Skeletal Radiol (2015) 44:307–308
DOI 10.1007/s00256-014-2073-5

TEST YOURSELF: ANSWER

Painful ankle swelling

Annu Chopra · Andrew J. Grainger · Emma L. Rowbotham

Published online: 6 December 2014

Answer

Traumatic tear of the accessory soleus muscle myotendinous junction (grade 2 muscle strain).

Discussion

The accessory soleus muscle is an uncommon anatomical variant with an incidence of between 0.7 and 5.5 % [1]. It has a relatively constant origin from the anterior surface of the soleus muscle; however, the distal insertion is more variable and five types have been identified: onto the Achilles tendon and either a tendinous or muscular insertion onto the superior or medial calcaneus.

The normal accessory soleus muscle most frequently presents as an incidental finding or soft tissue mass. In the latter case, the initial hurdle is recognising the existence of the anomalous muscle. A conventional radiograph may show a soft tissue density "mass" occupying Kager's fat pad, but the diagnosis is more reliably made on ultrasound or MRI. These investigations more clearly delineate the anatomy of the "mass", anterior to the Achilles, and crucially show the mass to have the composition of muscle [2].

In this case, the presentation was with pain, which is unusual and when seen does not usually occur until the 2nd/3rd decade; presumably once the muscle has developed and increased in size and once the individual engages in more strenuous exercise. Pain experienced during exercise is the only symptom regularly

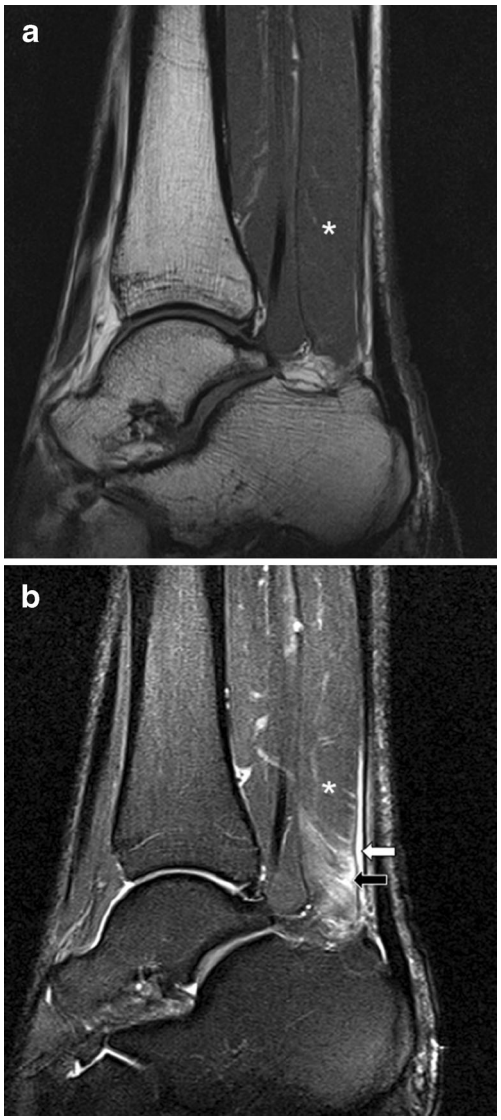

Fig. 1 **a** T1-weighted sagittal image. Kager's fat pad is "filled" with the accessory soleus muscle (*asterisk*). **b** Sagittal T2 fat-saturated image. The tear is demonstrated by a feathery interfibrillar oedema/haemorrhage associated with a small area of more confluent haematoma/fluid (*black arrow*) at which point there is retraction of fibres from the myotendinous junction. Perifascial fluid/haemorrhage is also seen (*white arrow*)

The case presentation can be found at doi: 10.1007/s00256-014-2072-6

A. Chopra (✉)
Sheffield Teaching Hospitals NHS Foundation Trust, Northern General Hospital, Herries Road, Sheffield S5 7AU, UK
e-mail: Annu.chopra@sth.nhs.uk

A. J. Grainger · E. L. Rowbotham
Leeds Teaching Hospitals NHS Foundation Trust, Chapel Allerton Hospital, Leeds LS7 4SA, UK

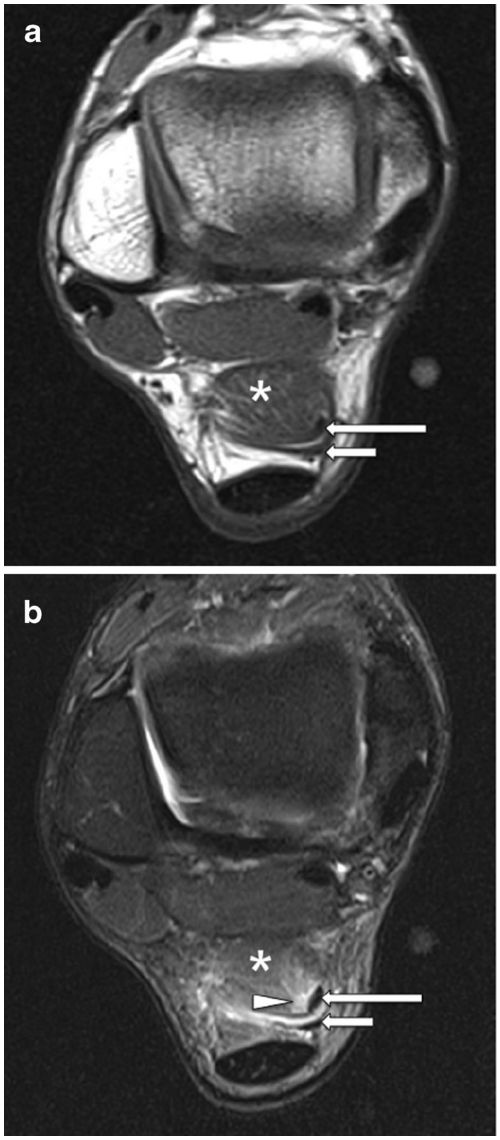

Fig. 2 **a** T1-weighted axial image shows the accessory soleus muscle (*asterisk*), its tendon (*long arrow*) and the plantaris tendon (*short arrow*). **b** T2-weighted axial fat-saturated image shows the accessory soleus muscle (*asterisk*), its tendon (*long arrow*) and the plantaris tendon (*short arrow*). There is a small haematoma (*arrowhead*) at the level of the myotendinous junction, at the site of the tear

reported by patients with accessory soleus muscle [2]. As the muscle is invested in its own fascial layer and derives its blood supply from the posterior tibial artery, it is hypothesised that exertional symptoms are attributed to a localised compartment syndrome [3]. However, the case described, with acute onset of pain persisting once the activity had ceased, is not typical of compartment syndrome where there is recurrent pain during activity, resolving on rest. This patient was managed conservatively and resumed to full, normal sporting activity at 4 weeks post-injury, with no symptom recurrence.

The MRI images reveal the accessory soleus muscle lying within Kager's fat pad (Fig. 1). There is fluid associated with the accessory soleus muscle fascia and high signal along the myotendinous junction in a "feathery" pattern. An area of fibre retraction is seen with a small haematoma (seen as confluent fluid) and consequent distortion of the normal muscle architecture (Figs. 1b and 2b). The appearances are consistent with a small grade 2 myotendinous junction muscle tear.

Tears (or strains) of an accessory soleus muscle confirmed on MRI have been rarely reported [3, 4]. Reports do not always make it clear as to the severity of the injury, which, in common with myotendinous injuries to other muscles vary from low-grade microfibrillar disruption (grade 1) to macroscopic disruption of fibres as seen in this case [5, 6]. The injury was assessed as grade 2 because the tear is incomplete (grade 3), but shows disruption of the normal myotendinous architecture, seen as fibre retraction and the small haematoma described (Figs 1b and 2b). Grading of muscle injury has improved with the advent of modern MR systems, with superior resolution capabilities allowing the demonstration of fibrillar disruption of the muscle fibrils against a background of muscle oedema. Ultrasound grading systems have also been developed for the evaluation of muscle tears, although careful consideration needs to be given to the timing after the injury, and the relative insensitivity of ultrasound to low-grade injury [6, 7].

Conflict of interest There is no conflict of interest.

References

1. Sookar PA, Naraghi AM, Bleakney RR, Jalan R, Chan O, White LM. Accessory soleus muscles: anatomy, symptoms and radiology evaluation. Radiographics. 2008;28(2):481–99.
2. Kouvalchouk JF, Lecocq J, Parier J, Ficsher M. The accessory muscle: a report of 21 cases and a review of the literature. Rev Chir Orthop Reparatrice Appar Mot. 2005;91(3):232–8.
3. Featherstone T. MRI diagnosis of accessory soleus muscle strain. Br J Sports Med. 1995;29:277–8.
4. Doda N, Peh WCG, Chawla A. Symptomatic accessory soleus muscle: diagnosis and follow-up on magnetic resonance imaging. Br J Radiol. 2006;79(946):e129–32.
5. Palmer WE, Kuong SJ, Elmadbouh HM. MR imaging of myotendinous strain. Am J Radiol. 1999;173:703–9.
6. Peetrons P. Ultrasound of muscles. Eur Radiol. 2002;12:35–43.
7. Koh ES, Mcnally EG. Ultrasound of skeletal muscle injury. Semin Musculoskelet Radiol. 2007;11:162–73.