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Technical notes & surgical techniques

Comparison of post surgical results in medial and lateral lumbar spine herniated discs: Own case series experience

Domenico Chirchiglia*, Attilio Della Torre, Domenico La Torre

Department of Neurosurgery, University Magna Graecia of Catanzaro, Campus Germaneto, Viale Europa, 88100 Catanzaro, Italy

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ABSTRACT

Lumbar disc herniation is a frequent condition. It causes radicular pain with irradiation along a lower limb or localized to the back. Disc herniation can be lateral or medial, with different clinical features. Medial disc herniation is more frequent, characterized by immediate good outcome after surgical treatment. Lateral disc herniation shows a greater delay in improvement on pain after surgical treatment, especially in the elderly. Some factors affect the surgical outcome, such as old age, alterations of the vertebral body, ligaments, intervertebral level. Our study is in line with these data, highlighting the better outcome, immediately after the surgical treatment in patients with medial disc herniation, while results has not been immediate in patients with lateral disc herniation, Finally, there was disappearance of the pain for both groups, as demonstrated in the long-term follow-up, after the surgical treatment.

1. Introduction

Lumbar disc herniation (LDH) is a primary cause of leg pain. Clinical manifestations can include lower back pain or radiating pain until lower extremities, muscle spasm, paresthesias, and muscle weakness in the lower extremities [1].

Current classifications are based on neuroimaging and pathomorphology. LDH can be classified into 3 types (central, paramedian, and foraminal) according to the part that protrudes. On the basis of protrusion degree, the injury can be further classified as bulge, protrusion, or extrusion. In addition, there are non-ruptured, ruptured, and sequestered types based on surgical results. Disc herniation is also divided into central, subarticular, foraminal, and extra foraminal, medial or lateral. Central posterior hernia, very rare, less than 10%, can cause bilateral sciatica or lower back pain, postero-lateral hernia, the most frequent occurrence, tends to compress the inner part of the nerve root in the level between the exit from the spinal cord and the junction hole. It can cause a unilateral sciatica, The foraminal hernia occurs in the junction hole, compresses the nerve root and the upper level spinal ganglion. It represents about 10% of all lumbar hernias and is generally found between L3-L4 and L4-L5 discs [2]. The purpose of this work is to compare the post-surgical outcomes of medial and lateral herniated discs, concerning own sample and making the point on clinical aspects and pathophysiology of both conditions, through a literature review.

2. Methods

In this retrospective-observational study, we analyzed a series of 100 patients affected by herniation of lumbar disc treated surgically. Cases of small disc protrusion and lumbar canal stenosis have been excluded. The sample consisted of two groups of patients: fifty patients affected by medial lumbar disc herniation, clinically presenting with lower back pain, fifty with lateral lumbar disc herniation, presenting with sciatica. All the patients underwent clinical, neurophysiological, and radiologic examinations, such as respectively electromiography, radiography and spine CT-MRI. The age range was between 30 and 60 years, average 41.2%. Males were 60, females 40. Disc herniation was divided into central, subarticular (medial group), intraforaminal. extraforaminal (lateral group). In cases with multiple intervertebral levels involved, we are based on clinical examination and electromyography.

All patients underwent surgical treatment. A preoperative Visual Analogic Scale (VAS) showed scores between 7 and 9.

3. Results

The results were as follows: all patients with medial herniated discs reported better results than those with lateral disc herniation. Patients with medial disc herniation reported after surgical treatment the disappearance of pain. About patients with lateral disc herniation, all of

* Corresponding author.
E-mail addresses: chirchiglia@unicz.it (D. Chirchiglia), adt2005@tiscali.it (A. Della Torre), dlatorre@unicz.it (D. La Torre).

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them reported after surgical treatment the gradual but complete disappearance of pain, confirmed by follow-up at 1–2 years.

4. Discussion

In this study we compared two groups of patients, 50 for each group, suffering from lumbar pain by medial and lateral disc herniation. The aim was to establish which of the two conditions was the most favorable clinically, especially after surgery. The results of the study showed that medial disc herniation is characterized by a better surgical outcome compared to the group with lateral disc herniation.

Lateral disc herniation has clinical characteristics different compared to medial disc herniation, such as older age, more frequent radicular pain, and neurologic deficits.

This is probably because lateral disc herniation mechanically irritates or compresses the exiting nerve root or dorsal root ganglion inside of a narrow canal more directly than medial disc herniation. Medial disc herniation instead, due to the central location, tends to create a minor disc-nerve root conflict, and a more frequent low back pain, without irradiation among lower limbs, less associated with sensory-motor symptoms [3].

Lee studied 352 subjects diagnosed with localized lumbosacral disc herniation and found a prevalence of medial disc herniation group including 278 (79%) patients compared to the medial group with 74 patients (21%). Mean age of the lateral group was significantly higher than that in the medial group. The lateral group showed a significantly larger proportion of patients with radiating leg pain and multiple levels of disc herniations than the medial group. The proportion of patients who underwent surgery was not significantly different between the 2 groups. However, the proportion of patients who had successful pain reduction after treatment was significantly smaller in the lateral than in the medial group. Patients with lateral disc herniation were older and reported mainly lumbosciatica.

Incidence of lateral disc herniation is lower than that medial and has been reported about 7%–12% of all lumbosacral disc herniations [4]. Lateral disc herniation has different clinical characteristics compared to medial disc herniation. Patients with lateral disc herniation can manifest with more severe clinical symptoms, including severe radicular pain, or more frequent motor and sensory neurological deficits than those with medial disc herniation [5] because the herniated disc fragment is located in or around a narrow root foramen, through which nerve root passes, resulting in direct compression of dorsal root ganglion which is a pain sensitive structure [6]. Then, post-surgical outcomes of lateral disc herniation were found to be worse than those of medial disc herniation. Lateral disc herniations may be extraforaminal, located beyond the pedicles, or intraforaminal. It occurs predominantly at the L4-L5 and L5-S1 levels.

Clinical complaints often include severe radicular pain accompanied by neurological deficits, including motor, reflex, and sensory findings, revealing over 75% of cases [7].

Foraminal stenosis exacerbates the radicular symptoms of both conditions in equal measure [8].

Older patients may show postural instability after surgical treatment.

Our study did not reveal substantial differences about the outcome between the two conditions except for a greater delay in the improvement and disappearance of pain in patients with lateral disc herniation. The main cause of difference between that study and others – including our study – was the different definition of lateral disc herniation. They included subarticular disc herniation in the group of lateral disc herniation, which was the main difference from other studies definition, most of which regarded lateral disc herniation as foraminal and/or extra foraminal [9].

The prevalence of a symptomatic herniated disc in the lower back is about 1% to 3% with the highest prevalence among people aged 30–50 years, with a male to female ratio of 2:1. In individuals aged 25–55 years, about 95% of herniated discs occur in the low back at the L4/L5 and L5/S1 levels; disc herniation above this level is more common in people aged over 55 years and upper lumbar disc herniation may be associated with hip pain and/or groin pain. Disc displacement may present as internal disc disruption, disc prolapse, disc protrusion, disc extrusion, disc herniation, or simply discogenic pain. The estimated prevalence of lumbar radiculopathy or sciatica has been described as 9.8 per 1,000 cases, 5.1 in men and 3.7 in women. Irritation of the nerve root (lumbar radiculopathy) from a herniated disc resolves by itself about 23% to 48% of the time, but up to 30%–70% will still have significant symptoms after one year, with 5%–15% requiring surgery [10].

The intraforaminal localization of the herniated disc could cause a greater conflict between the disc and the nerve root, due to a reduced intraforaminal space [11].

The extraforaminal hernia, on the other hand, compresses the outer part of the nerve root at the exit level from the joining hole, or affects the overlying root if it is more lateral. The pain in this case is sharpened by inclining towards the side of the hernia if it is external, since it increases the compression of the disc, so the subject will be led to hold an antalgic posture by bending from the opposite side. If the herniation is instead lateral, the pain will present itself flexing towards the opposite side, so the posture adopted by the patient will be inclined towards the lesion [12].

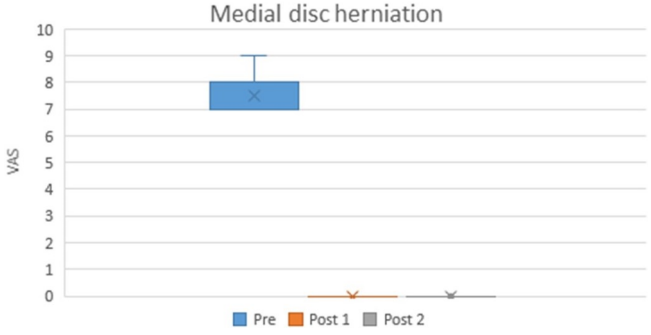
The surgical outcome of patients with lateral disc herniation is worse than those with disc herniation [13].

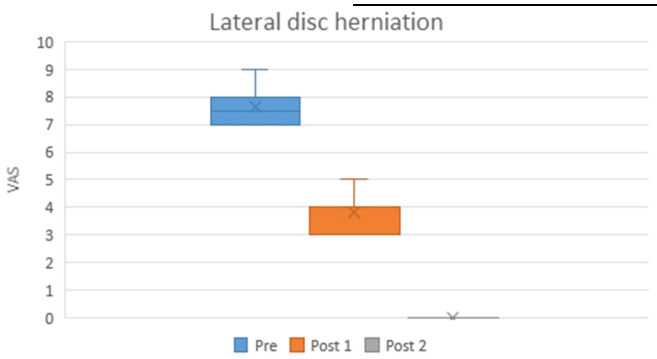
Our case studies agree with the literature data. We believe that lateral disc herniation creates greater irritation of the nerve root leading to a more intense and persistent radicular pain. However, our study showed that in both groups, lateral and medial disc herniation, the result, at two months follow-up, was similar, since all patients had total disappearance of pain, those suffering from medial disc herniation had an immediate post-surgical improvement, while patients with lateral disc herniation showed a greater delay in disappearance of radicular pain.

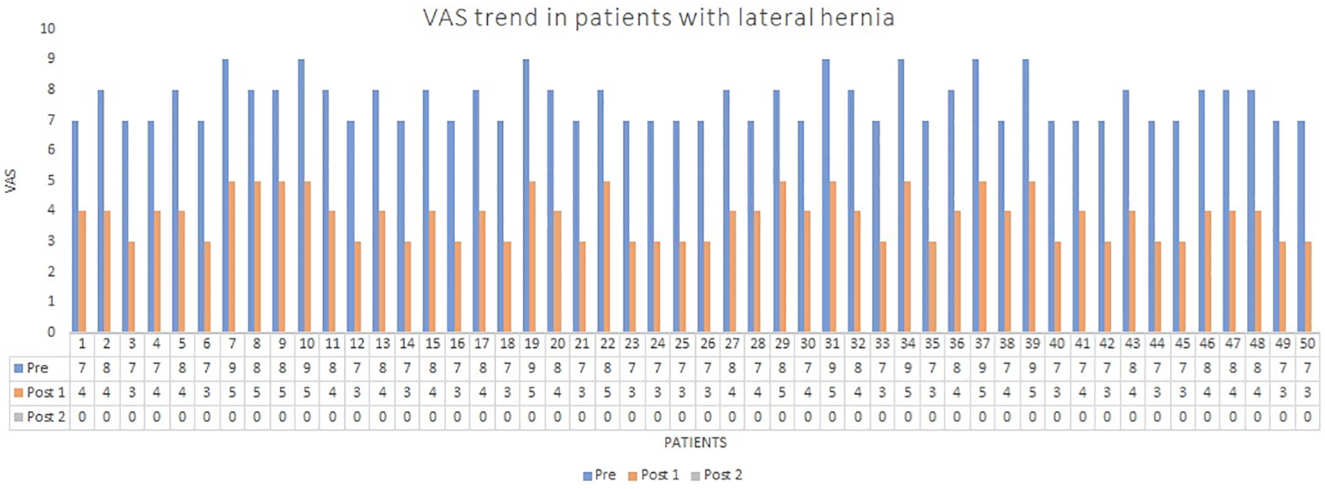
5. Conclusions

Lateral and medial disc herniations have different localization and different clinical features. The first are less frequent but with greater involvement of the nerve root and consequently cause of more intense and persistent pain, the second manifesting partial nerve root involvement and causing less severe pain. Although an herniated lateral disc is a clinical condition apparently more severe than the medial disc herniation, surgical treatment shows that the final result is satisfactory for both conditions. The difference is temporal, being better the result in the immediate, after surgical treatment, regarding the medial herniation disc.

Statement regarding IRB/ethics committee approval and patient - consent.







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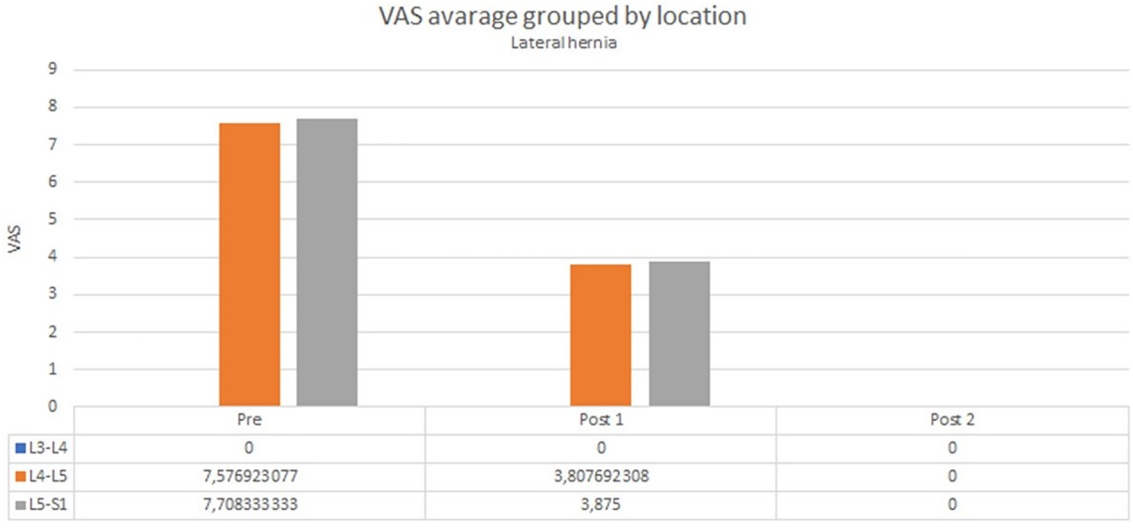
Post 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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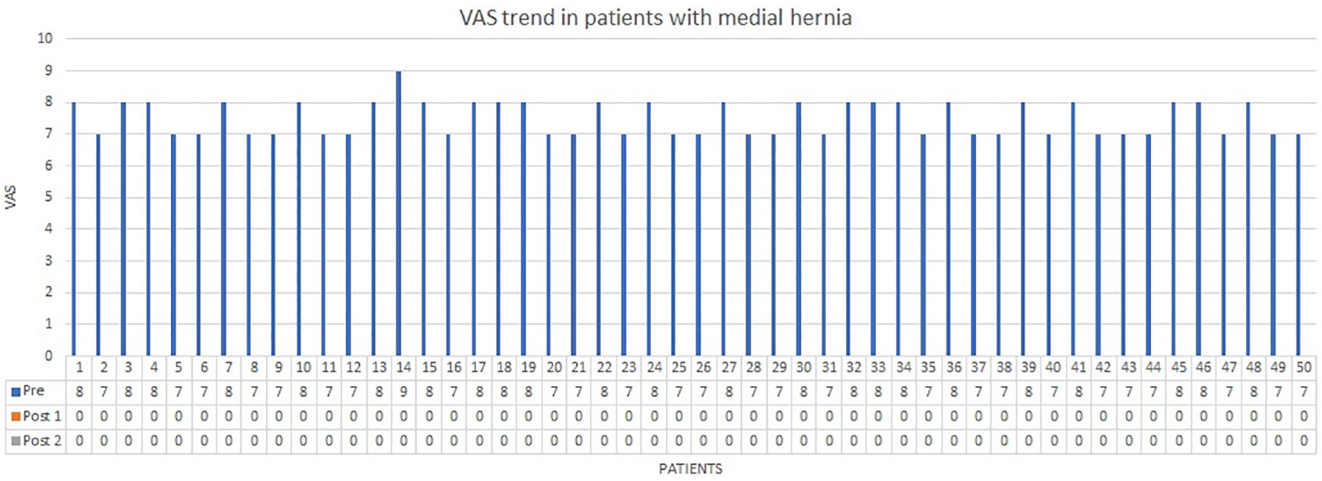

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CRediT authorship contribution statement

Domenico Chirchiglia: Conceptualization, Methodology, Software. **Attilio Della Torre:** Software, Validation, Writing - review & editing. **Domenico La Torre:** Data curation, Writing - original draft, Visualization, Investigation, Supervision.

References

[1] H.W. Park, K.S. Park, M.S. Park, et al., The comparisons of surgical outcomes and clinical characteristics between the far lumbar disc herniations and the paramedian lumbar disc herniations, Korean J. Spine 10 (2013) 155–159.
[2] D.G. Wilder, M.H. Pope, J.W. Frymoyer, The biomechanics of lumbar disc herniation and the effect of overload and instability, J. Spinal Disord. 1 (1988) 16–32.
[3] I.S. Lee, H.J. Kim, J.S. Lee, et al., Extraforaminal with or without foraminal disc herniation; reliable MRI findings, Am. J. Roentgenol. 192 (2009) 1392–1396.
[4] N.E. Epstein, Foraminal and far lateral lumbar disc herniations: surgical alternatives and outcome measures, Spinal cord 40 (2003) 491–500.
[5] K. Salame, Z. Lidar, Minimally invasive approach to far lateral lumbar disc herniation: technique and clinical results, Acta Neurochir. 152 (2010) 663–668.
[6] F. Porchet, A. Chollet-Bernand, N. de Tribolet, Long term follow up of patients surgically treated by the far lateral approach for foraminal and extraforaminal lumbar disc herniation, J. Neurosurg. 90 (1999) 59–66.
[7] O.A. Merot, Y.M. Maugars, J.M. Berthelot, Similar outcome despite slight clinical differences between lumbar radiculopathy induced by lateral versus medial disc herniations in patients without previous foraminal stenosis: a prospective cohort study with 1-year follow-up, Spine J. 14 (2014) 1526–1531.
[8] H. Baba, Y. Macsawa, Furusawa, et al., Extraforaminal lumbar disc herniation at two contiguus intervertebral levels, Spinal Cord 35 (1997) 725–728.
[9] U. Ebeling, H. Mattle, H.J. Reulen, Intervertebral disk displacement. Incidence, symptoms and therapy], Neirvenarzt 61(4) (1990) 208–212. Extreme lateral and interlaminar approach for intra-canal and foraminal double disc herniation at lumbosacral level.
[10] J.S. Bae, K.J. Kim, M.S. Kang, I.T. Jang, Neurocirugia (Astur). 2018. pii: S1130-1473(18)30088-5. doi: 10.1016/j.neucir.2018.07.002. [Epub ahead of print].
[11] M. Kanayama, F. Oha, T. Hashimoto, What types of degenerative lumbar pathologies respond to nerve root injection? A retrospective review of six hundred and fortyone cases, Int. Orthop. 39 (2015) 1379–1382.
[12] G. Lofrese, L. Mongardi, F. Cultrera, G. Trapella, P. De Bonis, Surgical treatment of intraforaminal/extraforaminal lumbar disc herniations: many approaches for few surgical routes, Acta Neurochir. (Wien) 159 (7) (2017) 1273–1281, https://doi.org/10.1007/s00701-017-3198-9 Epub 2017 May 22. Review.
[13] D.O. Al-Khawaja, T. Mahasneh, J.C. Li, Surgical treatment of far lateral lumbar disc herniation: a safe and simple approach, J. Spine Surg. 2 (1) (2016) 21–24, https://doi.org/10.21037/jss.2016.01.05 Review.