AMSER Case of the Month October 2024

53-year-old female presents to PCP with leg pain after walking

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Patient Presentation

- HPI: 53-year-old female presents with aching in leg after walking. She has experienced right lower extremity pain for three months. Pain is localized on the right lateral calf and is typically worse at the end of the day. She describes associated heaviness and achiness in the calf. Denies trauma, claudication, muscle loss or pain at rest.
- Physical Exam: Small lump on the mid-right anterolateral leg, no erythema or edema. +2 dorsalis pedis pulses bilaterally w/ small varicosities noted on the anterior shins.
- Differential diagnosis: venous insufficiency, deep venous thrombosis, muscular strain, neoplasm, vascular malformation, lipoma
- DVT is suspected.

Pertinent Labs

- No pertinent labs

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

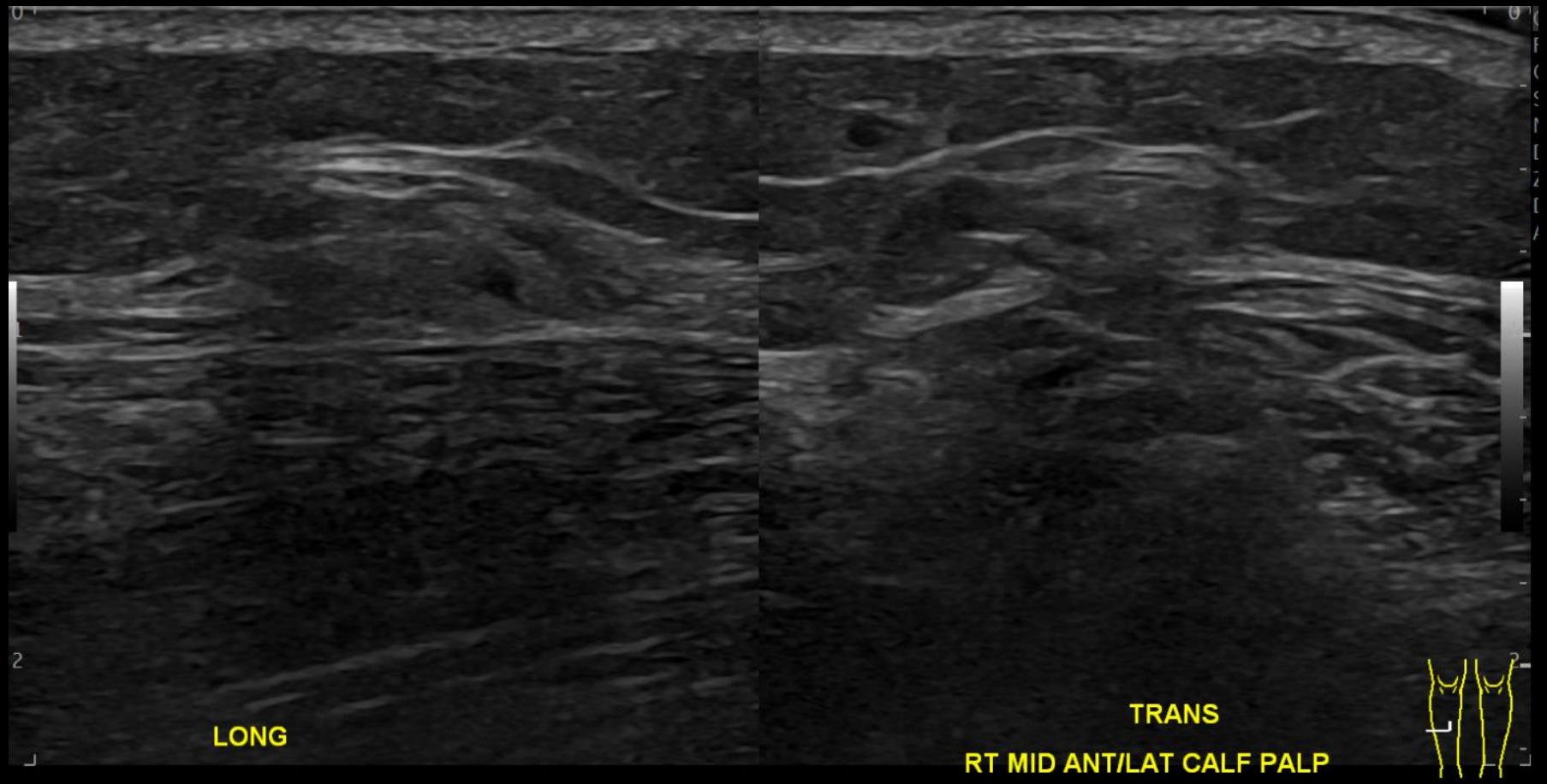
American College of Radiology
ACR Appropriateness Criteria®
Soft Tissue Masses

Variant 1: **Superficial soft tissue mass. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
US area of interest	Usually Appropriate	O
Radiography area of interest	Usually Appropriate	Varies
US area of interest with IV contrast	Usually Not Appropriate	O
Image-guided biopsy area of interest	Usually Not Appropriate	Varies
Image-guided fine needle aspiration area of interest	Usually Not Appropriate	Varies
MRI area of interest without and with IV contrast	Usually Not Appropriate	O
MRI area of interest without IV contrast	Usually Not Appropriate	O
FDG-PET/CT area of interest	Usually Not Appropriate	☢☢☢☢
CT area of interest with IV contrast	Usually Not Appropriate	Varies
CT area of interest without and with IV contrast	Usually Not Appropriate	Varies
CT area of interest without IV contrast	Usually Not Appropriate	Varies

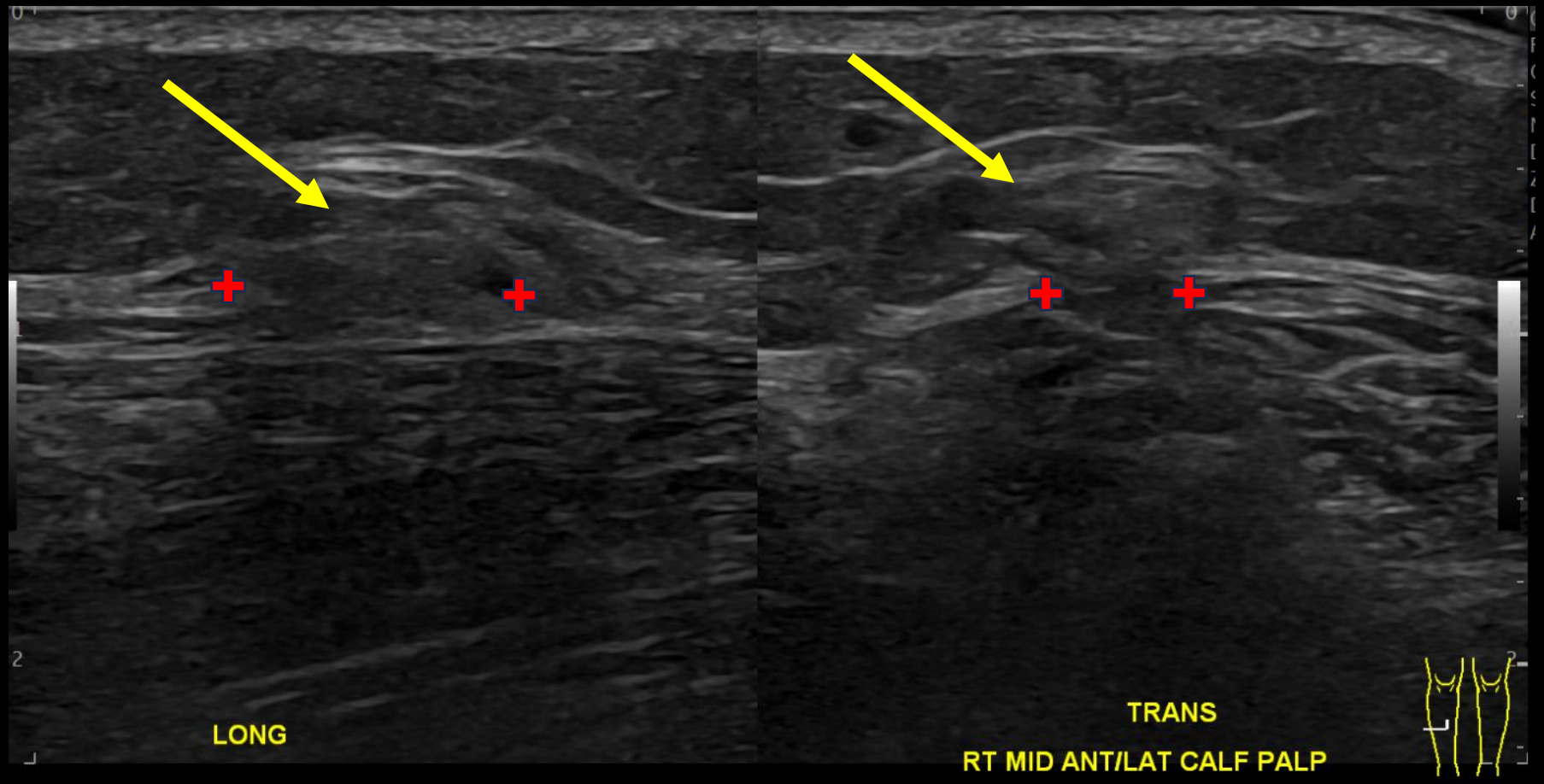
This imaging modality was ordered by the physician

Findings (unlabeled)



- Long and transverse grayscale ultrasound images of the mid anterior right lower leg

Findings (labeled)



- There is a defect in the fascia overlying the extensor hallucis longus muscle between the red markers on long and transverse US images.
- There is muscle herniation through the fascial defect into the subcutaneous tissues (yellow marker)
- Additional dynamic ultrasound images showed muscle herniating beyond the fascial layer with flexion.

Final Dx:

Fascial defect with muscle herniation of the extensor hallucis longus

Case Discussion (Pathophysiology)

- Muscular hernias are caused by focal defects in the muscular fascial sheath, typically classified as congenital or acquired, and are often asymptomatic.
- Congenital muscular hernias may penetrate around the sites of nerves and muscles, or be caused by structural weaknesses in the muscular fascia
- Acquired causes typically include traumatic fractures or forces applied to the associated contracted muscle that tear the underlying muscular fascia
- Muscular herniations of the extremities most commonly occur in the legs, with the tibialis anterior the most affected
- Herniations in the lateral compartment of the leg are less common.

Case Discussion (Imaging)

- Ultrasound
  - Sonography is advantageous due to dynamic visualization of the hernia at rest and under stressful muscular contractions
  - Muscular hernias are typically hypoechoic to the surrounding muscle due to atrophy caused by the repetitive trauma of the herniation
  - A “mushroom-like” appearance may be visualized as the herniated musculature overlaps the defective fascia with a convex contour
- MRI
  - May be useful for confirmation or when ultrasonography is equivocal
  - Advantages include superior visualization of the musculofascial defect and improved quantification of muscular herniation and fascial splitting
  - Fast imaging with dynamic muscular contractions such as dorsi or plantar flexion may aid in visualization of the defect

Case Discussion (Treatment)

- Symptomatic muscular hernias are treated conservatively with compression stockings, rest and activity restrictions.
- Patients with moderate to severe symptoms that do not improve with conservative management may necessitate a surgical referral.
- Optimal surgical treatment is controversial, some interventions include a decompressive fasciotomy, partial muscle excisions, and fascial patch grafting w/ autologous fascia lata or synthetic mesh.
- There is a consensus for a longitudinal fasciotomy as the safest intervention
- Early elective repair is recommended with symptomatic hernias and evidence of associated nerve involvement

References:

Beggs I. Sonography of muscle hernias. AJR Am J Roentgenol. 2003;180(2):395-399. doi:10.2214/ajr.180.2.1800395

Mellado JM, Pérez del Palomar L. Muscle hernias of the lower leg: MRI findings. Skeletal Radiol. 1999;28(8):465-469. doi:10.1007/s002560050548

Nguyen JT, Nguyen JL, Wheatley MJ, Nguyen TA. Muscle hernias of the leg: A case report and comprehensive review of the literature. Can J Plast Surg. 2013;21(4):243-247.