Conservative approach to avascular necrosis of the hallucial sesamoid: case report

Tratamento conservador da osteonecrose do sesamoide do hálux: relato de caso

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ABSTRACT

Avascular necrosis of the hallucial sesamoids is a rare condition that can cause severe limitations to the patient, such as change in the gait and difficulty with daily life activities. Surgical treatment of resection of the affected sesamoid, although commonly employed, has limitations and shows a number of complications. We report a case of a 24-year-old college athlete with avascular necrosis of the fibular sesamoid of the hallux. She was successfully treated with a conservative approach, and was able to return to her sports activities. Surgical approach was not necessary.

Keywords:

Sesamoid bones; Hallux; Osteonecrosis; Case reports

RESUMO

A osteonecrose dos sesamoides do hálux é uma patologia pouco frequente, que pode causar limitações graves ao paciente, como alteração de marcha e dificuldade para realizar atividades cotidianas. O tratamento cirúrgico para ressecção do sesamoide afetado, apesar de muito empregado, possui limitações e diversas complicações descritas. Este é um relato de uma atleta universitária de 24 anos, com osteonecrose do sesamoide lateral do hálux direito. Ela foi tratada conservadoramente com sucesso, conseguindo retorno total às atividades esportivas, evitando-se a abordagem cirúrgica.

Descritores:

Ossos sesamoides; Hálux; Osteonecrose; Relatos de casos

INTRODUCTION

Avascular necrosis of the hallucial sesamoids is one of the possible causes of metatarsalgia. It is a rare pathology, which can cause severe pain under the first metatarsal head that is often difficult to control. It is more common in adolescents and young adults, predominantly affecting females.[1-4] It is associated with microtrauma, sports activities and foot deformities.[1,2,5]

Disease etiology is uncertain. Some authors postulate that avascular necrosis is secondary to repetitive trauma, which ends up disrupting the blood supply[2,5] or causing a stress fracture, with a reparative process that results in avascular necrosis [3,4]. McBride and Anderson believed that avascular necrosis of the sesamoids could occur secondary to repetitive trauma or even as a primary event,[6] since there are reports of patients who developed the disease without presenting any risk factors or history of recurrent trauma.

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Patients typically present with pain in the region of the metatarsophalangeal joint of the hallux, with insidious or post-traumatic onset. During the clinical examination, pain may be noticed on direct palpation of the sesamoids. In general, patients report pain worsening when the foot is lifted from the ground. Another common symptom is pain on forced dorsiflexion of the hallux.[2,3,6]

In addition to frontal and lateral radiographs, the sesamoids should be x-rayed in the axial view. Radiographs show sclerosis, flattening, fragmentation, and areas of demineralization of the sesamoids. However, the appearance of these abnormalities in the images may take from 6 to 12 months from the onset of symptoms.[3,4]

Bone scintigraphy is able to demonstrate reduced uptake in the affected sesamoid soon after the blood supply is interrupted, prior to the appearance of radiographic abnormalities. However, once the repair process begins, hypercaptation of the sesamoid can be noted.[3]

Magnetic resonance imaging has high sensitivity for the detection of avascular necrosis of the sesamoids, and is able to identify the disease even in the early stages. The main finding is death of the bone marrow cells, represented by a low intensity signal on T1.[7] However, magnetic resonance imaging alone is not very specific, and the disease may be confused with other pathologies in which bone marrow replacement occurs.[8]

Conservative treatment consists of the use of anti-inflammatory drugs and techniques to reduce mechanical overload on the affected sesamoid, such as suitability of shoes and insoles, rest and change of activities.[2]

If conservative treatment fails it is possible to perform surgical treatment. Complete resection of the affected sesamoid is the most common procedure. However, it has limitations and is subject to several complications, such as hallux deformity, loss of strength and joint stiffness.[2-4,9]

CASE REPORT

A 24-year-old female patient who is the goalkeeper of the futsal team of the college, visited our department in February 2014, with a history of 2 months of pain in the right foot. The pain started gradually, and was most evident after futsal training sessions. The pain worsened progressively until the patent was forced to discontinue all training sessions. During the clinical examination, pain was noted upon direct palpation of both sesamoids, especially the lateral one, without limitation of range of motion of the metatarsophalangeal joint of the hallux or pain on joint mobilization.

The axial radiograph of the sesamoids showed joint flattening, areas of sclerosis and demineralization of the lateral sesamoid (Figure 1). No abnormalities were noted in the medial sesamoid using this imaging method.

Magnetic resonance imaging showed lateral sesamoid unevenness, with T1 hyposignal, sclerosis and hypocontrast regions compatible with avascular necrosis. Edema and enhancement of the medial sesamoid were also observed. These were suggestive of sesamoiditis (Figures 2 and 3).

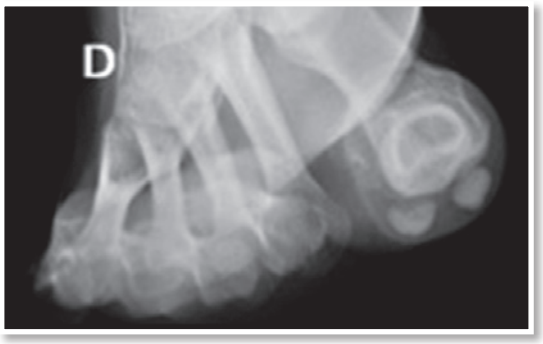

Figure 1 | Joint flattening, areas of sclerosis and demineralization of the lateral sesamoid.

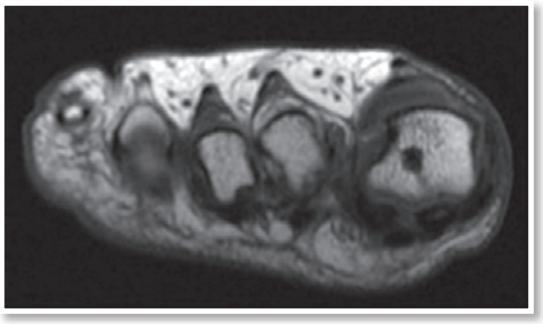

Figure 2 | T1 hyposignal of the lateral sesamoid.

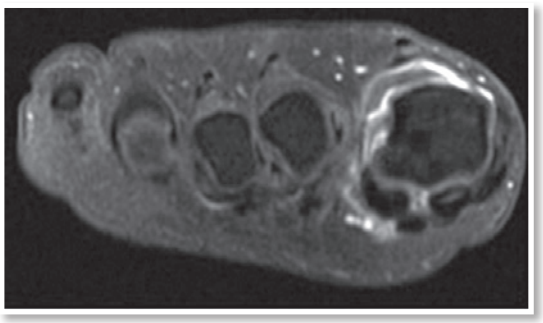

Figure 3 | Hypocontrast regions of the lateral sesamoid and enhancement of the medial sesamoid.

The patient was initially instructed to discontinue all physical activity and to start wearing shoes with a stiff sole or carbon fiber insole, which provides the sole with the necessary stiffness. She began physiotherapy sessions, performing exercises to stretch the posterior chain of the lower limbs, strengthening of the intrinsic muscles and proprioception, as well as analgesia. Seven months after the onset of the condition, the patient reported a substantial improvement in symptoms.

This was followed by gradual resumption of sports activities. The carbon fiber insole was replaced with an EVA insole for sports, with support for the medial plantar arch and cushioning under the sesamoids. Initially instructed not to engage in jumping or high impact activities during training sessions, the patient progressively increased her training load.

After 1 year, the patient reported almost complete improvement of symptoms. She underwent a further MRI for control, which showed evident lateral sesamoid fragmentation (Figure 4). Total regression of edema caused by sesamoiditis was noted in the medial sesamoid.

Figure 4 | Fragmentation of the lateral sesamoid.

Two years and 6 months after the onset of symptoms, the patient had not only resumed her normal futsal training routine, but had also joined the college rugby team 3 months earlier. She reported mild pain occurring sporadically when kicking the ball over a short distance repeatedly, but that the pain soon stopped and did not restrict her activity in any way.

DISCUSSION

One of the discussions regarding avascular necrosis of the sesamoids is about its etiology, which is currently seen as uncertain. Some authors uphold that it occurs secondarily to traumatic events,[2,5] while others postulate that it can occur primarily,[6] without triggering events.

In the case presented here, the patient had different pathologies in both sesamoids: avascular necrosis of the lateral sesamoid and medial sesamoiditis. This fact suggests that the repetitive trauma resulting from sport activity led to a mechanical overload on the sesamoids, triggering the pathologies. Accordingly, avascular necrosis of the lateral sesamoid would be secondary to recurrent trauma.

Conservative treatment of avascular necrosis of the sesamoids is not simple, as it does not produce immediate results. Thus, cooperation, patience and full understanding of the severity of the condition by the patient are necessary. Conservative treatment should be attempted initially with the use of anti-inflammatory drugs, resting, shoe suitability and insoles.[2] Several types of insole have been described for this purpose, with support for the medial plantar arch, shock absorbers or depressions on the first metatarsal head, always with the purpose of reducing mechanical overload on the sesamoids.

If conservative treatment fails, it is possible to perform surgical treatment. Complete resection of the affected sesamoid is the most common method. However, complete resection of the sesamoid is a procedure with limitations, which can cause muscle imbalance in the metatarsophalangeal joint of the hallux, leading to claw toe, hallux varus, loss of strength or joint stiffness. In addition, mechanical overload with consequent degenerative abnormalities of the remaining sesamoid is relatively common.[2, 4-9] For this reason, some authors advocate the resection of both sesamoids simultaneously.[9] However, most authors agree that the best treatment is isolated resection of the affected sesamoid.

Although conservative treatment is believed to be inefficient,[10] most of the literature maintains that conservative treatment should be attempted for at least 6 to 12 months,[6,7] and, in most cases, it is possible to keep the patient's pain at tolerable levels for the rest of their lives. We agree with this conduct, especially if we take into account the limitations of surgical treatment with its potential consequences and complications.

In the case described here, the treatment was a success, even though the patient was an athlete subject to repetitive cycles of impact. However, even if the initial efforts fail, we believe in the benefit of insisting on conservative treatment for this pathology, even if this requires a change in lifestyle or in the activities carried out by the patient.

There is still a shortage of data in the literature regarding late follow-up and the rate of patients successfully treated conservatively. Further studies in this direction

may determine the true role of conservative treatment in avascular necrosis of the sesamoids.

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