Extreme lateral lumbar disc herniation in a 12-year child: case report and review of the literature

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Abstract Extreme lateral lumbar disc herniations (ELL-DHs) occur more frequently among elderly patients, with a peak incidence in the sixth decade, and are rarely found in children. The patient presented is a 12-year-old boy with a 3-month history of right-sided leg pain. Computerized tomography and magnetic resonance imaging demonstrated an extreme lateral disc herniation on the right at L4–L5 with compression of the L4 nerve root. He subsequently underwent removal of extreme lateral herniated disc through an intertransverse approach under general anesthesia. At 11-month follow-up, the patient maintained resolution of preoperative symptoms and a neurological examination revealed no sensory or motor deficit. Surgical intervention may be indicated for patients with ELLDHs that fail with conservative treatment.

Keywords Extreme lateral lumbar disc herniation · Child · Surgery

Introduction

In 1974, Abdullah et al. [1] were the first to describe the clinical syndrome of ELLDH. The overall frequency of ELLDHs in various clinical series varies around 1–12% of either observed or surgically treated LDHs. They occur more frequently at upper lumbar levels and among elderly patients with a peak incidence in the sixth decade. Because they compress the exiting root with its dorsal ganglion, the

clinical presentation often involves lancinating leg pain, whereas low back pain is often mild to moderate. To our knowledge, there is no report of ELLDH in children. In this report, we describe the clinical course and treatment outcome of a 12-year child with ELLDH.

Case report

History and presentation

A 12-year-old male was admitted to the hospital with a 3-month history of right-sided leg pain descending from the anterior aspect of the thigh to the anteromedial calf. The right-sided leg pain had increased gradually. No bowel or bladder symptoms were associated with this patient. This patient was treated with nonsteroidal anti-inflammatory medications, steroid combined with bedrest, and there was no improvement in symptoms after treatment for 3 months.

Examination

A physical examination showed an antalgic gait and very limited motion of the lumbar spine, especially regarding flexion, decreased pinprick sensation in the distal right L4 dermatome, 4/5 strength on manual motor testing of the right quadriceps, and right knee reflex was absent and femoral nerve stretch test was positive. Plain X-ray films did not show narrowing of the disc height.

Imaging

As a lumbar disc herniation was suspected, computed tomography (CT) and magnetic resonance imaging (MRI) were performed. CT (Fig. 1) and MRI (Fig. 2) showed an

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Fig. 1 Axial CT images demonstrating an extreme lateral lumbar disc herniation at the level of the right L4–L5 disc

Fig. 2 Axial MRI images demonstrating an extreme lateral lumbar disc herniation at the level of the right L4–L5 disc

extreme lateral disc herniation on the right at L4–L5 with compression of the L4 nerve root.

Operation

The patient underwent an excision of the herniated disc. Briefly, the patient was positioned prone on the Jackson operating table on a Wilson frame after the induction of general endotracheal anesthesia. After sterile preparation of the lumbar region, the L4–L5 level was localized using intraoperative fluoroscopy, and a 4-cm incision was marked in the midline and then the paraspinal musculature was dissected. The soft tissue overlying the L4 transverse process, L5 transverse process, and lateral facet was dissected using monopolar cautery and pituitary rongeurs. Kerrison

rongeurs were then used to remove the superior portion of L5 transverse process and to shave down small portions of the lateral facet and the inferolateral portion of the L4 pars interarticularis. Application of bone wax and hemostatic foam easily controlled bleeding from the cancellous surfaces of the bone. Careful blunt dissection allowed identification of the L4 nerve root along its course, inferior to the pedicle of L4 and tautly stretched over the ELLDH. Gentle retraction of the nerve root superiorly allowed exposure of the disc, over which epidural veins were cauterized and then incised with microscissors. Annulotomy and routine disc removal were then performed, after which the nerve root was seen to be relaxed and well decompressed. Copious irrigation and hemostasis were followed and closure with a single fascial stitch, subcutaneous and subcuticular stitches, and Dermabond on the skin.

Postoperative course

In this case, the patient enjoyed immediate postoperative regression of his pain. His gait subsequently normalized and he returned to full study duties. His neurological examination at the 11-month follow-up revealed no sensory or motor deficit.

Discussion

ELLDHs tend to occur in slightly older individuals than paramedian LDHs with a peak incidence in the sixth decade [1–10]. To our knowledge, this is the first case of ELLDH in children treated with surgery. Most commonly found at L4–L5 and L3–L4 [2–4, 8, 10, 11], ELLDHs are characterized by the compression of the nerve root which exits at the same level and this is in contrast to classic posterolateral disc compression, which affects the nerve root leaving at the level below. ELLDHs more often compromise the upper lumbar nerve roots producing a femoral radiculopathy [1, 9, 12, 13] and the femoral nerve stretch test is often positive. However, there is also a high frequency of decreased straight leg raising, because ELLDHs at L5–S1 have been found frequently [9].

Conservative treatment for ELLDHs includes nonsteroidal anti-inflammatory medications or high-dose steroid combined with bed rest, and even epidural or selective nerve root steroid injections [14]. Success rates for nonoperative treatment range from 10 to 71% in adult patients [10]. However, this child failed with 3-month management of nonsteroidal antiinflammatory drugs (NSAIDs), steroids and bed rest. We believed that surgical treatment should be indicated when no significant improvement has been obtained with management of NSAIDs, steroids and bed rest. Various techniques have been proposed for the

operative treatment of ELLDHs. These include midline incisions and subperiosteal muscle dissections with hemilaminectomy and partial or complete facetectomy or paramedian incisions with intermuscular dissections for an intertransverse approach; and combined approaches for LDHs occupying paramedian, foraminal and extraforaminal locations. Instability [15, 16] and severe back pain [7] have been reported after an interlaminar approach with facetectomy and spinal fusion has been advocated in every case [17]. In addition, an extraforaminal disc prolapse is often sequestered [1, 12, 15, 18, 19], and many migrate superiorly and laterally. These sequestered fragments may be missed even after full facetectomy and therefore are the cause of persistent radicular pain [15]. In general, however, for ELLDHs, the intertransverse approach generates the least amount of osteoligamentous injury. Advantages of the intertransverse approach include maximal preservation of pars and lateral facet to avoid instability and chronic pain often attributed to aggressive facetectomy required in the interlaminar approach, direct visualization of the offending pathology, and ease of the approach. However, in a retrospective study of patients with ELLDHs treated through the intertransverse approach, Weiner et al. [20] reported that one-fifth of patients developed some degree of instability, with half of these requiring fusion for associated back pain 5 years postoperatively. This may be a part of the natural history of lateral disc herniations, and they are a precursor to the development of degenerative spondylolisthesis. The intertransverse approach was applied to preserve the pars and lateral facet in this case so that spinal instability and chronic pain was avoided.

Conclusion

ELLDHs usually occur among elderly patients. However, ELLDHs should be taken into consideration if there is no obvious intracanal protrusion in young patients with radicular symptoms. Surgical intervention may be indicated for children with ELLDHs that fail with conservative treatment.

Conflict of interest statement None of the authors has any potential conflict of interest.

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