

## A rare case of L5-S1 right severe foraminal stenosis and paramedian disc herniation result in foot drop of right lower extremity: A case report

Ngoc Quyen Nguyen<sup>1\*</sup>, Trong Hau Phan<sup>2</sup>

1 108 Military Central Hospital, Department of Out-patient Clinic, Hanoi, Viet Nam

2 108 Military Central Hospital, Department of Spinal Surgery, Hanoi, Viet Nam

\* Corresponding Author: Ngoc Quyen Nguyen E-mail: [bsquyenpts108@gmail.com](mailto:bsquyenpts108@gmail.com)

### ABSTRACT

**Objective:** the authors presented a extremely rare case of severe foraminal stenosis combined with huge lateral lumbar disc herniation

**Case presentation:** The authors presented a 74 – year old, male with type II chronic diabetes, had severe pain of the dermatomal distribution of L5, S1 nerve roots, and foot-drop of the right lower limb. When we evaluated the patient’s MRI, the huge paramedian disc herniation of the right L5-S1 level was seen and the right L5-S1 laminotomy and discectomy were planned for the treatment of the patient. However, the clinical symptoms were not completely correlated with that MRI finding so that, we re-checked the MRI, particularly at the lumbosacral region, and the right severe foraminal stenosis of L5-S1 level was found. The patient underwent surgery with facetectomy, transforaminal interbody fusion, and pedicle screw fixation. After the operation, the patient has quickly reduced radiating pain of the right lower extremity, although the foot-drop was not improved. Because of the huge lateral lumbar disc herniation impression, that could affect the assessing the patient’s injury correctly, leded consequences of a missing diagnosis of foraminal stenosis and inadequate surgery method.

**Conclusion:** It is essential to detail examination of the clinical manifestations and thorough assessment of MRI for evaluation of the correlation between the physical examination and MRI findings before making the decision of surgical method.

**Keywords:** Foraminal stenosis, Lumbar disc herniation, Clinical feature, Image finding,

### INTRODUCTION

Lumbar disc herniation (LDH) is one of the most common disorder of a lumbar degeneration among adults and has a reported lifetime occurrence as high as 40% (1). It usually involves at L4–L5 or L5–S1 level (95%), results in the majority of herniated disc cases (2, 3). The symptoms of LDH commonly include one, or a combination, of the following: 1) typical sciatica symptoms of injured nerve root such as lower back pain, and/or pain in the buttock, and/or leg and/or foot pain, and/or numbness, weakness, and/or tingling in the leg and/or foot; and 2) in a serious case has loss of bladder or bowel control which is known as cauda equina syndrome. Lumbar foraminal stenosis (LFS) is a condition seen in degenerative lumbar spines in which a nerve root is compressed in a narrowed lumbar foramen. LFS is a relatively common disease that accounts for approximately 8%–11% of degenerative lumbar spinal diseases (4, 5). In the clinical manifestations of LFS, radicular leg pain is often predominant, (6) leg pain at rest is also seen in LFS, which is often increased in the sitting or supine position, and in the lateral decubitus position on the side affected by LFS (7). The pain is often severe and radiating with a dermatomal distribution and may be exacerbated with the lumbar extension on the painful side (Kemp’s sign), which illustrates well the dynamic anatomical features of LFS (8). The most common nerve root involved in LFS is the L5 nerve root (75 %) (4). The diagnosis and surgical treatment of LDH or LFS are well-known. However, the combination of ipsilateral foraminal stenosis and paramedian disc herniation at the L5-S1 level is very rare, to the best of our knowledge; it has been no report of this condition in the English literature.

### Case Report Article

Received 26-09-2021

Accepted 11-10-2021

Available Online: 15-10-2021

Published 30-10-2021

Distributed under  
Creative Commons CC-BY-NC 4.0

OPEN ACCESS



## Case presentation

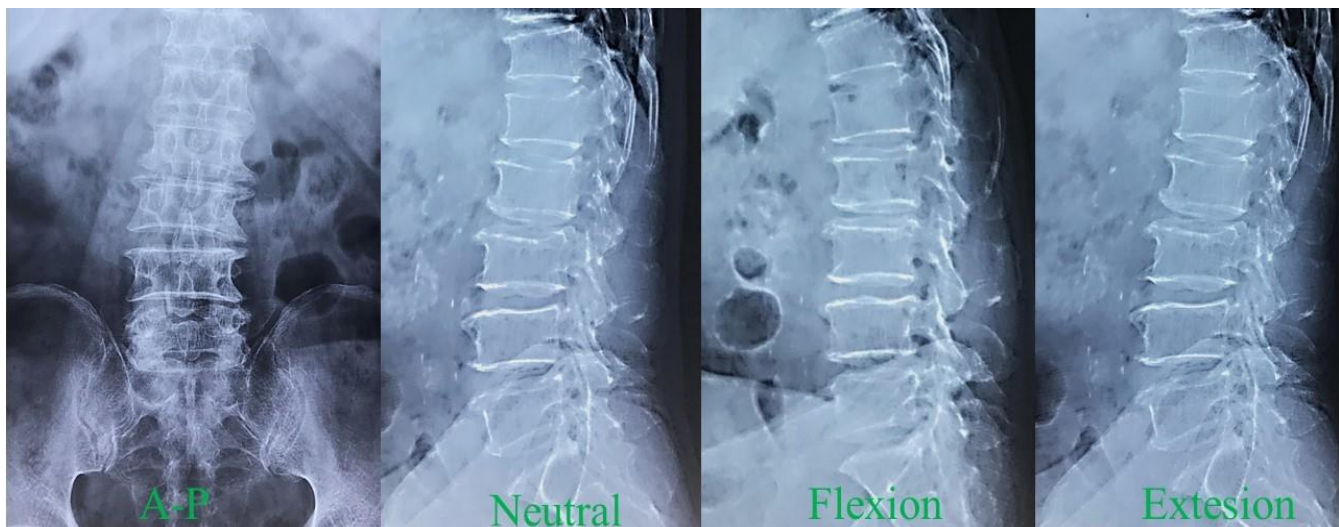
A 74-year – old, male, retired worker was admitted to our spine unit of 108 Military Central Hospital, Hanoi, Vietnam, on June 2021 because of severe radicular pain and foot-drop of the right lower extremity. He had type II chronic diabetes for 10 years. One year and a half before coming to our hospital, he got numbness, radiating pain of right lower limb but he could not describe the dermatomal distribution, and he was treated with Vietnamese traditional medicine for about one year. The radicular pain was reduced however the numbness and tingling were increased and the significant muscle weakness of the right foot dorsiflexion, toe extension was appeared for 3 months before coming to our hospital, but he could walk without support. Three weeks before admission, he suddenly had terrible pain, which radiated into the buttock, posterior lateral thigh, and shaft of the right limb resulted in him being unable to walk on his own and he had to use a wheelchair. He took the painkillers, however, his pain was not only decreased but also got worse. The muscle strength of the right big toe and foot extensors was grade zero. His Achille tendon reflex was absent, and the straight leg raise test was positive at 30 degrees on the right leg.

Plain radiographs (**Figure 1**) showed the degenerative lumbar spine without instability. At first, a large herniated disc of the right L5-S1 was seen on MRI (**Figure 2**).

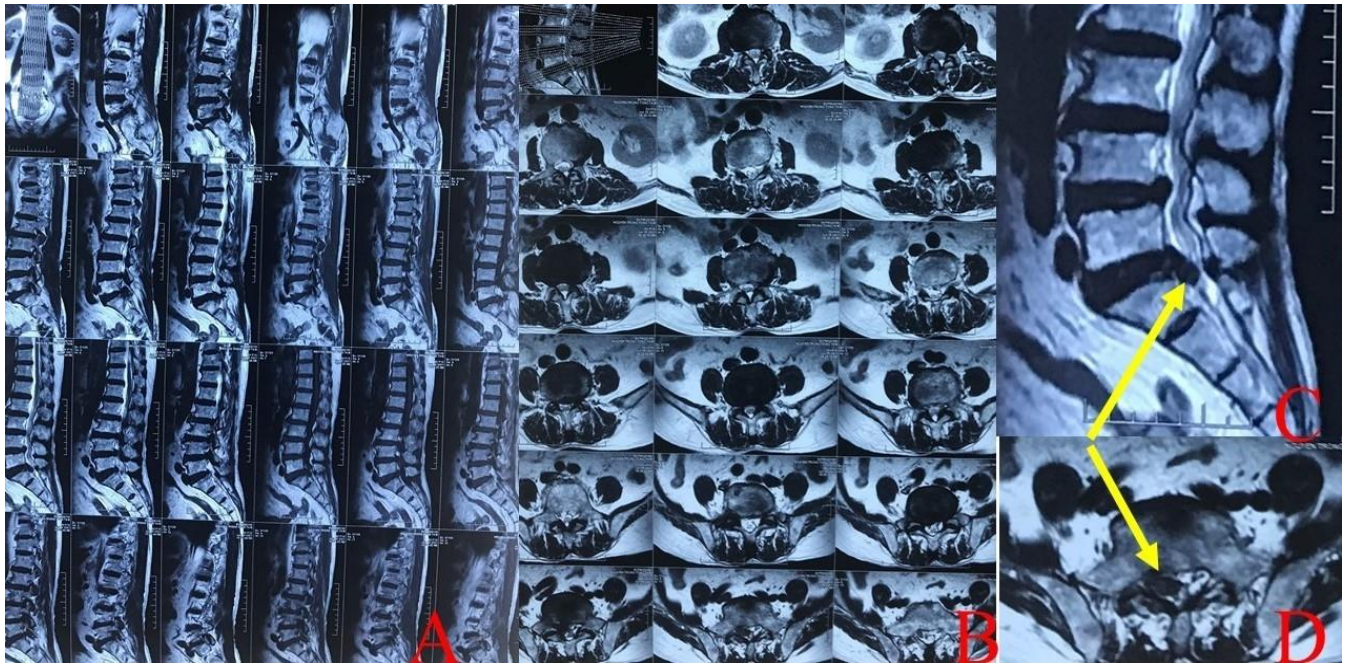
Thus, we supposed this injury caused the patient's symptoms and the surgical procedure of right laminotomy and discectomy of right L5-S1 disc was planned. However, considering of the patient's clinical symptoms, we thought that the right herniated L5-S1 disc alone was not completely consistent.

We re-evaluated the MRI of the patient and the severe stenosis of the right L5S1 foramina was found (Figure 3). We did a selective nerve root block test by injection of right L5-S1 foramen and the patient's right leg pain was reduced by 70% in 24 hours.

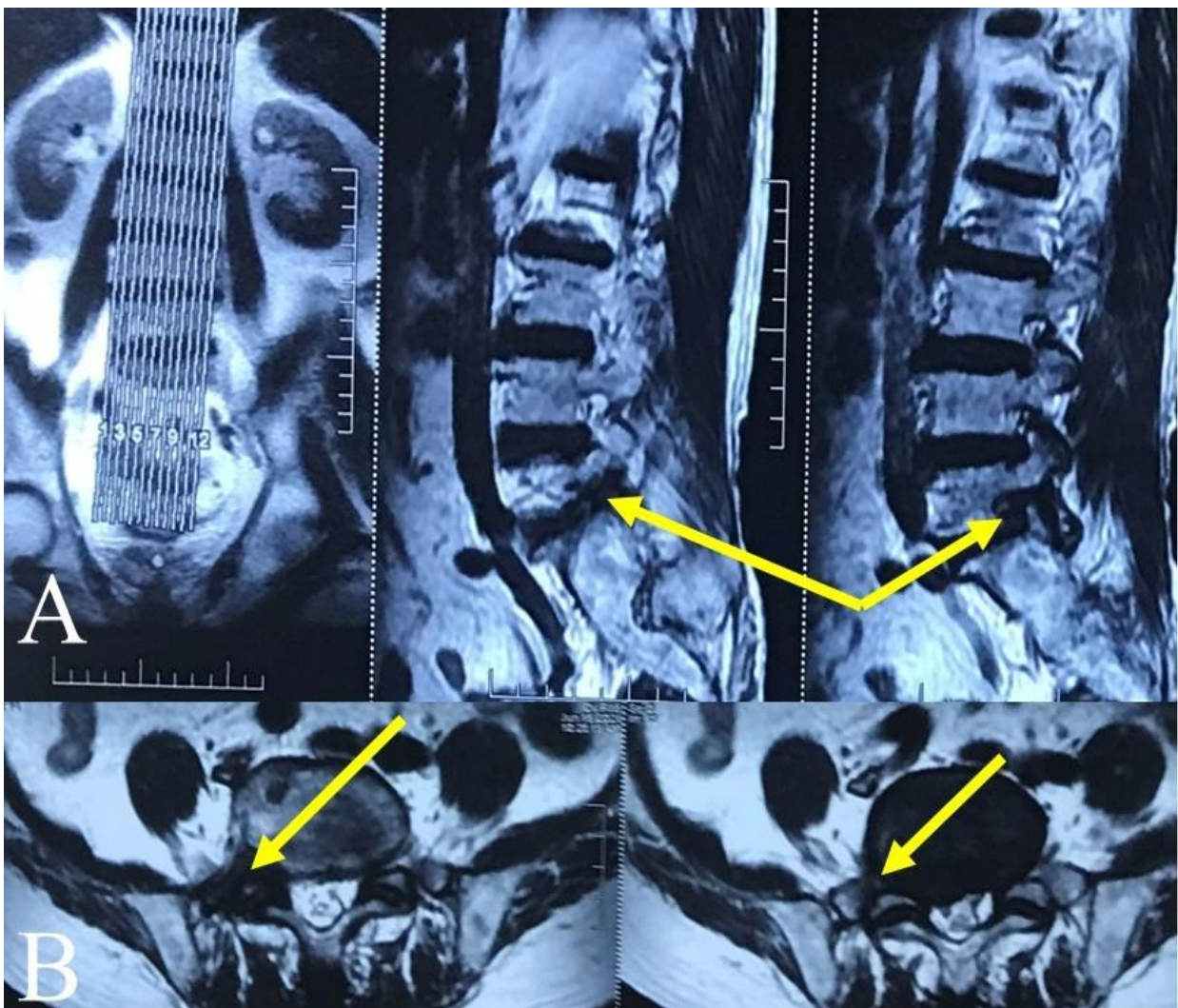
The operation with total facetectomy, laminotomy and discectomy of right L5-S1 level was performed for the patient. We also added the pedicle screw fixation and L5-S1 interbody fusion because of resection of the right L5-S1 facet joint. Peri-operative, we found the fragment of the herniated disc on right paramedian L5-S1 level and the severe compression of right L5 nerve root was caused by posterolateral osteophytes protruding into the foramen without a far-lateral herniated disc. Post-operatively, the terrible pain of the right lower limb was gone, but the foot-drop was not changed. On the 3rd postoperative day, the patient started to walk with a walking frame, and he was discharged after 10 days of surgery.



**Figure 1:** Plain radiography shows lumbar degeneration without instability.



**Figure 2:** MRI shows huge herniation of right L5-S1 disc: Fig. 2A, B. All axial, sagittal slices of the MRI of patient's lumbar spine; Fig. 2D,C, Illustrated Images of right huge L5S1 disc herniation on axial, sagittal MRI (head of yellow arrows).



**Figure 3:** Grade 3 of right L5S1 foramininal stenosis was seen on MRI (head of yellow arrows): Fig. 3A. Sagittal slice; Fig. 3B axial slices.

## DISCUSSION

Although, many studies of LDH and LFS have been reported in the literature but the combination of LDH and LFS at the same side of L5-S1 level is really rare. The symptomatic L5-S1 disc herniation often causes radiculopathy of S1 nerve root (9) and severe L5-S1 foraminal stenosis may result in the symptoms of L5 nerve root compression (8). The diagnosis of LDH is well-known, and MRI is the gold standard for imaging to confirm suspected LDH (10). It is more difficult to diagnose the compressive condition of the lumbar foraminal zone. Lee et al. (11) subdivided the lateral intervertebral region into the lateral recess (entrance) zone, foraminal zone (vertical interpedicular [foramen]) zone, and extraforaminal zone. The foraminal zone lies beneath the lamina and facet joints and is also appropriately referred to as the “hidden zone” (12). In diagnosing LFS, physicians should bear in mind that visualization of the foramen in the “hidden zone” still carries on difficult because of its anatomical and clinical features, and therefore, LFS can produce false-positive findings (8). To solve the false positive problem, selective nerve root imaging and block are reported to be also helpful as a diagnostic technique (13). Radiological diagnosis of LFS is usually needed to perform multiple radiological modalities, including plain, dynamic X-ray, and computed tomography and magnetic resonance imaging, or even novel protocols such as diffusion tensor imaging (8). The lumbar foraminal pathologies may be missed diagnosis or delayed treatment, particularly in combination with other disorders. LFS is often unrecognized and accounts for approximately 60 % of failed back surgery syndromes with continued post-operative symptoms (4, 14, 15) reported a case with delayed treatment of L5-S1 foraminal stenosis because of a massive uterine myoma. In our case, we initially missed diagnosis of right L5-S1 foraminal stenosis because the right L5-S1 disc was clearly seen on MRI. However, why did the patient have foot-drop and the pain of L5 root dermatome of the right leg? We thoroughly re-evaluated the patient’s MRI, particularly the L5-S1 foraminal zone and we found grade 3 foraminal stenosis on the right side according to Lee’s MRI grading system of LFS (16). Although, it is obvious to any spine surgeon that detailed examination of the clinical manifestations and thorough assessment of MRI for evaluation of the correlation between the physical examination and MRI findings before making the decision of surgical method are essential. However, in the case with atypical manifestation of lumbar nerve root compression, the correlation between the physical examination and image findings should be frequently checked in order to do not overlook any disorders of lumbar spine, particularly in foraminal zone.

Until now, there are several available surgical methods for treatment of L5-S1 paramedian disc herniation or foraminal stenosis alone including traditional procedure or minimal invasive surgery or endoscopic surgery. The severe foraminal stenosis may need to add the fixation and fusion. However, for the case of LDH combined with the ipsilateral foraminal stenosis of L5-S1 level like our patient, the surgical procedure may be more challenging because the surgical approaches need to achieve the removal of paramedian disc herniation and the adequate decompression of foraminal zone. From out-point of view, the endoscopic surgery with transforaminal or

interlaminar approach could be applied for this case, but this kind of surgery needs long learning – curve and the surgeon has to have a lot of experience in endoscopic spinal surgery for the treatment of LDH and LFS. We had never seen this kind of patient so that we chose the traditional transforaminal interbody fusion for our patient because this approach is very familiar to any spine surgeon. However, after experiencing this case, we suppose that the transforaminal interbody fusion with minimally invasive surgery may be the better choice.

## CONCLUSION

Although, it is obvious to any spine surgeon that detail examination of the clinical manifestations and thorough assessment of MRI for evaluation of the correlation between the physical examination and MRI findings before making the decision of surgical method are essential. However, in the case with atypical manifestation of lumbar nerve root compression, the correlation between the physical examination and image findings should be frequently checked in order to do not overlook any disorders of lumbar spine, particularly in the foraminal zone. The surgical procedure for this kind of patient may be more complicated than LDH or LFS alone. There are several surgical treatments which could be chosen, but it may depend on the experience and preference of the surgeons.

**Author Contributions:** NON, THP: Research of the literature, Patient examinations and Therapy, Patient follow-ups, NON; Manuscript preparation and revisions.

**Financial & competing interest's disclosure:** The authors have no relevant affiliations or financial involvement with any organisation or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

**Conflict of interest:** The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. This research did not receive and specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## REFERENCES

1. Frymoyer JW, Pope MH, Clements JH, Wilder DG, MacPherson B, Ashikaga T. Risk factors in low-back pain. An epidemiological survey. *J Bone Joint Surg Am.* 1983 Feb;65(2):213–8.
2. Postacchini F, Postacchini R. Operative management of lumbar disc herniation : the evolution of knowledge and surgical techniques in the last century. *Acta Neurochir.* 2011;108:17–21.
3. Pouriesia M, Fouladi RF, Mesbahi S. Disproportion of end plates and the lumbar intervertebral disc herniation. *Spine J.* 2013 Apr;13(4):402–7.
4. Jenis LG, An HS. Spine update. Lumbar foraminal stenosis. *Spine (Phila Pa 1976).* 2000 Feb;25(3):389–94.
5. Kunogi J, Hasue M. Diagnosis and operative treatment of intraforaminal and extraforaminal nerve root compression. *Spine (Phila Pa 1976).* 1991 Nov;16(11):1312–20.
6. Wiltse LL, Guyer RD, Spencer CW, Glenn WV, Porter IS. Alar transverse process impingement of the L5 spinal nerve: the far-out syndrome. *Spine (Phila Pa 1976).* 1984;9(1):31–41.

7. Yamada K, Aota Y, Higashi T, Ishida K, Nimura T, Konno T, et al. Lumbar foraminal stenosis causes leg pain at rest. *Eur Spine J*. 2014 Mar;23(3):504–7.
8. Orita S, Inage K, Eguchi Y, Kubota G, Aoki Y, Nakamura J, et al. Lumbar foraminal stenosis, the hidden stenosis including at L5/S1. *Eur J Orthop Surg Traumatol*. 2016;26(7):685–93.
9. Humphreys SC, Eck JC. Clinical evaluation and treatment options for herniated lumbar disc. *Am Fam Physician*. 1999 Feb;59(3):575-582,587-588.
10. Amin RM, Andrade NS, Neuman BJ. Lumbar Disc Herniation. *Curr Rev Musculoskelet Med* [Internet]. 2017 Dec;10(4):507–16. Available from: <https://pubmed.ncbi.nlm.nih.gov/28980275>
11. Lee CK, Rauschnig W, Glenn W. Lateral lumbar spinal canal stenosis: classification, pathologic anatomy and surgical decompression. *Spine (Phila Pa 1976)*. 1988 Mar;13(3):313–20.
12. Macnab I. Negative disc exploration. An analysis of the causes of nerve-root involvement in sixty-eight patients. *J Bone Joint Surg Am*. 1971 Jul;53(5):891–903.
13. Herron LD. Selective nerve root block in patient selection for lumbar surgery: surgical results. *J Spinal Disord*. 1989 Jun;2(2):75–9.
14. Burton C V, Kirkaldy-Willis WH, Yong-Hing K, Heithoff KB. Causes of failure of surgery on the lumbar spine. *Clin Orthop Relat Res*. 1981 Jun;(157):191–9.
15. Eguchi Y, Ohtori S, Suzuki M, Oikawa Y, Yamanaka H, Tamai H, et al. Diagnosis of Lumbar Foraminal Stenosis using Diffusion Tensor Imaging. *Asian Spine J* [Internet]. 2016/02/16. 2016 Feb;10(1):164–9. Available from: <https://pubmed.ncbi.nlm.nih.gov/26949473>
16. Lee S, Lee JW, Yeom JS, Kim K-J, Kim H-J, Chung SK, et al. A practical MRI grading system for lumbar foraminal stenosis. *AJR Am J Roentgenol*. 2010 Apr;194(4):1095–8.