



# Why Would We Operate on a “Confirmed” DVT Diagnosis?

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# History

F.R. is a 40 year old African American male who presented to the ER on 4/6/17 due to a Chief Complaint of Right Leg pain

The pain started on 4/5/17 early in the morning when he was taking a shower. He initially stated on admission he was not sure what elicited the pain.

# History

He was able to go work and complete the work day however by the time he got back home the pain became intolerable to the point that moving it was extremely painful.

He tried:



# History

In the ER he had an elevated D-Dimer on initial labs which prompted a Doppler US which 'confirmed' DVT. And according to a recent study in 2017, it showed that Ultrasound was **96%** sensitive and **96.8%** specific with regards to DVT diagnosis

He was then admitted to the medicine service and started on anticoagulation

# Physical Exam

## Musculoskeletal

**Inspection** – Right gastrocnemius was larger in appearance comparatively to the left gastrocnemius; Right gastrocnemius appeared erythematous comparatively to the left; No ecchymosis was appreciated

**Palpation** – Exquisitely tender to light palpation of the right gastrocnemius area. Homan's sign was positive. Tenderness was also elicited when palpating the popliteal fossa

**ROM** – Right Dorsiflexion was limited secondary to pain; Right Plantarflexion was also limited due to pain but more ROM appreciated than dorsiflexion; Left ROM intact and 5/5 muscle strength

**Pulses** – 2/4 pulses palpable at bilateral Dorsalis Pedis

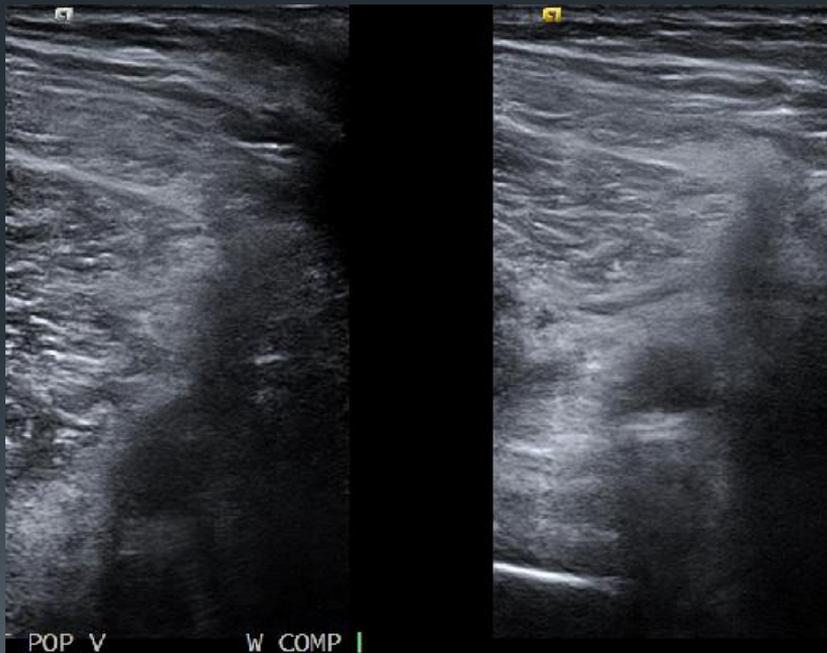
**Neuro** – Sensation to light touch intact

# Differential Diagnosis at this time:

- 1) Right Lower Extremity DVT
- 2) Ruptured Baker's Cyst
- 3) Right Lower Extremity Lymphatic Insufficiency
- 4) Right Lower Extremity Cellulitis
- 5) Necrotizing Fasciitis
- 6) Compartment Syndrome
- 7) Right LE muscle tear was considered but due to patient's history it was low on differential but MRI was ordered due to decreased ROM

# Tests (4/6/17)

Right Lower Extremity Venous Doppler:



# Treatment

Started initially on weight based Lovenox 1mg/kg BID with Coumadin 5mg QHS in the inpatient setting

# Next Day... (4/7/17)

The medical team received a call early in the morning stating the patient was complaining of **severe pain in his leg**.

ROM was drastically decreased to absolutely no Dorsiflexion and very subtle Plantarflexion and patient's right calf area was extremely stiff to palpation

After further discussion with the patient about the day his calf started hurting he states **"Now that I think about it, when I was in the shower, I slipped a little bit and heard a pop. But I didn't think it was that important"**

**\*\*At this point the patient had received 420mg of Lovenox and 5mg of Coumadin\*\***



4/7/17

Luckily a full leg MRI was ordered the day before...

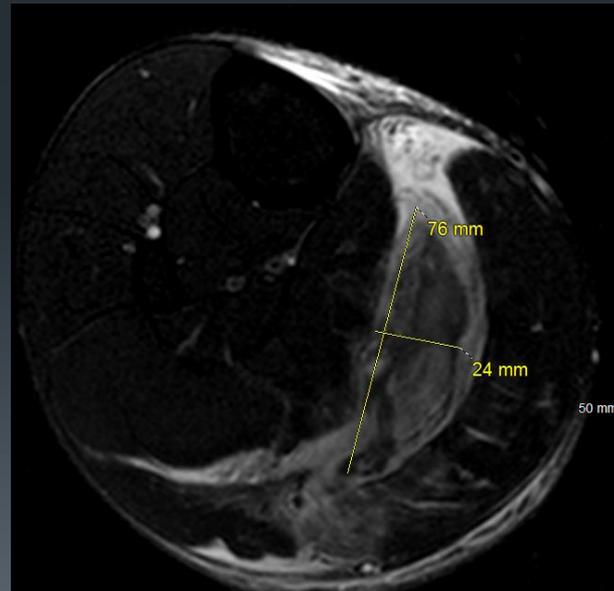
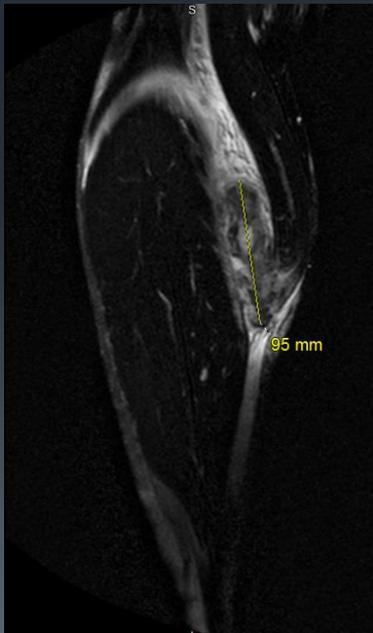
...until it was discovered that only the ankle was captured

Placed an order for a STAT MRI of the leg again

Both MRIs were read that evening

# Tib/Fib MRI

Deep to the medial head of the gastrocnemius, there is a heterogeneous complex fluid collection measuring 7.5 x 2.4 x 9.5 cm in AP, transverse and craniocaudal dimensions consistent with a hematoma. The constellation of findings are consistent with **plantaris tendon rupture**.





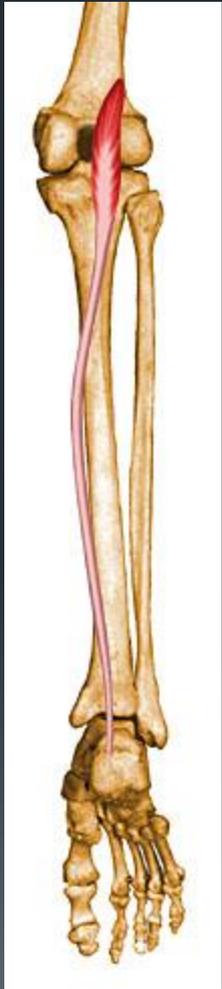
4/7/17

Orthopedics were consulted and all anticoagulation was stopped. Compartment pressures were taken and Lateral, Deep Superficial, and Anterior pressures were all normal. Deep Posterior was elevated at 35mmHg. He was then taken to the OR for fasciotomy of the right lower extremity with hematoma evacuation

# Final Diagnosis

- 1) Plantaris Rupture mimicking DVT
- 2) Hematoma Development due to anticoagulation therapy
- 3) Deep Posterior Compartment Syndrome secondary to hematoma

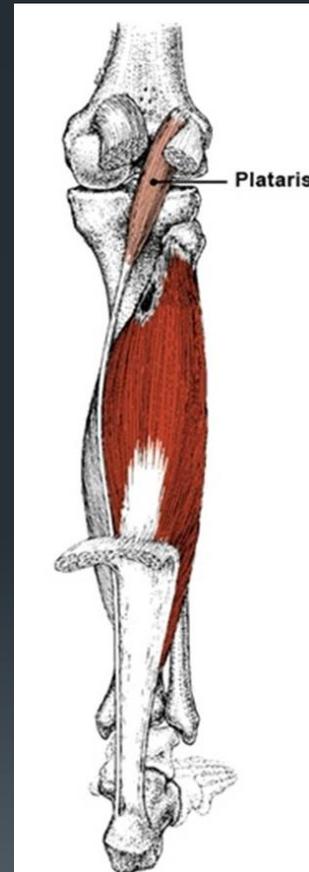
# Discussion



- Plantaris Rupture is commonly referred to as “Tennis Leg”
- The long thin tendon courses between the medial head of the gastrocnemius muscle and the soleus muscle in the midportion of the leg. On cadaveric dissection, this long, slender tendon is easily mistaken for a nerve and hence has been dubbed by some the “**freshman’s nerve.**” It continues inferiorly along the medial aspect of the Achilles tendon, which it accompanies to its insertion on the calcaneus. Anatomic studies have shown that the calcaneal insertion may also occur independently of the Achilles tendon. This is of interest as the plantaris tendon often remains intact when the Achilles tendon ruptures. Neural innervation is provided by the tibial nerve (S1, S2).
- The muscle ranges from 7 to 13 cm long varying highly in both size and form when present

# Discussion

- In terms of function, the plantaris muscle acts with the gastrocnemius but is insignificant as either a flexor of the knee or a plantarflexor of the ankle. It has been considered to be an organ of proprioceptive function for the larger, more powerful plantarflexors as it contains a high density of muscle spindles.
- Probably its main purposes at this point is that it is commonly harvested by surgeons for tendon grafts



# Discussion – The Debate

- “Tennis Leg” was actually first described by R.W. Powell in 1883 but studies in 1958, 1977, and 1982 considered Plantaris Muscle Ruptures an “intellectual hoax”
- However, in 1997 the first recorded isolated Plantaris Muscle Rupture was discovered after initially MR showed a possible neoplastic process in a 40y/o patient. Upon surgical intervention it was discovered that it was a large hematoma secondary to a sole Plantaris Muscle Rupture.
- According to a study in 2002 with regards to Tennis Leg, findings showed incident of rupture of the medial head of the gastrocnemius muscle in 66.7% of the sample, fluid collection between the aponeuroses of the medial gastrocnemius and soleus muscles without muscle rupture in 21.3%, **sole rupture of the plantaris tendon in 1.4%**
- In 2008, a Cadaveric Study showed that 13% of the sample were absent Plantaris Muscle
- And a recent study in 2017 showed that what we refer to as Tennis Leg very rarely, if ever, involves the Plantaris Muscle



# Outcome

F.R. tolerated the procedure well and unfortunately had to leave AMA the next day due to:

“My girlfriend is throwing my stuff out on the street! I gotta go!”



# Follow up

Unfortunately the patient did not follow up in the clinic or with Orthopedics.

# Return to Activity

- Patients with plantaris tendon rupture are almost always treated conservatively
- The literature overwhelmingly supports conservative treatment as sufficient to properly manage non-specific causes of tennis leg
  - RICE and NSAID therapy with immobilization being the key within the first 3-5 days of onset of injury
- Surgical treatment (fasciotomy) is indicated in situations when an associated posterior compartment syndrome has complicated the evolution of the signs and symptoms because of the swelling and hematoma formation associated with a rupture or tear

# References:

- 1) <https://emedicine.medscape.com/article/1362989-overview#a1>
- 2) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1978447/>
- 3) <https://www.ncbi.nlm.nih.gov/m/pubmed/18266282/>
- 4) <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5310238/>