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Case report

Spondyloptosis in athlete

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ARTICLE INFO

Article history:

Received on 20 May 2012

Accepted on 30 November 2012

Keywords:

Spondyloptosis

Spondylolysis

Low back pain

Teenager

Ahtlete

ABSTRACT

The adolescent athletes are at greater risk of low back pain and structural spine injuries. Spondylolysis is responsible for the majority of back pain cases in young athletes, rarely occurring in adults. We report a case of a 13-year-old judo female athlete, who came to our service with 5 months of progressive low back pain during training which was initially attributed to mechanical causes, without any further investigation by imaging methods. At admission, the patient had lumbar deformity, antalgic posture and bilaterally positive unipodalic lumbar hyperextension maneuver. After a research which showed spondyloptosis, the patient underwent surgery. In this article, we discuss, based on this case report, the diagnostic approach to low back pain in young athletes, since the complaint of chronic back pain can be a marker of a structural lesion that may be permanent and bring irreversible functional loss.

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Espondiloptose em atleta

RESUMO

Os atletas adolescentes estão sob maior risco de lombalgia e lesões estruturais da coluna. A espondilólise é responsável pela maioria das lombalgias em jovens esportistas e raramente ocorre em adultos. Relatamos o caso de uma paciente de 13 anos, atleta de judô, que chegou a nosso serviço com quadro de cinco meses de lombalgia progressiva durante os treinos, sendo inicialmente atribuída a causas mecânicas, sem que houvesse uma investigação mais detalhada por métodos de imagem. Na admissão já apresentava deformidade lombar, postura antálgica e manobra de hiperextensão lombar em unipodálico positiva bilateralmente. Realizou-se investigação, que evidenciou espondiloptose, sendo, então, submetida a tratamento cirúrgico. Com base neste relato de caso, discutimos a abordagem diagnóstica de lombalgia em atletas jovens, uma vez que a queixa de lombalgia crônica pode ser marcador de uma lesão estrutural, a qual pode ser definitiva e trazer perda funcional irreversível.

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Palavras-chave:

Espondiloptose

Espondilólise

Lombalgia

Adolescente

Atleta

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<http://dx.doi.org/10.1016/j.rbre.2012.11.002>

Introduction

Low back pain is a very common complaint among adolescents. Among the athletes, there is a higher prevalence of pain and an increased risk of structural damage.¹ The sports gesture is related to the development of joint lesions, for example, repetitive movements of extension and rotation are associated with lesions of the posterior column, such as spondylolysis.²

There is a tendency to associate low back pain of the athlete to mechanical factors.³ Among differential diagnoses, disc disease, muscle contracture, and constitutional deformities like scoliosis and lumbar lordosis should be considered. Furthermore, it is important to rule out inflammatory diseases that may go unnoticed when there are no other peripheral symptoms.^{3,4}

In children and teen athletes, the aetiology of low back pain is different from the causes of adult low back pain.⁵ Spondylolysis is responsible for the majority of back pain cases in young athletes, and rarely occurs in the adult ones.⁶

The patient's complaint must be taken into consideration. The history and physical examination are important to establish the underlying cause of low back pain; but imaging studies may be crucial for an early diagnosis and treatment, preventing irreversible structural damage and disadvantage to the daily activities and sports practice.^{6,7}

Case report

JCT, 13, female, born and raised in Mogi das Cruzes city, student and judo athlete for seven years.

The patient came to the Outpatient Sports Medicine Service, Discipline of Rheumatology, HC-FMUSP, complaining of back pain for five months. She referred back pain associated with local tumor five months ago. In the beginning of the clinical manifestation, the pain appeared only during her training activities and had no irradiation, but evolved with pain during resting periods and radiating to the posterior aspect of the right leg. The patient had no improvement of the picture with use of nonsteroidal anti-inflammatory agents, as well as with analgesic measures (thermotherapy and electrotherapy) performed in the Physical Therapy Department. However, the girl did not stop her practice, despite the pain.

There was no history of trauma, night pain, fever, asthenia, weight loss, sensory or motor changes in lower limbs or sphincter alterations, use of supplements or steroids, or any other morbidity.

She practiced judo competitively for seven years, was an orange belt, performed physical conditioning with strength exercises and stretching for an hour, and specific training for two hours, four times a week.

On physical examination, the patient was in good general condition, with weight of 45 kg and height of 155 cm, with cardiovascular, pulmonary and abdominal examinations without changes. At musculoskeletal examination, the patient had an antalgic posture while sitting, wore her arms as support for the weight of the trunk, with postural deviation in antalgic scoliosis, accentuation of physiological lumbar lordosis

and with a bone tumour at L5 (Fig. 1). At palpation, we found painful contracture of the paraspinal musculature. The pain was triggered by lateralization movement of the trunk, and lumbar rotation and hyperextension. The unipodalic lumbar hyperextension maneuver was positive bilaterally.

After a diagnostic hypothesis of spondylolisthesis, we requested imaging studies (Fig. 2) which showed high-grade spondylolisthesis, or also classified as spondyloptosis.

The patient was symptomatically treated, instructed to rest and referred to the care of Neurosurgery, which indicated reduction and fixation of L5-S1.

Discussion

Low back pain is very common in athletes, with an estimated prevalence of up to 45%, while in non-athletes the prevalence is 18%.²

Numerous athletes exhibit mechanical low back pain secondary to muscle spasm and ligament injuries. In adults, the main causes of pain are disc herniation, vertebral body fracture, spinal canal stenosis and degenerative diseases.³

In young patients, although the major cause of low back pain has muscle origin, some clinical aspects must be considered, as night pain, pain after trauma, hyperextension pain, presence of a specific painful spot, or any neurologic finding.⁸

In adolescents, muscle imbalance, incomplete ossification of the *pars interarticularis*, and inadequate training are the risk factors involved in the development of spinal lesions.⁹ In these



Fig. 1 – Bone tumor topography of L5.

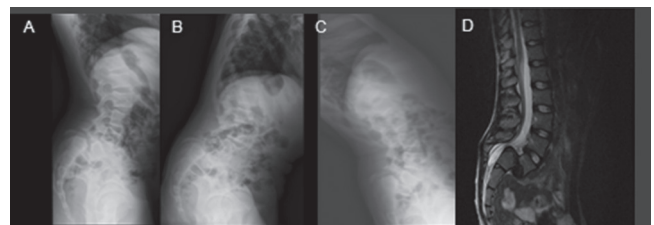


Fig. 2 – Plain radiography with total slippage of L5 on S1, not reducible with the position (A: neutral, B: in flexion, C: in extension, D: MRI of vertebral column with spondyloptosis of L5 on S1, with stenosis of the spinal canal).

young athletes, the most common structural change is spondylolysis, i.e., a *pars interarticularis* fracture.^{3,5,8} Spondylolysis is responsible for 47% of all back pain in this population, while in adults the diagnosis appears in only 5% of cases.¹⁰

The athletes with higher risk of developing spondylolysis and spondylolisthesis are those who practice repetitive spine extension, flexion and rotation movements, for instance, practitioners of artistic gymnastics, skating, hockey and soccer players.² The present case report patient practiced judo, which involves performing such movements.

The spondylolysis may be asymptomatic, except in the acute phase of fracture. The patient can present with hyperlordotic posture, and his/her back pain can be reproduced by hyperextension and rotation of the spine, a maneuver easily reproducible and that was positive in the present case.⁶

After spondylolysis, there is an increased risk of an anterior vertebral slip over another – this is called spondylolisthesis. The greatest instability phase occurs during the growth spurt in adolescence.¹¹

The spondylolisthesis is classified into five grades, with grade I occurring when there is 25% slippage; grade II, 50 %; grade III, 75 %; grade IV, 100%; and grade V, also called spondyloptosis, when a total slippage of L5 on S1 occurs.

The symptoms depend on the degree of slip, and can range from an asymptomatic patient to back pain, with neurological symptoms associated.

The prevention of injury in young athletes is crucial. This prevention must be taken with the reversal of risk factors, such as muscle shortening and imbalance, and the use of incorrect techniques during training. An abrupt change in training volume during the growth spurt should also be considered as a risk factor.⁹

In our case, the patient already had pain with five-month length during workouts, without further investigation by imaging methods that could rule out a possible structural damage or even a recommendation of cessation of training. This combination of factors certainly contributed to delay in the diagnosis of spondylolysis, and resulted in the evolution of the injury to spondyloptosis.

The investigation of spondylolysis by imaging studies should be done with a request of plain radiography in three positions, showing the defect in the *pars interarticularis* (Scotty dog sign), but with low sensitivity. Computed tomography (CT) is the gold standard for diagnosis. SPECT can be used to evaluate the activity of the lesion.⁶

Bone scintigraphy is recommended for patients with low back pain, because of its high sensitivity. A CT-scan may be indicated, when the scintigraphy results positive, to define if the hypercapitation aetiology represents *pars interarticularis* fracture or bone stress reaction, and helps define the degree and chronicity of the fracture.^{11,12} MRI is less sensitive than CT for assessing bone injury, but it can help to assess whether the injury is acute, when it identifies a local oedema.^{1,12}

When there is suspicion of spondylolisthesis, magnetic resonance imaging (MRI) or computed tomography (CT) for evaluating stenosis of the spinal canal and foramina is indicated.⁶

In our case, we chose to perform MRI due to signs of neurological involvement and the time course of the complaint.

The treatment of spondylolisthesis is controversial. Therapeutic modalities include rest and sometimes orthopaedic corsets, aiming to avoid hyperextension of the spine. Surgical arthrodesis is indicated for pain refractory to conservative treatment, or in high-grade spondylolisthesis (slippage greater than 50%), especially in children or adolescents during the growth spurt, due to the risk of progression and neurological injury.¹³

It is expected that young athletes can return to sports activity after successful treatment, even in cases in which surgical treatment was necessary, with the exception of collision sports,⁸ as in the case in question.

Therefore, in a teen athlete, it is always important to recognize and investigate the complaint of chronic low back pain because this symptom may be a marker of a structural lesion that may be permanent and bring irreversible functional loss.

Conflicts of interest

The authors declare no conflicts of interest.

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