Synovial Sarcoma Presenting as Posterior Tibial Tendon Dysfunction: A Report of Two Cases and Review of the Literature

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INTRODUCTION

Posterior tibial tendon dysfunction (PTTD) is a common disorder affecting the foot and ankle. In contrast, synovial sarcoma is uncommon. Because they often are slow growing, synovial sarcomas can be misdiagnosed as arthritis, bursitis, or synovitis. Synovial sarcoma also is one of the few soft-tissue tumors that can be painful. We describe two patients who had signs and symptoms similar to those of PTTD but had synovial sarcomas. They complained of pain and swelling of the medial foot and ankle. In addition, a review of the literature is presented for this unusual entity.

CASE 1

A 44-year-old, obese woman with bipolar disorder presented with a 2-year history of pain in her right foot at the dorsomedial aspect. She initially noticed a 2 mm mass in her medial arch that increased in size slightly, and she began to have soreness with pressure, standing, and wearing tight shoes. She bought larger shoes and became limited to sneakers. She complained of pain and swelling of the medial foot and ankle. In addition, a review of the literature is presented for this unusual entity.

decreased her pain. Physical examination showed mild swelling and tenderness on the dorsomedial aspect of the navicular tuberosity. Plain radiographs were negative, and magnetic resonance imaging (MRI) of the right foot (Figure 1) without contrast was performed. The radiological report stated: “The distal posterior tibial tendon shows diffuse mild internal grey signal intensity, suggestive of chronic tendinopathy, most consistent with degeneration versus small chronic partial tears.”

Neither injection of local anesthetic nor use of a short-leg walking cast for six weeks provided any pain relief. Three months after the MRI, she elected to undergo surgical intervention. With popliteal block anesthesia, a calcaneal osteotomy was made through a lateral incision. Through a second incision over the posterior tibial tendon, the tendon sheath was incised, revealing fat and hypertrophic synovium throughout the tendon sheath. This was debrided sharply and sent to pathology for cultures and evaluation. Small tears were noted in the distal aspect of the posterior tibial tendon and the tendon was reconstructed with the flexor digitorum longus tendon.

The pathology report identified a synovial sarcoma, 2 to 3 mm in diameter. The following day, the patient was referred to an orthopedic oncologist. After physical examination, complete staging studies were obtained, including three-phase bone scan, computed tomography (CT) of the chest and foot. Two months after the initial operation, the patient had wide excision of the synovial sarcoma, posterior tibial tendon, and a portion of the navicular with multiple biopsies (Figure 2). The posterior tibial artery was explored and the adductor hallucis was transferred anteriorly. The pathologic examination revealed a small focus of residual biphasic synovial sarcoma (Figure 3).

Between six and eight months postoperatively, she completed a course of radiation therapy, 5040cGy. Her
SYNVOIAL SARCOMA

Fig. 1: MRI (T1) of the right foot of a forty-four year old female with pain, swelling and flattening of the medial arch. The report indicated there was chronic tendinopathy of the posterior tibial tendon (arrow), consistent with degeneration versus small chronic partial tears (A). Adjacent cut shows the small soft-tissue mass (B) (arrow).

Fig. 2: Intraoperative photographs of the surgical incision (A), the margins of the wide excision (B), and the surgical defect (C).

postoperative course was complicated by a chronic non-healing wound of the right foot. Hyperbaric oxygen treatment decreased the wound to a 0.5 cm x 1 cm granulating wound. She also required care from a pain specialist for right foot neuropathic pain, which was markedly decreased after three right lumbar sympathetic blocks.

At 15 months after surgery, she is free of local recurrence and metastasis. Currently, she has pain over the medial navicular and cuneiform, which she describes as sharp and stabbing, 8 of 10 in severity, with occasional radiation to her ankle. She does not use pain medication. Rest helps the pain, and it is only intermittent, occurring about twice a day and lasting only a few seconds. There is numbness and tingling around her hallux and first web space, especially the plantar aspect of the medial forefoot. She continues to have weakness and a limp and is only able to walk one quarter of a block, at a time. She uses a walker at home, and supplements this with a wheelchair outdoors. Her American Orthopaedic Foot and Ankle Society (AOFAS) Clinical Rating System scores are 50 points for the ankle and 43 points for the midfoot.
**Case 2**

A 31-year-old healthy woman complained of left foot pain of five years duration. She did not recall an injury and localized the pain to the medial mid- and hindfoot. There was a quarter-size mass that was tender to touch. Over a 12-month period the mass grew noticeably, and the pain increased, causing her to limp. She saw four podiatrists over a 2-year period, and she was given multiple diagnoses that included posterior tibial tendinitis, plantar fasciitis, and enthesopathy. She received two cortisone injections, physical therapy, and orthotic devices, but her pain persisted. She was then evaluated by an orthopedic surgeon. An MRI of the foot and ankle in August, 2001, suggested early grade I tenosynovitis (Figure 4), with a small amount of fluid within the tendon sheaths of the flexor digitorum longus, flexor hallucis longus, and posterior tibial tendons. Although a soft tissue mass was seen, it was not interpreted as an abnormal growth. She was treated in a cast for six weeks without relief of her symptoms.

In September of 2001, the mass was excised and the posterior tibial tendon was reconstructed through a posteromedial approach. The mass was lobular, encapsulated, and in the region of the talonavicular joint. It was excised from the dorsomedial aspect of the foot to the plantar aspect of the talonavicular joint, deep to the flexor digitorum longus tendon and the abductor hallucis muscle.

Evaluation by the Armed Forces Institute of Pathology (AFIP) identified synovial sarcoma, and she was referred to an orthopedic oncologist. At the time of her examination, she did not complain of pain but had swelling in the arch and dorsum of the foot. Complete staging studies were obtained, including radiographs of the foot, MRI, CT scan, and three-phase bone scan.

In November of 2001, a left below-the-knee amputation was performed for residual disease in the plantar aspect of the left foot. Pathology examination identified
residual high-grade sarcoma. The patient’s postoperative course was complicated by a chronic wound with recurrent abscess. A split thickness skin graft was placed, but failed to heal. Ultimately debridement with revision of the stump allowed healing. At 18 months after revision, the patient had a healed wound, ambulates with her prosthesis, has no pain (except occasional phantom limb pain), and does not require pain medication. She is able to walk up to an hour, or three to four blocks at a time. She does not have a limp, but has difficulty negotiating hills and uneven surfaces such as gravel. The motion of her knee equals that of the contralateral limb, and she is free of metastatic disease.

DISCUSSION

"I have not seen synovial sarcoma, but has it seen me?" These words by the late Francesca Thompson, M.D. continue to ring true. They were part of her commentary on a paper presentation at the annual AOFAS meeting in 1995 that reported synovial sarcoma of the foot and ankle in seven patients. According to the AFIP, synovial sarcoma is the fourth most common soft-tissue sarcoma after malignant fibrous histiocytoma, liposarcoma, and rhabdomyosarcoma. It does not originate from synovial structures, but rather, it is a carcinosarcoma-like tumor with true epithelial differentiation. Miettinen and Virtanen suggested that the name is a misnomer that should be abandoned. In general, this tumor is found in the distal extremities and is associated with the tendon sheath, bursa, and joint capsule. Most patients are adolescents and young adults between the ages of 15 to 40 years. While the symptoms can be variable, the most frequent complaints are pain and a mass. The mass may only present with swelling, or it can be multi-lobular, firm, and well-circumscribed. In some cases, the mass may be painless for years and slow growing. Frequently, the duration of symptoms is 2 to 4 years. Moreover, synovial sarcoma can be misdiagnosed as arthritis, synovitis, or bursitis. Usually, patients do not have a history of injury to the area.

The most common location of synovial sarcoma is in the extremities near a large joint, with a propensity for the knee. In 345 AFIP cases, 60% were in the lower extremities, with 102 in the thigh-knee region, 33 in the lower leg or ankle area, and 45 in the foot. In 1999, the Cleveland Clinic Foundation reported 34 synovial sarcomas of the extremities, and of these, five were in the foot and one was in the ankle. Four of these patients were treated with amputation, and one patient died of pulmonary metastases. There are few other reports of synovial sarcoma affecting the foot and ankle. In 1988, Seale et al. published a retrospective study of seven patients with malignant soft-tissue tumors of the foot and ankle, four being synovial sarcomas. The patients were treated with intracapsular excision, marginal excision, wide excision, or radical amputation. A paper presentation of seven synovial sarcomas of the foot and ankle showed common clinical signs and symptoms of pain, tenderness, edema, and an enlarging mass. Three of the lesions were not painful or tender. The mean duration of symptoms prior to presentation was one year. Most of the patients were given a diagnosis of benign masses, such as ganglia, plantar fasciitis, synovitis, and fibroma. As a result, there was a delay in the correct diagnosis. Chou and Malawer reported 33 patients with tumors of the foot and ankle treated at one institution over a 14-year period. Of these, only four patients had synovial sarcomas and were treated with limb-sparing procedures with good functional results. None of these reports describe involvement of the posterior tibial tendon or misdiagnosis of PTDD.

While plain radiographs generally are negative, in about 15% to 20% of cases, underlying bone reaction (such as periosteal reaction, superficial bone erosion, or invasion) or multiple small radiopacities from focal calcification can be seen. MRI is the modality of choice in the evaluation of soft-tissue tumors of the foot and ankle, allowing examination of a mass in the axial, sagittal, and coronal planes. Although the image does not provide a histologic diagnosis, it shows features that allow differentiation between benign and malignant lesions. The treatment for synovial sarcoma is wide or radical excision with adjuvant radiation therapy and possibly chemotherapy. A wide excision involves complete removal of the tumor with a surrounding margin of normal tissue and maintenance of the intact pseudocapsule. With a radical excision, the entire compartment is excised, usually by amputation. The histological characteristics of synovial sarcoma are an epithelial component (similar to carcinoma) and spindle cells (fibrosarcoma appearing). The most common form of this disease is the biphasic type, with epithelial cells and fibroblast-like spindle cells present. The prognosis for 5-year survival ranges from 36% to 76%, and the 10 year survival rate is less (20% to 63%), because of late metastases. Favorable prognostic factors include age of the patient (15 years or younger), less than 5 cm in size, distal extremity involvement, and low tumor stage.

CONCLUSION

These two case reports show the difficulty in making the correct diagnosis when the signs and symptoms
are similar to those of PTTD. If a mass is present, an MRI or CT scan should be obtained to help define the size and show any calcification. Most soft-tissue masses in the foot and ankle are benign. Size and depth are the two most important factors in malignancy. If a mass is present, an MRI or CT scan should be obtained to help define the size and show any calcification. Most soft-tissue masses in the foot and ankle are benign. Size and depth are the two most important factors in malignancy. Tumors larger than 5 cm and deep to the fascia have the highest likelihood of being sarcomas, while those that are superficial and less than 5 cm are more likely benign. Synovial sarcoma exhibits a typical intermittent pain pattern that then becomes constant. Often, patients experience night pain. A painful mass in a young adult (third to fifth decades of life) that shows soft-tissue calcification should be assumed to be a synovial sarcoma unless proven otherwise, and a biopsy is warranted.

The biopsy should be done by a surgeon familiar with the diagnosis and treatment of tumors, and the pathologist should have experience in musculoskeletal pathology. If the mass is found at the time of a posterior tibial tendon procedure, a frozen section should be sent. If there is a question of malignancy, the surgical wound can be closed until the final pathology is completed. The patient should be referred to an orthopedic oncologist.

REFERENCES

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