



Successful Pain Management in a Pregnant Woman with a Herniated Intervertebral Disc Using Ultrasound-Guided Epidural Steroid Injection: A Case Report

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This case report aimed to describe successful pain management and maintenance of pregnancy in a woman with a herniated intervertebral disc using ultrasound-guided epidural steroid injections (US ESI). A 43-year-old pregnant woman at 23 weeks' gestation presented with severe radiating pain extending from the hip to the thigh and calf. Magnetic resonance imaging revealed a herniated disc at the L5–S1 level with severe compromise of the thecal sac. Multiple rounds of US ESI were performed that reduced her pain from a numerical rating scale score of 9–10 to approximately 6. The patient underwent a cesarean section at 36 weeks and 6 days' gestation. Following delivery, the patient underwent a discectomy and has since experienced no recurrence of pain or complications. Pregnant women with herniated intervertebral discs may experience severe radicular pain but have limited treatment options. This case demonstrates that US ESI can be beneficial when appropriate.

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Introduction

Pregnancy is a unique physiological state that can exacerbate pre-existing spinal conditions such as herniated intervertebral discs.¹ Managing these conditions is particularly challenging because of the need to balance effective pain relief with maternal and fetal safety.² Herniated intervertebral discs at the L5–S1 level, which commonly lead to severe radicular pain, can significantly impair a woman's quality of life and complicate her pregnancy.

Treatment options for herniated discs traditionally include physical therapy, oral medications, and, in more severe cases, surgical interventions. However, during pregnancy, the use of certain medications is limited because of their potential teratogenic effects, while surgical interventions carry increased risks. This necessitates the exploration of alternative minimally invasive procedures that can provide effective pain relief while minimizing the risks to the mother and fetus.

Epidural steroid injections (ESI) have been widely used to manage radicular pain associated with herniated discs.³ The injection of corticosteroids into the epidural space can significantly reduce inflammation and pain. When guided by ultrasound (US), this procedure becomes safer and more precise, reducing the risk of complications.⁴ Despite the

well-documented efficacy of US-guided ESI (US ESI) in the general population, literature is limited on its application and outcomes in pregnant women.

Through this case report, we aimed to contribute to the existing body of knowledge by describing the successful use of US ESI for managing severe radicular pain in a pregnant woman with a herniated L5–S1 intervertebral disc. By detailing the patient's presentation, treatment, and outcomes, we highlight the potential of US ESI as a viable pain management strategy for this unique patient population. Our findings suggest that, when appropriately indicated, US ESI can provide significant pain relief, thereby improving maternal comfort and allowing the continuation of a healthy pregnancy.

Case

A 43-year-old woman at 23 weeks' gestation presented with severe continuously radiating pain in the left hip, thigh, and calf that had persisted for 2 to 3 weeks. She reported a pain intensity of 9–10 on the numerical rating scale (NRS)

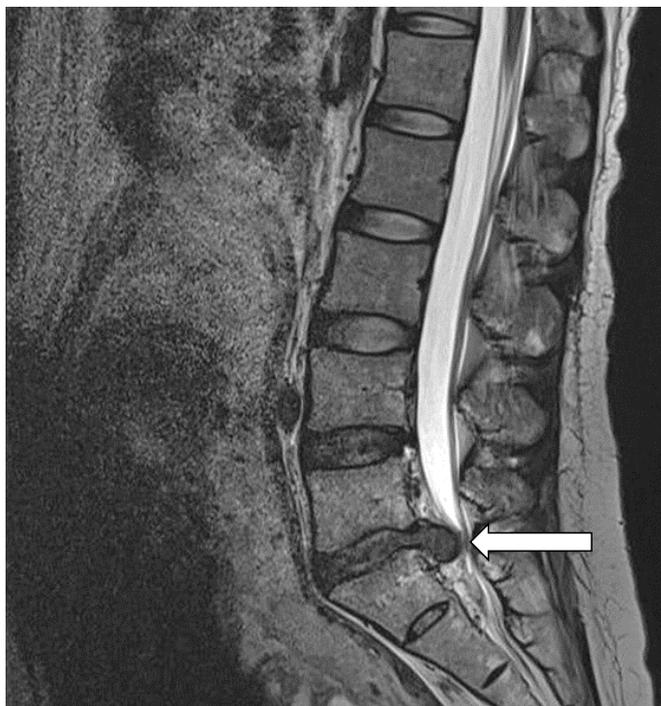


Fig. 1. Sagittal T2-weighted magnetic resonance image showing herniated nucleus pulposus at the L5–S1 level (arrow) compromising the thecal sac during pregnancy.

and described the pain as sharp and shooting that worsened with movement and walking but was mildly alleviated with rest. The patient also experienced a tingling sensation. The patient had no history of spinal deformity, trauma, or surgery. A physical examination revealed sensory deficits in the S1 dermatome without motor function impairment or bowel or bladder dysfunction. Conservative management with non-steroidal anti-inflammatory drugs provided minimal pain relief. Due to the persistent pain, magnetic resonance imaging (MRI) was performed at 27 weeks and 6 days' gestation. MRI showed a severely herniated central intervertebral disc at L5–S1 with severe compromise of the thecal sac (Fig. 1, 2).

At 28 weeks and 4 days' gestation, the decision to perform US ESI was made to alleviate the maternal pain while minimizing the risks to the fetus. After providing written informed consent, the patient was brought into the procedure room and placed in the left lateral decubitus position to avoid fetal stress and aortocaval compression. The procedure, performed using dexamethasone 5 mg/mL administered transforaminally under US guidance, was well tolerated with no immediate complications.

The initial injection did not significantly alleviate the patient's pain. Therefore, over the next few weeks, additional injections were administered at 1-week intervals. The second and third injections, administered at 29 weeks and 4 days' and 30 weeks and 2 days' gestation, respectively, reduced the pain by approximately 20%, decreasing the NRS from 9–10 to 7–8. Despite experiencing less daytime pain, the patient

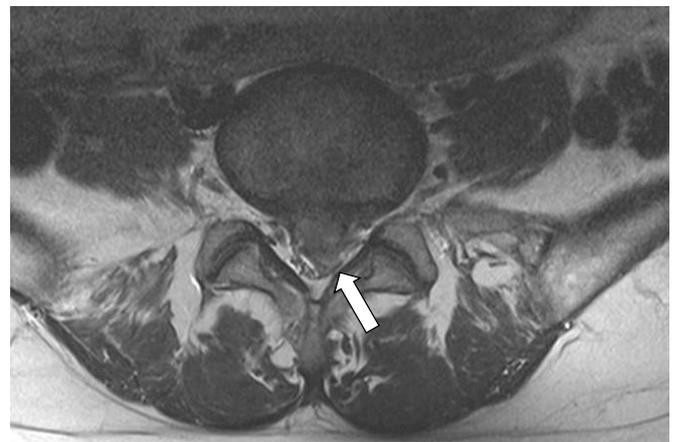


Fig. 2. Axial T2-weighted magnetic resonance image showing herniated nucleus pulposus at the L5–S1 level (arrow) compromising the thecal sac during pregnancy.

continued to have difficulty sleeping because of nighttime pain. At 31 weeks and 6 days' gestation, a fourth injection was administered, further decreasing the pain to an NRS of 6–7. This improvement allowed the patient to sit for approximately 5 minutes, which she previously could not do. A fifth injection, given at 32 weeks and 6 days' gestation, reduced the pain to an NRS of 6, allowing the patient to sleep at night (Fig. 3).

Discussion

Lower back pain affects approximately 56% of women during pregnancy,⁵ during which time the enlarged uterus can place stress on the lumbar joints. Additionally, increased levels of relaxin during pregnancy can lead to increased joint laxity, which may cause back or pelvic pain.¹ Disc herniation during pregnancy was once thought to affect approximately 1 in 10,000 pregnancies. However, this figure was derived from a small retrospective study of five patients conducted in the 1970s.⁶ With the advent of MRI, the same institution reported a tenfold increase in the incidence of pregnancy-associated disc herniation with an incidence of 1 in 1,000.⁷ The mana-

gement of disc herniation in pregnant patients should be planned by a multidisciplinary team to balance the maternal and fetal risks and benefits. Emergency surgery should be considered if neurological deficits such as cauda equina syndrome are present. However, these cases do not exceed 15% of patients with disc herniation.⁵

The American College of Obstetricians and Gynecologists recommends delaying elective surgeries until after delivery whenever possible.⁸ However, many women experience severe pain that limits their mobility, with 80% being affected and approximately 30% requiring bed rest due to severe pain.⁹ Uncontrolled pain can progress to a chronic pain condition, leading to increased maternal stress, depression, insomnia, and hypertension that can adversely affect fetal outcomes.¹⁰

Conservative management primarily comprises bed rest and oral analgesics. Nonsteroidal anti-inflammatory drugs should be avoided during the third trimester of pregnancy as they can cause closure of the ductus arteriosus and oligohydramnios.⁵ If pain persists despite 3 to 4 weeks of bed rest and oral analgesics, US ESI may be considered.

US ESI has been used cautiously in pregnant patients because of the potential maternal and fetal risks. While a single

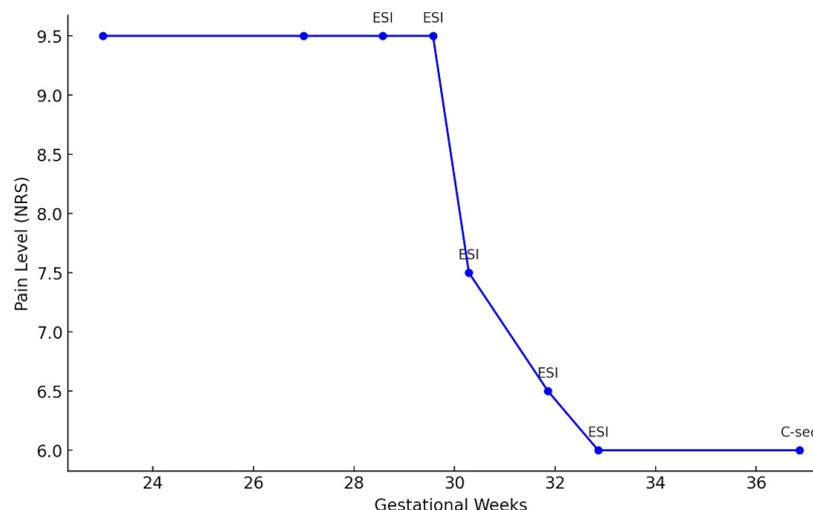


Fig. 3. Pain levels by gestational weeks. At 36 weeks and 6 days' gestation, the patient underwent a cesarean section (C-sec) under spinal anesthesia, delivering a healthy female infant weighing 3,150 grams. The 1- and 5-minute Apgar scores were 8 and 9, respectively. The newborn was in good overall condition with no complications. The patient underwent a discectomy following delivery. Postoperatively, she reported no recurrence of symptoms and maintained a tolerable condition without significant pain. NRS, numerical rating scale; ESI, epidural steroid injection.

dose is generally low risk, ESI should be reserved for severe symptoms or new lumbar nerve root compression signs.¹¹ Corticosteroids like betamethasone and dexamethasone can cross the placenta, but their epidural administration results in lower systemic absorption than oral or intravenous routes, minimizing fetal exposure.¹² Non-particulate steroids like dexamethasone are preferred for their safer profile.³ Limited data exist on ESI frequency and dosage in pregnant patients. Although X-rays are the most commonly used modality for spinal procedures, US can be useful without the concern of ionizing radiation.⁴ Monitoring maternal health for complications such as hypoxia, hypocarbia, and hypotension is crucial.

Case studies have suggested that ESI can provide significant pain relief in pregnant women with disc herniation, potentially reducing the need for invasive surgical intervention. The decision to use ESI should balance maternal pain relief and improved function against the risk of fetal corticosteroid exposure.

Recent studies explored the use of platelet-rich plasma (PRP) for epidural injections in patients with disc herniation.¹³⁻¹⁵ PRP is autologous, minimizes the risk of fetal exposure, is rich in growth factors and cytokines, promotes healing, reduces inflammation, and provides effective pain relief and tissue repair. Its use is generally considered safe, with minimal systemic absorption and reduced fetal risk.

Studies have demonstrated the efficacy of PRP at reducing pain and improving function in patients with disc herniation, potentially offering a safer alternative to traditional corticosteroid injections. However, further studies are required to fully understand the long-term safety and efficacy of PRP in pregnant patients.

In this case, our patient underwent a cesarean section due to advanced maternal age (43 years). Consensus is currently lacking regarding the delivery method for patients with herniated intervertebral discs. However, a study conducted by Brown et al. suggested that women with lumbar disc herniation may experience increased neurologic damage due to elevated epidural venous pressure while pushing during labor.¹⁶ In cases in which cauda equina syndrome is present or there is progressive motor weakness requiring urgent surgery, a cesarean section is performed; moreover, spinal surgery may be conducted under the same anesthesia.^{16,17}

In conclusion, although there is weak evidence of the analgesic and surgery-delaying effects of ESI in pregnant patients with disc herniation, US ESI can be a reasonable option in cases of severe pain or neurological deficits. Proper steroid selection, cautious use of imaging, and close monitoring of maternal and fetal health are essential to ensuring maternal and fetal safety during the procedure. Further studies are required to better understand the efficacy and long-term safety of US ESI in pregnant women.

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Conflict of Interest

No potential conflict of interest relevant to this article was reported.

Authors' Contributions

Conceptualization: JGB, SS; Data curation: SHN; Investigation: GSL; Supervision: JGB; Writing—original draft: GSL, SHN; Writing—review & editing: JGB, SS.

References

- 1) Smith MW, Marcus PS, Wurtz LD. Orthopedic issues in pregnancy. *Obstet Gynecol Surv* 2008;63:103-11.
- 2) Sehmbi H, D'Souza R, Bhatia A. Low back pain in pregnancy: investigations, management, and role of neuraxial analgesia and anaesthesia: a systematic review. *Gynecol Obstet Invest* 2017;82:417-36.
- 3) Knezevic NN, Candido KD, Vlaeyen JW, Van Zundert J, Cohen SP. Low back pain. *Lancet* 2021;398:78-92.
- 4) Hurdle MF. Ultrasound-guided spinal procedures for pain: a review. *Phys Med Rehabil Clin N Am* 2016;27:673-86.
- 5) Whiles E, Shafary R, Valsamis EM, Horton C, Morassi GL, Stokes O, et al.

- The management of symptomatic lumbar disc herniation in pregnancy: a systematic review. *Global Spine J* 2020;10:908-18.
- 6) LaBan MM, Perrin JC, Latimer FR. Pregnancy and the herniated lumbar disc. *Arch Phys Med Rehabil* 1983;64:319-21.
 - 7) LaBan MM, Rapp NS, von Oeyen P, Meerschaert JR. The lumbar herniated disk of pregnancy: a report of six cases identified by magnetic resonance imaging. *Arch Phys Med Rehabil* 1995;76:476-9.
 - 8) ACOG Committee Opinion No. 775 Summary: nonobstetric surgery during pregnancy. *Obstet Gynecol* 2019;133:844-5.
 - 9) Mens JM, Vleeming A, Stoeckart R, Stam HJ, Snijders CJ. Understanding peripartum pelvic pain. Implications of a patient survey. *Spine (Phila Pa 1976)* 1996;21:1363-70.
 - 10) Black E, Khor KE, Kennedy D, Chutatape A, Sharma S, Vancaillie T, et al. Medication use and pain management in pregnancy: a critical review. *Pain Pract* 2019;19:875-99.
 - 11) Connolly TM, Nadav D, Gungor S. Ultrasound-guided caudal epidural steroid injection for successful treatment of radiculopathy during pregnancy. *Pain Manag* 2020;10:67-71.
 - 12) Bellini M, Barbieri M. Systemic effects of epidural steroid injections. *Anaesthesiol Intensive Ther* 2013;45:93-8.
 - 13) Wongjarupong A, Pairuchvej S, Laohapornsvan P, Kotheeranurak V, Jitpakdee K, Yeekian C, et al. "Platelet-Rich Plasma" epidural injection an emerging strategy in lumbar disc herniation: a randomized controlled trial. *BMC Musculoskelet Disord* 2023;24:335.
 - 14) Kawabata S, Akeda K, Yamada J, Takegami N, Fujiwara T, Fujita N, et al. Advances in platelet-rich plasma treatment for spinal diseases: a systematic review. *Int J Mol Sci* 2023;24:7677.
 - 15) Rawson B. Platelet-rich plasma and epidural platelet lysate: novel treatment for lumbar disk herniation. *J Am Osteopath Assoc* 2020;120:201-7.
 - 16) Brown MD, Brookfield KF. Lumbar disc excision and cesarean delivery during the same anesthesia: a case report. *J Bone Joint Surg Am* 2004; 86:2030-2.
 - 17) Geftler A, Sasson A, Shelef I, Perry ZH, Atar D. Cauda equina syndrome in a 36 week gravida patient. *Isr Med Assoc J* 2015;17:522-3.