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Two Different Treatment Options for Intramuscular Plantar Hemangioma: Surgery Versus Percutaneous Sclerotherapy

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ABSTRACT

Intramuscular hemangiomas are benign neoplasms usually seen in children and adolescents. They tend to occur in the deep fascia and muscle and more often in the lower extremity, although they are rarely encountered in the plantar musculature. Surgical excision, ultrasound- or fluoroscopic-guided percutaneous sclerotherapy, and angiographic embolization are all treatment options. Surgical excision is the most prevalent form of therapy, although this can be difficult in the hands and feet. For this reason, ultrasound- and fluoroscopic-guided percutaneous sclerotherapy is a useful treatment option for pedal intramuscular hemangioma. In the present report, we describe 2 cases of intramuscular hemangioma in children, 1 treated by excision and 1 by percutaneous sclerosis.

Intramuscular hemangioma (IH) is a rare, benign, soft tissue tumor occurring in childhood and adolescence (1,2). Although hemangioma is common, IH is a rare condition that accounts for approximately 0.8% of all hemangiomas (3). IHs occur often in the lower extremities, in particular, in the thigh (4); however, plantar IH has been rare. Thus, we describe 2 cases in the present report (5,6). Most patients known to have plantar IH will present with pain or swelling on weightbearing (3,7). Although magnetic resonance imaging can be helpful in making the diagnosis, histologic examination of the excised tumor is required to confirm the diagnosis. Because surgical excision is the main treatment option, it also allows for pathologic assessment. An alternative treatment option is angiographic embolization (8) or ultrasound- or fluoroscopic-guided percutaneous sclerotherapy (9). In the present report, we present 2 cases of plantar IH localized in the flexor digitorum brevis muscle treated using sclerotherapy.

Case Report

Patient 1

A 7-year-old female was admitted to the Orthopaedic Polyclinic with a 1-year history of a palpable mass in the plantar-medial aspect of her right foot associated with mild swelling and pain on weightbearing without a history of trauma. The symptoms and swelling increased with exercise. The physical examination revealed only mild plantar-medial swelling (Fig. 1), and the findings from standard foot radiographs appeared normal. Gadolinium contrast-enhanced magnetic resonance imaging scans showed a mass in the flexor digitorum brevis muscle that measured 4 cm long × 3 cm wide × 5 cm deep. The mass was lobulated without infiltrative margins. On the T_1-weighted images, the mass displayed an intermediate signal intensity mixed with small areas of high signal, resembling fat depositions at the periphery of the lesion. On the T_2-weighted images, the lesions displayed a hyperintense signal compared with the skeletal muscle. The mass showed heterogeneous and poor enhancement after administration of intravenous gadolinium. The radiologic diagnosis was IH (Fig. 2), and operative excision of the lesion was planned. In the operating room, a longitudinal incision was used to expose the flexor hallucis brevis muscle belly, with the patient supine and under only general anesthesia. The lesion was located in the muscle, and wide excision, using both a cold steel scalpel and electrosectioning

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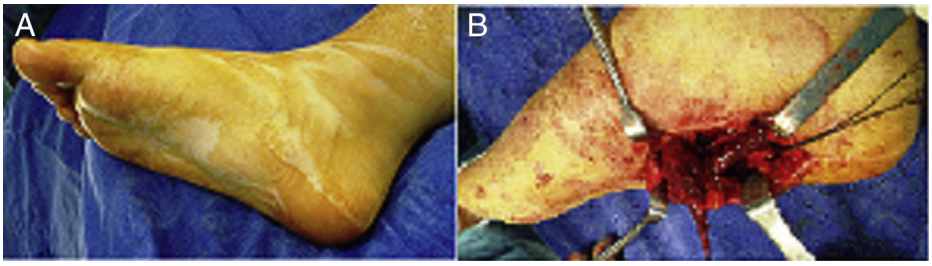

Fig. 1. (*A*) Preoperative clinic view of the right foot. (*B*) Intraoperative clinic view of the lesion.

(radiofrequency), was performed to remove the entire mass (Fig. 1*B*). To avoid residual gaps, a mini-vacuum drain was used with an elastic bandage covering the whole foot and ankle. Subsequent histologic examination of the excised lesion confirmed the diagnosis of IH (Fig. 3). Because capillary and cavernous-like vessel spaces were present, the lesion was classified as a mixed IH.

The patient was mobilized with partial weightbearing on her right heel for the first 2 postoperative weeks. She had returned to her regular shoes and activities by 4 weeks postoperatively. At 2 months postoperatively, a hallux hammer toe was observed, and adhesion of the flexor hallucis longus to the flexor hallucis brevis was found. The patient was returned to the operating room to release the adhesion. At the latest follow-up visit, 22 months after the original surgery, she had had no recurrence of the IH and has experienced no residual scar or wound complications.

Patient 2

A 9-year-old male with a 3-year history of progressive left foot pain and local swelling without previous trauma presented to our practice for evaluation. The pain was aggravated by weightbearing activities. Physical examination of the plantar-medial midfoot revealed soft tissue swelling with hypersensitivity on palpation. The findings from standard foot radiographs were considered normal. On T_1-weighted magnetic resonance imaging scans, the mass showed intermediate signal intensity mixed with small areas of high signal intensity. On the T_2-weighted images, the lesion displayed a hyperintense signal compared with the surrounding skeletal muscle. The mass presented with heterogeneous enhancement on T_1-weighted images with fat suppression after gadolinium injection. The radiologic diagnosis was plantar IH (Fig. 4).

Before applying percutaneous polidoconol, a color Doppler ultrasound scan of the plantar aspect of the foot was performed, and the mass was localized. Percutaneous sclerotherapy was performed in an angiography laboratory with the patient under chloral hydrate sedation by an interventional radiologist. Antiseptic preparation of the skin was undertaken using 10% povidone iodine. Ultrasound-guided direct percutaneous puncture of the lesion was performed with a 22-gauge intravenous cannula. Phlebography with nonionic contrast was performed to clearly visualize the malformation (Fig. 5) and to determine the hemodynamic characteristics of the lesion, its relation to the venous drainage system, and the estimated volume of polidocanol required to sclerose the benign vascular neoplasm. A blood pressure cuff was inflated to 120 mm Hg proximal to the lesion, above the ankle joint on the cruris, before the polidocanol was injected. Elevation of the tourniquet to a pressure greater than the diastolic blood pressure occluded the outflow to avoid unwanted venous return and prevent rapid outflow of the sclerosing agent into the general circulation. A total of 1 mL of 2% polidocanol was injected for each 1 cm of the lesion diameter. Injection of the sclerosing agent was guided by real-time ultrasonography and fluoroscopy. After the injection, the cuff was deflated. After the procedure was completed, the patient was observed for a 3-hour period, during which the right foot was elevated and compressed with gauze. The gauze compression was then maintained for the first 3 postoperative days, and the patient was administered oral nonsteroidal antiinflammatory drugs (ibuprofen 400 mg) twice daily for 3 days. Regular shoe wear was resumed at 20 days postoperatively, and all regular activities had been resumed by 30 days postoperatively. After 6 months, the

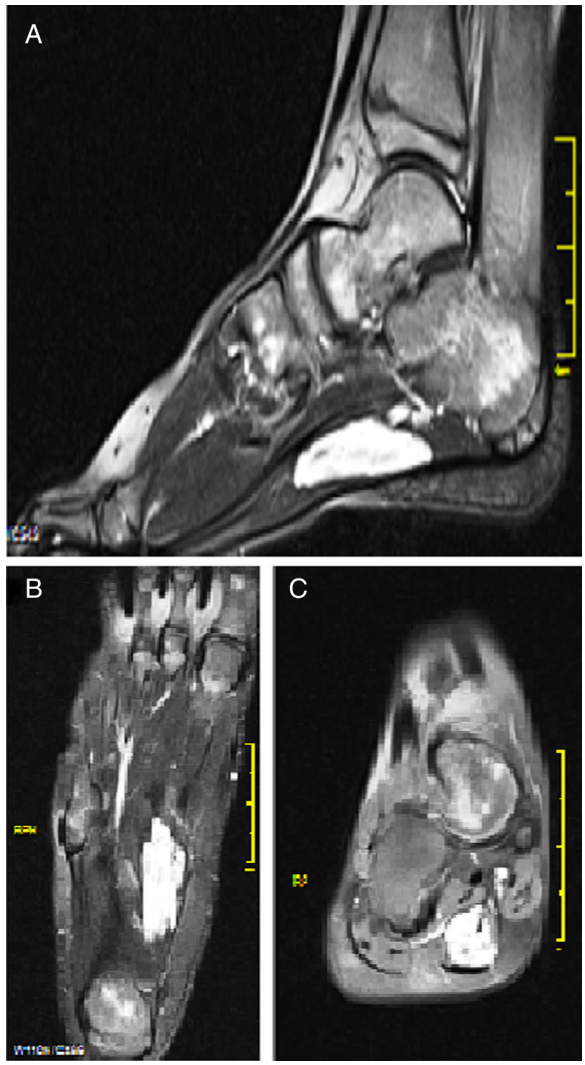

Fig. 2. (*A*) Sagittal plane magnetic resonance image of the intramuscular hemangioma of the right foot for patient 1. (*B*) Transverse plane magnetic resonance image of the lesion. (*C*) Frontal plane magnetic resonance image of the lesion.