CASE REPORT

Case Report: A case report highlighting bilateral EDB wasting as a clinical marker for lumbar canal stenosis [version 1; peer review: 2 approved, 1 approved with reservations]

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Abstract

Herein we discuss a case of a 55 year old male presenting with history suggestive of sciatica on the left leg. Straight leg raising (SLR) test was positive at 45 degrees on the left side. His ankle reflex was absent and the power of extensor hallucis longus (EHL) was 4/5 on the same side. MRI lumbosacral spine revealed left paramedian disc prolapsed on L4/L5 level with spinal canal diameter of 9mm. However since his bilateral extensor digitorum brevis (EDB) were wasted, we suspected associated lumbar canal stenosis and thereby opted for laminectomy and discectomy in this case. Intraoperatively dural wasting, hypertrophied facets and narrow canal were confirmed. Laminectomy, medial facetectomy and discectomy were carried out. The patient recovered uneventfully with resolution of his sciatica-like pain. Bilateral EDB wasting thereby provides a clinical clue to the underlying lumbar canal stenosis and can help in making correct therapeutic decisions.

Keywords

extensor digitorum brevis , lumbar canal stenosis , dural wasting

Open Peer Review

Approval Status

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3. Rully Hanafi Dahlan , Padjadjaran University, Bandung, Indonesia			
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Any reports and responses or comments on the article can be found at the end of the article.

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Introduction

Lumbar disc herniation mostly causes radicular symptoms but can also lead to lumbar canal stenosis^{1,2}. Tackling only the disc may not suffice in improving the symptomatology in patients and can invariably lead to failed back syndrome. Wasting of the extensor digitorum brevis (EDB) has been previously used as a marker for L5/S1 radiculopathy^{3,4}. Herein we highlight the clinical importance of observing for evidence of bilateral EDB wasting as a marker for underlying lumbar canal stenosis. This simple clinical observation can help decide the correct surgical strategy and thereby prevent failed back syndrome by carrying out laminectomy rather than just tackling the disc by performing minimally invasive discectomy.

Case report

A 55 year old male from Lumbini, Nepal presented to us with a history of low back pain for 4 months with recent onset sciatica on his left side. There was no history suggestive of vascular claudication. His bladder and bowel habit was normal. His peripheral pulses in the legs were normal. There was no significant past medical or surgical illnesses. The patient had been taking oral analgesics for his pain that reduced his pain to some extent. Examination revealed straight leg raising (SLR) of 45 degrees on his left leg. Left ankle reflex was absent. The power of the extensor hallucis longus (EHL) on his left leg was 4/5. Pain sensation was diminished on his left first dorsal web space and the lateral part of the foot dorsum. However his bilateral EDB muscles were wasted (Figure 1, Figure 2) and so, clinical diagnosis of L4/L5 disc with canal stenosis was made. MRI lumbar spine revealed L4/L5 left paramedian disc with a canal diameter of 9mm. Dynamic X-ray of the lumbar spine did not show any instability. Because of the presence of bilateral EDB wasting, we opted for laminectomy in the patient rather than minimal access discectomy. Removing only the disc might result in

failed back syndrome in such a patient. After detailed counseling regarding the disease process, probable complications, benefits and risks of different modes of surgical management and obtaining both written and verbal consent from the patient's son akin, we posted the case for surgery. Intraoperatively, hypertrophic facet joints and a narrow canal were confirmed. There was significant dural wasting (Figure 3). We performed discectomy, bilateral medial facetectomy and laminectomy on the corresponding level (Figure 4). Postoperative there was resolution of the sciatica-like pain and the patient was mobilized from the second postoperative day. The patient was started on tablet pregabalin 75 mg and tablet methycobalamine 1500 µg once daily orally for 3 weeks. Patient follow-up one month

Figure 2. Normal EDB (arrow head) in a healthy volunteer.

Figure 1. Extensor digitorum brevis (EDB) wasting (arrow head) in a patient with lumbar canal stenosis.

Figure 3. Intraoperative dural compression and wasting seen in a case of canal stenosis.

Figure 4. Lax dura seen after decompressive laminectomy.

later revealed no new symptoms. The patient was advised to perform regular back exercises and physiotherapy. Dynamic lumbar spine X-ray did not reveal any instability.

Discussion

With the increasing longevity and continually climbing proportion of middle-aged and elderly persons, low back ache is surely going to be a ubiquitous and disabling disease of mankind².

The diagnosis of spinal stenosis is normally aided by radiological studies⁵. CT of the lumbar spine can show characteristic trefoil appearance of the canal while MRI can show loss of CSF surrounding the canal. However, in developing countries like ours, radiological studies may be limited due to a lack of patient finances and hospital resources. As a result, doctors are limited to clinical diagnosis.

Management of lumbar disc disease ranges from conservative⁶ to epidural steroids injection^{7,8} and surgery⁹. However, failure to

correctly diagnose and treat canal stenosis may invariably lead to failed back syndrome in patients¹⁰.

The role of EDB as a clinical indicator of the L5 radiculopathy has already been proven^{3,4}. Therefore, simple assessment of the bulk of the EDB muscle on both sides can predict the underlying canal stenosis and thereafter help make correct therapeutic decisions.

In this era of minimally invasive procedures, this simple bedside marker provides a word of caution for novices in the vast realms of lumbar spine procedures.

Conclusion

Bilateral EDB wasting can be taken as a reliable clinical marker for the diagnosis of lumbar canal stenosis. This simple bedside observation can aid us in deciding on the correct surgical strategy and thereby prevent failed back syndrome if we happen to miss the underlying canal stenosis and instead manage the disc only. It is a clinical pearl for general doctors working in remote areas to correctly assess and refer patients with EBD wasting to tertiary care centres from a subset of patients presenting with low back ache.

Consent

Both written and verbal informed consent for publication of images and clinical data related to this case was sought and obtained from the son of the patient.

Author contributions

SM reviewed the literature, wrote and formatted the paper. BMK revised and edited the final format.

Competing interests

No competing interests were disclosed.

Grant information

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Rully Hanafi Dahlan

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Farid Yudoyono

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I have following points that should be clearly described:

1. Fig 3 and 4 show surgical views. Authors must state with symbols (asterisks etc) to show what level of surgical work.
2. We would suggest a detailed axial and sagittal view of the MRI for the detail level of lumbar canal compression.
3. EDB is sensitive for L5-S1 radiculopathy. Authors must verify it with EMG modality.

Competing Interests: No competing interests were disclosed.

We confirm that we have read this submission and believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 28 September 2015

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Mehmet Zileli

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This report tries to show the importance of muscle atrophy of extensor hallucis (EHL) longus in diagnosis of lumbar spinal stenosis. I have following criticisms:

1. They must place MRI images of the patient instead of intraoperative surgical views.
2. They claim that atrophy of EHL on both sides shows the disease is spinal canal stenosis instead of disc herniation. However they do not have any evidence that it cannot be produced by a midline disc herniation. Nor can a case report make us reach a conclusion like that.
3. Atrophy of the EHL muscles should be justified by muscle strength measurements and EMG.

Competing Interests: No competing interests were disclosed.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 24 August 2015

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Amit Thapa

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The authors Kumar *et al.* in this article have persuasively highlighted the importance of clinical examination while deciding on a case of low back ache with radiculopathy. This is becoming ever vital as incidence of failed back syndrome is on a rise, a major causative factor being incomplete clinical evaluation of patient¹. However few points need to be highlighted.

1. Since the patient had been complaining of low back ache for 4 months and only recently started having sciatica, it would be prudent to ask patient regarding claudication and relation of position on pain. The first question would tell us about canal stenosis and the later about facet arthropathy. This is important in this case, as the procedure done on the patient would not relieve the facet arthropathy and patient would keep on complaining of axial back ache later.
2. As this case highlights co existence of degenerative lumbar spinal stenosis and disc herniation, more discussion on lumbar spinal stenosis is warranted. Degenerative lumbar spinal stenosis describes a condition in which there is diminished space available for the neural and vascular elements in the lumbar spine secondary to degenerative changes in the spinal canal, presenting with a history of gluteal or lower extremity symptoms exacerbated by walking or standing which improves or resolves with sitting or bending forward. Patients whose pain is not made worse with walking have a low likelihood of stenosis².

3. We would request more details on the MRI study if possible an axial film of the site of compression. Guideline suggest getting a thin (4-5 mm) MRI sections with a combination of T1, proton density and T2 pulse sequences in both axial and sagittal planes with additional angled and stacked axial sections². Meta-analysis has shown sensitivity of MRI in the diagnosis of adult spinal stenosis to be 81-97%, of CT 70-100% and myelography 67-78%³. Besides the antero-posterior diameter (< 10 mm) and cross-sectional area (< 70 mm²) of spinal canal, MRI finding of positive sedimentation sign is a good positive sign to rule in lumbar spinal stenosis with high specificity and sensitivity⁴.
 4. Authors have correctly highlighted the importance of dynamic x ray study to see for any instability. In presence of instability based on Posner's criteria, patient should be offered decompression with fusion if the stenosis is moderate to severe². However we stress on the need of standing full-length lateral radiographs of the spine to check for sagittal balance of the patient which has bearing of increasing instability after performing procedures like laminectomy. In particular, 3 measures are of vital importance: (1) global sagittal balance (C7 plumb line [C7PL], C7/sacro-femoral distance ratio, and spino-sacral angle), (2) spino-pelvic morphology (pelvic incidence, sacral slope, and pelvic tilt), and (3) spinal parameters (lumbar lordosis and thoracic kyphosis). Jeon *et al.* have found posterior migration of the C7PL and increase lumbar lordosis following decompressive laminectomy, in their evaluation of 40 patients over 2 years⁵.
 5. Figure 1 and 2 shows EDB located laterally than are expected. Authors must have drawn them to show the visible differences. However to see for EDB, best location would be interdigital spaces over dorsal of foot as EDB helps extend digits 2 though 4 (see [figure](#))⁶.
 6. EDB being a muscle with smallest bulk in foot is clinically very sensitive for L5 radiculopathy. This is a case report, similar to earlier reports in cases of spina bifida or tethered cord syndrome where late manifestation has led to EDB weakness⁷. However North American Spine Society (NASS) in their recommendation, have found insufficient evidence to make a recommendation for or against certain physical findings for the diagnosis of degenerative lumbar spinal stenosis including an abnormal Romberg test, thigh pain exacerbated with extension, sensorimotor deficits, leg cramps and abnormal Achilles tendon reflexes².
- To conclude, the authors have genuinely stress on the need of comprehensive clinical evaluation of spine and neurological function before embarking on surgical management of low back ache or radiculopathy. This paper supports the case with a good summary.

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Competing Interests: No competing interests were disclosed.

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