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Anterior disc herniation in a young child

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Abstract

Background: Anterior disc herniation is a rare problem in adults and, to date, has not been reported in young children.

Case presentation: We report the case of a 4-year-old girl who presented with severe low back pain persisting for three weeks, unrelieved by rest. The mother reported onset of symtoms following gymnastics involving repeated hyperlordotic lumbar postures. Laboratory testing, including WBC, ESR, and CRP, were within normal limits. MRI of the lumbar spine revealed an anterior disc herniation at the L4/L5 level, with separation of the adjacent anterior ring apophysis. The patient was treated with a brace for four weeks, resulting in complete symptom resolution. Follow-up MRI after three months and X-rays after 1 year showed significant narrowing of the L4/L5 disc space, without evidence of scoliosis.

Conclusion: Anterior disc herniation may represent a rare condition in early childhood. The etiology remains unclear, however, it may represent a consequence of failure of the cartilaginous ring apophysis due to chronic overload like in other apophyseal injuries of the lower extremities.

Keywords: Case report; Anterior disc herniation; Ring apophysis; Young children; Pediatric spine; Hyperlordosis.

Background

Posterior disc herniation in childhood and adolescence is rare and usually does not occur before the age of 10 [1,2]. Exceptionally, cases have been reported in children under two years of age [3]. Failure of the posterior ring apophysis accompanied by disc herniations are reported especially in adolescent patients involved in sports like wrestling [4].

Anterior disc herniation in children has been reported by Kozlowski [5]. In his paper – before MRI was available – he reported on 6 patients with suspected anterior disc herniations on x-rays. However, they

probably all represented lumbar Scheuermann disease because disc herniation occurred into the vertebral end plate. In the MRI-era no anterior disc herniations have been reported in children in the literature so far – to our knowledge.

Case Presentation

A 4 year old girl presented with severe low back pain which increased with motion and was not alleviated by rest (VAS=10 at night). There was severe pain of the lower lumbar region accompanied by sever muscle spasm of the erector muscles. No inclination or reclination was possible. No radicular symptoms, such as pain radiating to the buttocks or lower limbs, were reported. There were no signs of infection like fever. Lab results including WBC, ESR, CRP were normal.

MRI was ordered immediately to rule out discitis. However, an anterior disc protrusion at the level of L4/L5 was detected accompanied by a separation of the adjacent ring apophysis (Figure 1).

Previous history and development were uneventful. However, the mother reported that recently the child did engage in gymnastics and frequently performed postures which included maximal and repeated hyperlordotic positions of the lumbar spine.

The child was treated with a full-time brace for four weeks to immobilize the spine. The brace was well tolerated, and symptoms resolved completely within one week. After brace removal, physical therapy was initiated. The further course was uncomplicated. 3 months after onset of symptoms MRI and a X-ray in a standing posture (after one year) were performed. There were no signs of scoliosis, however, the disc space of L4/L5 had narrowed significantly (Figures 2, 3).

Figure 1: MRI at the onset of symptoms. Sagittal T2-weighted image demonstrates anterior disc herniation at L4/L5 with separation of the anterior parts of the ring apophysis of both vertebrae.

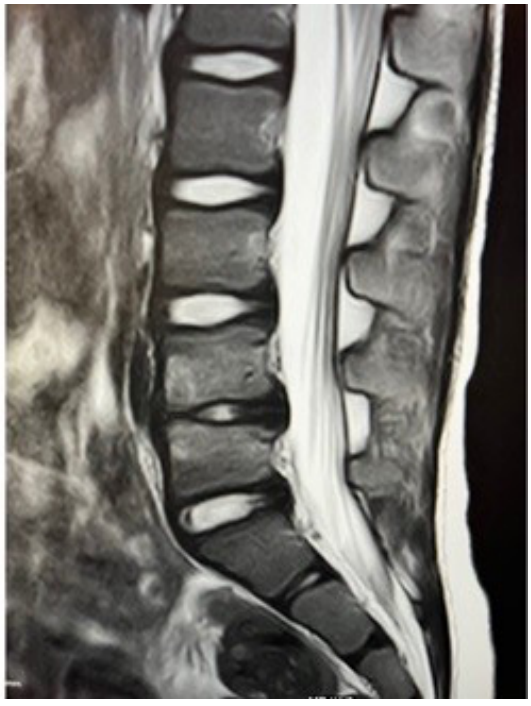

Figure 2: MRI after 3 months. Sagittal T2-weighted image demonstrates complete resorption of disc material anterior to the spine and severe narrowing of the disc space L4/L5.

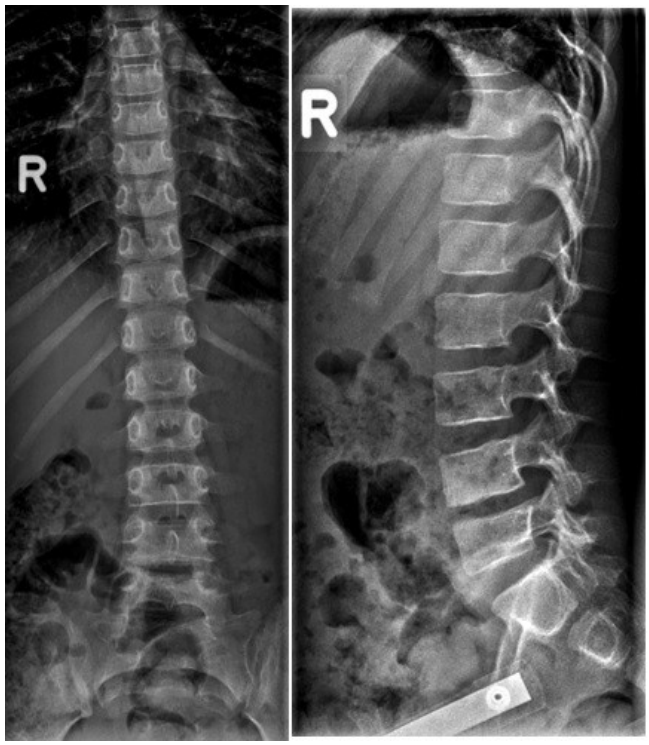

Figure 3: X-rays standing a.p. and lateral. Severe narrowing of disc space L4/L5 at one year F/U.

Discussion and Conclusion

To the best of our knowledge, this is the first MRI-confirmed report of anterior disc herniation in a young child. Before MRI was available, Kozlowski reported on 6 children with back pain and X-rays which were interpreted as anterior disc herniations but more likely represent signs of lumbar Scheuermann disease because disc protrusion occurred into the vertebral endplate in those patients [5]. No previous MRI-based diagnoses of true anterior disc herniation in children have been documented.

The underlying etiology remains speculative. It is likely that repetitive hyperlordotic loading, such as during gymnastics, leads to overload at the chondro-osseous junction. Junghannus in his work describes that the disc of the immature spine is attached to the cartilaginous ring apophysis which will later form the ring apophysis by fibrous extension of the outermost fibers of the annulus fibrosus [6].

Maximal tension of this fibers may transform into shear forces at the chondro-osseous junction of vertebra and lead to subsequent injury. The same etiology applies to posterior disc herniations followed by separation of the ring apophysis (slipped vertebral apophysis) in older children who are involved in sports with possible overloading of the ring apophysis due to shear forces [4,7,8]. It also applies to other apophyseal injuries in children for example in the lower extremities. A chronic overload in tension probably accompanied by constitutional factors contribute to such injuries. However, those fractures usually occur during the ossification stage rather than in early cartilaginous ring stage.

Anterior disc herniation probably is a very rare condition in children but should be suspected when chronic overload in hyperlordotic positions in the lumbar spine may be present like in gymnasts. The prognosis currently is unclear but degeneration of the motion segment may occur early in life.

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