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Case Report

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Bilateral spondylolysis in a school karate kid

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Abstract

Spondylolysis, or isthmic lysis, is the dissolution of the continuity of the pars interarticularis, which is the bone bridge between the inferior and superior articular surfaces of a single vertebra. The prevalence of spondylolysis in the general pediatric and adolescent populations ranges from 4.4 to 4.7%. Many factors have been theorized, but there is general agreement that young athletes practicing sports involving high levels of axial loading of the lumbar spine are at a higher risk. Although asymptomatic spondylolysis is more prevalent, clinicians generally face the challenge of diagnosing the condition earlier and prior to its aggravation. Commonly the course of the condition is favorable under conservative treatment allowing the patient to resume his prior activities. We present a case of bilateral spondylolysis in a 13-year-old boy with a history of chronic low back pain.

Keywords: Spondylolysis, Child, Sports, Trauma, Conservative treatment.

INTRODUCTION

Spondylolysis or isthmic lysis is an isolated defect in the neural arch consisting of unilateral or bilateral dissolution of continuity of the pars interarticularis, considered as the bone bridge between the inferior and superior articular surfaces of a single vertebra [1]. The prevalence in the general pediatric and adolescent populations ranges from 4.4 to 4.7% [2], with an increase in children practicing sports involving axial stress [3]. Sports and activities of daily living are frequently pain-free. The clinician generally faces the challenge of diagnosing the condition prior to aggravate [4].

Here, we present the case of a 13-year-old boy with a history of chronic low back pain who was diagnosed with bilateral spondylolysis and managed with conservative treatment.

CASE REPORT

A 13-year-old karate boy presented with a 10-month history of recalcitrant, mild back pain. The onset of symptomatology is concomitant with a series of footkicks during a school fight. Physical examination revealed restricted lumbar range of motion and tenderness in the lumbar region, which increased with activity and was exacerbated by lumbar hyperextension. The neurological examination results were normal. Computed tomography (CT) scan revealed bilateral L5 isthmic spondylolysis with spondylolisthesis grade 1 (figure 1). Full-time bracing was prescribed for three months to immobilize the lumbar spinal region with significant clinical improvement. The boy resumed his previous daily living and sports activities.

DISCUSSION

Behind simple muscular back pain, the most common pathologies leading to low back pain are spondylolysis with or without spondylolisthesis and Scheuermann disease [5]. The rate of spondylolysis in children is 4.4 % at the age of 6 years, with an increased prevalence of 6 % in adulthood [6]. Asymptomatic spondylolysis is more prevalent among athletes and is commonly identified incidentally using CT or magnetic resonance imaging (MRI) for unrelated reasons [7]. The most common spondylolysis locations were S1-L5 and L5-L4 [8].

However, the pathogenesis of spondylolysis remains unclear. It is often thought to be a stress reaction and/or an overuse injury to the growing immature skeleton. Lemoine et al. [7] analyzed 717 CT scans

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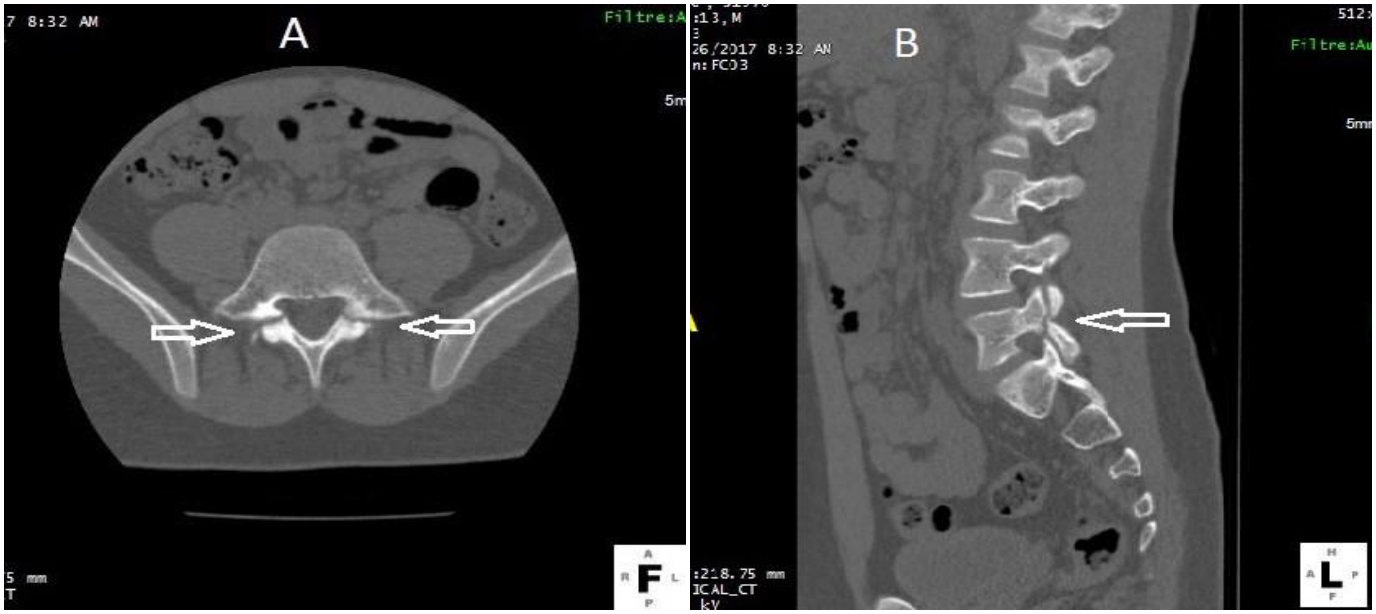

Figure 1: CT scan of the lumbar spine showing a bilateral isthmic lysis of L5 in axial section **(A)** with a spondylolisthesis grade 1 of L5 on S1 in sagittal reconstruction **(B)**.

required for unrelated lumbar conditions in children under eight. The peak prevalence of unilateral spondylolysis was observed in newborns and young infants in a specific malformative context. Sakai et al [6] identified spinal bifida occulta at the first sacral lamina in 92.6% of school children with L5 spondylolysis. Vitamin D insufficiency due to low sunlight exposure and extensive indoor training has also been proposed as a potential cause of pars fractures. This may partly explain the prevalence of spondylolysis among the Inuit Eskimo population, which can reach as high as 50% [8]. In contrast, the prevalence of bilateral spondylolysis increased after the age of learning to walk, possibly supported by a high pelvic incidence and repetitive micro-traumatism [9]. There is general agreement that sports involving high levels of truncal flexibility and axial loading of the lumbar spine, such as gymnastics, dance, and martial arts, are risk factors. The vertebral posterior elements are loaded with spinal hyperextension, which can constrain the pars and increase the chances of a fracture. In Japan, there is a more frequent association with judo [7]. Congenital predisposition has also been suggested.

In our patient, we identified two risk factors: sports activity (karate) and acute direct trauma. Stress fractures of the pars interarticularis should be at the top of the differential, especially among children experiencing repetitive spinal microtrauma [10].

Symptomatic spondylolysis may present with a wide spectrum of clinical findings, including back pain with occasional radiation to the buttock and/or proximal lower extremities triggered by strenuous activity, leg pain, or crouch gait due to pain [11]. In addition to assessing lumbar pain and range of motion, it is crucial to evaluate neurological status. Indeed, neurological symptoms such as numbness, saddle anesthesia, and bladder dysfunction are likely secondary to spondylolisthesis with spinal nerve impingement [12].

Plain radiographs are useful in diagnosing spondylolysis, revealing sagittal deformity at the lumbosacral junction, including the lateral and oblique “Scottie dog” views [13]. Lateral Plain radiography allows the establishment of the Meyerding classification in cases of slippage and measuring of the pelvic incidence, which is found to be significantly higher in patients with both low-grade and high-grade isthmic spondylolisthesis than in controls [11]. MRI may be advantageous, allowing early stages of spondylolysis detection with 80% sensitivity and no radiation compared to computed tomography [14]. Feldman et al [15] preconized plain x-rays for all children with low back pain, and reserved MRI for cases with constant pain, neurological deficits, or constitutional Symptoms.

Commonly, the course of the disease is favorable under conservative treatment, including cessation of athletic activities, NSAIDS, and 4 to 6 weeks of full-time rigid spinal orthosis followed by physical therapy focusing on hamstring stretching and core strengthening [16]. A prospective study by Sairyo et al. [17] showed union rates of 94%, 64%, 27%, and 0% for early, progressive with high signal intensity, progressive with low signal intensity, and terminal defects, respectively. Patients with early stage defects are the best candidates for conservative treatment, with an average treatment period of 2.5 months. Commonly, young athletes resume sports activities at the same level [18]. Rarely, arthrodesis is needed when conservative management fails and in cases of neurological complications (compression of nerve roots or cauda equina syndrome) [19].

CONCLUSION

For children with refractory low back pain, the clinician should consider spondylolysis. The traumatic or microtraumatic contexts were very suggestive. Conservative management is the treatment rule. The challenge remains diagnosis in the early stages to avoid aggravation and delayed healing. The more advanced the stage, the longer is the bone healing. In young athletes, return to play is possible in most cases.

Conflict of interest

The authors reports no conflicts of interest.

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