Aggressive Surgical Excision of Recurrent Pigmented Villonodular Synovitis

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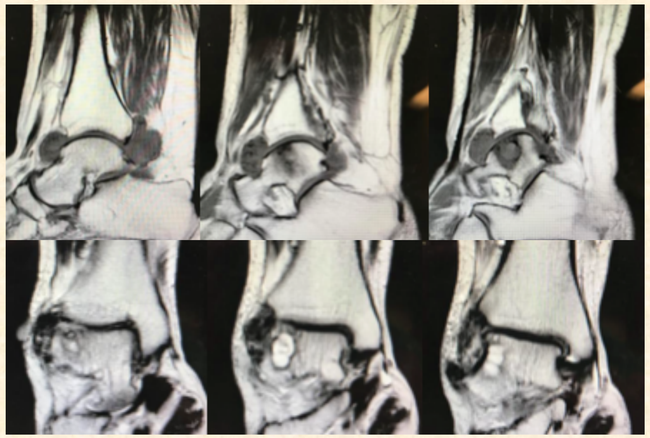
Background and Purpose

Pigmented villonodular synovitis (PVNS) is an aggressive proliferation of hypervascularized synovial tissue containing multinucleated giant cells, macrophages, and hemosiderin. Although considered benign, PVNS causes joint pain, swelling, and restricted motion. The localized form of PVNS manifests as nodules within discrete areas of synovium, while the diffuse form will infiltrate the entire synovial lining. The diffuse form is likely to cause degenerative changes as the multinucleate cells express characteristics of osteoclasts. Local synovectomy is often successful for localized forms, while diffuse PVNS may call for a more radical excision. This case study describes an aggressive surgical approach after multiple recurrences of PVNS.

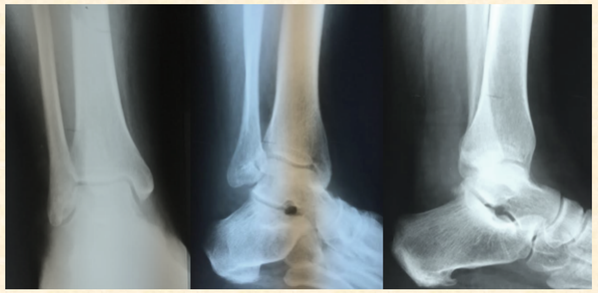
Methods & Procedure

An otherwise healthy 32-year-old female presented with worsening palpable ankle mass and associated pain. Patient had an existing diagnosis of PVNS and had undergone multiple synovectomies over a ten-year period. The most recent surgery took place five years prior and consisted of arthroscopic partial synovectomy, open repair of lateral collateral ligaments, and microfracture of a lateral talar dome lesion. Upon presentation, patient complained of a tight pulling sensation along the dorsum of the foot and anterior ankle with difficulty navigating stairs. Physical exam revealed pain and a small palpable mass along the anterolateral joint line of the right ankle. An MRI was ordered and showed a heterogenous low signal material at the anterior, posterior, and lateral aspect of the ankle joint. An associated cystic lesion was also noted at the lateral aspect of the talus extending into the talar dome. Decision was made to pursue surgery and patient underwent open synovectomy and excision of talar lesion with tibial autograft.



Procedure (continued)

General anesthesia was initiated and patient was placed in a lateral decubitus position. The right foot was exsanguinated with an Esmarch and a thigh tourniquet was inflated to 300 mmHg. A linear incision was made at the proximal aspect of the tibia just medial to the tibial crest. Dissection was carried out down the the periosteum. A 1 cm x 1 cm window was created in the cortical bone via four holes made with a 2.5 mm drill bit and an osteotome. This window was set aside on the back table in normal saline. Cancellous bone was visualized, curetted through the window, and set aside on the back table. The cortical window was then replaced. Closure of the periosteum and deep fascia was achieved with 3-0 Vicryl followed by subcutaneous and skin closure. Attention was then directed to the anterolateral aspect of the ankle joint where a linear incision was made just lateral to the extensor digitorum longus tendon. Dissection was carried out down to the ankle joint capsule. Sutures from prior repair were identified and removed. At the anterior ankle joint capsule, a brown nodular mass was visualized. The capsule was incised, the this mass was extruded in one piece. The specimen was set aside for pathology. Additional synovial resection was performed in the regions adjacent to the mass as it was noted to extend medially. The surgical site was inspected for any residual pathological tissue, which was excised. Attention was then directed posteriorly. Another linear incision was made just lateral to the Achilles tendon. The sural nerve was immediately identified and gently retracted. Further dissection was carried out until the the flexor hallucis longus (FHL) tendon was identified. At this point in time, a second mass was noted just adjacent to the FHL tendon. This lesion was noted to be more firm and pale in color. It was excised in one piece via gentle manipulation and blunt dissection and set aside for pathology. The site was inspected for any residual suspicious tissue, which was removed. Attention was directed to the anterolateral incision where the talar dome was visualized and the known anterolateral defect was identified. The area just adjacent to the articular cartilage was drilled and brown viscous material was noted on the drill bit. This region was then curetted to remove the mass from the talus entirely. The area was copiously flushed with normal saline. Next, the cancellous graft from the tibia was tamped into the talar defect so that it was immobile. Both incision sites were flushed and capsular closure was achieved with 2-0 Vircyl followed by 3-0 Vicryl for subcutaneous closure and staples for skin closure. A below knee cast was applied.



Results

Pathology of all excised soft tissue was consistent with PVNS. There was the additional finding of tophaceous gout from the anterior lesion (Figure 4). Patient was non-weight bearing for six weeks in a CAM walker boot. At 4 weeks post-op, x-rays showed consolidation of the osteochondral defect. Patient was pain-free and had full range of motion on physical exam on most recent follow up. To date, patient is 2.5 years status-post synovectomy and there has not been any evidence of recurrence.

Clinical History: Pigmented villonodular synovitis right ankle. (Location: Inpatient)

DIAGNOSIS:

A. Right ankle anterior , soft tissue mass (excision):
SYNOVIAL GIANT CELL TUMOR (PIGMENTED VILLONODULAR SYNOVITIS).
TOPHACEOUS GOUT.

B. Right ankle posterior , soft tissue mass (excision):
SYNOVIAL GIANT CELL TUMOR (PIGMENTED VILLONODULAR SYNOVITIS).

C. Right ankle , right talus bone (curettage):
BONE WITH SYNOVIAL CYST.

MICROSCOPIC DESCRIPTION:

A. Right ankle anterior, soft tissue mass: Sections show a cellular proliferation of round histiocytoid cells with abundant hemosiderin and multinucleate giant cells. There are frequent normal mitotic figures. The synovium also shows foci of amorphous deposits surrounded by numerous giant cells. Under plane polarized light classic uric acid crystals are present.

GROSS DESCRIPTION:

A. Right ankle anterior, soft tissue mass: Received in formalin are multiple rubbery, lobulated tissues, the largest measures 5.2 x 2.7 x 1.8 cm. All show nodular, gray-brown surfaces. A representative section is submitted in 1 cassette.

B. Right ankle posterior, soft tissue mass: Received in formalin is a single rubbery, tan-yellow 2.8 x 1.5 x 1.5 cm tissue. A representative section is submitted in 1 cassette.

C. Right ankle, right talus bone: Received in formalin are multiple tan-yellow, gelatinous portions of tissue with few admixed hard bone fragments aggregating 2.2 x 2.0 x 0.6 cm. The specimen is submitted in 1 cassette following short term decalcification. DP/cd

Discussion

This case study details the surgical treatment for recurrent PVNS in a patient who had undergone prior surgical intervention, including synovectomies, without adjunctive therapy. Our goal was an extensive eradication of all pathological tissue in order to restore pain-free joint function. Literature supports surgical resection as the mainstay for treatment of ankle and hindfoot PVNS. Primary fusion may be considered in cases of extensive osteoarthritis. Our patient had previously undergone synovectomy via arthroscopic approach. Arthroscopy has been reported as a successful for eradication of localized PVNS lesions of the knee, however there is a higher rate of recurrence. There are very few examples comparing arthroscopic and open synovectomy of the ankle, therefore the role of arthroscopy is limited. MRI is useful in both diagnosis and surgical planning. Additionally, MRI is effective in detecting bone lesions. Our patient did not undergo any other adjunctive therapy such as chemotherapy or radiotherapy. These modalities have been utilized and reported to be effective in patients who undergo an incomplete synovectomy or those with recurrence. However, such therapies can cause complications including skin necrosis, post-radiation fibrosis, edema, malignancy, and chronic wounds. Bickels et al reported no recurrence of PVNS in seven patients who underwent subtotal synovectomy for diffuse PVNS of the ankle joint followed by intra-articular injection of yttrium 90. All patients experienced complications afterward including chronic pain and full-thickness skin necrosis. To date, there are no randomized control trials to demonstrate benefit of radiation therapy. Our case includes the unexpected finding of tophaceous gout within the anterior specimen. Gout is known to mimic other inflammatory conditions, including PVNS. A search of the literature did not reveal any similar cases of concurrent gout and PVNS. Our case demonstrates the importance of pre-operative imaging, surgical planning and proper technique in order to prevent recurrence.

References

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