A Unique Schwannoma of the Distal Hallux: A Case Study

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Purpose

There are very few cases describing schwannomas in association with sensory nerves or in the digits. This case describes the evaluation, treatment and post-operative expectations of an abnormal presentation of a schwannoma located at the distal tip of the hallux.

Literature Review

Schwannomas have been found to make up less than 5% of all soft tissue tumors (1). Only 9% of all schwannomas are found in the foot or ankle (1, 2). This tumor is the most common solitary nerve sheath tumor, developing from Schwann cells, which are wrapped around peripheral nerves to provide protection and facilitate efferent and afferent signals (3).

Most case studies described schwannomas located in the plantar midfoot (4-11) and the ankle (12-18), most commonly associated with a major nerve or nerve branch, with very few associated with sensory nerves (4-18). Only 35% of schwannomas in the foot arise from superficial sensory nerves (19). The only study found regarding a benign, non-variant, schwannoma of the hallux was by Soto et al. in 2014, describing a subungual schwannoma located on the hallux, which was excised without recurrence at the 1 year follow up (20).

There are few other studies discussing schwannomas located distal to the midfoot. Wolpa and Johnson described a case of a schwannoma located on the 5th toe in 1989 which resulted in excision with no complications (21). Ishida et al described a schwannoma located on the 2nd digit that had been present for 10 years prior to presentation which was resected without recurrence at 1 year (22). Iwama et al reported a malignant schwannoma of the 5th digit that involved the distal phalanx resulting in recurrence and eventual pulmonary metastasis (23). Fisher et al also described a case of a malignant schwannoma located on the hallux which resulted in a radical partial 1st ray amputation after confirmation of malignancy (24).

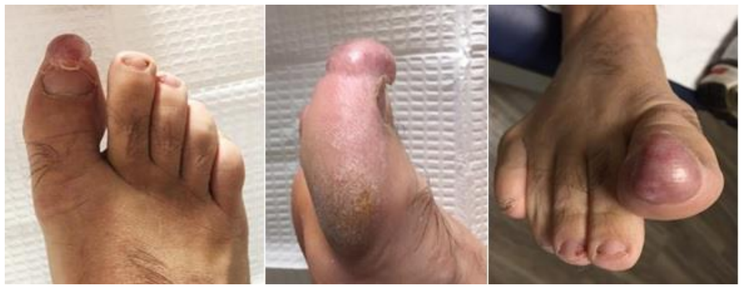

Figure 1. Raised, nodular-type soft tissue mass located at the distal aspect of the right hallux, measuring approximately 2cm x 2cm

Case Study

History: A 49-year-old Caucasian male presented to the clinic complaining of a soft tissue mass on the tip of his right great toe present for 8 years, which began to increase in size and pain over the previous 3-6 months. The patient denied a history of trauma to the area. The pain was described as dull and achy, aggravated by direct pressure and shoe gear. The patient attempted and failed conservative care including shoe gear changes and padding. The patient had no significant medical history was taking no medications. His only prior surgery being a carpal tunnel release. The patient had no significant family or social history and denied tobacco use.

Physical: The mass was soft, mildly tender to palpation and did not pulsate or illuminate (Figure 1). There was no change in neurologic sensation in relation to the mass and the overlying skin was tense but intact. The mass did not move with hallux range of motion. The remaining neurovascular, dermatologic, and musculoskeletal exam was normal.

Imaging: Radiographs were taken, revealing normal osseous density with no fractures, dislocations or signs of joint abnormalities. Increased soft tissue contour at the distal aspect of the hallux was noted. Magnetic resonance imaging of the right hallux with and without contrast revealed a contrast enhancing nonspecific solitary lesion measuring 17 x 15 x 12 millimeters without bony involvement or destruction (Figure 2).

Treatment: An excisional biopsy was performed through an incision at the distal aspect of the hallux, overlying the mass taking caution not to violate the mass (Figure 3). It was successfully removed intact and sent to pathology (Figure 4). The overlying skin returned to normal thickness and the incision was closed. The patient was allowed to weight bear as tolerated in a surgical shoe. The sutures were removed at 2 weeks post-op and the patient healed without loss of sensation, recurrence or other complications. Patient was followed from October 2017 until final follow up on January 2019.

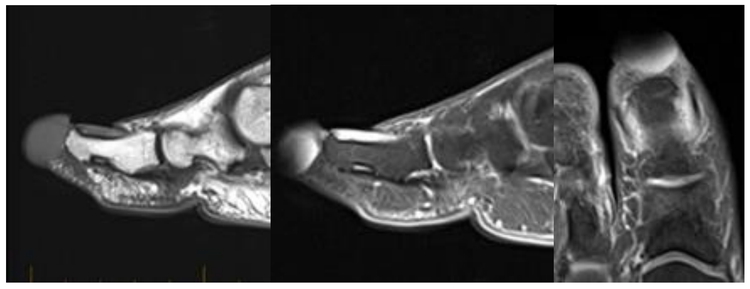

Figure 2. Magnetic resonance imaging of the right hallux revealed a contrast enhancing nonspecific solitary lesion measuring 17 x 15 x 12 millimeters without bony involvement or destruction A) sagittal T1 without contrast B) sagittal T1 fat suppressed with contrast C) coronal T1 fat suppressed with contrast

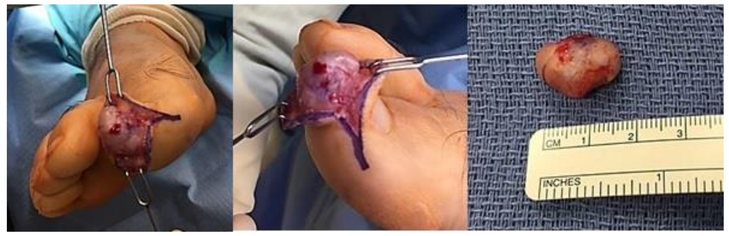

Figure 3. The mass was a cystic nodule with a smooth, thin tan-gray wall, containing tan-gray debris with vascular involinvolvement.

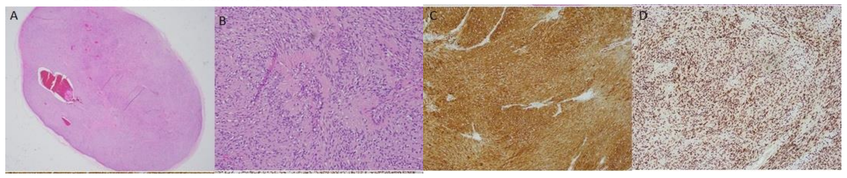

Figure 4. Microscopic examination demonstrated (A) a well demarcated ovoid neoplasm composed of intersecting fascicles of spindle cells with variable cellularity. (B) Large blood vessels were present within the neoplasm. Immunostains demonstrate (C) positive S-100 and (D) SOX-10 in the neoplastic cells, with no evidence of high-grade cystologic atypia, increased mitotic activity or necrosis.

Discussion

This case is a rare presentation of a large schwannoma located at the distal tip of the hallux. These peripheral nerve sheath tumors are often misdiagnosed clinically as ganglion cysts or a form of fibroma, which may lead to mistreatment. It is important to keep schwannomas in the differential diagnosis of soft tissue masses in order to pursue to the correct diagnostic and treatment options. Surgical excision of the entire mass is the recommended treatment option for schwannomas, taking care to keep all nerves intact, resulting in minimal likelihood of sensation loss or recurrence.

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