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CASE REPORT

Endoscopic resection of a localized tenosynovial giant cell tumor causing posterior ankle impingement in a 15-year-old athlete: A case report

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ABSTRACT

Tenosynovial giant cell tumor (TGCT) is a systematically benign but locally aggressive lesion arising from the synovium, tendon sheath or joint bursae. Even in athletes, soft tissue tumors may be the underlying reason or a component of posterior ankle impingement, although the most common mechanism is forceful and repetitive plantar flexion. In this article, we present a case of localized TGCT in a 15-year-old female patient presenting with symptoms of posterior ankle impingement. The preferred technique for treatment was complete local resection via posterior ankle endoscopy. The patient returned to sports at three months and no recurrence was observed on the last follow-up at the first postoperative year. Although rare, soft tissue tumors should be taken into consideration in posterior ankle impingement in athletes. Such benign soft tissue tumors in the posterior ankle can be treated safely and effectively via two-portal posterior endoscopic approach.

Keywords: Ankle, posterior ankle endoscopy, posterior ankle impingement, tenosynovial giant cell tumor.

Tenosynovial giant cell tumor (TGCT) is a systematically benign but locally aggressive lesion arising from the synovium, tendon sheath or joint bursae, which can be classified as localized or diffuse according to its localization and biologic behavior. The lesion may be both intraarticular or extraarticular local or diffuse.[1] While the diffuse form is mostly seen in the large joints such as knee, hip, foot and ankle, the localized form is usually encountered in the wrist and the digits (85% of the cases).[2] The second most common site for localized TGCT is foot and ankle (3 to 16.9%).[3] The most useful imaging technique for diagnosis and surgical planning is magnetic resonance imaging (MRI).[2]

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Posterior impingement syndrome of the ankle is a disorder presenting as a non-specific pain deep to the Achilles tendon that worsens by plantar flexion and repetitive push-off maneuvers.[4] The underlying pathology is the compression on posterior talus, posterior tibia and/or neighboring soft tissue structures -such as flexor hallucis longus (FHL) tendon, peroneal tendons, deltoid ligament and intermalleolar ligament- during plantar flexion.[5] Any space-occupying lesion may cause or increase this compression. Os trigonum, hypertrophied posterior talar process or post-traumatic calcifications are well-known lesions to cause posterior ankle impingement.[6] In our case, a

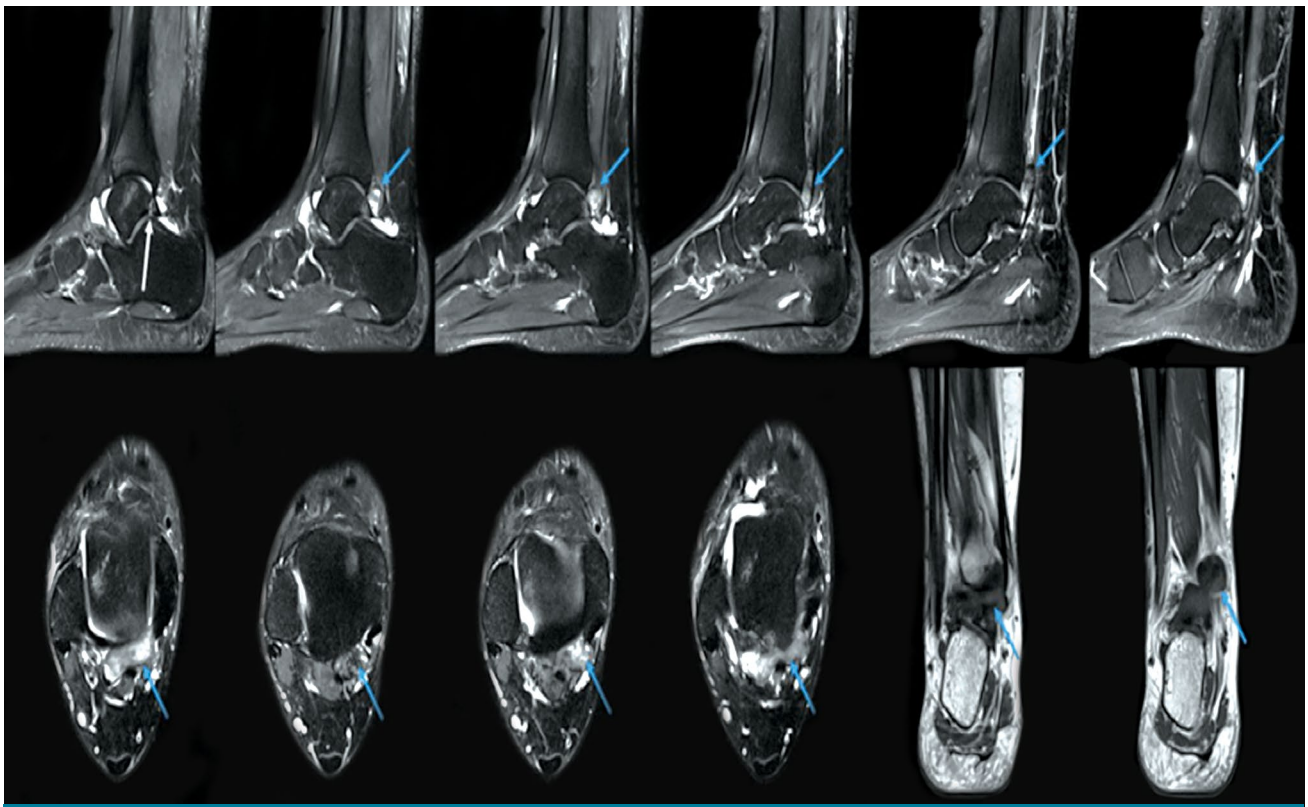

FIGURE 1. Magnetic resonance images showing os trigonum (white arrow) and soft tissue lesion (blue arrows) in posterior ankle.

neoplastic soft tissue mass (TGCT) which is rarely seen in posterior ankle and cause posterior ankle impingement was a contributing lesion for posterior ankle impingement.[7]

CASE REPORT

A 15-year-old female youth league basketball player had a history of one year of right ankle pain and recurrent swellings without any obvious trauma other than sports practice. She had had many physiotherapy sessions with almost no benefit. Physical examination revealed swelling on the posterior ankle with painful palpation with a positive posterior impingement test. Range of motion was full -although plantar flexion was painful- and neurovascular examination normal.

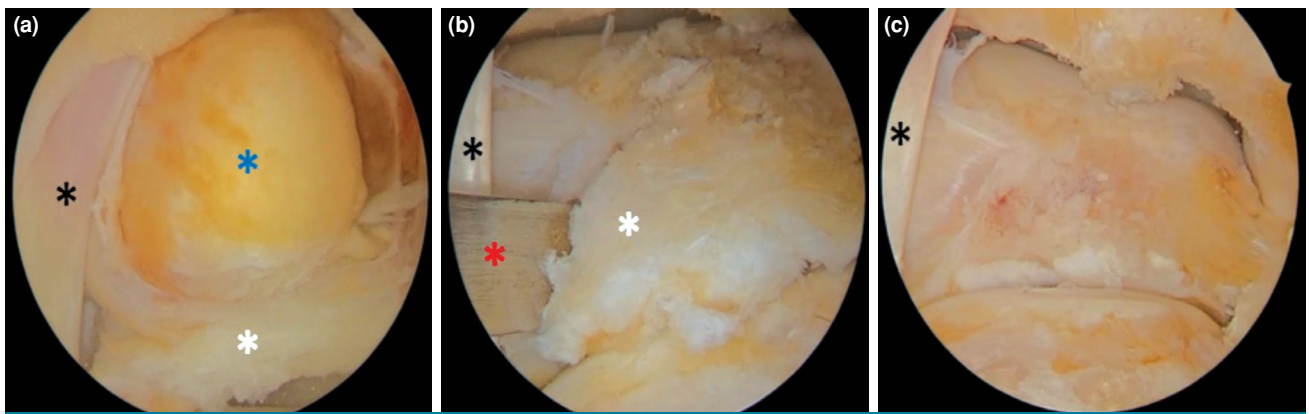

FIGURE 2. (a) Arthroscopic view of tumor (blue asterisk), os trigonum (white asterisk), and flexor hallucis longus tendon (black asterisk). **(b)** Separation of os trigonum with a tissue separator (red asterisk). **(c)** After complete resection and synovectomy.

FIGURE 3. Macroscopic view of resected soft tissue tumor.

Patient's complaint of recurrent swellings, inefficiency of prolonged physical therapy, and the physical examination finding of swelling on the posterior ankle were findings that are not expected in posterior ankle impingement caused by only repetitive trauma, overuse or os trigonum. A written informed consent was obtained from the legal guardian of the patient.

The MRI revealed os trigonum posterior to talus and a soft tissue mass of benign appearance with the size of 21×25×8 mm, with clear margins and no signs of invasion or extension to neighboring tissues with mild contrast signal (Figure 1). Endoscopic benign soft tissue tumor excisional biopsy was planned.

The surgical procedure was performed under general anesthesia in prone position. The right lower extremity was prepped and dressed sterile; a pneumatic tourniquet of 250 mmHg pressure was applied to the thigh. Hindfoot endoscopy was performed via posterolateral and posteromedial portals. Diffuse bursitis was observed in the precalcaneal region. Once the inflamed pre-Achilles bursa was debrided with shaver and radiofrequency device, os trigonum and a tan-reddish colored soft tissue lesion sized 3×2.5 cm located just medially to FHL tendon was noticed. Both os trigonum and the soft tissue mass were irritating and impinging on FHL tendon (Figure 2a). The soft tissue mass was carefully detached from surrounding adhesions and punch biopsy materials were taken from the lesion. The materials were sent for histopathologic examination (Figure 3). The remaining soft tissue lesion was then completely removed with shaver and punch until no macroscopic residual tissue was left. Under radiographic guidance with the C-arm, a narrow tissue separator was inserted into the endoscopy area. The mobile and unstable os trigonum was released and resected out of the posterior ankle (Figure 2b and Figure 4). Tenosynovectomy of the degenerated and inflamed FHL tendon was performed with shaver and radiofrequency device (Figure 2c). The endoscopy was ended with closure of the portals and sterile dressing. Elastic bandage was applied to the ankle, no complications were encountered, and the patient was discharged on the same day of surgery.

Early range of motion exercises and proprioceptive physiotherapy with partial weight bearing with a pair of Canadian crutches were initiated at the third postoperative day. The histopathologic examination revealed the lesion to be a TGTC. The patient returned to basketball at the third postoperative month. She had no complaints on the last follow-up at the first

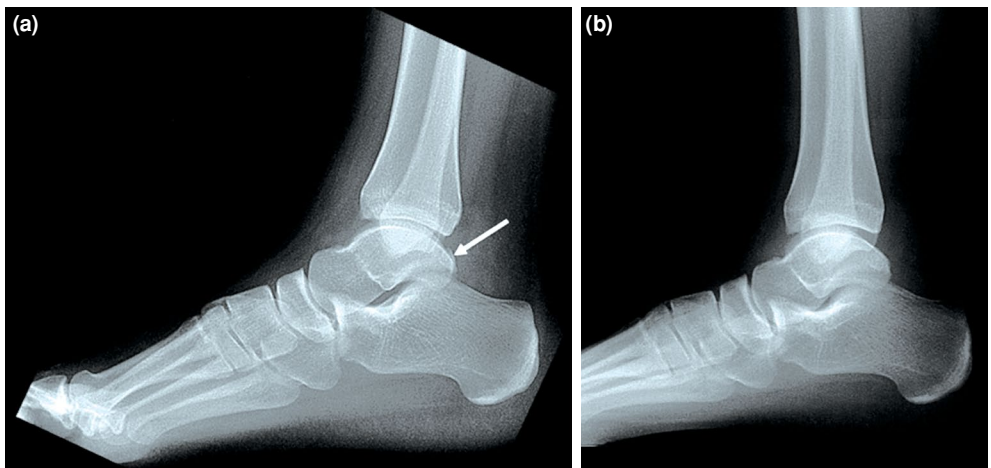

FIGURE 4. (a) Preoperative lateral X-ray showing os trigonum (white arrow) and **(b)** postoperative lateral X-ray.

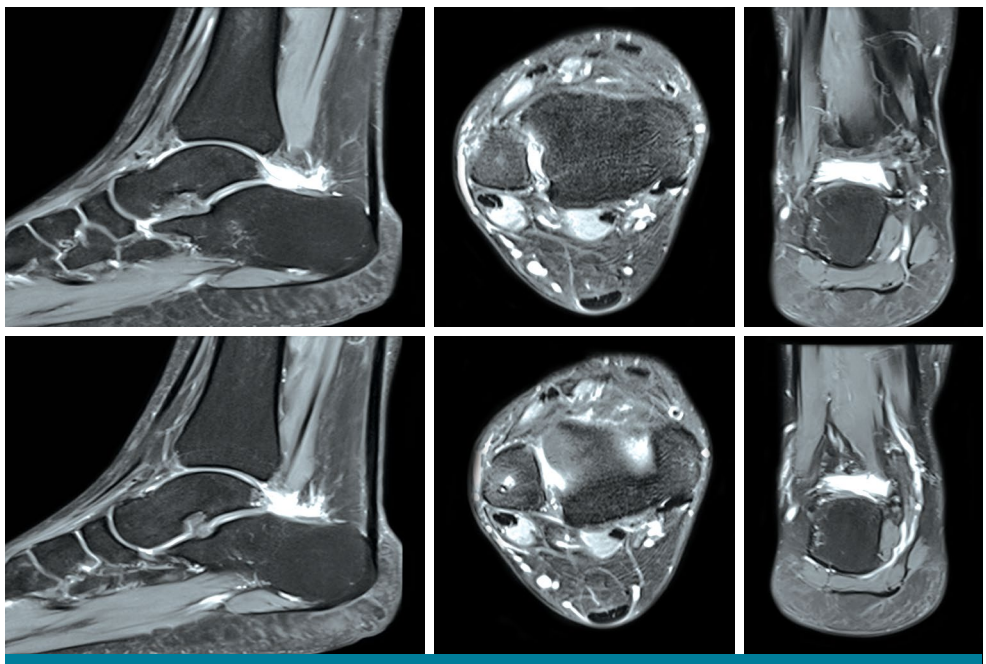

FIGURE 5. Magnetic resonance images taken at first postoperative year.

postoperative year, and MRI revealed no recurrence of the tumor (Figure 5).

DISCUSSION

Tenosynovial giant cell tumor is a benign lesion originating from tendon sheaths, synovium or bursae. It is usually seen in the hand and wrist, rarely (3 to 16.9%) in the foot and ankle.[4,,8,9] Although the disease can be seen at any age, typical age of presentation is the third to fifth decades and 91% of the cases of foot and ankle are located anteriorly.[10,11] Our case is a 15-year-old female athlete with a TGCT in the posterior ankle, presenting with an unusual age and tumor location.

Although the recommended treatment for the diffuse and locally invasive types of the disease is open synovectomy[12] and macroscopically incomplete resection is reported to be associated with a higher risk of local recurrence and inferior functional outcomes,[13] arthroscopic/endoscopic synovectomy and resection are reported to be appropriate for localized and locally non-invasive lesions that are accessible via arthroscopy/endoscopy with a very low rates of recurrence.[14-16]

Posterior ankle impingement is a pathology arising from the abnormal compression on bony and/or soft tissue structures in the posterior ankle.[5] Several space-occupying bony and posttraumatic calcific lesions have been emphasized to cause or increase the abnormal compression, but we were not able to find any evidence or report in the literature about TGTC to contribute to or present with symptoms of posterior ankle impingement. The present case or case series reports of TGTC in foot and ankle include cases presenting with a palpable and locally painful mass treated via open surgery.[17,18] Stieda process (elongated protuberance of talus), pathological os trigonum, osteophytes, osteochondral lesions, loose bodies, synovial chondromatosis, subtalar coalition, FHL tenosynovitis, synovitis, impingement of the joint capsule, and impingement of the anomalous muscles together with repetitive or forceful plantar flexion have been described as possible underlying pathologies of posterior ankle impingement in athletes.[19] In our case, an unexpected neoplastic soft tissue mass (TGCT) was contributing to the impingement because of its size and location.

Van Dijk described the two-portal approach for posterior ankle.[20] This technique has been used successfully to visualize and treat pathologies involving posterior ankle.[21,22] In the case presented, we utilized this approach to treat a TGCT lesion safely and effectively, that was a component of posterior ankle impingement.

The potential advantages of endoscopic resection include small wounds, better cosmetic results, less

scar formation, minimal soft-tissue dissection, and the possibility of very early rehabilitation. Potential risks are residual tumor and/or recurrence along with general complications associated with posterior ankle endoscopy.

In conclusion, even in athletes, soft tissue tumors may be the underlying reason or a component of posterior ankle impingement, although the most common mechanism is forceful and repetitive plantar flexion. Such benign soft tissue tumors in the posterior ankle can be treated safely and effectively via two-portal posterior endoscopic approach.

Declaration of conflicting interests

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