

# A 73-Year-Old Man with Bilateral Posterior Ankle Pain

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## SECTION 2 – ANSWER

### Case

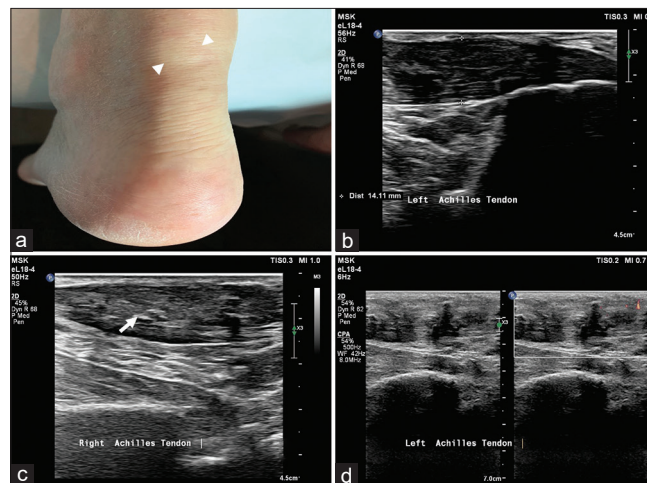
A 73-year-old man had been long-term followed at the clinic due to metabolic and cardiovascular disease. Treadmill exercise electrocardiography was arranged to assess the cardiac function. However, he failed to complete the examination due to bilateral posterior ankle pain. Physical examination revealed bilateral Achilles tendons swelling and tenderness. The patient stated that he had this condition for >40 years, and could be reduced after taking the analgesics. The following ultrasound images showed the transverse and longitudinal views of the bilateral Achilles tendons [Figure 1].

### Interpretation

After placing the probe over posterior ankle region, the bilateral Achilles tendons showed diffuse thickening. There was a heterogenous lesion, predominantly hypoechoic and some hyperechoic confluent inside the bilateral Achilles tendons. The lesions had increased signals under the power Doppler mode, implying increased blood flow inside the lesions. These findings were correspondent with bilateral Achilles xanthomas.

### DISCUSSION

Xanthoma is a disorder that lipid deposit in the connective tissue. It is characterized as papules, plaques, or nodules in the skin. When xanthoma happens in the tendon, Achilles tendon and extensor tendons of hands are frequently involved. A group of lipid metabolism disorders is highly relevant to xanthoma, including familial hypercholesterolemia, familial  $\beta$ -sitosterolemia, and cerebrotendinous xanthomatosis.<sup>[1]</sup> According to the previous investigations, familial hypercholesterolemia patients with xanthoma has shown three times higher risk of developing cardiovascular disease, and higher chance to evolve in ST elevation myocardial infarction when comparing with patients without xanthoma.<sup>[2,3]</sup> Thus, xanthoma cannot be considered as a merely



**Figure 1:** Gross appearance and ultrasound images of bilateral Achilles tendons. (a) Gross appearance of left Achilles tendon, (b) Longitudinal view of left Achilles tendon, (c) Transverse view of right Achilles tendon and (d) Transverse view of left Achilles tendon with power Doppler mode. Arrowhead: A soft yellowish mass at posterior ankle; Arrow: Some hyperechoic spots within right Achilles tendon under ultrasonography

cosmetic problem, treating and following the metabolic factors is warranted.

The diagnosis of xanthoma is mainly based on the clinical assessment, biopsy, and image studies. The gold standard of diagnosis is based on tissue biopsy, which characterized by lipid crystal cleft and foamy macrophage. Ultrasonography offered the benefits of noninvasive, inexpensive, and real-time assessment. The classical sonographic features of xanthoma are diffuse thickening of Achilles tendon, predominantly in the distal part.<sup>[4]</sup> Normal tendinous fibrillar pattern is replaced by the predominant diffuse hypoechoic lesion and some focal hyperechoic confluent.<sup>[4]</sup> A study included 215 participants found out that hypercholesterolemia patients had significantly

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thicker Achilles tendon than normal subjects ( $9.42 \pm 3.63$  mm vs.  $6.05 \pm 0.28$  mm,  $P < 0.05$ ).<sup>[5]</sup> Besides, there was a correlation between Achilles tendon thickness and low-density lipoprotein level.<sup>[5,6]</sup> Surprisingly, increased Achilles tendon xanthoma size might be contributed to increased relative water content instead of lipid. It has shown that mean relative water content per unit volume was 71% higher in xanthoma tendons.<sup>[7]</sup> This might explain why xanthoma present with hypoechoic lesion under the ultrasonography.

When posterior ankle pain present, ultrasonography is useful to differentiate between xanthoma and other diseases, including Achilles tendinopathy and gouty tendinopathy.<sup>[4]</sup> It is also useful to distinguish the etiologies of hypercholesterolemia. The familial hypercholesterolemia patient tends to have thickened tendon with inhomogeneity, while hypercholesterolemia due to other etiologies tends to present without tendon thickening.<sup>[6]</sup> In addition, ultrasonography is effective to monitor the treatment response. After taking the statin, a follow-up ultrasonography at 1 year might reveal reduced Achilles tendon thickness and normal tendon architecture.<sup>[8]</sup>

Other than ultrasonography, magnetic resonance images (MRI) is also advantageous in diagnosing xanthoma. However, which image modality is better for diagnosis is still in debate. Two studies compared ultrasound and MRI to diagnose xanthoma, and both of them preferred using sonography rather than MRI because ultrasonography is more capable of quantitating tendon cholesterol accumulation.<sup>[9,10]</sup>

In this case, the patient has underlying disease with metabolic disease and cardiovascular disease. He has long been taking the statin to control the dyslipidemia. The bilateral lesions showed diffuse tendon thickening, with predominantly hypoechoic and some hyperechoic confluences inside the bilateral Achilles tendon, which was compatible with xanthoma. In conclusion, ultrasonography provides a noninvasive and instant assessment of posterior ankle pain.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that his name

and initials will not be published and due efforts will be made to conceal the identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

Prof. Tyng-Guey Wang, an editorial board member at *Journal of Medical Ultrasound*, had no role in the peer review process of or decision to publish this article. The other author declared no conflict of interest in writing this paper.

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