

CASE REPORT

Unilateral leg oedema due to spontaneous Achilles tendon rupture

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Abstract

This is a case of severe unilateral lower leg oedema in a 77-year-old man, due to a spontaneous, complete Achilles tendon rupture. What makes this case unusual is the absence of trauma in the patient's history. The correct diagnosis was made only after magnetic resonance imaging. However, a thorough clinical re-examination of the patient revealed an inability to stand and walk on toes and a palpable defect of the Achilles tendon, which was difficult to detect due to the marked oedema. This case reminds physicians that an Achilles tendon rupture can also occur without clear history of trauma and should be considered as a cause of unilateral lower leg oedema, especially in presence of pain. Moreover, it illustrates the crucial role of a thorough clinical examination (including standing and walking on toes) for the correct diagnosis, even when restricting factors such as oedema and pain are present.

INTRODUCTION

Unilateral leg oedema is a common presenting symptom in the emergency room and in medical outpatient settings. Differential diagnoses include conditions causing venous or lymphatic stasis, but musculoskeletal pathology is also a possible aetiology.

In the case reported here, a patient presenting with unilateral leg oedema without any history of trauma was diagnosed with complete Achilles tendon rupture. To our knowledge, no similar cases have been published so far.

CASE REPORT

A 77-year-old patient presented in our Medical Outpatient Clinic due to a persistent swelling of his left leg. The swelling

had begun ~6 weeks ago, without any obvious trigger and had been gradually expanding from the toes towards the knee. During the same time the patient had noticed pain at the calf when walking; he reported a feeling 'as though he was walking on a metal bar'. He did not feel pain at rest; moreover he reported no weakness of the leg and no sensory abnormalities.

The patient had normal body weight (BMI 24); his medical history was remarkable for type 2 diabetes, treated with metformin, vildagliptin and gliclazid, as well as coronary artery disease treated with aspirin, metoprolol and simvastatin. He had no history of arthritis and denied travelling or immobilization before the onset of the symptoms. Moreover, he denied any trauma and this was confirmed by his wife. He mentioned that he had been working everyday in his garden by the time the

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swelling and pain occurred. However, these daily gardening activities were not unusual for him. Due to the pain while walking, he was unable to go on with his gardening at the time of presentation at our clinic.

The clinical examination revealed a severe, pitting oedema of the left foot and lower leg (up to the level of the knee; Fig. 1) with diffuse tenderness. There was no redness of the skin, but the left lower leg was slightly warmer than the right. The Homans sign was negative. The dorsalis pedis artery pulses were bilaterally palpable; the posterior tibial artery pulse was not definitely palpable on the left, possibly due to the marked oedema. There were no signs of inguinal lymphadenopathy. Passive movements of the left foot, especially the dorsal extension, were painful. The muscle strength examination in lying position showed no weakness. The sensory functions were intact besides a mild reduction in vibration sense on both lower extremities, which was attributed, together with bilaterally absent ankle jerk reflexes, to a mild peripheral neuropathy, probably diabetic.

The patient's walking ability was observed in the examination room, a limping on the left was attributed to the reported pain in the left leg, while walking. During this first clinical examination a comprehensive assessment of standing and walking was not performed.

D-dimer-testing was just above the age-adjusted cut-off value [1] ($820 \mu\text{g/l}$ with age-adjusted normal values: $<770 \mu\text{g/l}$). Based on the high probability of DVT in our patient according to the clinical model proposed by Wells et al. [2] (score ≥ 2 due to unilateral pitting oedema, difference in calf circumference ≥ 3 cm, no likely alternative diagnosis), we performed a venous duplex ultrasonography which showed no signs of DVT. However, it revealed diffuse subcutaneous fluid entrapment as well as a small ruptured Baker's cyst, which was not considered a likely cause of the marked oedema. To further investigate the soft tissues of the leg, we finally performed a magnetic resonance imaging (MRI), which showed a complete acute to sub-acute rupture of the left Achilles tendon (Fig. 2). Moreover, a partial rupture of the soleus muscle with intramuscular

haematoma was seen (Fig. 3), with diffuse accompanying muscle oedema in the posterior leg compartment.

A clinical re-examination of the patient revealed an inability to stand or walk on his left toes, as well as a positive Thompson test on the left. Moreover, we could palpate an actual defect of the tendon, which was previously not noted, probably due to the marked oedema.

Surgical therapy was chosen, mainly due to the severe impact of the symptoms on everyday life. The repair of the Achilles tendon rupture was augmented with a 'turn down flap technique' using

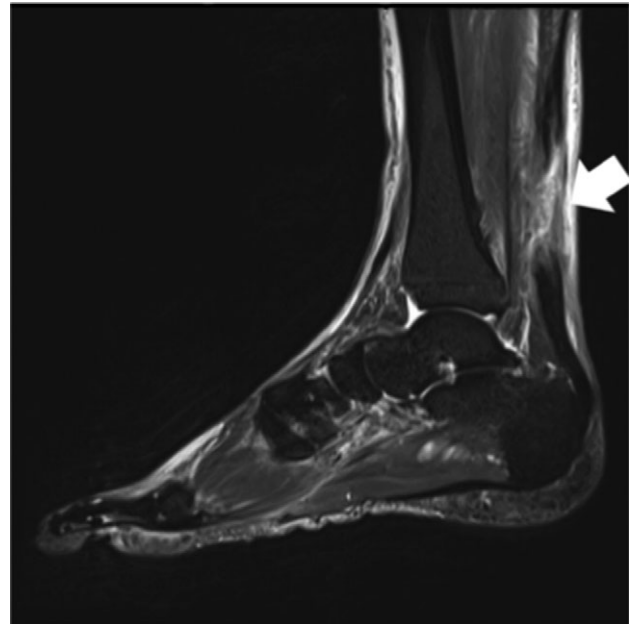


Figure 2: TIRM (Turbo Inversion Recovery Magnitude) MRI sequence of the left foot and distal leg (sagittal plane). Note the ~30 mm defect of the Achilles tendon (arrow), representing a total Achilles tendon rupture.

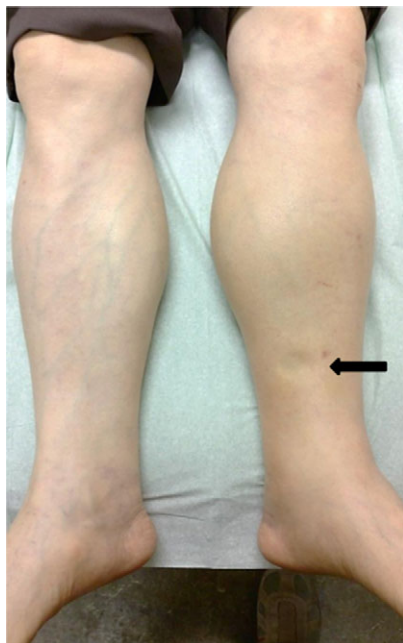


Figure 1: Severe pitting oedema of the left leg at initial presentation. The arrow indicates a thumbprint.

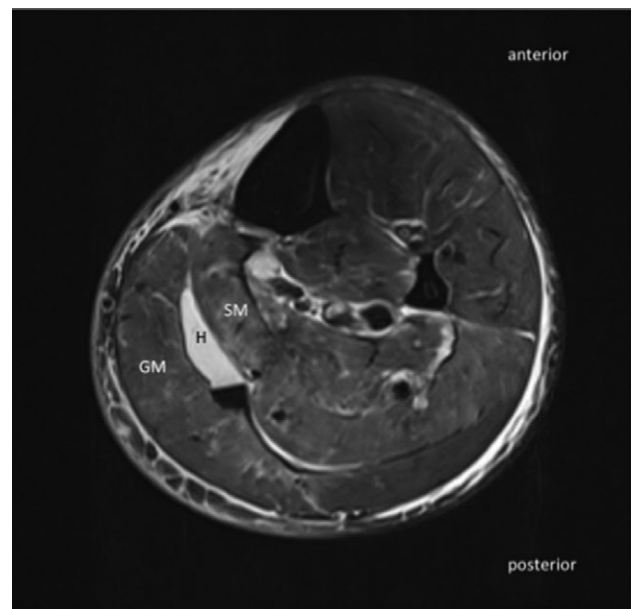


Figure 3: T2 fat suppressed MR images (axial plane) of the left lower leg. Note the haematoma (H) between the medial head of *M. gastrocnemius* (GM) and *M. soleus* (SM).



Figure 4: Complete regression of the oedema, 8 months after surgery.

the plantaris-longus-tendon. The patient showed an excellent recovery. The follow-up examination 8 months after the operation showed a complete regression of the leg oedema (Fig. 4). Moreover, the patient had no pain and could walk again on his toes.

DISCUSSION

In unilateral leg oedema differential diagnostic thinking is related to the chronological development [3, 4]. An acute appearance (<72 h) has to be differentiated from a chronic oedematous swelling. Deep vein thrombosis, ruptured Baker's cyst, muscular rupture and compartment syndrome are the most frequent causes for an acute unilateral leg swelling. They can all present with pain.

Common causes for a chronic unilateral swelling are: chronic venous insufficiency, secondary lymphoedema, pelvic tumour or lymphoma causing pressure on the veins and complex regional pain syndrome (CRPS) [4]. Of these only the latter is typically associated with pain.

In our case, the oedema was already 6-week old at the time of the presentation. However, the patient could particularly recall the time-period when the swelling first occurred, so that an acute onset with persisting symptoms and delayed seeking of medical care was possible.

The acute rupture of the Achilles tendon typically presents with severe pain in the lower calf. Usually the cause is an injury, as in running and sports like soccer [5].

However, there are cases of 'atraumatic' ruptures, with various risk factors being discussed, such as obesity and corticosteroids [6]. Neither these, nor other possible risk factors such as use of fluoroquinolone antibiotics were present in our patient. Diabetes was also considered a risk factor, but a recent systematic review found no such association [6]. Since in our case, the Achilles tendon rupture was accompanied by a rupture and haematoma of the soleus muscle, the underlying cause must have been an injury, which remained unnoticed by the patient. The frequent crouching and kneeling during his gardening activities could represent a form of consistent low-grade stress on the tendon, which could have contributed to the rupture.

The diagnosis in our case was made by a 3T MRI, while a previous ultrasound did not report any tendon abnormalities. In general, the sensitivity of ultrasound for the detection of Achilles

tendon ruptures is high (between 80 and 100%) [7]. In our particular case, the ultrasound may have been negative, due to the low clinical suspicion of a tendon problem at the time (the indication for the ultrasound was only to rule out a DVT).

To conclude, rupture of the Achilles tendon is a (rare) cause of leg oedema, even without clear history of trauma. The examination of standing and walking on the toes should be performed in patients with unilateral painful lower leg oedema. In suspicion of Achilles tendon rupture, ultrasound and—in our case—MRI can confirm the diagnosis.

CONFLICT OF INTEREST STATEMENT

The authors report no conflicts of interest.

FUNDING

The authors report no targeted funding for this work.

ETHICAL APPROVAL

The authors declare that no formal ethical approval was needed for this work.

CONSENT

The case report contains no direct patient identifiers and no relevant indirect identifiers (as specified in the journal policy). The patient was however explicitly and adequately informed by the corresponding author regarding the potential publication of this case and the photographs submitted here and has given his consent.

GUARANTOR

The first author guarantees for the accuracy of the data and the article.

REFERENCES

- Schouten HJ, Geersing GJ, Koek HL, Zuithoff NP, Janssen KJ, Douma RA, *et al.* Diagnostic accuracy of conventional or age adjusted D-dimer cut-off values in older patients with suspected venous thromboembolism: systematic review and meta-analysis. *Br Med J* 2013;**346**:f2492.
- Wells PS, Hirsh J, Anderson DR, Lensing AW, Foster G, Kearon C, *et al.* Accuracy of clinical assessment of deep-vein thrombosis. *Lancet* 1995;**345**:1326–30.
- Ely JW, Osheroff JA, Chambliss ML, Ebell MH. Approach to leg edema of unclear etiology. *J Am Board Fam Med* 2006;**19**: 148–60.
- Trayes K, Studdiford JS, Pickle S, Tully AS. Edema: diagnosis and management. *Am Fam Physician* 2013;**88**:102–10.
- Holm C, Kjaer M, Eliasson P. Achilles tendon rupture—treatment and complications: a systematic review. *Scand J Med Sci Sports* 2015;**25**:e1–10.
- Claessen FM, de Vos RJ, Reijman M, Meuffels DE. Predictors of primary Achilles tendon ruptures. *Sports Med* 2014;**44**: 1241–59.
- Dams OC, Reininga IHF, Gielen JL, van den Akker-Scheek I, Zwerver J. Imaging modalities in the diagnosis and monitoring of Achilles tendon ruptures: a systematic review. *Injury* 2017;**48**:2383–99.