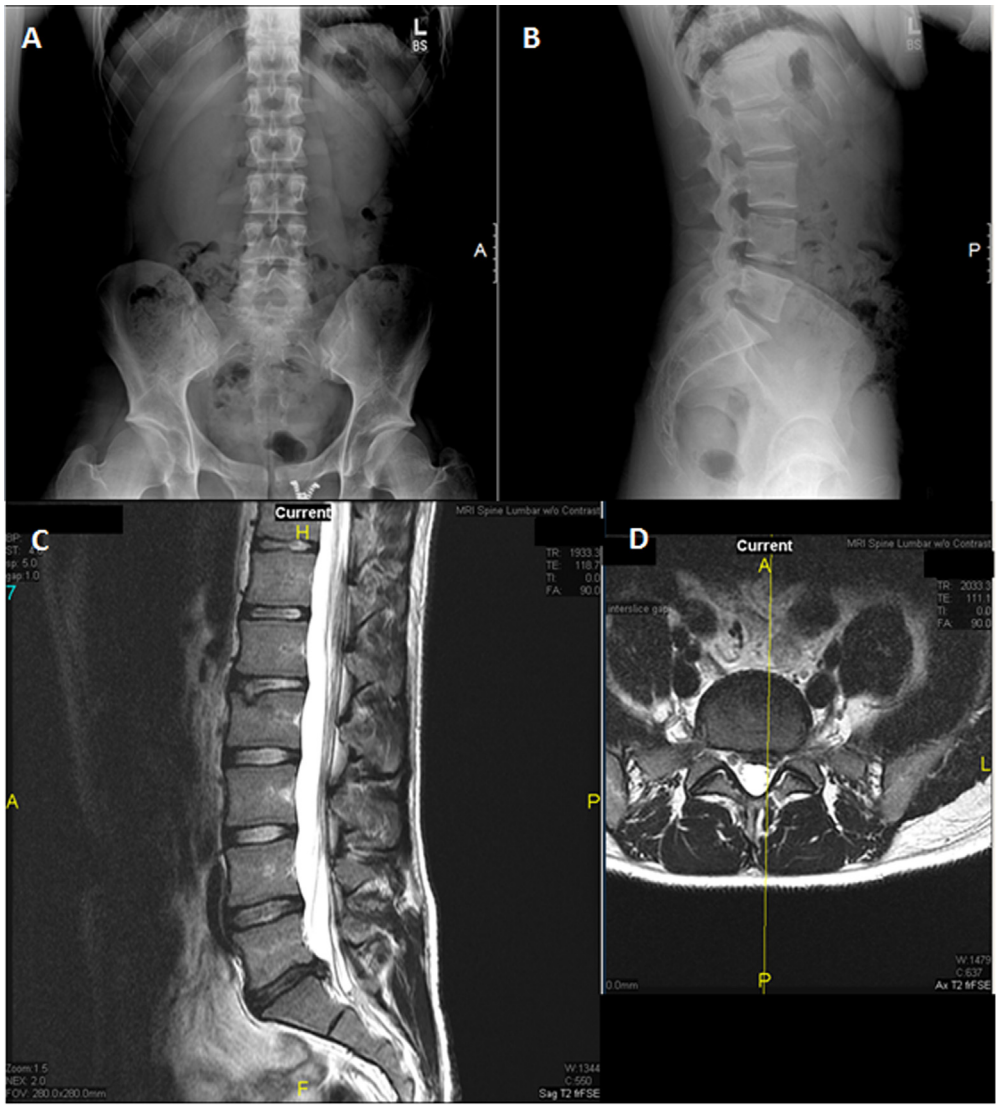

Fig. 1 – Preoperative AP (A) and lateral (B) plain radiographs in a 24-year-old male. Preoperative sagittal (C) and axial (D) T2-weighted fat-suppressed fast-spin-echo magnetic resonance images showing a prominent left L5–S1 disc herniation.

is proper positioning with adequate padding, particularly for the prevention of lateral femoral cutaneous nerve injury and pressure necrosis of vulnerable structures, including the knees and medial malleoli (Fig. 2). The 90–90 positioning of the arms also ensures protection of the cubital tunnels (Fig. 3).

Marking of the patient can be done with palpation of the superior aspects of the iliac crests, which correspond in most cases to the L4–5 disc space or L3–4 interspinous process level. Midline spinous processes can then be marked, and the interspinous regions can be counted from the sacrum up. The interspinous space of interest is then marked with a marker or scratched on the skin with a 25-gage needle (after prepping with alcohol preferably). Fluoroscopy can assist in this process.

Once the patient is prepped and draped, an incision is made in the midline, usually about 3–5 cm. Subcutaneous tissue is dissected down to lumbar fascia, which can then be incised on the side of the herniation, adjacent to the spinous process, which can be palpated at this level. The deep incision at this point should span the adjacent segment's spinous process. Fluoroscopy can be used to confirm the operative level, usually with a Kocher clamp or spinal needle. Electrocautery can then be used to subperiosteally elevate the paraspinal muscles from the lateral aspect of the spinous process. Usually the superior and inferior aspects of the adjacent segments are exposed as well. Blunt dissection with a Cobb elevator is completed laterally with the interlaminar space, starting from the lateral process as it meets the lamina. It is very important during the exposure to avoid damage to the facet joint.

Bipolar electrocautery is used for careful hemostasis. A rongeur can be used for removal of nonessential posterior muscle and soft tissue for visualization as well, while maintaining the interspinous ligament's integrity. In a side-to-side manner, a curet can then be used to disengage the ligamentum flavum. The curet should face cephalad, as the insertion