



REVISTA BRASILEIRA DE REUMATOLOGIA

www.reumatologia.com.br



Case report

Achilles tendon xanthoma imaging on ultrasound and magnetic resonance imaging



Eloy de Ávila Fernandes^a, Eduardo Henrique Sena Santos^{a,*},
Tatiana Cardoso de Mello Tucunduva^a, Antonio J.L. Ferrari^b,
Artur da Rocha Correa Fernandes^b

^a Department of Imaging Diagnosis, Universidade Federal de São Paulo, São Paulo, SP, Brazil

^b Departamento de Medicina, Universidade Federal de São Paulo, São Paulo, SP, Brazil

ARTICLE INFO

Article history:

Received 24 September 2013

Accepted 11 December 2013

Available online 13 May 2015

Keywords:

Xanthoma

Achilles tendon

Ultrasound

Magnetic resonance imaging

ABSTRACT

The Achilles tendon xanthoma is a rare disease and has a high association with primary hyperlipidemia. An early diagnosis is essential to start treatment and change the disease course. Imaging exams can enhance diagnosis. This study reports the case of a 60-year-old man having painless nodules on his elbows and Achilles tendons without typical gout crisis, followed in the microcrystalline disease clinic of Unifesp for diagnostic workup. Laboratory tests obtained showed dyslipidemia. The ultrasound (US) showed a diffuse Achilles tendon thickening with hypochoic areas. Magnetic resonance imaging (MRI) showed a diffuse tendon thickening with intermediate signal areas, and a reticulate pattern within. Imaging studies showed relevant aspects to diagnose a xanthoma, thus helping in the differential diagnosis.

© 2014 Elsevier Editora Ltda. All rights reserved.

Aspectos de imagem do xantoma do tendão calcâneo na ultrassonografia e ressonância magnética

RESUMO

O xantoma no tendão calcâneo é uma doença rara e tem uma alta associação com hiperlipidemia primária. O diagnóstico precoce é fundamental para o início do tratamento e para alterar o curso da doença. Os exames de imagem podem auxiliar nesse diagnóstico. Este estudo relata o caso de um homem de 60 anos apresentando nódulos indolores nos cotovelos e tendões calcâneos, sem crises típicas de gota, acompanhado no ambulatório de doenças microcristalinas da Unifesp para esclarecimento diagnóstico. Os testes laboratoriais solicitados apresentavam dislipidemia. Ultrassom (US) mostrou espessamento difuso dos tendões calcâneos com áreas hipoecoicas. Ressonância magnética (RM) mostrou

Palavras-chave:

Xantoma

Tendão calcâneo

Ultrassonografia

Ressonância magnética

* Corresponding author.

E-mail: eduardo_sena1@yahoo.com.br (E.H.S. Santos).

<http://dx.doi.org/10.1016/j.rbre.2013.12.003>

2255-5021/© 2014 Elsevier Editora Ltda. All rights reserved.

espessamento difuso dos tendões, com áreas de sinal intermediário e padrão reticulado no interior. Os exames de imagem mostraram aspectos relevantes no diagnóstico de xantoma, auxiliando no diagnóstico diferencial.

© 2014 Elsevier Editora Ltda. Todos os direitos reservados.

Introduction

Xanthomas are nonneoplastic lesions characterized by a local concentration of lipid-laden macrophages, giant cells, and other inflammatory cells in response to cholesterol deposition in tissues. They are relatively common, with most of them occurring on the skin, especially on the eyelids.¹ The lesions are most frequently seen on tendons and synovium and they usually involve the extensor tendons of the hands, both Achilles tendons, and patellar ligaments.^{1,2} They typically occur at the third decade with a female 4:3 ratio predominance over males.²

The Achilles tendon xanthoma is a rare disease³ and is highly associated with the primary hyperlipidemia. The early diagnosis is essential so that the treatment is started and it can change the disease course before the development of an advanced coronary disease.

Imaging diagnosis might be earlier than clinical diagnosis, thus it is clinically important to recognize imaging characteristics, especially ultrasound and magnetic resonance aspects of xanthomas.

Case report

A male patient aged 60 with pain nodules on the elbows and Achilles tendons with no typical gout crisis has been followed in the microcrystalline disease clinic, Department of Rheumatology, Universidade Federal de São Paulo (Unifesp). A suspected chronic tophaceous gout with an atypical presentation was considered because of the nodulations. Laboratory tests obtained were as follows: total serum cholesterol (268 mg/dL) and cholesterol fractions (HDL: 43 mg/dL; LDL: 192 mg/dL), triglycerides (166 mg/dL) and uric acid (5.6 mg/dL). He underwent ankle ultrasound (US) and magnetic resonance imaging (MRI) in the diagnostic workup.

The US (Fig. 1) showed a diffuse thickening of the Achilles tendons with hypochoic areas and other small hyperechoic confluences. MRI (Fig. 2) showed a diffuse thickening of tendons with intermediate signal areas and a reticular pattern within.

The patient underwent a resection biopsy of elbow lesions.

Discussion

The Achilles tendon xanthoma is a rare condition of concern to orthopedic surgeons when planning surgeries for cosmetic deformities. The numbers of lesions, cholesterol levels, age, and gender are correlated.⁴ It is important in Internal Medicine and in Dermatology because of a link with a

specific change in the lipid metabolism, the familial hypercholesterolemia. The familial hypercholesterolemia has an autosomal dominant inheritance and is characterized by an elevated LDL-cholesterol, tendon xanthomas, and coronary disease. Although xanthomas have been described in the absence of familial hypercholesterolemia, this can be the first disease manifestation.⁵

Despite the xanthoma is usually known as a soft tissue lesion, it can rarely be found in bone.⁶ The variability of cell composition leads to a discussion on whether these skeletal system lesions are truly tumors or not. Histological findings similar to xanthomas can be seen in neoplastic and nonneoplastic bone lesions. Xanthomatous changes may occur in lesions such as fibrous dysplasia, giant-cell tumor, aneurysmatic bone cyst, nonossifying fibroma, fibrous cortical defect, benign and malignant fibrous histiocytoma, Erdheim-Chester disease, xanthogranulomatous osteomyelitis, and renal carcinoma metastasis. Xanthomas, therefore, can develop a condition unrelated to hyperlipidemia.⁷

Clinical manifestations of Achilles tendon xanthomas depend on the lesion sizes. The smaller lesions are often asymptomatic. The larger lesions are clinically apparent and manifest as cosmetically disfiguring masses which can impair ambulation and cause local pain or irritating skin symptoms.⁷

Radiography, US, and MRI can be used previously to the emergence of clinical manifestations. On X-rays, tendon xanthomas are shown either as an abnormal tendon thickening or soft tissue noncalcified masses with a nonspecific appearance.^{7,8}

US and MRI are effective techniques in assessing and detecting Achilles tendon xanthomas. RM tendon xanthoma imaging may present morphological or signal changes. The ventral margin of the Achilles tendon is normally flat or concave, but it may have a convex appearance in axial imaging when a xanthoma is present.⁷

MRI characteristics of tendons affected by xanthomas show either a diffuse reticulate pattern⁹ or focal areas with a high signal on T1 and T2, with this latter aspect occurring when triglycerides are predominantly deposited.⁵ In the current case, a diffuse reticulate pattern was observed. This pattern may be explained by the patient's lipid profile – predominantly LDL fraction dyslipidemia and triglyceride levels close to normal range.

Although small areas with high signal, especially on T2, can be found in tendon xanthomas, they are predominantly characterized by a tendon enlargement on MRI which is indistinguishable from that seen in tendon diseases with other etiologies, thus limiting the clinical use of MRI in tendon xanthoma workup.⁵

US is more widely available, less expensive, and faster to perform than MRI. The normal Achilles tendon shows a multiple parallel line pattern, which, taken together, forms

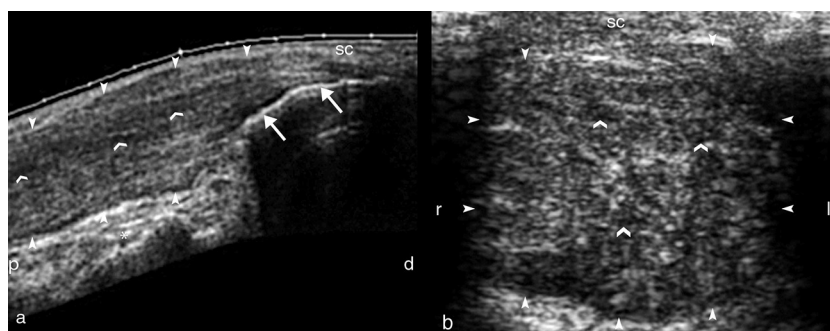


Figure 1 – 1a) Achilles tendon ultrasound extended in the longitudinal plane (P = proximal; D = distal) and 1b) cross-sectional plane (D = right; E = left) showing marked diffuse and concentric thickening of the Achilles tendon (arrowheads mark the tendon external margins) predominating in middle- and distal sections with a diffuse heterogeneity, with confluent hypoechoic areas (open arrows) and thin hyperechoic foci within the tendon being observed, which cause a loss of the fibrillar pattern of tendons. Arrows delineate calcaneus cortical bone, (*) demonstrates Kager fat pad and (sc) is the subcutaneous tissue. No hyperechoic masses are seen in the tendon despite the extensor involvement of the tendon.

a fibrillar pattern. The histological correlation shows that fibrillar echoes arise from the interface between endotendon septa.¹⁰ Achilles tendon xanthomas have been described as hypoechoic nodules within the tendon or having a diffusely heterogeneous pattern.⁹

In the current case, the US study was crucial to differentiate the intratendinous xanthoma from pyrophosphate crystal deposition, gout, and tendon disease.

The different tendon impairment patterns by tophi in chronic tophus gout on a ultrasound study include sodium monourate crystal deposits, translated as hyperechoic dotted foci or intratendon gouty tophi, which are heterogeneous hyperechoic nodulations with bright dots sometimes having calcifications within. Ill-defined nodules, multiple grouped nodules and the presence of an anechoic halo are also described as characteristics of tophi.¹¹ The tophus can be

located involving the tendon having no relationship with the tendon, at the tendon insertion, compressing it or within the tendon,¹² thus being easily detected on ultrasound.

As an extended diffuse impairment of the Achilles tendon was observed in the current case and no grouped tophi were observed as hyperechoic ovoid masses within the tendon or calcified areas, the diagnosis of tophus in Achilles tendons was ruled out by the ultrasound.

In calcium pyrophosphate disease, crystal deposition in tendons is typically linear and extended, thus an acoustic shadow might be generated.¹³ This appearance was not observed in the study either. The diffuse thickening pattern associated with hyperechoic areas observed in Achilles tendons supported the ultrasound diagnosis of xanthoma.¹⁴

An early diagnosis of xanthoma is essential so that the treatment can be initiated and the disease course can be

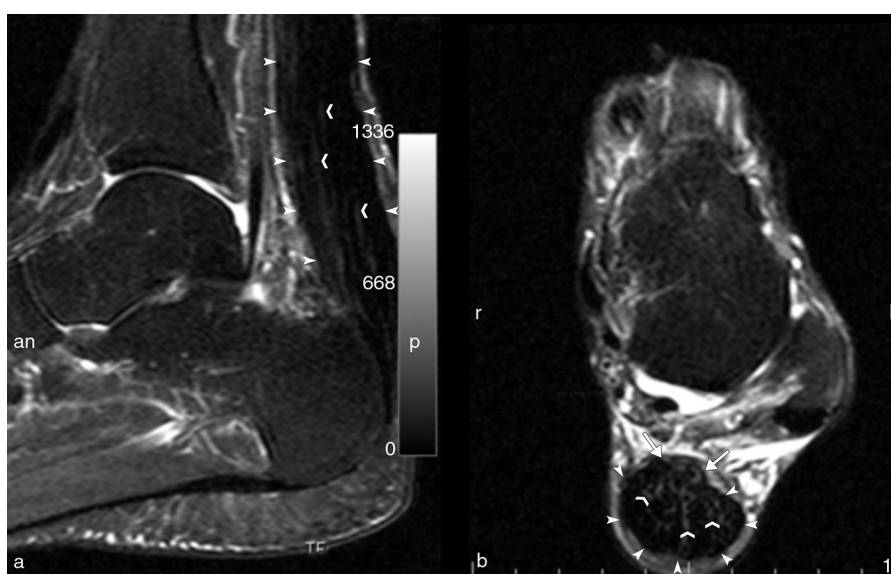


Figure 2 – STIR magnetic resonance imaging of the Achilles tendo in a patient with a xanthoma. (a) sagittal plane (A: anterior, P: posterior) and (b) cross-sectional plane (D: right; E: left) showing a diffuse thickening and a reticulate pattern of the tendon (open arrowheads). Arrowheads mark outline the Achilles tendon. Of note, the ventral margin of the tendon has a convex outline in cross-sectional plane (arrows).

modified prior to the development of an advanced coronary disease. Imaging studies showed relevant aspects in xanthoma diagnosis, thus aiding in the differential diagnosis. The US was shown to be more helpful and specific to characterize this condition.

Conflicts of interest

The authors declare no conflicts of interest.

REFERENCES

1. Fair KP. Xanthomas. Emedicine [online]. <http://www.emedicine.com/derm/topic461.htm>. Updated January 15, 2008.
2. Fahey JJ, Stark HH, Donovan WF, Drennan DB. Xanthoma of the Achilles tendon. *J Bone Joint Surg Am.* 1973;55:211-1197.
3. Carranza-Bencano A, Fernandez-Centeno M, Leal-Cerro A, Duque-Jimeno V, Gomez-Arroyo JA, Zurita-Gutierrez M. Xanthomas of the Achilles tendon: report of a bilateral case and review of the literature. *Foot Ankle Int.* 1999;20:314-6.
4. Murano S, Shinomiya M, Shirai K, Saito Y, Yoshida S. Characteristic features of long-living patients with familial hypercholesterolemia in Japan. *J Am Geriatr Soc.* 1993;41:253-7.
5. Liem MS, Gevers Leuven JA, Bloem JL, Schipper J. Magnetic resonance imaging of Achilles tendon xanthomas in familial hypercholesterolemia. *Skeletal Radiol.* 1992;21:453-7.
6. Bertoni F, Unni K, Mcleod RA, Sim FH. Xanthoma of bone. *Am J Clin Pathol.* 1988;90:377-84.
7. Narvaez JA, Narvaez J, Ortega R, Aguilera C, Sanchez A, Audia E. Painful heel: MR imaging findings. *RadioGraphics.* 2000;20:333-52.
8. Mathieson JR, Connell DG, Cooperbei PL, Lloyd-Smith DR. Sonography of the Achilles tendon and adjacent bursae. *AJR.* 1988;151:127.
9. Dussault RG, Kaplan PA, Roederer G. MR imaging of Achilles tendon in patients with familial hyperlipidemia: comparison with plain films, physical examination, and patients with traumatic tendon lesions. *AJR Am J Roentgenol.* 1995;164:403-7.
10. Matinoli C, Derchi LE, Pastorino C, Bertolono M, Silvestri E. Analysis of echotexture of tendons with US. *Radiology.* 1993;186:839-43.
11. Fernandes EA, Sandim GB, Mitraud SAV, Kubota ES, Ferrari AJL, Fernandes ARC. Ultrasound features of tophi in chronic tophaceous gout. *Skeletal Radiol.* 2011;40:309-15.
12. Fernandes EA, Sandim GB, Mitraud SAV, Kubota ES, Ferrari AJL, Fernandes ARC. Sonographic description and classification of tendinous involvement in relation to tophi in chronic tophaceous gout. *Insights Imaging.* 2010;1:143-8.
13. Grassi W, Meenagh G, Pascual E, Filippucci E. Crystal clear" sonographic assessment of gout and calcium pyrophosphate deposition disease. *Semin Arthritis Rheum.* 2006;36:197-202.
14. Bude RO, Adler RS, Bassett DR. Diagnosis of Achilles tendon xanthoma in patients with heterozygous familial hypercholesterolemia: MR vs sonography. *AJR.* 1994;162:913-7.