



# A Case of Vascular Leiomyoma on the Heel: A Rarely Seen Benign Soft Tissue Tumor with Brief Reviews

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Dear Editor:

A 33-year-old male visited our clinic for painful mass on the heel of his right foot. The patient did not know when occurred. A slight blue to skin-colored nodule about 1 × 1 cm in size was found on his right heel (Fig. 1A). Ultrasonography was performed and a well-demarcated oval hyperechoic mass in the subcutaneous fat layer, with prominent vascularity was indicated (Fig. 1B). A vascular leiomyoma, hemangioma, glomus tumor or complicated epidermoid cyst was suspected. The tumor was completely resected and the microscopic examination exposed numerous tortuous vascular channels with proliferation of spindle-shaped cells displaying an interlacing band-like pattern. Elongated spindle cells with abundant brightly eosinophilic cytoplasm were observed without necrosis, pleomorphism, mitosis or nuclear atypia (Fig. 2A; H&E, ×40). With these results, fibrous components with edematous stroma were seen (Fig. 2B; H&E, ×200). Immunohistochemistry revealed the spindle-shaped tumor cells were diffusely positive with desmine (Fig. 2C, ×100). Tissue were stained with Masson's trichrome (Fig. 2D, ×100). S-100 stain was negative (Fig. 2E, ×100). The final diagnosis appeared to be vascular leiomyoma.

Leiomyoma is a benign smooth muscle tumor which usually occurs in the extra-skeletal area, such as ovaries, uterus, bladder, lung and gastrointestinal tract<sup>1</sup>. Occasionally

skin and subcutaneous soft tissues are involved<sup>2</sup>. Enzinger and Weiss explained that leiomyomas can be classified into three types; vascular, cutaneous and deep soft tissue<sup>3</sup>. Vascular leiomyomas, featured by a painful solitary tumor occurring most frequently in the extremities, originate from the tunica media layer of a vein<sup>2,3</sup>. Pain is accompanied in approximately 60% of patients whether there is tenderness<sup>4</sup>. It typically affects middle aged females in the third and fourth decades but may occur at any age<sup>1,2,4</sup>. It usually presents as a solitary mass. Its differential diagnosis includes tender tumors such as neuroma, neurilemmoma, and eccrine spiradenoma because pain is the most characteristic subjective symptom. Etiology is still unknown. Morimoto suggested that pain may be caused by the contraction of vessels which lead to local ischemia<sup>5</sup>. X-ray findings are mostly normal, however, rarely, dystrophic calcifications might be seen<sup>3</sup>. The essential histologic features include bundles and masses of smooth muscle fibers, irregularly separated by strands of collagen fibers<sup>1</sup>. A variety of immunohistochemical stainings such as desmin, vimentin, S-100 protein, neuron specific enolase, actin and factor VIII-related protein could be performed for differentiation or an indication of muscle origin and endothelial cell<sup>1,3</sup>. The most satisfactory treatment is complete excision<sup>1</sup>. In the Korean dermatology literature, there have been several reported cases on lower extremities, cheek,

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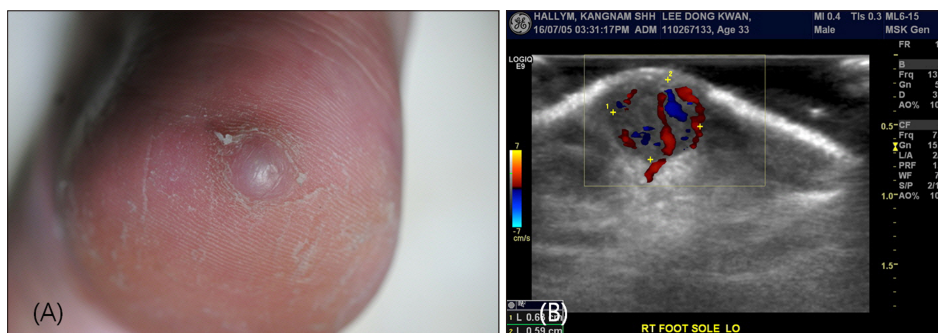
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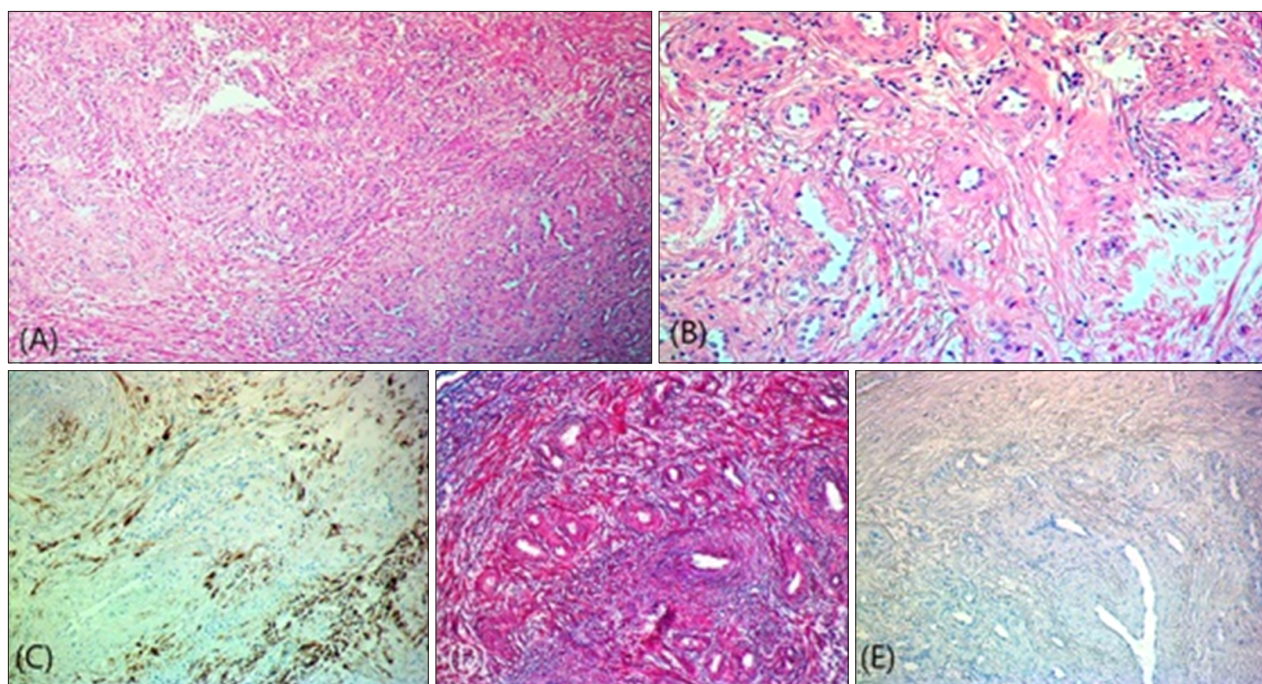
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**Fig. 1.** (A) A slightly bluish to skin-colored nodule about 1×1 cm in size was found on his right heel. (B) By ultrasonography, a well-demarcated oval hyperechoic mass in the subcutaneous fat layer, with prominent vascularity, was determined in the subcutaneous fat layer on the right heel.



**Fig. 2.** (A) Numerous tortuous vascular channels with proliferation of spindle-shaped cells displaying an interlacing band-like pattern. The angioleiomyoma composed of rich vascular channels with thick vessel walls and smooth muscle bundles with elongated nuclei. Elongated spindle cells with abundant brightly eosinophilic cytoplasm were observed without necrosis, pleomorphism, mitosis or nuclear atypia (H&E, ×40). (B) Fibrous components and edematous stroma were observed. The mitotic activity was low and no necrosis was seen. (H&E, ×200). (C) The tumor cells show positivity for desmin (×100). (D) Masson's trichrome stain demonstrating smooth muscle fibers in red, erythrocytes in blue, collagen fibers in blue and nuclei in black-blue (×100). (E) S-100 stain was negative (×100).

lip and multiple locations involving shoulders, upper chest, upper back, arm, and neck<sup>1</sup>. Few studies analyzing vascular leiomyoma have been conducted in Korea<sup>1</sup>. Little has been reported on the heel in young adult male patient, just like our case. Vascular leiomyomas are rarely diagnosed clinically before biopsy, but can occur anywhere in various ages. Although vascular leiomyoma is an infrequent soft tissue tumor, it is worth consideration as the differential diagnosis of nodule with pain on the heel.

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## CONFLICT OF INTEREST

The authors have nothing to disclose.

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# Clinical Factors Influencing Outcomes of 1064 nm Neodymium-Doped Yttrium Aluminum Garnet (Nd:YAG) Laser Treatment for Onychomycosis

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Dear Editor:

Onychomycosis is a common fungal infection of the nails, approximately 2% to 13% of the general population is affected by onychomycosis<sup>1</sup>. There are several therapeutic modalities, among which oral antifungal agents are considered the gold standard. While these agents are generally well tolerated, they carry a treatment failure risk of approximately 25% to 40% primarily due to poor patient compliance and drug interactions. There are also several contraindications for oral antifungal drugs including liver disease and congestive cardiac failure. Apart from these medical causes, some patients are reluctant to take oral

antifungal drugs due to concerns and misconceptions about the risks associated with systematic antifungals. Thus, there is a growing need for new therapeutic options that are safe and beneficial to a wider population without contraindications. Recently, a number of different devices have been developed, most of which utilize a 1064 nm neodymium-doped yttrium aluminum garnet (Nd:YAG) laser<sup>3</sup>. Although not included in recent guidelines<sup>2</sup>, several studies have shown that 1064 nm Nd:YAG lasers are effective in treating onychomycosis, while other studies have reported conflicting results<sup>4-6</sup>. The Food and Drug Administration has also approved the 1064 nm Nd:YAG

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