

Unnecessary multiple epidural steroid injections delay surgery for massive lumbar disc: Case discussion and review

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Abstract

Background: Epidural steroid injections (ESI) in the lumbar spine are not effective over the long-term for resolving “surgical” lesions. Here, we present a patient with a massive L2–L3 lumbar disk herniation whose surgery was delayed for 4 months by multiple unnecessary ESI, resulting in a cauda equina syndrome.

Methods: A 54-year-old male acutely developed increased low back and radiating left leg pain in October of 2014. In December of 2014, a magnetic resonance imaging (MRI) scan showed a massive central/left sided disk herniation at the L2–L3 level resulting in marked thecal sac and left L2 foraminal and L3 lateral recess root compression. Despite the marked degree of neural compression, pain management treated him with 3 ESI over the next 3 months.

Results: At the end of April of 2015, he presented to spine surgeon with a cauda equina syndrome. When the new MRI scan confirmed the previously documented massive central-left sided L2–L3 disk herniation, the patient emergently underwent an L1–L3 laminectomy with central-left sided L2–L3 lateral/foraminal discectomy. Postoperatively, the patient was neurologically intact.

Conclusions: Pain specialists performed multiple unnecessary lumbar ESI critically delaying spinal surgery for 4 months in this patient with a massive lumbar disk herniation who ultimately developed a cauda equina syndrome. Unfortunately, pain specialists (e.g., radiologists, anesthesiologists, and physiatrists), not specifically trained to perform neurological examinations or spinal surgery, are increasingly mismanaging spinal disease with ESI/variants. It is time for spine surgeons to speak out against this, and “take back” the care of patients with spinal surgical disease.

Key Words: Cauda equina syndrome, epidural steroid injections/variants, lumbar disk herniation, massive discs, pain specialists, spinal surgeons, unnecessary delay

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INTRODUCTION

Pain management specialists, typically comprised of radiologists, physiatrists, and anesthesiologists, who are neither trained to perform neurological examinations or spinal surgery, are increasingly performing not only

epidural spinal injections (ESI) and their variants, but even on occasion, “spinal surgery” (e.g., percutaneous discectomy). Most studies show ESI/variants have no long-term efficacy, and not only expose patients to the major risks and complications of the injections themselves, but also lead to critical delays in surgery that may lead

to permanent neurological injury.^[16,17] Here, we present a patient with a massive L2–L3 central-left sided disk herniation that filled the spinal canal whose surgery was critically delayed by pain management (anesthesiologist) for 4 months to perform 3 unnecessary ESI. Ultimately, the patient presented to this spinal surgeon with a cauda equina syndrome. When the second magnetic resonance imaging (MRI) showed a massive L2–L3 disk herniation, identical to the first MRI, he underwent an L1–L3 laminectomy with a central-left lateral/foraminal/lateral recess discectomy; fortunately, he fully recovered. Nevertheless, other similar patients under the care of pain specialists may receive months if not years of unnecessary ESI/variants, critically delaying their surgery and potentially leaving them with permanent neurological deficits.

CASE REPORT

A 54 year-old-male developed acute, radiating left sided low back, thigh, and buttock pain in October 2014. In December of 2014, an initial lumbar MRI documented a massive central-left sided disc nearly filling the spinal canal at the L2–L3 level accompanied by left foraminal/lateral recess compression of the L2 and L3 roots respectively [Figures 1 and 2]. A small, incidental right sided L4–L5 non-surgical paracentral disk herniation was also seen. Despite the massive size of the L2–L3 disc, the pain specialist performed 3 ESI during January, February, and March. When finally seen by this spine surgeon at the end of April 2015, he exhibited a forward/right sided tilt at 60°, and complained of severe intractable pain, numbness, and weakness in the left greater than the right lower extremity of several months' duration. Straight leg

raising was positive on the left at 10°/right at 20°; left sided motor function at the iliopsoas/quadriceps level was 2/5 with right sided iliopsoas/quadriceps function at the 3–4/5 level. He also had bilateral loss of the patellar and achilles responses, and profound pin loss left greater than right from L2 to S1. The new MRI and computed axial tomography scans (CT) documented the same massive disk herniation filling the spinal canal at the L2–L3 level with similar foraminal/lateral recess extension [Figures 3 and 4]. He underwent an emergency L1–L3 laminectomy with L2–L3 discectomy/foraminal decompression on the left. Postoperatively, the patient was and remains neurologically intact 3 months later.

FREQUENCY OF EPIDURAL/TRANSFORAMINAL FLUOROSCOPIC SPINAL INJECTIONS

Low back pain/sciatica accounts for 13% (the second most common) of the reasons for medical office visits in the US.^[19] Manchikanti *et al.* observed that there has been a 160% increase in epidural injections from 2000 to 2010; furthermore, “20% of physicians performing these procedures are not adequately trained,” and some are performed for ‘financial incentives’.^[15] ESI, including translaminar (TLES) (addresses more diffuse symptoms), and transforaminal (TFESI) approaches (directly treat a single nerve root), demonstrate “efficacy for up to 6 months, though long-term benefits are less reliable.”^[12] Other authors similarly comment that ESI provide short but not long-term pain relief for disk herniation/radiculitis, but neither short nor long-term benefits when treating lumbar spinal stenosis.^[16] Should we be condoning these injections that are performed by up to 20% of poorly trained physicians with “financial

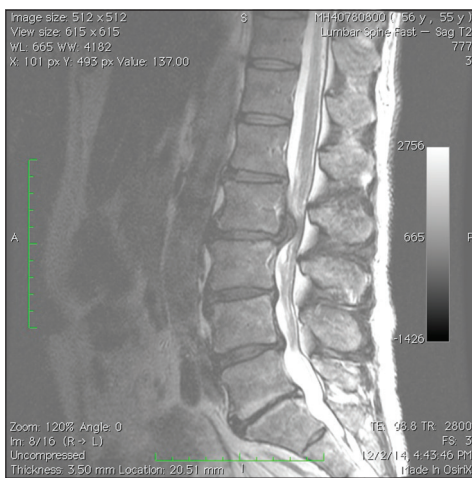


Figure 1: The preoperative December 2014 magnetic resonance imaging parasagittal study documented a massive central-left sided L2–L3 lumbar disk herniation resulting in severe thecal sac and left L2 and L3 foraminal/lateral recess root compression respectively. Notably the right mild/moderate sequestered L4–L5 disc was asymptomatic

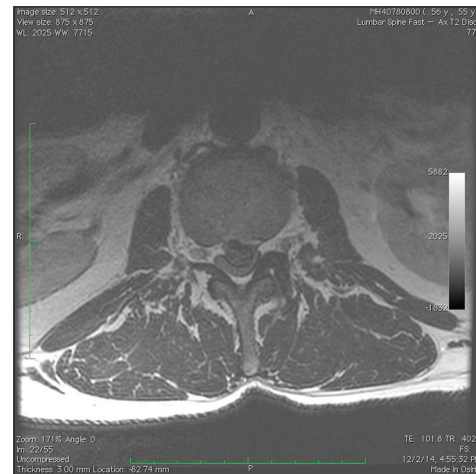


Figure 2: The preoperative December 2014 magnetic resonance imaging axial study documented a massive central-left sided L2–L3 disk herniation resulting in severe thecal sac and left L2 and L3 foraminal/lateral recess root compression respectively



Figure 3: The immediate preoperative April 2015 parasagittal magnetic resonance imaging study documented the same massive central-left sided L2–L3 lumbar disk herniation seen on the magnetic resonance imaging from December of 2014. It still resulted in severe central-left sided thecal sac and left L2 and L3 foraminal/lateral recess root compression respectively

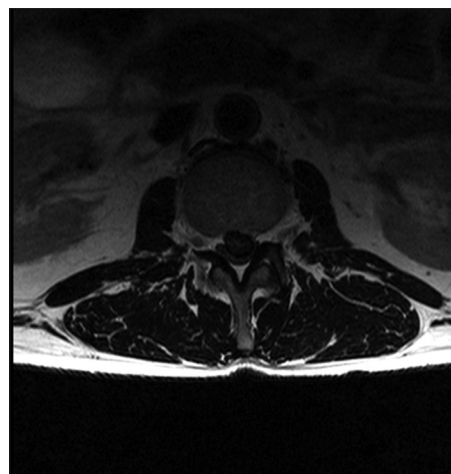


Figure 4: The immediate preoperative April 2015 axial magnetic resonance imaging study documented the same massive central-left sided L2–L3 lumbar disk herniation seen on the magnetic resonance imaging from December of 2014. It still resulted in severe central-left sided thecal sac and left L2 and L3 foraminal/lateral root compression respectively

incentives” to perform as many as possible, while providing no long-term benefits?

EQUAL EFFICACY OF EPIDURAL VERSUS OTHER INJECTIONS PERFORMED WITH/WITHOUT STEROIDS

ESI/TLESI are equally effective as other types/locations of injections performed with/without steroids. In a randomized, double-blind trial, Carrette *et al.* documented that ESI utilizing methylprednisolone acetate (80 mg methylprednisolone in 8 ml of isotonic saline) versus epidural injections performed with isotonic saline (1 ml) alone were equally effective when administered 3 times per patient in the management of sciatica.^[6] Similarly, when Valat *et al.* compared the efficacy of ESI versus epidural isotonic saline, they found “the efficacy of isotonic saline administered epidurally for sciatica cannot be excluded, but epidural steroid injections (ESI) provide no additional improvement.”^[20] In a 2-year randomized, double-blind, controlled trial of fluoroscopically guided caudal epidural injections performed with or without steroids, Manchikanti *et al.* concluded that both types of injections constituted an “effective treatment for a select group of patients who have chronic function-limiting low back and lower extremity pain secondary to central spinal stenosis.”^[14] In Wilson-MacDonald *et al.* study, 93 potential surgical candidates exhibited comparable 2-year outcomes (Oxford pain chart and Oswestry disability index [ODI]) utilizing ESI versus intramuscular injections of steroids/local anesthetic.^[22] Arden *et al.* found equal efficacy for performing three injections per patient utilizing either ESI vs. interligamentous saline injections (3 weeks apart) for patients with unilateral sciatica.^[3] At

3 weeks, 6 weeks, 3 months, and 1-year for all 158 patients with herniated discs, there were no significant differences in outcomes for either of the two groups involving a total of 158 patients with herniated discs. In short, there appeared to be no benefit to ESI/caudal steroid injections compared with multiple other modalities including intramuscular injections of steroids/local anesthesia vs. epidural or interligamentous saline alone.

MULTIPLE COMPLICATIONS OF ESI/TLESI ARE OFTEN UNDERREPORTED

Many studies cite the fact that the multiple complications of ESI/TLESI/TFLESI injections are often underreported [Table 1].^[8] Risks typically include; infection, epidural abscess, meningitis, diskitis, epidural hematoma, intravascular injections, nerve trauma/damage, mistaken subdural injections, intradural injections, cerebrospinal fluid fistulas, persistent headaches, air embolism, urinary retention, exposure to increased radiation, allergic reactions, seizures, blindness, osteonecrosis, osteoporosis, weight gain, and pituitary suppression.^[1,4,8,10-12,21,23]

ESI AVERT SURGERY IN PATIENTS WITH “SURGICAL” DISC DISEASE

In Riew *et al.* prospective, randomized, controlled, double-blind study, the authors compared the efficacy of selective nerve root injections utilizing bupivacaine/steroid (28 patients) versus bupivacaine alone (27 patients) in patients with radiculopathy attributed to “surgical” disk herniations.^[18] Patients could choose over 13–28 months to receive up to four injections; 20 of 28 receiving bupivacaine/steroid versus 9 of 27 receiving

Table 1: Complications and outcomes of spinal interlaminar epidural steroid injections and and transforaminal epidural steroid injections (modified)^[8]

Author/data	Complications	Complications
Manchikanti <i>et al.</i> ^[15] Facet nerve blocks 43,000 injections 7500 episodes	Complications >1% 11.4%-intravascular injury 76.3%-local bleeding 19.6%-oozing 1.2%-hematoma/profuse bleeding	Complications <1% Soreness, root irritation Vasovagal reactions Complications 0% Dural puncture/infection Cord irritation
Landa and Kim ^[12] Goodman <i>et al.</i> ^[10] Zimmerer <i>et al.</i> ^[23] 36 patients (SEA)	0-1.9%-epidural hematoma 1-2%-infection risk SEA secondary to 16-hematogenous spread 16-spine operations 4-epidural injections	0.1%-severe infections Epidural injections responsible for ***SEA 11.1%-epidural abscesses (4/36) 20%-surgical/epidural injections (4/20)
Berger <i>et al.</i> ^[4] 137,250 epidural analgesia for labor	04-6%-dural punctures 37%-managed-blood patches at 24 h	Blood patches efficacy 86%-failure rate 44%-persistent headache
Webb <i>et al.</i> ^[21] Epidural analgesia for labor	0.4-6%-dural punctures	28%-postural headaches (persisted)

*ILES: Interlaminar epidural steroid injectins; **TFESI: Transforaminal epidural steroid injectins; ***SEA: Spinal eidural abscess

bupivacaine alone decided against surgery (significant [$P < 0.004$]). The authors concluded that patients with radiculopathy and 1–2 level “surgical” disc disease should first undergo selective nerve root injections with corticosteroids before opting for surgery. Of note, in this study, the primary author is a spinal surgeon who would likely not have included patients with massive disk herniations who he and his colleagues thought were at risk of developing cauda equina syndromes.

EPIDURAL STEROIDS DO NOT REDUCE NEED FOR SPINAL SURGERY

For truly surgical spinal lesions, epidural injections (ESI, TLESi, TFLESi) do not avoid/reduce the need for surgery. In Carrette *et al.* randomized double blind trial for patients with disc disease, epidural steroids vs. epidural isotonic saline injections, “offered no significant functional benefit, nor did it reduce the need for surgery” up to 1-year later.^[6] When Bicket *et al.* examined 26 studies involving patients with spinal pain, they found only “moderate evidence” that patients receiving ESI were “less likely to undergo surgery” vs. control patients.^[5] Although ESI showed a “trend” to reduce the need for surgery within <1-year, this was not true over the longer-term (≥ 1 year). Cohen *et al.* additionally noted that the use of ESI are widely utilized but critically, “most subgroup analyses of controlled studies show no difference in surgical rates between ESI and control patients.”^[7] In Wilson-MacDonald *et al.*, 2-year outcomes utilizing ESI vs. intramuscular injections of steroids/local anesthetic, led to no substantial long-term differences

in the need for surgery in either group.^[22] When Arden *et al.* evaluated the efficacy of performing three ESI vs. interligamentous saline injections (3 weeks apart) for patients with unilateral sciatica, 1-year later, there were no long-term benefits regarding pain, function, or the need for surgery.^[3] More recently, Friedly *et al.* and Andersson’s views of the inefficacy of ESI were strongly opposed by Manchikanti *et al.*^[2,9,15] The former two authors observed that epidural injections of steroids/lidocaine offered little short-term benefit vs. epidural injections utilizing lidocaine only. Furthermore, they advised that patients with lumbar stenosis go on to have early, definitive surgery.^[2,9,15]

CONCLUSION

ESI/TLESi/TFESI are the most commonly performed procedures in the US for managing chronic low back pain. The procedures are not Food and Drug Administration (FDA) approved for this application, and are associated with major risks/complications.^[7,10,13,15,19] These steroid injections have been shown to be equally effective as intramuscular steroids, epidural saline or interlaminar saline injections, have no demonstrable long-term benefits, and have not reduced the need for surgery.^[4,5,10] Pain specialists, typically including anesthesiologists, physiatrists, and radiologists, are neither trained in neurology or in spinal surgery, but are increasingly performing ESI/variants for patients with surgical spinal lesions. Even more recently, and these physicians who are not spine specialists are performing percutaneous discectomies resulting in major morbidity/mortality (medicolegal communication). It is

time for spine surgeons to speak out against the overuse of ESI/variants, and to “take back” the care of patients with surgical spinal disease.

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