Plantar-Flexion Induced Entrapment of the Dorsalis Pedis Artery in a Teenaged Cross-Country Runner

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BACKGROUND:

- Symptomatic peripheral artery disease [PAD] rarely affects young adults and, when present, typically has a non-atherosclerotic etiology.
- Anatomic variants are another documented cause of PAD in young adults in the literature.

CASE PRESENTATION AND WORKUP:

- A 17 year old girl presented with a four month history of plantar flexion-dependent right foot pain that resolved upon returning to neutral position.
- The affected foot also demonstrated cold intolerance over this time period.
- She had palpable dorsalis pedis [DP] and posterior tibial pulses bilaterally with feet in a neutral position.
- Arterial duplex showed accelerated velocities (295 cm/s) in the right DP over the navicular bone at rest with total flow obliteration upon plantar flexion. Flow was uninterrupted in dorsiflexion.
- A magnetic resonance arteriogram [MRA] identified a potential compression site where the DP ran deep to the extensor hallucis brevis [EHB] tendon suggesting an anatomical obstruction.

OPERATIVE MANAGEMENT:

- An incision was made over the right DP in the area of compression with incomplete compression noted intraoperatively.
- The redundant EHB muscle was confirmed as the site of compression, transected, and transferred to the extensor hallucis longus tendon.
- Abnormal fibrous bands were also identified in the area of compression and were lysed.
- A completion angiogram showed the DP remained widely patent with plantar flexion.

DISCUSSION:

- Nonatherosclerotic causes of symptomatic PAD is a likely etiology in young adults and adolescents presenting with intermittent claudication.
- A differential diagnosis should include chronic compartment syndrome, popliteal artery entrapment, tarsal tunnel syndrome, and less frequently anatomical anomalies.
- Intermittent and/or position-dependent vascular symptoms should raise concern for musculoskeletal anomalies.

EDUCATIONAL TAKEAWAYS:

- While the more common presentation in a young athlete of popliteal artery compression would be treated with surgical bypass, our patients mechanical nature of obstruction can effectively be treated with tendon transposition.
- Surgical tendon release also allows athletic patients such as ours the ability to quickly return to their normal daily activities.

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