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Recurrence of a Benign Tumor: The Challenge of a Knee Intra-articular Schwannoma – A Case Report

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Learning Point of the Article:

Schwannoma should be considered a potential differential diagnosis for tumors originating in Hoffa's fat pad. Although recurrence is uncommon in benign tumors, it remains a possibility in patients previously diagnosed with schwannoma.

Abstract

Introduction: Recurrent intra-articular knee schwannoma is an extremely rare occurrence of an already rare tumor, with no previously documented cases in the literature.

Case Report: We present the case of a 42-year-old female from South India who underwent surgical excision for a recurrent Hoffa fat pad (HFP) schwannoma 20 years following the initial excision. Clinical examination revealed a long-standing painless swelling that had gradually increased in size over a decade, with the recent onset of pain. Magnetic resonance imaging demonstrated a multilobulated lesion within the HFP. Histopathological examination and immunohistochemical analysis confirmed the diagnosis of a schwannoma. Complete excision via the medial parapatellar approach resulted in relief of symptoms with no evidence of re-recurrence at 3-year follow-up.

Conclusion: This case highlights the importance of considering schwannoma as a potential differential diagnosis for HFP tumors and recognizing the possibility of recurrence, thereby facilitating timely diagnosis and effective management.

Keywords: Schwannoma, Hoffa's fat pad tumor, intra-articular knee tumors, Schwannoma recurrence.

Introduction

The infrapatellar fat pad, also known as Hoffa's fat pad (HFP), first described by Hoffa [1], is an intracapsular but extra-synovial structure in the knee that plays several roles in knee joint function and pathology. It is a richly innervated structure receiving branches of the femoral, common peroneal, and saphenous nerves [2]. It is commonly injured, and the pathology of the fat pad is a common cause of anterior knee pain [3].

Apart from trauma and inflammation of the HFP, various intrinsic and extrinsic tumors or tumor-like lesions affecting the HFP have also been reported in the literature [4,5]. Tumors of the HFP can be classified as diffuse or solitary. In addition to the more common lesions of the HFP, such as pigmented villonodular synovitis, hemangioma, and ganglion cysts [5,6], rare lesions, like schwannomas, have also been reported in the literature [7].

A schwannoma, also known as a neurilemmoma or neurinoma, is a rare, usually encapsulated tumor of the peripheral nerve sheaths, composed of well-differentiated Schwann cells [8]. These tumors are typically benign; however, malignant transformation has been reported in the literature, particularly following radiation therapy [9]. Schwannomas of the peripheral nerve can be asymptomatic or usually present with a painful swelling associated with hypersensitivity or paresthesia in the

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Author's Photo Gallery

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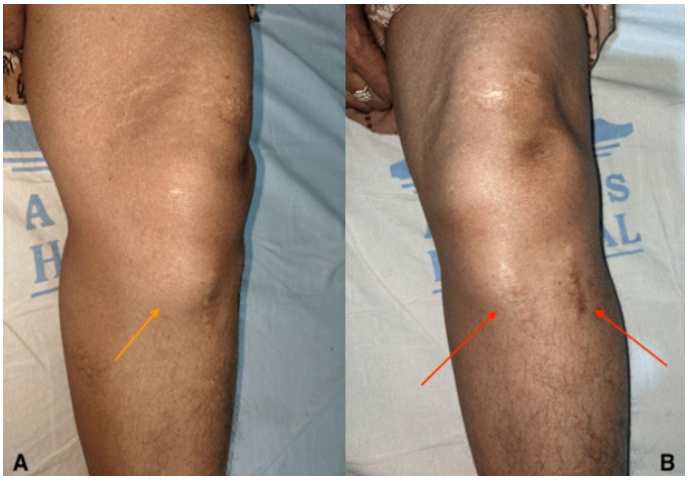

Figure 1: Pre-operative clinical picture of the swelling. Clinical picture showing the (a) Site of the swelling and (b) Scar marks from the previous surgery.

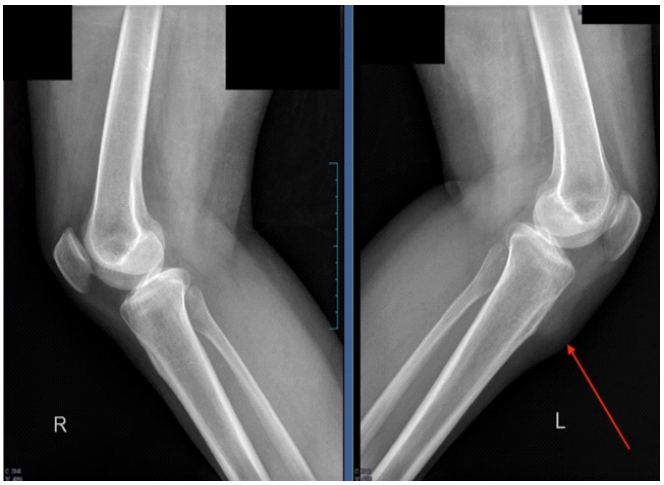

Figure 2: Pre-operative X-rays of the bilateral knee in lateral view. X-rays of the bilateral knees in lateral view showing soft tissue shadow (red arrow) on the left side.

affected area. Magnetic resonance imaging (MRI) helps distinguish a mass arising from a peripheral nerve or soft tissue. Histological examination reveals Antoni regions A and B, which are two distinct areas characterized by high and low cellularity, respectively. Immunohistochemical (IHC) studies demonstrate strong reactivity of schwannomas for S-100 protein [10].

Here, we present the case of a 42-year-old female who underwent surgical excision for recurrence of an HFP schwannoma, 20 years after the initial excision. Although cases of schwannoma of the HFP have been reported in the literature [8, 7, 11], this is the first reported case of local recurrence at this site, to the best of our knowledge.

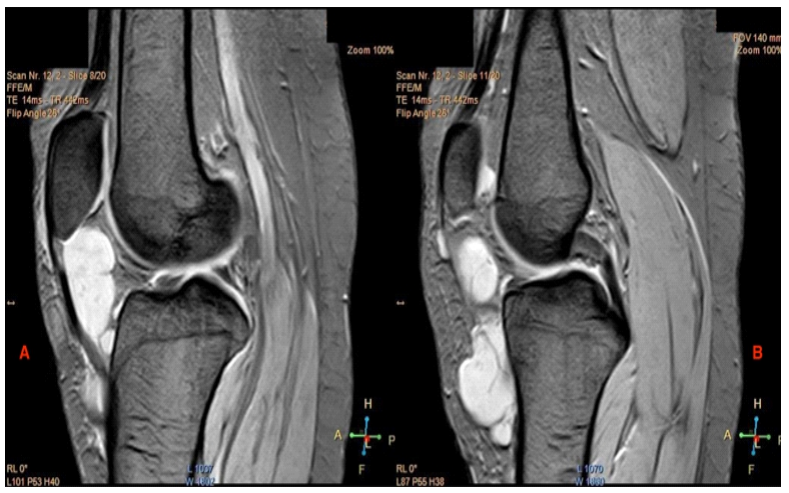

Figure 3: Magnetic resonance imaging of the knee (sagittal) showing the lesion. A T2-weighted proton density fat-saturated image of the left knee reveals a distinct, well-circumscribed juxta-articular multilobulated lesion within the infrapatellar fat pad, measuring approximately 6.7 × 5.5 × 2.5 cm (a), extending inferiorly to the pretibial fat (b).

Case Report

A 42-year-old female from South India, with no known comorbidities, presented to our outpatient department 3 years ago with complaints of a swelling over the anterior aspect of the left knee for the past 10 years, associated with pain in the same region for the past 6 months. The size of the swelling had gradually increased over a period of 10 years to attain its current size. There was no difficulty in performing day-to-day activities until the last 6 months, when she started experiencing anterior knee pain, which was insidious in onset and progressive in nature, along with a localized tingling sensation. Her symptoms aggravated with activity and were relieved with rest. She was mobilizing independently. There was no history of prior trauma.

On further evaluation of her history, it was noted that she had experienced similar complaints of swelling and pain over the left knee 20 years earlier, for which she had undergone surgical excision of the swelling at that time. Following the excision, there was complete resolution of symptoms for 10 years. Upon reviewing her previous histopathological reports, the primary lesion was identified as a schwannoma.

On clinical examination, there was a swelling over the anteromedial aspect of the left proximal tibia measuring 4 × 3 × 2 cm in size, with the proximal end of the swelling overlying the medial joint line. The swelling was round to oval in shape (Fig. 1a). There was no local warmth. The swelling was diffusely tender, soft in consistency, non-fluctuant, with a smooth surface, and normal overlying skin. There were two healed vertical scar marks present over the proximal tibia, each measuring approximately 4 cm, one over the swelling

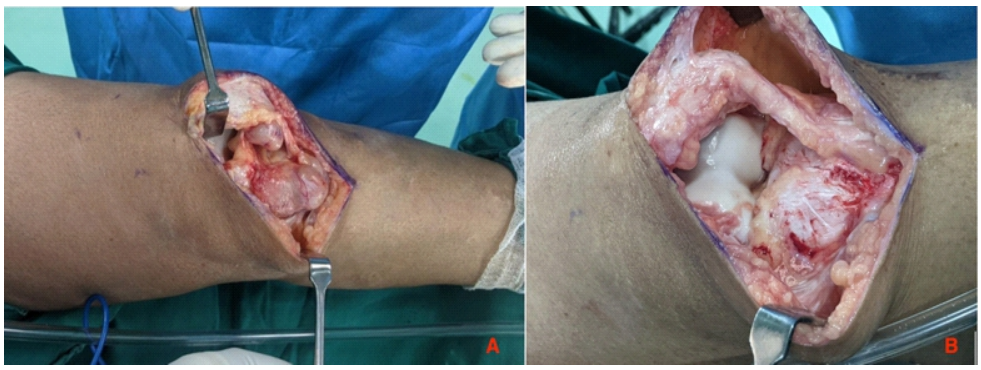

Figure 4: Intra-operative image showing the lesion before and after the excision. Intra-operative images showing a multilobulated encapsulated lesion in the Hoffa's fat pad region (a) and an image following excision of the tumor (b).

and the other about 3 cm lateral to it (Fig. 1b). The patient also had a limited extension of the knee joint. The Tinel's sign was negative, and the remaining neurovascular examination was normal.

Plain radiographs of both knees showed the soft tissue shadow in the region of the tibial tuberosity on the left side (lateral view) with an otherwise normal knee joint (Fig. 2). An MRI of the left knee was performed, which demonstrated a well-circumscribed, juxta-articular multilobulated lesion in the infrapatellar fat pad measuring about 6.7 × 5.5 × 2.5 cm, extending inferiorly into the pretibial fat (Fig. 3a and b).

Fine-needle aspiration cytology of the lump revealed spindle cells embedded in the mesenchymal matrix with elongated hyperchromatic nuclei, suggesting a spindle cell lesion.

The patient was planned for surgical excision. Under spinal anesthesia, a midline incision of approximately 10 cm was made, and a medial parapatellar arthrotomy was performed. A multiloculated soft tissue lesion measuring 6 × 4 × 1.5 cm was found arising from the HFP beneath the patellar tendon, which was excised completely. The swelling was solitary, well-defined, and encapsulated, and grayish-yellow in color (Fig. 4). Minor wear of the medial femoral articular cartilage was noted. The anterior horns of the medial and lateral menisci were found to be normal and stable. The specimen was sent for histopathological examination and IHC analysis.

Standard post-operative protocol for analgesics and antibiotics was followed. The patient was mobilized on post-operative day 1 with full weight bearing, and physiotherapy was initiated. For osteoarthritis, she was started on non-operative management with lifestyle modification and quadriceps strengthening exercises. She was discharged on post-operative day 3.

On the cut surface of the specimen, the lesion was gray-white, trabeculated, and contained myxoid areas with intervening hemorrhagic space, giving it a firm to fibrous appearance. Histological examination revealed a cellular spindle cell lesion with hyper- and hypocellular areas. The spindle cells had eosinophilic fibrillary cytoplasm and elongate ovoid nuclei. These cells were arranged in intersecting fascicles and whorls. In the hypocellular areas, the cells were loosely arranged within an edematous stroma. Marked nuclear atypia was noted without evidence of mitoses or necrosis (Fig. 5a).

These findings suggested a spindle cell neoplasm, and IHC was performed. IHC showed strong positivity for S-100 protein, while epithelial membrane antigen was focally and weakly positive, and the Ki-67 proliferation index was 2-3%. The final diagnosis was spindle cell neoplasm consistent with

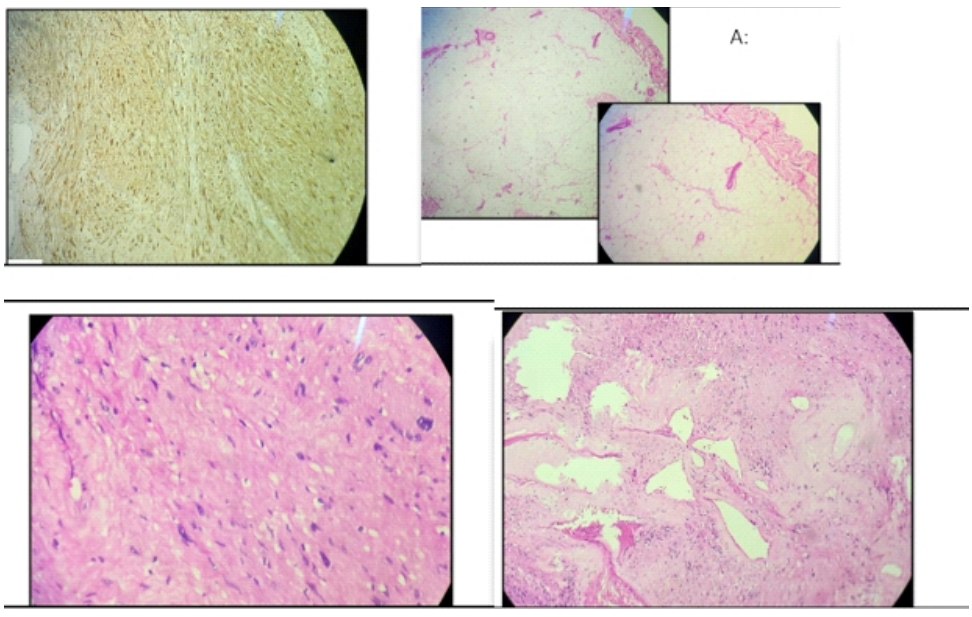

Figure 5: Histopathological image of the excised lesion. A photomicrograph stained with Hematoxylin and Eosin (H&E) shows a cellular spindle cell lesion with varying degrees of cell density (a). The spindle cells demonstrated eosinophilic fibrillary cytoplasm and elongated ovoid nuclei, arranged in intersecting fascicles and whorls (magnification, ×200). Immunohistochemical staining revealed that the tumor cells were strongly positive for S-100 protein (b) (magnification, ×200).

schwannoma with degenerative changes (Fig. 5b).

At the 3-year follow-up, the patient reports symptoms only after prolonged standing or excessive walking. On clinical examination, there is no evidence of recurrence.

Discussion

Schwannoma, also known as neurilemmoma, is a benign encapsulated soft tissue tumor classified under the group of peripheral nerve sheath tumors [12]. It usually occurs in the fourth and fifth decades of life and affects men and women equally [13].

These tumors are often asymptomatic and are usually discovered incidentally owing to their slow growth. Apart from the long-standing swelling, patients may present with pain, paresthesia, and a tingling sensation, which may suggest an unfavorable postoperative outcome [10]. A Tinel's sign along the course of the nerve is present in 4–76% of patients [10]. These symptoms develop when eccentrically placed lesions become large enough to compress the nerve.

Schwannomas can occur anywhere in the body and represent about 5% of all benign soft-tissue neoplasms [13]. To the best of the author's knowledge, only two cases of intra-articular knee schwannomas have been reported in the literature, of which one was reported to originate from HFP. Recurrence of the Schwannoma itself is rare (<1%) [13]. To the best of the author's knowledge, this is the first reported case of intra-articular recurrence of a schwannoma arising from the HFP.

The HFP is a richly innervated structure, receiving branches of the femoral, common peroneal, and saphenous nerves [2]. Since the tumor was located within the HFP, it is possible that it originated from one of these nerves. However, the exact nerve of origin or the specific branch could not be identified.

The principle of treatment for schwannomas involves complete surgical excision of the tumor through an open approach. Due to the encapsulating nature of schwannomas, en bloc excision is usually achievable. Careful dissection is essential to preserve the function of the involved nerve [14]. Because of the extra-synovial nature of HFP, open arthrotomy with complete excision is the recommended treatment for both cystic and solid tumors involving the HFP, as arthroscopic resection may not allow complete removal of the lesion [3]. In the present case, the patient underwent open arthrotomy and excision to achieve complete resection.

Conclusion

In summary, this case is a significant contribution to the literature as it is the first reported case of a recurrent intra-articular schwannoma involving the HFP. Given the scarcity of documented cases at this site, our findings emphasize the importance of considering schwannoma as a potential differential diagnosis for tumors originating in the HFP. Our contribution will facilitate early recognition, accurate diagnosis, and effective management of schwannomas in this anatomical location, ultimately improving patient outcomes and guiding future research endeavors in this area.

Clinical Message

Schwannoma, although rare, should be considered as a differential diagnosis for lesions arising from HFP, especially in patients presenting with long-standing swelling with recent onset of pain or neurological symptoms. Despite its benign nature, schwannoma can rarely recur even after complete excision, sometimes after a prolonged interval. A thorough clinical evaluation, supported by MRI and histopathological confirmation, is essential for accurate diagnosis. Complete surgical excision with meticulous dissection remains the treatment of choice to minimize recurrence and preserve function.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

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