

Accessory soleus muscle: a case report

Músculo solear acessório: relato de caso

Wilel de Almeida Benevides¹, Thiago Alexandre Alves Silva¹, Matheus Levy de Almeida Taveira de Souza¹

ABSTRACT

Soleus accessory muscle is a congenital anatomical variant rarely seen and diagnosed in the daily practice. This disease incidence ranges from 0,7-5.5% according to the medical literature, and it usually occurs in the second/third decade of patients' life. The disease can be asymptomatic but normally it presents pain, swelling and/or mass in the posterior medial ankle. A variety of treatment options have been described, from conservative treatment to fasciotomy and surgical excision. We report a case resistant to conservative treatment that required surgical approach.

Keywords:

Congenital abnormalities/diagnosis; Diagnosis, differential; Muscle, skeletal/abnormalities; Muscle, skeletal/pathology; Muscle, skeletal/surgery; Case reports

INTRODUCTION

The accessory soleus muscle, also called the supernumerary soleus or soleus secundus, was first described in the literature in 1843 by Fuc Cruvelhier and is a congenital anatomical variant with an incidence of 0.7 to 5.5%.⁽¹⁾ Located on the posterior surface of the ankle, it derives its innervation from the tibial nerve and its blood supply from the posterior tibial artery.⁽¹⁾

The muscle is usually asymptomatic until the second decade of life. This anatomical variant may present as a mass in the posteromedial region of the ankle accompanied by pain related mainly to physical activity. Real inci-

RESUMO

A presença do músculo solear acessório é uma variante anatômica congênita, raramente vista e diagnosticada na prática clínica. Sua incidência varia de 0,7 a 5,5% segundo a literatura médica. É mais comumente diagnosticada na segunda ou terceira décadas de vida, e pode ser assintomática, mas, geralmente, manifesta-se como dor, edema e/ou massa posteromedial do tornozelo. Várias formas de tratamento são descritas, desde abordagens conservadoras, até fasciotomia e excisão cirúrgica. Relatamos um caso refratário a medidas conservadoras com necessidade de abordagem cirúrgica.

Descritores:

Anormalidades congênicas/diagnóstico; Diagnóstico diferencial; Músculo esquelético/anormalidades; Músculo esquelético/patologia; Músculo esquelético/cirurgia; Relatos de casos

dence of symptoms in this rare pathology is still being discussed. Brodie et al.⁽¹⁾ report that this condition usually manifests with a painful mass, in contrast to Doda et al.,⁽²⁾ who state that most cases are asymptomatic.

This supernumerary muscle lies deep to the gastrocnemius, in the posterior region of the upper third of the fibula on the oblique solear line, between the head of the fibula and the posterior part of the tibia. From its origin, the accessory soleus muscle descends anteromedial to the Achilles tendon. Five types of insertions have been described:⁽¹⁾ in the Achilles tendon,⁽²⁾ of the muscular type, in the upper calcaneus,⁽³⁾ tendinous, in the upper calcaneus,⁽⁴⁾ muscular

Correspondence to:

Wilel de Almeida Benevides
Avenida Raja Gabáglia, 1.002 – Gutierrez
Zip Code: 30441-070 – Belo Horizonte, MG, Brazil
E-mail: wilelbenevides@hotmail.com

Conflict of interest:

none reported.

Funding:

none reported.

Received on:

September 14, 2016

Accepted on:

November 3, 2016

¹ Hospital Madre Teresa, Belo Horizonte, MG, Brazil.

type, in the medial calcaneus,⁽⁵⁾ tendinous, in the medial calcaneus.⁽³⁾

The therapeutic approach is still controversial for cases of symptomatic accessory soleus. In cases refractory to conservative treatment, surgical measures including fasciotomy, excision, muscle release and embolization of blood flow must be taken. Our choice of surgical treatment is presented below.

CASE REPORT

A 28-year-old female patient, a law student who visited the doctor's office complaining of pain and persistent paraesthesia on the medial surface of the left ankle while playing sports. The patient also reported a mass in the posteromedial region. She did not complain of pain and/or discomfort during activities of daily living and walking.

A mass of soft consistency posterior to the medial malleolus at the Böhler angle of the left ankle (Figure 1) was palpated during the physical examination. The mass was painless and appeared more prominent during flexion and extension of the ankle. The range of motion of the foot and ankle and the neurovascular examination were within the normal range.



Figure 1 | Ankle in the preoperative phase showing presence of a mass in a region posterior to the lateral malleolus.

An anteroposterior and lateral radiograph of the foot and ankle were requested and did not show any abnormalities. The MRI scan did not show the presence of soft tissue tumors, but instead showed a mass with intermediate signal intensity on the T1 and T2-weighted images in the posteromedial region of the ankle, with a diagnostic hypothesis of anatomical variant in the form of accessory soleus muscle (Figure 2).

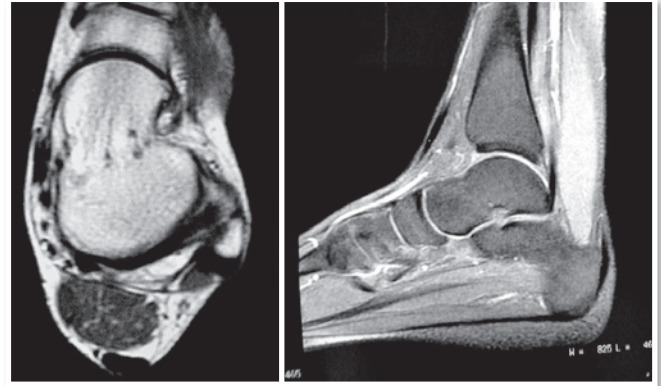


Figure 2 | MRI of the ankle in axial and sagittal cross-sectional views, presenting a lesion with intermediate signal intensity on the T1 and T2-weighted images in the posteromedial region of the ankle.

The patient underwent conservative treatment with non-steroidal anti-inflammatory drugs/analgesics, immobilization, orthosis and physical therapy. After 3 months, she returned for reassessment without improvement of symptoms.

Due to failure of the conservative treatment, it was decided to undertake surgical treatment. The procedure was performed under spinal anaesthesia, with the patient in ventral decubitus, with a tourniquet on the root of the thigh. A surgical approach was created via a posteromedial pathway to the distal third of the foot and left ankle, and the belly of the accessory soleus muscle was visualized after opening of the fascia. We noted that a muscular mass measuring approximately 10.5cm (Figure 3) was causing compression of the neurovascular bundle due to its volume, and was accountable for the patient's symptoms. The entire muscle was resected from its origin to its insertion in the superomedial fragment of the calcaneus (Figure 4) and material was sent for anatomopathological examination (Figure 5). After layered anatomic closure, the patient underwent Jones immobilization and was directed to progressively increase weight bearing in the postoperative

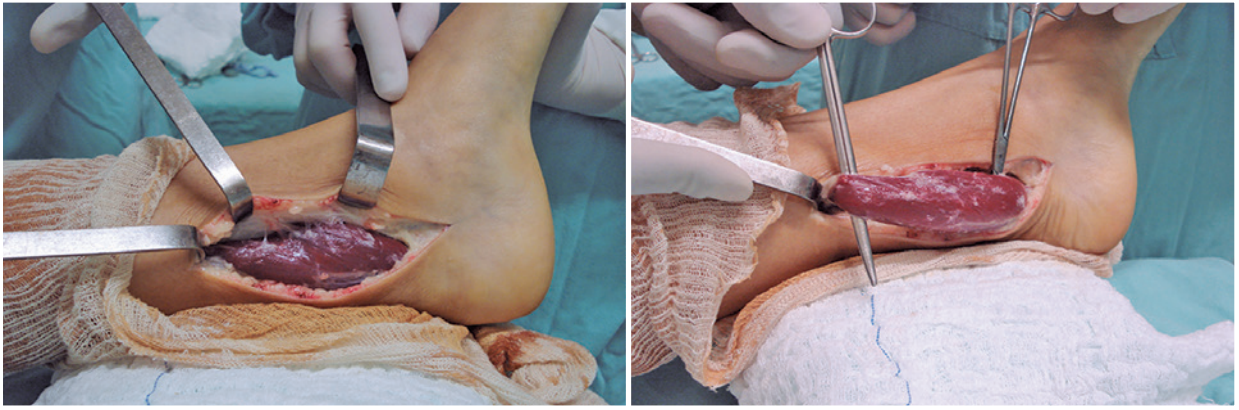


Figure 3 | Surgical treatment with resection of muscle mass.

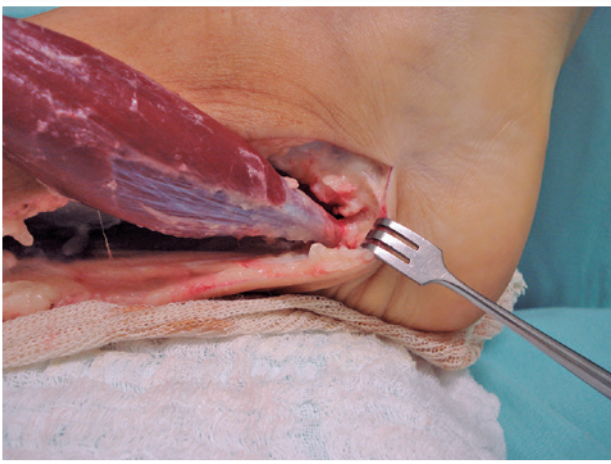


Figure 4 | Insertion of the accessory soleus muscle in the superomedial calcaneal tuberosity.



Figure 5 | Resected accessory soleus muscle measuring approximately 10.5cm.

period, according to her tolerance levels. The stitches were removed after 15 days, and functional rehabilitation with physical therapy was started.

The patient was reassessed periodically and remained asymptomatic after the surgical treatment. At 3 months after surgery she had already resumed full physical activities and had no further complaints 1 year after surgery.

DISCUSSION

The accessory soleus muscle has the characteristic findings of a normal muscle in an abnormal location, and is considered an anatomical variant that develops in the anteromedial region of the soleus and of the Achilles tendon. Gordon and Matheson⁽⁴⁾ described the origin of the accessory soleus muscle as an early division of a single progenitor anlage, at the time of muscle differentiation. The prevalence of this anatomical variant is 6%, and its bilaterality is estimated to occur in one third of cases. The origin of the accessory soleus muscle is the posterior aspect of the tibia and the anterior surface of the soleus. Its vascularization originates in the posterior tibial artery and in the innervation of the tibial nerve.

The mean incidence found in cadaveric studies was almost 2% with a men-to-women ratio of 2:1. In most cases, the accessory soleus muscle is asymptomatic and consists of an occasional finding. When symptomatic, it is usually present in young men (aged 20 to 30 years) who engage in physical activity.

Pain appears during physical activity and is located in the posteromedial region of the ankle, in association with a visible or palpable mass. Symptoms disappear with rest, do not usually affect activities of daily living, and are not related to trauma.

Physical examination reveals soft and painless swelling in the posteromedial region of the ankle, which becomes rigid and painful with resisted contraction.

Several hypotheses have been discussed as a way of explaining the pain caused by the presence of the accessory soleus muscle: compression of the tibial nerve causing tarsal tunnel syndrome; intermittent claudication during exercise, due to insufficient blood supply; and excessive pressure due to increased volume during exercise, which causes compartment syndrome (most widely accepted hypothesis).

Among the differential diagnoses of masses in the lower limbs, we should include: lipoma, lymphangioma, hemangioma, soft tissue sarcoma, and others. If the tumor is painful, we should also remember chronic posterior compartment syndrome, tarsal tunnel syndrome, posterior tibial tendon lesions, tarsal coalition, and Achilles tendinitis. Although uncommon, the presence of the accessory soleus muscle should be remembered for all masses in the posterior region of the ankle.

Several types of imaging methods can be used to aid in the diagnosis of this anatomical variant. Plain radiographs usually show an increase in soft tissue density consistent with a mass in the distal region of the leg, between the tibia and the triceps surae muscle, which may obliterate Kager's fat pad. In the past, computed tomography was widely used to confirm the diagnosis of accessory soleus muscle. A soft tissue mass in the posterior region of the ankle, with the same attenuation as the adjacent muscles, is consistent with a muscle mass. However, distinguishing between a soft tissue tumor and the accessory soleus muscle can be hard, as both may look the same on the CT scan. Nowadays, the use of MRI allows us to distinguish fairly easily between a normal muscle mass and soft tissue tumors. Magnetic resonance imaging, with the possibility of multiplanar sections, provides greater anatomical detail as well as evaluation of origin and insertion of the mass. Some authors have reported the use of ultrasonography to assess the presence of the accessory soleus muscle. With this technique, it is possible to evaluate the texture and location of the tumor.⁽⁶⁾ Electroneuromyography and nerve conduction tests may also be part of the propaedeutics.

Conservative treatment, with rest, elevation, immobilization and physiotherapy, should usually be the first option both for athletes and for sedentary patients. In the initial approach, the first step to be taken is to avoid exercises that cause pain, followed by rehabilitation with physical therapy. There are no physiotherapy protocols for these cases in the literature. According to Rossi et al.,⁽⁷⁾ such protocols should include massage, stretching and strengthening of the gastrocnemius, soleus and Achilles tendon. After 12 weeks, the patient can progressively resume physical activity, starting with gentle runs and squats, and progressing to sprint start and low-to-high impact training.

If conservative treatment fails, the most common surgical options for athletes and the physically active are fasciotomy and excision.⁽⁸⁾ Both procedures have proven equally effective, and the therapeutic option can be challenging.^(1,9) Kouvalchouk et al.⁽¹⁰⁾ reported the largest case series (17 patients (athlete) of 21 described) and stated that complete resection is the most reliable treatment for symptomatic patients.

In our patient we decided to perform a complete excision of the musculature due to: failure of conservative treatment, presence of a bulky mass in the ankle region, need for complete and immediate resolution of symptoms, increased rates of Achilles tendinopathy associated with the presence of the accessory soleus and support of the medical literature in regard to this technique.

CONCLUSION

The presence of the accessory soleus muscle is a rare anatomical variant that should be included as a differential diagnosis of tumors in the posteromedial region of the ankle. In symptomatic cases, with failure of conservative treatment, surgical options should be used. Although the results in the literature are still inconclusive due to the few reports, the small series cases and the shortage of data, fasciotomy and excision produce equally effective results.

REFERENCES

1. Brodie JT, Dormans JP, Gregg JR, Davidson RS. Accessory soleus muscle: a report of 4 cases and review of literature. *Clin Orthop Relat Res.* 1997;(337):180-6.
2. Doda N, Peh WC, Chawla A. Symptomatic accessory soleus muscle: diagnosis and follow-up on magnetic resonance imaging. *Br J Radiol.* 2006;79(946):e129-32.
3. Del Nero FB, Ruiz CR, Aliaga Júnior R. The presence of accessory soleus muscle in humans. *einstein (Sao Paulo).* 2012;10(1):79-81.
4. Gordon SL, Matheson DW. The accessory soleus. *Clin Orthop.* 1973;(97):129-32.
5. Mukish P, Reybet-Degat PY, Demangel A, Trouilloud P, Baulot E. Accessory soleus muscle: a difficult diagnosis: a case report and a review of the literature. *Eur J Orthop Surg Traumatol.* 2012;22 Suppl 1:205-9.
6. Downey MS, Siegeman J. Accessory soleus muscle: a review of the literature and case report. *J Foot Ankle Surg.* 1996;35(6):537-43.
7. Rossi R, Bonasia DE, Tron A, Ferro A, Castoldi F. Accessory soleus in the athletes: literature review and case report of a massive muscle in a soccer player. *Knee Surg Sports Traumatol Arthrosc.* 2009;17(8):990-5.
8. Christodoulou A, Terzidis I, Natzsis K, Gigis I, Pournaras J. Soleus accessorius, an anomalous muscle in a young athlete: case report and analysis of the literature. *Br J Sports Med.* 2004;38(6):e38.
9. Leswick DA, Chow V, Stoneham GW. Resident's corner. Answer to case of the month #94. Accessory soleus muscle. *Can Assoc Radiol J.* 2003;54(5):313-5.
10. Kouvalchouk JF, Lecocq J, Parier J, Fischer M. [The accessory soleus muscle: a report of 21 cases and a review of the literature]. *Rev Chir Orthop Reparatrice Appar Mot.* 2005;91(3):232-8. French.