Case Report

Vascular leiomyoma of the thigh: Classic presentation of a rare tumor with imaging and pathology correlation✩✩

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A B S T R A C T

We report a case of a vascular leiomyoma arising from the superficial femoral artery presenting as a non-painful thigh mass in a 55-year-old woman. Leiomyomas typically arise from the uterus and gastrointestinal tract, and rarely arise from vessels. We present this case to emphasize that although extremity leiomyomas are rare, they should be considered if there is a soft tissue mass abutting a vessel. Radiologists should be familiar with the imaging features associated with vascular leiomyomas.

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Introduction

Leiomyoma is a benign tumor originating from smooth muscle cell with the most common location being the uterus [1]. When the tumor arises from the smooth muscle cells of the tunica media of the artery or vein, the tumor is called a vascular leiomyoma, angiomyoma, or an angioleiomyoma [2]. Vascular leiomyomas occur more often in females than males in their third and fourth decades and involve the distal lower extremities more often than the upper extremities [2,3]. We present a case of a large vascular leiomyoma in the proximal thigh arising from the superficial femoral artery.

Case report

Our patient, a 55-year-old woman, without past medical or surgical history, presented with a large painless mass in the proximal right thigh after recent intentional weight loss, which prompted her to get further medical attention. On physical examination, there was a very large firm mobile mass in her right upper inner thigh, measuring approximately 15 cm. No Tinel's sign could be elicited. No inguinal lymphadenopathy was appreciated on clinical exam. For further characterization of the palpable soft tissue mass, an ultrasound was ordered. On ultrasound, the mass was solid and...
demonstrated heterogeneous predominately hypoechoic signal relative to the subcutaneous fat with areas of internal vascularity (Fig. 1). The imaging appearance on ultrasound was indeterminate, and subsequently, a MRI was recommended to more optimally characterize the soft tissue mass.

MRI demonstrated a sharply demarcated intermuscular mass within the anteromedial aspect of the proximal thigh interposed between the sartorius and the adductor longus muscles. The mass was isointense to slightly hyperintense to muscle on the T1-weighted images and hyperintense to muscle on the T2-weighted fat-saturated images (Figs. 2A and B). The mass demonstrated strong homogeneous contrast enhancement (Fig. 2D). The superficial femoral artery was identified at the posterior aspect of mass. More than 180 degrees of the circumference of the artery was encased by the mass (Fig. 2, yellow arrow). There was no evidence of vascular invasion or occlusion. The mass also compressed the femoral vein (Fig. 2). There was no intramuscular edema or enhancement to suggest invasion of the mass into the sartorius and adductor longus muscles. As the mass was intimately associated with the superficial femoral artery, the main differential consideration was a vascular leiomyoma. Other considerations include peripheral nerve sheath tumor given its close proximity to the saphenous nerve and intermuscular location. For definitive diagnosis, tissue sampling was requested by the referring surgical oncologist.

The patient underwent ultrasound-guided fine needle aspiration and core needle biopsy with a preliminary diagnosis of a vascular leiomyoma without evidence of malignancy. Subsequently, the patient underwent surgical resection of the mass. Operative course was complicated by superficial femoral artery laceration, which was managed by primary repair.

The cytological evaluation demonstrated a spindle cell neoplasm with negative S100 and Calretinin arguing against nerve sheath tumor. The core needle biopsy and surgical resection histopathologic evaluation demonstrated spindle cells with bland cytoplasm, and positive staining for Desmin and smooth muscle actin (SMA), without mitotic figures or necrosis, which is consistent with a benign leiomyoma (Fig. 3).

Subsequent postoperative course was uneventful, and 6 months’ postsurgery follow-up MRI was negative for recurrent or residual disease.

Discussion

Leiomyomas arise most commonly in the genitourinary or gastrointestinal tract [4]. Extremity leiomyomas typically arise from the tunica media of the veins and uncommonly the tunica media of the arteries [4]. They may be cutaneous, subcutaneous, intramuscular, or intraosseous in location. Lower extremity involvement is more common than the upper extremities [2]. Vascular leiomyomas are more commonly seen in 30- to 40-year-old women [3]. Commonly, these present as slowly growing masses that may be painful, which is thought to be due to contraction leading to focal ischemia [3].

On gross pathologic examination, these tumors are well-circumscribed, lobulated, and tan fleshy masses, with whorled appearance. Dystrophic calcification and/or ossification has been demonstrated in a few case reports [4]. Microscopic appearance consists of interlacing fascicles of bland spindle cells with eosinophilic cytoplasm and without nuclear atypia [3,5]. Psammoma body appearance reflecting areas of dystrophic calcifications are commonly described [4,6]. Immunohistochemistry profile of angioleiomyomas typically demonstrate positive smooth muscle actin and desmin, markers for smooth muscle cells and CD34 and CD31, markers for vessel [5,7]. Negative S100 and Calretinin (nerve sheath tumor markers) and HMB 45 (melanoma and angiomyolipoma markers) are useful to differentiate these lesions from nerve sheath tumors, angiofibroma, and melanoma [5,8].

Radiologically, extremity leiomyomas if large can be seen as soft tissue density mass on radiographs with or without dystrophic calcifications. On ultrasound imaging they are mixed echogenic, well-defined solid masses with presence of Doppler flow signal indicating internal vascularity [9]. On MR imaging, they are often isointense to skeletal muscle on the T1-weighted images and hyperintense to skeletal muscle on
Fig. 2 – (A) Axial T2-weighted fat-suppressed image of the right thigh demonstrates a lobulated circumscribed homogeneously hyperintense intermuscular mass within the anterior aspect of the thigh interposed between the sartorius and the adductor longus muscle. The mass is homogeneously mildly hyperintense compared to the adjacent muscle on the T1-weighted image (B). The superficial femoral artery (arrow) is at the posterior medial aspect of the mass. Sagittal STIR image (C) again demonstrates the relationship between the mass and the superficial femoral artery (arrow). The mass avidly enhances homogeneously on the postcontrast T1-weighted fat-suppressed image (D).

the T2-weighted images [10]. Peripheral T2 hypointense rim suggestive of a fibrous capsule may also be seen [11]. Internal foci of low T1 and T2 signal intensity representing dystrophic calcification may be seen [12,13]. Our case also demonstrated an intimate relationship between the mass and the superficial femoral artery, which demonstrated greater than 180 degrees of encasement by the mass.

Imaging differential considerations of a large arterial vascular leiomyoma may include peripheral nerve sheath tumor, myxoma, angiolipoma, and angiofibroma [2,11,14,15]. Peripheral nerve sheath tumors, may have signal characteristics similar to leiomyoma, both potentially presenting as enhancing lobulated masses that are hyperintense to skeletal muscle on T2-weighted images [16]. Additionally, peripheral nerve sheath tumors being neurogenic in origin are commonly located along neurovascular bundles. However, other clues to the diagnosis of peripheral nerve sheath tumors that are absent with vascular leiomyomas include split fat sign, target sign, fascicular sign, and continuity with a nerve [17]. The nonaggressive nature can be established radiologically; however, it is often difficult to definitively make the diagnosis of vascular leiomyoma on imaging prospectively. Therefore, core biopsy is often performed for accurate diagnosis. The usual treatment of choice for vascular leiomyoma is complete surgical excision. The prognosis is good and recurrence is rare. In cases with multiple and painful vascular leiomyomas, medical treatment with gabapentin, nifedipine, and antidepressants have some role [3,15].

The differential diagnoses for soft tissue extremity masses are long. MRI often can help narrow the differential diagnosis
Fig. 3 – (A) Gross pathology image of a cut surface of the mass demonstrates a well-circumscribed tan fleshy mass. (B and C) The tumor is composed of fascicles of bland spindle cells with eosinophilic cytoplasm and no cytologic atypia, necrosis, or significant mitotic activity. (D) Immunohistochemistry demonstrates that the tumor is positive for SMA and desmin (D insert).

However, vascular leiomyomas may not be a considered a differential given its rarity. With this case report, we emphasize that vascular leiomyomas should be included in the differential of soft tissue extremity masses especially when they are in close relation to an adjacent vessel.

**Author contributions**

Study conception and design: RT, GJ, and AK; data collection: AK, JB, RT, and GJ; analysis and interpretation of results: AK, RT, JB, and GJ; draft manuscript preparation: AK, RT, and GJ; All authors reviewed the results and approved the final version of the manuscript. We attest that all authors contributed significantly to the creation of this manuscript, each having fulfilled criteria as established by the ICMJE.

**Patient consent**

Written informed consent was obtained from the patient for scientific publication of this case report.

**REFERENCES**


