Schwannomas are benign neoplasms of the Schwann cells of the neural crest. They are solitary, slow-growing, smooth-surfaced, and usually asymptomatic tumors originating from the Schwann cells of the peripheral nerve sheath. Neurologic defects are uncommon in benign schwannomas. There seems to be no sex predilection, and most patients are middle-aged. Schwannomas can arise from any nerve in the body except for the olfactory and optic nerves, and they most commonly occur in the neck, posterior mediastinum, or pelvis. Cellular schwannoma mass size usually depends on its location. The greater the diameter of the nerve trunk, the greater the size of the lesion. The mean greatest dimension of cellular schwannomas of the sciatic nerve is 10 to 17 cm, of the mediastinum is 2 to 12 cm, of the neck is 2 to 4 cm, and of the foot or ankle is 1.5 to 2.0 cm.

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Cellular schwannoma shares some of the gross and histologic features of classic benign schwannoma but is distinguished histologically by the dominance of cellular and fascicular spindle-cell components and some mitotic activity. In gross appearance, cellular schwannoma is typically an encapsulated, firm, tan-yellow mass without evidence of necrosis. Histologically, it is currently defined as a well-encapsulated mass predominantly containing the Antoni type A pattern showing fascicles of densely packed cells with small, spindle-shaped Schwann cells streaming around numerous acellular, eosinophilic areas

Unusually Large Cellular Schwannoma of the Foot

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This article presents a case of an unusually large cellular schwannoma of the foot. This uncommon lesion of the lower extremity is described with regard to clinical appearance, radiologic evaluation (including magnetic resonance imaging), histologic characteristics, and intraoperative findings. (J Am Podiatr Med Assoc 95(2): 157-160, 2005)

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Case Report

On January 10, 2000, a 29-year-old man presented to our office in Old Bridge, New Jersey, complaining of a mass on the dorsum of the left foot that had first appeared approximately 10 years previously and had grown rapidly during the past 2 years. Because the mass was asymptomatic and the patient suffered from medical phobia, he did not seek medical treatment until the size of the mass prevented him from wearing a shoe. The patient's medical history was unremarkable. He denied the use of any medications or a history of allergies.

Physical examination revealed a well-circumscribed, freely movable, nonpulsatile mass measuring approximately 7.0 × 5.0 × 3.0 cm on the dorsal aspect of the left foot (Fig. 1). Radiographs showed no evidence of pathology. Magnetic resonance imaging revealed an enhancing (high signal intensity) mass measuring 6.6 × 4.3 × 3.0 cm. The mass extended from the second and third metatarsal bases to the level of the proximal phalanx of the second and third toes, with a lobulated extension between the two metatarsal bones. The mass did not appear to infiltrate the interosseous muscles. There was no evidence of bony involvement. The mass had intermediate T1 signal intensity similar to that of muscle and did not appear as low signal on T1-weighted images, which would have suggested fluid. T2-weighted images had increased signal, with areas of low signal intensity centrally that suggested fibrous bands. Because the mass had a complex signal intensity on T2-weighted images, it seemed to represent a neurogenic tumor, mesenchymal tumor, or soft-tissue sarcoma/synovial mass (Fig. 2). The mass required clinical evaluation with biopsy.

The patient was admitted to Raritan Bay Medical Center on March 22, 2000, with the diagnosis of a soft-tissue mass of the left foot. Using a sterile handheld Doppler ultrasound device, the dorsalis pedis artery was identified. Two semi-elliptical incisions, 10 cm long and 2.5 cm wide at the central aspect of the incision, were centered over the interspace between the second and third metatarsals. After the skin wedge was excised, a well-encapsulated, large, firm, yellowish-tan mass was seen (Fig. 3). Numerous superficial and deep vascular structures appeared to penetrate the encapsulated mass. The mass appeared to be contiguous with the second common digital branch of the medial plantar nerve. Upon completion of the skin plasty, the foot regained a normal anatomical appearance (Fig. 4).

On gross examination, the specimen consisted of a firm, well-circumscribed, encapsulated, slightly oval, pale yellow mass measuring 8.0 × 4.5 × 2.5 cm. The cut surfaces were pale yellow, with fine gray-white fibrous septa. Microscopic examination revealed a spindle-cell neoplasm (Fig. 5). Immunohistochemical staining demonstrated tumor cells showing strong, diffuse reactivity for vimentin, S-100 protein, and CD 34 (stem cells, stromal tumors), indicating a neural tumor rather than a smooth muscle tumor.

The patient's postoperative course was uneventful. Three years after surgery, the patient remained pain-free and displayed no recurrence of the lesion.

Discussion

The determination of whether a tumor is benign or malignant is the most important consideration regarding any new growth; therapy for the lesion and the patient prognosis are based on this determination. Cel-
lular schwannomas are usually asymptomatic until they impinge on surrounding structures. Magnetic resonance imaging may be helpful for delineating the tumor margins and identifying infiltration of the surrounding structures; however, it does not provide a definitive diagnosis. Histologically, cellular schwannoma is sometimes difficult to differentiate, in a small biopsy specimen, from benign schwannoma and malignant tumors such as malignant peripheral nerve sheath tumor, fibrosarcoma, or leiomyosarcoma. The differential diagnosis of this lesion is often difficult and relies on clinical suspicion. When biopsy results are not definitive, immunohistochemical staining offers a definitive diagnosis.

We presented a unique case of an unusually large cellular schwannoma of the foot. Review of the literature confirms that this cellular schwannoma is by far the largest one documented in the foot and ankle region. This may be because the neoplasm was asymptomatic and slow-growing and because of the patient's medical phobia, which prevented him from seeking medical attention earlier. Most patients with cellular schwannoma are middle-aged. This patient, however, was 29 years old at the time of surgery, with the mass first noticed approximately 10 years earlier.

Figure 2. A, Sagittal fast spin-echo short tau inversion recovery magnetic resonance image (repetition time/echo time, 6300/15 ms) shows homogeneous high signal intensity in the lesion. B, Coronal T1-weighted magnetic resonance image (repetition time/echo time, 500/10 ms) with fat saturation of the left foot. The mass emanates from a lobulated extension from the second interspace. The mass does not appear to infiltrate the interosseous muscles.

Figure 3. Intraoperative photograph of the soft-tissue mass. Note the encapsulation of the mass.

Figure 4. Postoperative photograph of the left foot displaying normal anatomical contours.
Figure 5. Photomicrograph demonstrating tumor cells with large hyperchromatic and polymorphous nuclei, considered to be a degenerative phenomenon. A cellular pattern is created by interlacing fascicles of spindle cells (H&E, high power).

References


Additional References