

CLINICAL NOTE

Rupture of the medial bundle of the flexor hallucis brevis secondary to distal calcifying tendonitis. Case report and differential diagnosis

J. Ramberde

Orthopaedic Surgery and Trauma Division, Hospital of Ripollès Area, Campdevàdol, Girona, Spain

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KEYWORDS

Sesamoid bones;
Tendinopathy;
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Abstract

Purpose: We report on the peculiar case of a patient that experienced pain under the first metatarsal head of the left foot. An attempt is made to establish its etiology.

Clinical case: The patient is a 29-year-old woman who experienced pain and intense rapid onset inflammatory signs on the plantar aspect of the head of the first metatarsal of the left foot. Plain films show distal migration of the medial sesamoid bone of the first metatarsophalangeal joint and perisamoid calcifications. Nuclear magnetic resonance is suggestive of osteonecrosis.

Discussion: We review the potential causes of pain under the first metatarsal head in order to carry out a differential diagnosis.

Conclusion: The cause of the pain was a rupture of the distal enthesis of the medial bundle of the flexor hallucis brevis at the level of the medial sesamoid, as a result of calcifying tendinitis.

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PALABRAS CLAVE

Huesos sesamoideos;
Tendinopatía;
Caso clínico

Rotura del fascículo medial del flexor hallucis brevis secundaria a entesitis calcificante distal. Caso clínico y diagnóstico diferencial

Resumen

Objetivo: A propósito de un caso clínico peculiar que cursa con dolor bajo la cabeza del primer metatarsiano izquierdo se intenta establecer su etiología.

Caso clínico: Mujer de 29 años que presenta dolor y signos inflamatorios intensos de inicio rápido en la cara plantar de la cabeza del primer metatarsiano izquierdo. La radiografía simple muestra migración distal del hueso sesamoideo medial de la primera articulación metatarsofalángica y calcificaciones perisamoidales. La resonancia magnética nuclear evidencia osteonecrosis.

Discusión: Se repasan las posibles causas de dolor bajo la cabeza del primer metatarsiano para realizar un diagnóstico diferencial.

E-mail: jramberde@terra.es

Conclusión: Se trata de una rotura de la entesis distal del fascículo medial del flexor hallucis brevis a nivel del sesamoideo medial como consecuencia de una tendinitis calcificante.

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Introduction

Sesamoid bones are important in the biomechanics of the first metatarsophalangeal (MTP) articulation. They absorb impact, distribute weight load, decrease friction, protect the flexor hallucis longus tendon and act as a pulley for the flexor hallucis brevis during the propulsive phase of walking.¹⁻⁸ During one walking cycle they transport 50-60% of the body weight, and during lift-off from the toes, they transport more than three times the body weight. These stringent demands may lead to various diseases that affect the medial sesamoid the most. The most demanding situations occur during sports or ballet, so these conditions are most commonly found in athletes and dancers.⁴ Any changes in the function of these bones (hereditary condition, high heels, overweight etc.) can also favour the condition.⁶

These ailments cause pain below the head of the first metatarsal which can become incapacitating. Its onset may be sudden or insidious. Pain increases with walking, palpation, forced dorsal flexion and plantar flexion with resistance. The patient may develop guarding supination when walking.⁴

Laboratory tests may be useful in the diagnosis if infection or inflammatory arthritis is present.² Radiography is the first diagnostic procedure. It must include anteroposterior, profile and Walter-Müller axial views.^{2,5,6,9} Bone scans allow us to locate the disease in the sesamoids or the first MTP and can differentiate between pathological sesamoids and bipartite sesamoids, but we must consider that 26-29% of all asymptomatic people have hot spots in the sesamoid bones.⁴ MRI, magnetic resonance imaging, is the complementary technique of choice: it is very sensitive, enables early diagnosis, can differentiate between soft tissue and osteoarticular disease, and often permits specific diagnosis.¹⁰

Sesamoid disease generally requires conservative treatment. If this fails, it may require surgical treatment, or even a partial or total sesamoidectomy.⁴⁻⁷

Case report

A female patient 29 years of age with no relevant medical history came to the emergency room due to intense pain that began a few hours before in the plantar side of the head of the first left MTT. The pain intensified with contact, including contact with bedclothes. Pain increased with walking. Oedema and local redness were present. She did not report trauma or a history of pain in the area. The radiography was normal. The emergency room doctor diagnosed her with gout and prescribed rest with the foot elevated, non-steroidal anti-inflammatory drugs (NSAIDs)

and colchicine, and asked her to see her primary care physician in 48 hours.

She returned to the emergency room 24 days later due to persisting symptoms. She brought a normal laboratory test report which her primary care physician had asked for on the third day after condition onset. This time, the emergency room doctor consulted with the trauma unit. The radiographies showed distal migration of the medial sesamoid and calcifications surrounding it (fig. 1). She was diagnosed with sesamoiditis due to a ruptured medial bundle of the flexor hallucis brevis which was probably secondary to calcifying distal enthesitis. An emergency MRI was ordered, the patient was asked to walk with crutches and take NSAIDs, and the colchicine was suspended. The MRI was performed in another centre.



Figure 1 Radiography. A: anteroposterior. B: oblique.

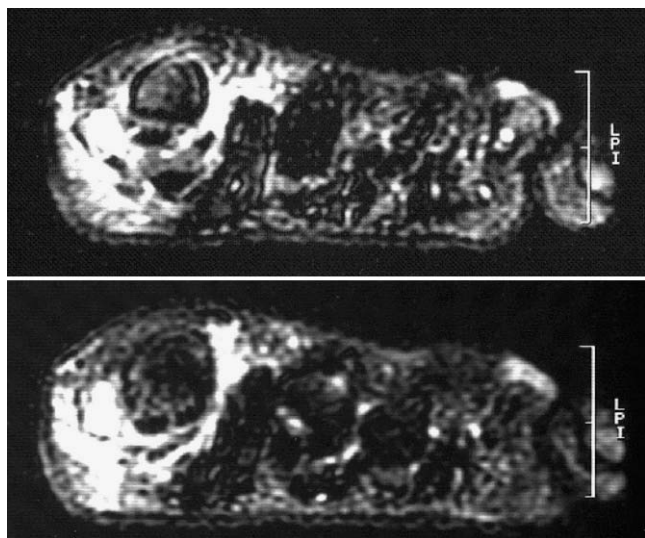


Figure 2 Magnetic resonance. Two coronal slices.

Nearly two months the patient was seen in an outpatient consult, and she only reported residual problems. The MRI report mentioned “increase in medial signal at the first MTP with distal luxation of the medial sesamoid with dystrophic calcifications in the immediate area suggesting osteochondritis-osteonecrosis of the internal sesamoid” (fig. 2). The patient was instructed to wear low-heeled shoes with thick rubber soles and take NSAIDs as needed. Fourteen months later, the patient remains asymptomatic.

Discussion

A painful condition of the sesamoid bones in the great toe may be due to any of a number of processes: fractures (acute or stress fractures), sesamoidosis, osteonecrosis, infections, arthritis, tendinitis, etc.

A preceding traumatic event is common with acute fractures.^{2,3,6} These are characterised by rapid onset pain, inflammation and ecchymosis. Radiography, bone scanning, computed tomography (CT) and MR imaging may show the fracture.

Stress fractures are usually caused by overloading following a prolonged or repetitive activity. They are characterised by progressive onset pain and mild swelling. The radiography showed the fracture three weeks after onset of symptoms.^{2,3,5,6,8} The CT scan, bone scan and MRI enabled us to perform the diagnosis.

Sesamoiditis is an inflammatory process affecting the soft tissue underneath the head of the first MTP and the sesamoids.⁸ It includes several diseases: tendinitis, bursitis, synovitis, chondromalacia of the sesamoids and painful bipartite or multipartite sesamoids.³ It is generally caused by overloading the first MTP in hyperextension. The overload is more often chronic (in athletes and dancers, or from high heels or flat feet) than acute (due to trauma).^{3,9} It tends to present with insidious onset pain and local inflammation. In many cases, a hygroma or hyperkeratosis appears, which can at times be ulcerated.^{3,4,6} The laboratory tests and radiographies tend to

be normal.⁴ A bone scan may be normal or show a hot spot in the first MTP as a sign of inflammation.^{2,3} The MRI shows oedema in the sesamoids and the underlying soft tissues.^{5,8,10}

Osteonecrosis of the sesamoids (Renander’s disease) may be idiopathic, but it is usually secondary to other diseases that cause poor blood supply to the sesamoids and lead to localised ischaemia. It is characterised by gradual onset pain, or pain following trauma with mild swelling. Plantar hyperkeratosis is common. Initial radiographies are normal and six to twelve months may pass before abnormalities appear on the X-ray image. The CT, bone scan, and above all the MRI enable earlier diagnosis.^{2,4-8}

Infections (osteomyelitis of the sesamoids and septic arthritis of the first MTP) generally arise from infected cutaneous ulcers or infected ulcerated corns in neuropathic, normally diabetic, patients.⁴ They are accompanied by acute pain, significant local inflammatory signs and fever, and prevent the patient from bearing weight on that side. Abscesses, fistulas and active suppuration may be present. There may also be leukocytosis and an increase in globular sedimentation rate (GSR). Cultures may be positive. The first radiographic images are normal, but variable changes appear later on.^{1,2} The bone scan and MRI are helpful in the diagnosis.^{2,10}

In arthritis of any origin, the patient experiences pain, joint effusion, inflammatory signs and limited movement in the first MTP.

A history of other types of arthritis is common with rheumatoid arthritis. The laboratory tests may show a positive rheumatoid factor with rheumatoid arthritis, human leukocyte antigen B27-positive with seronegative spondyloarthropathy and an elevated GSR in both cases. Radiography may show changes that are typical of these rheumatic diseases. The bone scan is positive if there is activity.² MRI is useful in the diagnosis.¹⁰

Microcrystalline arthritis present as self-limited attacks of acute pain with important local inflammatory signs. Pain persists while resting and during the night. With gout, the laboratory tests tend to show hyperuricaemia. Radiographic images show deep erosions, tophus, chondrocalcinosis, etc.⁶ Differentiating between gout and chondrocalcinosis based on clinical and radiographic findings is difficult. Joint fluid must be examined for sodium urate or calcium pyrophosphate dihydrate in order to confirm the diagnosis.² The joint most commonly affected by gout is the first MTP.⁶ Gout affects adult men with a peak age of onset in the fifth decade, and postmenopausal women.

Osteoarthritis tends to be associated with hallux valgus or hallux rigidus, or else is the result of a fracture.⁶ It is characterised by gradual onset pain, rigidity and crepitation in elderly patients.^{2,6} Radiographic images show the typical signs of osteoarthritis.^{2,10}

Tendinitis may be present at the level of the first MTP, normally affecting the flexor hallucis longus.^{6,10} It presents with pain below the head of the first MTP, extending proximally and distally. A radiographic image does not show the lesion, so an ultrasound or MRI is required to view it.⁶ The MRI shows a build-up of liquid in the sheath, and has increased contrast after administering gadolinium.¹⁰ These conditions may become chronic and lead to tendon degeneration (tendinosis), or even ruptured tendon.⁶⁻¹⁰

Calcifying tendinitis is a special type of tendinitis resulting from the deposit of calcium hydroxyapatite in the periarticular tendon insertion site. It rarely affects the small joints of the foot. It most frequently affects premenopausal women. It causes acute pain and swelling. The process is self-limited. Radiography shows the globular calcifications in the tendons.²

This area may be the site of other diseases, such as non-neoplastic soft tissue tumours (ganglions, bursitis, foreign body granulomas, etc.) and benign or malignant neoplasias of soft or bony tissue.

Conclusion

Medical literature does not contain any articles reporting distal migration of the medial sesamoid of the great toe and perisemoid calcifications.

The first diagnosis of gout seems to be an error; since gout typically affects men and post-menopausal women, it would be uncommon for it to affect a 29 year old woman. The laboratory tests did not show hyperuricaemia, pain duration was longer than usual, and the symptoms did not improve with colchicine.

Radiologists stated that the MRI showed osteonecrosis, but the symptoms, self-limited evolution and examination of the complementary procedures carried out lead us to doubt this diagnosis.

The symptoms, rapid onset, self-limited evolution, distal migration of the medial sesamoid, the perisemoid calcifications, presence of oedema in the soft tissue of the medial, plantar and lateral areas of the first MTP and the

build-up of liquid in the sheath of the medial bundle of the flexor hallucis brevis in absence of its tendon suggest sesamoiditis as a result of a ruptured medial bundle of the flexor hallucis brevis secondary to distal calcifying enthesitis.

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