

CASE REPORT

Surgical Management of the Pregnant Patient With Lumbar Disc Herniation in the Latter Stage of the Second Trimester

Kazuo Hayakawa, MD, PhD,^{*,†} Jun Mizutani, MD, PhD,^{*,‡} Nobuyuki Suzuki, MD, PhD,^{*}
Christopher Haas, MD, PhD,[†] Akira Kondo, MD, PhD,^{*} Seiji Otsuka, MD, PhD,^{*}
Muneyoshi Fukuoka, MD, PhD,^{*} and Takanobu Otsuka, MD, PhD^{*}

Study Design. Case report.

Objective. To report on a pregnant woman successfully treated with microendoscopic discectomy in the left lateral position under general anesthesia at 24-week gestation.

Summary of Background Data. Treatment for lumbar disc herniation in pregnant women poses a particular challenge due to the complexity of the clinical situation. Review of the literature emphasizes timely diagnosis with adequate management specific for each gestational period. A surgical approach mandates consideration of the physiologic parameters of pregnancy and the effects of these stressors on the fetus.

Methods. A 38-year-old primigravid woman presented with persistent and incapacitating low back and left leg pain. Magnetic resonance imaging demonstrated a herniated disc at L4-5 with a severely compressed left L5 nerve root. Symptoms were resistant to conservative treatment (acetaminophen; 1200 mg/day) and nerve root block with corticosteroids (1 mg/0.5 mL of betamethasone plus 0.5 mL of 1% lidocaine) provided only transient pain relief. Operative management with surgical discectomy was discussed. Anesthesiologists, obstetricians, and neonatologists were consulted for preoperative planning,

focusing on appropriate anesthesia, ideal positioning for surgical access, and provision for emergent fetal care. Surgery was ultimately performed in the left lateral position, in contrast to the oft-used prone position. Microendoscopic discectomy was performed under general anesthesia at 24-week gestation.

Results. The patient experienced complete relief from pain after surgical intervention and delivered a healthy baby at 39-week gestation after normal labor. Our methods, used in accordance with our preoperative simulation, resulted in a satisfactory outcome for both mother and child.

Conclusion. Although previously published cases noted the safety of operating in the prone position under epidural anesthesia, we performed minimally invasive microendoscopic discectomy in the left lateral position in combination with general anesthesia and found that this is a safe and preferable alternative for pregnant patients in the latter stage of the second trimester.

Key words: coherent teamwork, fetal monitoring, general anesthesia, left lateral decubitus position, lumbar disc herniation, microendoscopic discectomy, pregnancy, preoperative simulation, second trimester, surgical management.

Level of Evidence: N/A

Spine 2017;42:E186–E189

From the ^{*}Department of Orthopaedic Surgery, Graduate School of Medical Sciences, Nagoya City University, Nagoya, Japan; [†]Drexel University College of Medicine, Philadelphia, PA; and [‡]Department of Rehabilitation Medicine, Graduate School of Medical Sciences, Nagoya City University, Nagoya, Japan.

Acknowledgment date: February 8, 2016. First revision date: May 7, 2016. Acceptance date: June 1, 2016.

The device(s)/ drug(s) is/are FDA-approved or approved corresponding national agency for this indication.

No funds were received in support of this work.

Relevant financial activities outside the submitted work: consultancy, grants, payment for lectures, payment for manuscript preparation.

Address correspondence and reprint requests to Jun Mizutani, MD, PhD, Department of Rehabilitation Medicine and Orthopaedic Surgery, Graduate School of Medical Sciences, Nagoya City University, 1 Kawasumi, Mizuho-cho, Mizuho-ku, Nagoya, Aichi 467-8601, Japan; E-mail: mjun.mac1@mac.com

DOI: 10.1097/BRS.0000000000001741

E186 www.spinejournal.com

Although symptomatic lumbar disc herniation (LDH) during pregnancy is rare,¹ some patients experience incapacitating pain resistant to conservative management that requires surgical treatment.² Surgeons must carefully consider the risks and benefits of surgery, the effects of anesthesia and patient positioning on the mother and fetus, and a provision for urgent intervention in the event of preterm labor or fetal distress during surgical discectomy.^{3,4} We present the case of a pregnant woman who underwent microendoscopic discectomy (MED) in the left lateral position under general anesthesia at 24-week gestation. The case presented here serves to illustrate a novel, safe approach to surgical management of the pregnant patient with respect to the timing of surgery,

February 2017

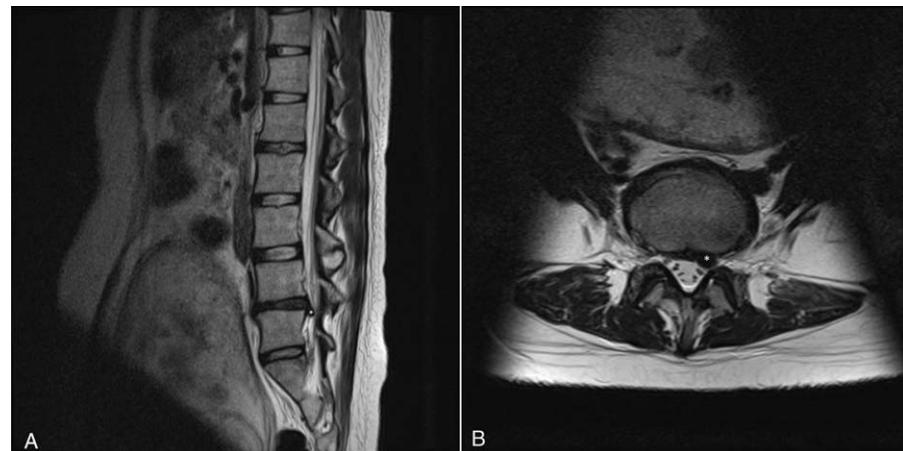


Figure 1. Preoperative MRI shows a herniated disc at L4-5 level (asterisk) and a definitively compressed nerve root (arrowhead). (A) Sagittal T2-weighted image. (B) Axial T2-weighted image. Images were taken at 20-week gestation. MRI indicates magnetic resonance imaging.

anesthetic methods, and surgical positioning in the latter stage of the second trimester.

CASE REPORT

A 38-year-old primigravid woman presented with excruciating low back and left leg pain. Physical examination revealed muscle weakness in ankle dorsiflexion (4/5), and dysesthesia along the left L5 nerve root dermatome. Despite outpatient medical management (acetaminophen;

1200 mg/day), her symptoms became progressively incapacitating and she was hospitalized at 20-week gestation.

Magnetic resonance imaging demonstrated LDH at L4-5 with a severely compressed left L5 nerve root (Figure 1A, B). Nerve root block with corticosteroids (1 mg/0.5 mL of betamethasone plus 0.5 mL of 1% lidocaine) provided transient pain relief.⁵ Surgical management was discussed with anesthesiologists, obstetricians, and neonatologists. Preoperative planning was performed in the operating room with the



Figure 2. Practical views of preoperative simulation/surgical setting. (A) Illustration of surgical positioning/setting performed with a healthy volunteer. The patient was placed in the left lateral decubitus position. To avoid pressure on the fetus, a pillow supported the patient's abdomen. A supporting pad positioned on the sternum and adhesive tape placed along the thigh were used to stabilize the patient's ventral aspect with minimal abdominal contact. In this setting, the patient's position was capable of rapid conversion to a supine position. (B) After sterile draping, an obstetrician was able to access the patient's abdomen to manage fetal monitoring devices. (C, D) Surgical discectomy was performed by an intralaminar approach using METRx MED System (Medtronic Sofamor Danek, Memphis, TN) and high-definition 3-chip camera system (Stryker, Kalamazoo, MI). This surgical approach afforded the surgeons sufficient working space to perform the procedure.

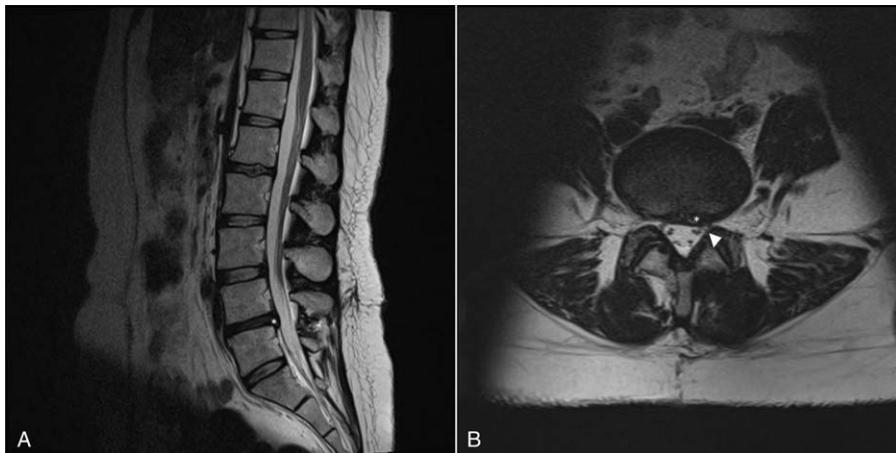


Figure 3. Follow-up MRI at 2 years postsurgery. (A) Sagittal and (B) axial T2-weighted images demonstrated resolution of the herniated disc (asterisk) and no nerve root compression (arrowhead). MRI indicates magnetic resonance imaging.

patient to optimize patient positioning, enabling intraoperative fetal monitoring and alternative positioning in the event of fetal distress. We found that lateral positioning was preferable to prone positioning, and therefore MED was performed via an intralaminar approach in the left lateral position under general anesthesia at 24-week gestation (Figure 2A–D). Fetal monitoring throughout surgery was uneventful.

The patient reported complete resolution of pain immediately after surgery (visual analog scale (VAS) score; back pain 3 to 0, leg pain 10 to 0, pre- and 1 month postsurgery, respectively). She delivered a healthy boy at 39-week gestation after a normal labor. At the most recent follow-up, 2 years after surgery, she remained symptom free and retained normal motor and sensory function (Figure 3A, B). The infant was developing appropriately.

DISCUSSION

Surgical treatment for pregnant patients with LDH is particularly challenging. Previously published cases have highlighted that surgical indications for lumbar discectomy during pregnancy are not different from nonpregnant cases.^{6,7} Few pregnant patients, however, readily accept surgical treatment due to anxiety over potential fetal risk. In our case, consultation with subspecialists, followed by preoperative simulation to optimize surgical management, resulted in relief of patient anxiety.

Optimal surgical positioning should be selected according to gestational age. Although Brown *et al* reported on the safety of operating in the prone position, ideal positioning, especially in the latter stage of the second trimester, is controversial.^{3,7} Han *et al*⁶ noted that prone positioning is not recommended beyond 12-week gestation due to the risk of aortocaval compression by the fetus, and that left lateral positioning is indicated during the second and third trimesters. Right lateral positioning may increase the risk of compression of the inferior vena cava.⁸ We simulated surgical positioning and found that left lateral positioning also offers the advantage of exposing the patient's abdomen after

sterile draping and conversion of the patient's position in the event of fetal distress, necessitating urgent surgical delivery (Figure 2A, B).⁹ In terms of gestational age, neonatal survival rates by cesarean delivery in Japan are 30% and 60% at 22 and 23 weeks, respectively. Beyond 24 weeks, survival rates are greater than 80%.^{10,11} Thus, if the clinical situation allows, we recommend delaying surgical treatment beyond 24-week gestation, unless patients show severe neurological deficits.

With respect to anesthetic choice, no reports have demonstrated adverse effects of epidural anesthesia.⁷ Nevertheless, spinal/epidural anesthesia often causes sudden hypotension secondary to vasodilation of peripheral blood vessels, potentially resulting in fetal distress and preterm labor.¹² On the other hand, general anesthesia has a rapid and reliable onset and may even suppress preterm labor when a volatile agent is used. At present, no anesthetic has been proven to be teratogenic in humans.³

In view of the risks and benefits, we used general anesthesia with minimally invasive MED, as it offers enhanced surgical access to left- or right-sided herniated discs in the left lateral position. Percutaneous endoscopic discectomy is a reasonable surgical alternative that enables minimally invasive discectomy under local anesthesia, but may be more indicated in the patient with a right-shifted herniated disc, due to the angulation of the transforaminal approach. These procedures provide high patient satisfaction, lower intraoperative blood loss, and shorter hospitalization periods when compared with open discectomy.^{13,14}

CONCLUSION

We present the case of a pregnant patient who underwent MED under general anesthesia at 24-week gestation in the left lateral position with complete resolution of symptoms. In summary, we recommend that surgical discectomy be delayed beyond 24-week gestation in the absence of severe maternal neurological deficits, and that preoperative MED simulation, left lateral positioning, and general anesthesia represent a safe alternative to medical management.

➤ Key Points

- Appropriate management of lumbar disc herniation in pregnant women for each gestational stage requires a precise understanding of the physiologic parameters of pregnancy and the effects on the fetus.
- Pregnant woman with lumbar disc herniation being considered for surgical management requires coherent and coordinated collaboration between spinal surgeons, obstetricians, anesthesiologists, and neonatologists.
- Simulation of operative planning with the patient before surgery is important in choosing appropriate management.
- This is the first report of a pregnant woman who underwent microendoscopic discectomy in the lateral position under general anesthesia for treatment of lumbar disc herniation.
- Endoscopic discectomy is a useful and safe alternative for the management of lumbar disc herniation in a pregnant woman.

3. Iyilikci L, Erbayraktar S, Tural AN, et al. Anesthetic management of lumbar discectomy in a pregnant patient. *J Anesth* 2004;18:45–7.
4. Moaveni DM, Birnbach DJ, Ranasinghe JS, et al. Fetal assessment for anesthesiologists: are you evaluating the other patient? *Anesth Analg* 2013;116:1278–92.
5. Goodman BS, Carnel CT, Mallempati S, et al. Reduction in average fluoroscopic exposure times for interventional spinal procedures through the use of pulsed and low-dose image settings. *Am J Phys Med Rehabil* 2011;90:908–12.
6. Han IH, Kuh SU, Kim JH, et al. Clinical approach and surgical strategy for spinal diseases in pregnant women: a report of ten cases. *Spine (Phila Pa 1976)* 2008;33:E614–9.
7. Brown MD, Levi AD. Surgery for lumbar disc herniation during pregnancy. *Spine (Phila Pa 1976)* 2001;26:440–3.
8. Vougioukas VI, Kyroussis G, Glasker S, et al. Neurosurgical interventions during pregnancy and the puerperium: clinical considerations and management. *Acta Neurochirurgica* 2004;146:1287–91.
9. Katz JD, Hook R, Barash PG. Fetal heart rate monitoring in pregnant patients undergoing surgery. *Am J Obstet Gynecol* 1976;125:267–9.
10. Ogawa M, Matsuda Y, Kanda E, et al. Survival rate of extremely low birth weight infants and its risk factors: case-control study in Japan. *ISRN Obstet Gynecol* 2013;2013:873563.
11. Su BH, Hsieh WS, Hsu CH, et al. Neonatal outcomes of extremely preterm infants from Taiwan: comparison with Canada, Japan, and the USA. *Pediatr Neonatol* 2015;56:46–52.
12. Douglas J, Choi D. Spinal anesthesia for obstetrics: discovery, rediscovery. *Can J Anaesth* 2000;47:833–6.
13. Cong L, Zhu Y, Tu G. A meta-analysis of endoscopic discectomy versus open discectomy for symptomatic lumbar disk herniation. *Eur Spine J* 2015;25:134–43.
14. Sairyo K, Egawa H, Matsuura T, et al. State of the art: transforaminal approach for percutaneous endoscopic lumbar discectomy under local anesthesia. *J Med Investig* 2014;61:217–25.

References

1. LaBan MM, Perrin JC, Latimer FR. Pregnancy and the herniated lumbar disc. *Arch Phys Med Rehabil* 1983;64:319–21.
2. Abou-Shameh MA, Dosani D, Gopal S, et al. Lumbar discectomy in pregnancy. *Int J Gynaecol Obstetr* 2006;92:167–9.