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Leiomyoma of the Foot: A Case Report and Literature Review

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ABSTRACT

Leiomyomas within the foot are rare occurrences that are difficult to diagnose clinically and radiographically. They are benign and tend to be slow growing, often with minimal or no pain. We present an unusual case of a worker's compensation patient who presented with a new-onset mass within his foot that was thought to be a fibroma, but was later discovered to be a fast-growing leiomyoma after surgical excision. We also present a review of the literature regarding leiomyomas within the foot and ankle.

A leiomyoma is a benign soft-tissue neoplasm that originates from smooth muscle. Leiomyomas make up 4.4% of all benign soft-tissue neoplasms (1) and 1.7% of all benign soft-tissue neoplasms within the lower extremity (2). They most commonly occur within the uterus and gastrointestinal tract. In rare instances, a leiomyoma can be found within the soft tissues of the extremities, with the lower extremity more common than the upper extremity. Leiomyomas have been classified according to their origin: piloleiomyomas that arise from the arrector pili muscle, angioleiomyomas that arise from vascular smooth muscle, and genital leiomyomas that arise from the scrotum, vulva, or nipple (3). They can also be classified according to their location: superficial or cutaneous leiomyomas that typically arise from the arrector pili muscle, subcutaneous leiomyomas that typically arise from dermal vascular smooth muscle, and deep leiomyomas that are extremely rare in the extremities (4). The following case report illustrates the clinical, radiological, and pathological findings in a rare subcutaneous leiomyoma within the foot.

Case Report

A 44-year-old male who worked as a pallet jack driver presented to a worker's compensation clinic in October 2016 with a new-onset mass of his left foot. He stated that while at work 2 days prior, he felt like there was something in his shoe toward the end of his shift. Upon removal of his shoe, he discovered a large mass on the bottom of his left arch, which he stated he had never noticed previously. He denied trauma to the left foot but did state that he works on his feet all day and had decided to wear tennis shoes instead of his normal work boots that day, which he felt put more pressure on his feet because the tennis shoes were thinner and less supportive than the work boots. He stated that the mass caused some discomfort but was not painful.

He had an insignificant medical history and only admitted to taking ibuprofen as needed for generalized achiness. He denied any allergies and admitted to a 10 pack-year history of smoking cigarettes.

On physical examination, his neurovascular status was intact without any numbness or tingling of the left foot. A rubbery type of mass could be observed and was palpated within the subcutaneous tissue of the left plantar medial arch. It measured approximately 4×3 cm. It was slightly mobile and did not illuminate. All digits had full range of motion without pain or crepitus. The mass was nontender on palpation and exhibited a negative Tinel sign.

The initial diagnosis was a suspected ganglion cyst. Aspiration of the mass was attempted unsuccessfully without any fluid recovered. A magnetic resonance imaging scan was ordered and revealed a well-defined subcutaneous mass along the plantar aspect of the medial and central bands of the plantar fascia that was mixed hyperintense/isointense to the surrounding skeletal muscle on T1 and hyperintense to the surrounding skeletal muscle on T2 (Fig. 1–3). The new diagnosis was a suspected fibroma.

The patient did not want to undergo surgery and instead elected for custom orthotics with a cut-out to accommodate the mass. Approximately 3 months after the patient's initial presentation, he complained

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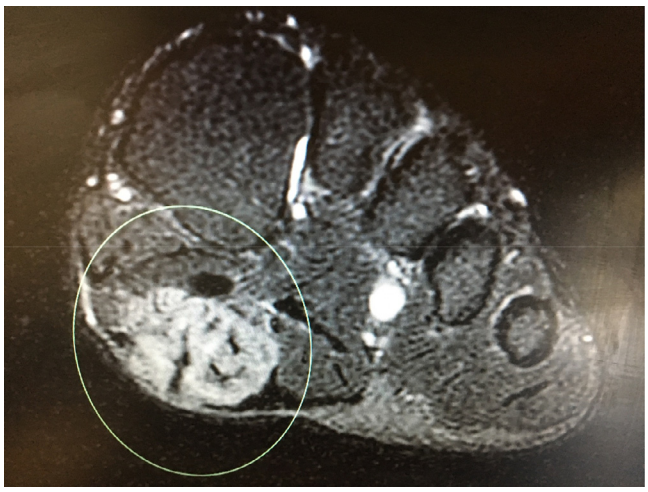

Fig. 1. Coronal T2 magnetic resonance image. The area of increased signal intensity within the highlighted circle corresponds to the location of the leiomyoma.

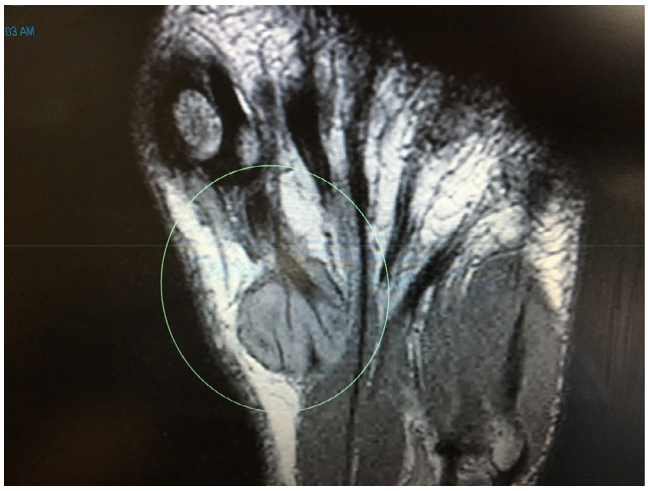

Fig. 2. Axial T1 magnetic resonance image. The area of intermediate signal intensity within the highlighted circle corresponds to the location of the leiomyoma.

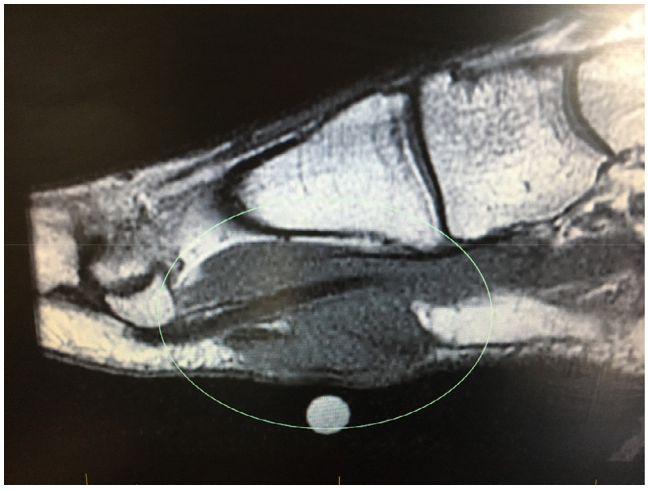

Fig. 3. Sagittal T1 magnetic resonance image. The area of decreased signal intensity within the highlighted circle corresponds to the location of the leiomyoma. The arrow is pointing to a skin marker used to help identify the location of the leiomyoma.

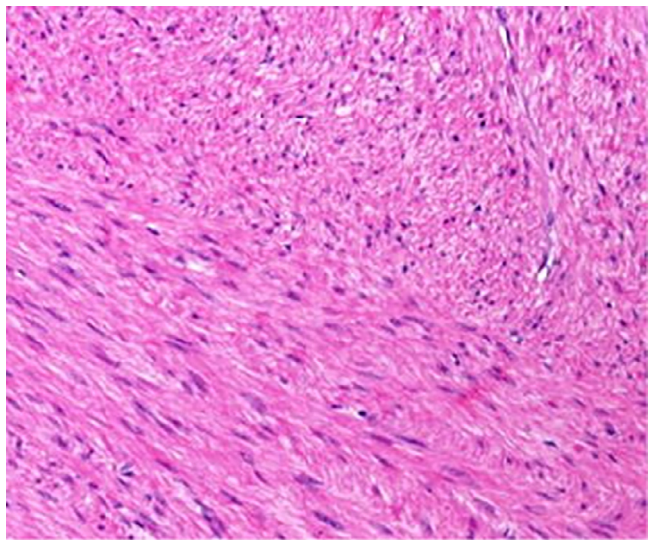

Fig. 4. Histomicrograph of leiomyoma showing benign fasciculated smooth muscle proliferation arranged in orderly intersecting fascicles (20 × magnification; hematoxylin and eosin stain).

that the mass seemed to be enlarging, and that his orthotics were not accommodative enough. Upon physical examination, the mass did not appear to be any larger when compared to the initial presentation. He ultimately elected for surgical excision of the mass in March 2017, approximately 5 months after his initial presentation.

The patient was placed in a supine position and received general and local anesthesia. An ankle tourniquet was inflated and a lazy S incision over the plantar medial arch was made with sharp dissection deep to the level of the plantar fascia. The mass was completely excised along with the medial and central bands of the plantar fascia. The muscles deep to the plantar fascia appeared normal and were left intact. The site was thoroughly irrigated with saline and closed in a layered fashion. A compressive dressing was applied, and the patient instructed to be non-weightbearing.

The mass, which was a white/tan nodular tissue fragment that measured 4 × 3.5 × 2.5 cm, was sent for pathologic examination. The pathology report revealed a well-circumscribed neoplasm composed of vesicles and whorls of spindle cells with wavy eosinophilic fibrillary cytoplasm and low-grade spindled nuclei (Fig. 4 and 5). The tumor was encapsulated with pericapsular lymphoid aggregates. There were variably thick walled vessels dispersed evenly throughout. No necrosis or increase in mitotic activity was seen. Immunohistochemical stains showed negative S-100, diffuse positive smooth muscle actin, and negative atypical beta catenin. The final diagnosis was a benign leiomyoma with clean margins free of cellular atypia.

The patient's postoperative course was uneventful. The patient was non-weightbearing for 3 weeks, at which point the sutures were removed and he was instructed to begin partial weightbearing as tolerated in a boot (Fig. 6). At approximately 7 weeks postoperatively, the patient was allowed to fully weight bear (Fig. 7). There were no major complications including dehiscence or infection, and only some mild neuritic pain which lasted for approximately 2 months postoperatively. At 1 year postoperatively, the patient had no pain or discomfort and there was no evidence of recurrence.

Discussion

Leiomyomas in the foot and ankle are a very rare occurrence, with only a handful of reported cases in the literature. Baarini and Gilheany presented a case in 2016 of a leiomyoma in the plantar medial arch of

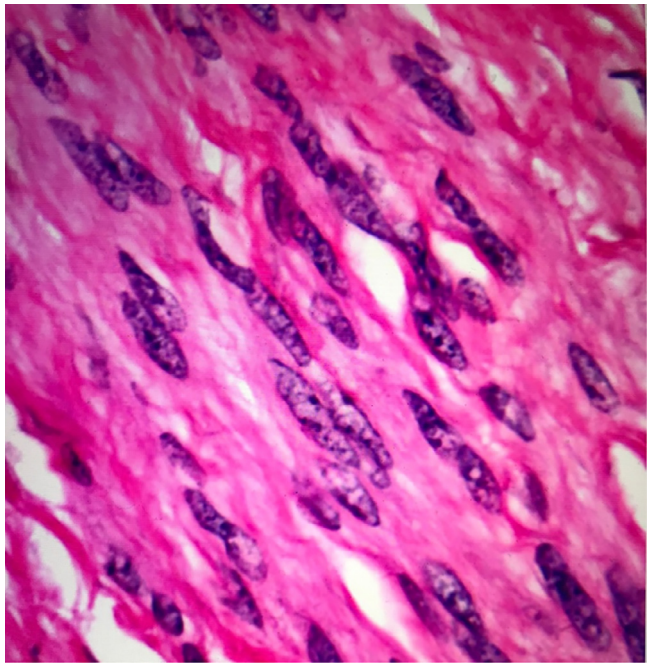

Fig. 5. Histomicrograph of leiomyoma showing abundant eosinophilic cytoplasm and regular blunt-ended nuclei. Note the absence of atypia and mytotic activity (40 × magnification; hematoxylin and eosin stain).

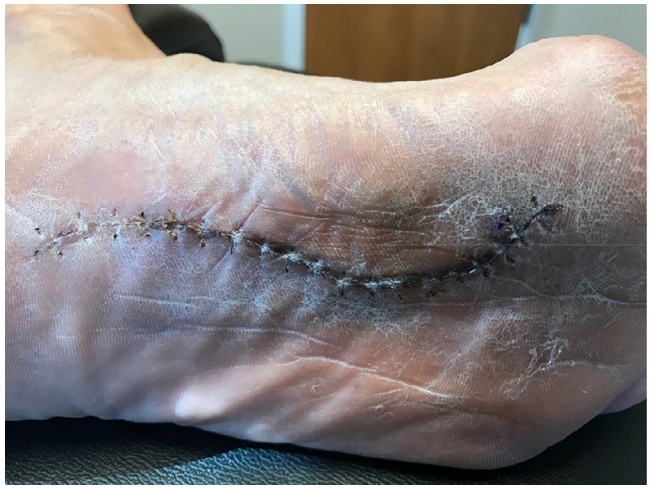

Fig. 6. Clinical appearance 3 weeks postoperatively. The plantar aspect of the foot is shown with digits to the right, heel to the left, medial border on the top, and lateral border on the bottom.

the foot of a 51-year-old male. This mass was slow growing over 2 years before he presented to the authors' clinic for excision (5). Szolomayer et al. presented a case series of 8 patients with leiomyomas that were all excised (6). The patients ranged in age from 39 to 82 years. There were 3 females and 5 males. The location of the mass varied considerably including the hallux, the plantar foot, and the ankle. The mass was painless in 3 cases and painful in 5 cases. The duration of symptoms ranged from 2 weeks to 20 years. The size of the mass ranged from 1 cm to 10 cm. Chavez-Lopez et al. presented a case of a leiomyoma in the ankle of a 39-year-old female. This mass was slow growing over 3 years before she presented to the authors' clinic for excision (7). Gaganthodi et al. presented a case of a leiomyoma in the plantar medial arch of the foot of a 44-year-old male. This mass was noticeable for

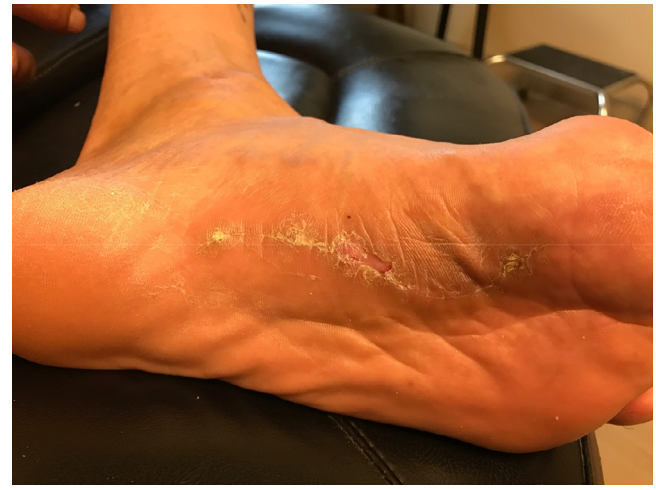

Fig. 7. Clinical appearance 15 weeks postoperatively. The plantar aspect of the foot is shown with digits to the right, heel to the left, medial border on the top, and lateral border on the bottom.

3 months before the patient presenting to the author's clinic for excision (8). Jalgaonkar et al. presented a case of a leiomyoma in the plantar aspect of the forefoot, just proximal to the 2nd digit of a 5-year-old male that was initially misdiagnosed as a fibroma (9). Stock et al. presented a case of leiomyoma in the dorsolateral aspect of the foot of a 50-year-old male. This mass was slow growing over 10 years before the patient presented to the authors' clinic for core needle biopsy without excision (10).

In our case, the patient reported that he did not previously notice a mass until going to work wearing less supportive shoes than his regular work boots. Leiomyomas are slow-growing tumors, which seems to contradict the patient's story. It is possible that the patient just didn't notice the mass until the day he wore the less supportive shoes at work. It is also possible the patient was aware that the mass existed before the incident at work but used the worker's compensation system to pay for treatment. Although unlikely, it is possible that this was truly a fast-growing leiomyoma, as the patient reported that the mass was enlarging after beginning conservative treatment.

Benign leiomyomas rarely transform to malignant leiomyosarcomas. De Vos et al. reported a rate of transformation of benign leiomyoma to malignant leiomyosarcoma of 0.13% to 0.29% (12). There have been reports of uterine leiomyoma transforming to leiomyosarcoma. Leibsohn et al. reported that of 1429 patients who underwent hysterectomies for benign leiomyoma, 7 were found to have leiomyosarcoma, which is a rate of 0.5% (11). There are currently no reported cases of leiomyosarcoma in the foot or ankle.

In conclusion, although leiomyomas are rare benign tumors of the lower extremity with a very low risk of malignant transformation, the foot and ankle practitioner should always keep leiomyoma as a differential diagnosis when evaluating soft-tissue masses. Excisional biopsy is the treatment of choice for most soft tissue masses. They are difficult to diagnose clinically and radiographically and usually requires a histologic evaluation to confirm the diagnosis of leiomyoma.

References

1. Lopez-Barea F, Rodriguez-Peralto JL, Burgos E, Gonzalez-Lopez J. Calcified leiomyoma of deep soft tissue: report of a case in childhood. Virchows Arch 1994;425:217–220.
2. Watson GM, Saifuddin A, Sandison A. Deep soft tissue leiomyoma of the thigh. Skeletal Radiol 1999;28:411–414.
3. Fisher C, Montgomery E, Thway K. Smooth muscle tumors. In: J. W. Pine, Jr., ed. Biopsy Interpretation of Soft Tissue Tumors, pp. 119–137, Lippincott Williams & Wilkins, Philadelphia 2011.

4. Hirata H, Kusuzaki K, Fukutome K, Maeda M, Uchida A. A hand mass that became painful 13 years after onset. Clin Orthop Relat Res 2005;433:265–270.
5. Baarini O, Gilheany M. Angioleiomyoma of the plantar medial arch. J Clin Diag Res 2016;10:7–8.
6. Szolomayer LK, Talusan PG, Chan WF, Lindskog DM. Leiomyoma of the foot and ankle: a case series. Foot Ankle Spec 2016;20:1–4.
7. Chávez-López M, Reyna-Olivera G, Pedroza-Herrera G. Vascular leiomyoma of the foot: ultrasound and histologic correlation. Reumatol Clín 2014;10(5):342–343.
8. Gajanthodi S, Rakesh R, Chaudhry RK. Vascular leiomyoma of foot. J Clin Diag Res 2013;7(3):571.
9. Jalgaonkar A, Mohan A, Dawson-Bowling S, Skinner J, Briggs T. Deep soft tissue leiomyoma mimicking fibromatosis in a 5-year-old male. J Foot Ankle Surg 2012;51 (1):110–113.
10. Stock H, Perino G, Athanasian E, Adler R. Leiomyoma of the foot: sonographic features with pathologic correlation. HSS J 2011;7:94–98.
11. Bharambe BM, Deshpande KA, Surase SG, Ajmera AP. Malignant transformation of leiomyoma of uterus to leiomyosarcoma with metastasis to ovary. J Obstet Gynaecol India 2014;64:68–69.
12. De Vos S, Wilczynski SP, Fleischhhacker M, Koeffler P. p53 alterations in uterine leiomyosarcomas versus leiomyomas. Gynecologic Oncology 1994;54:205–208.