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General Surgery

POSTERIOR KNEE MASS PRESENTING AS BENIGN SPINDLE CELL TUMOUR: A CASE OF DEEP-SEATED FIBROMATOSIS

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ABSTRACT Fibromatosis is a rare, histologically benign soft tissue tumor that tends to be locally invasive and has a high risk of recurrence. We report the case of a middle-aged female who presented with a progressively enlarging, painless swelling in the posterior aspect of the right knee for two years. MRI suggested a benign spindle cell lesion, and FNAC findings supported this. Surgical excision was performed, and histopathological examination confirmed the diagnosis of desmoid-type fibromatosis. Postoperatively, the patient developed right foot drop due to nerve involvement during tumor dissection and later developed a surgical site infection. This case highlights the diagnostic difficulty posed by such tumors due to their ability to mimic vascular lesions radiologically and underscores the importance of histological evaluation for accurate diagnosis. Early surgical intervention and long-term follow-up are essential due to the tumor's infiltrative nature and recurrence risk.

KEYWORDS : Desmoid Tumor, Fibromatosis, Popliteal Fossa, Spindle Cell Tumor

INTRODUCTION

Desmoid tumors, also referred to as aggressive fibromatosis, are rare fibroblastic neoplasms arising from musculoaponeurotic or fascial structures. Although histologically benign, they exhibit locally invasive behavior and a high propensity for recurrence after resection. First described by Müller, these tumors are most commonly located in the abdominal wall but can occur in various extra-abdominal sites, including the head and neck, chest wall, back, and extremities [1,2]. Extremity desmoid tumors are particularly uncommon.

A known association exists between desmoid tumors and familial syndromes such as Gardner's syndrome [3]. While the tumors are more frequently diagnosed in adolescent females—suggesting a hormonal influence—they may also present in infants and elderly individuals [4]. Despite their non-malignant histology, these tumors can grow rapidly and infiltrate surrounding structures. Even after apparent R0 resection, recurrence rates remain high [5]. Due to their rarity and overlapping features with vascular and soft tissue neoplasms on imaging, histopathological evaluation is essential for definitive diagnosis and appropriate management.

Case

A middle-aged female presented with a progressively increasing swelling over the posterior aspect of her right knee for the past two years. She reported that the swelling began as a small, painless lump, which gradually increased in size over time to approximately 4 × 4 cm by the time of presentation, as estimated by the patient's hand gestures. There was no associated pain, redness, discharge, or warmth over the swelling. The overlying skin was normal in appearance. She denied any history of trauma, systemic symptoms such as fever or weight loss, or the presence of similar swellings elsewhere in the body. The patient had no significant past medical, surgical, or drug history, and no known allergies. Her personal habits were unremarkable, and there was no family history of similar complaints or hereditary syndromes.

On physical examination, a firm, non-tender, non-pulsatile mass was palpable in the right popliteal fossa. It was fixed to deeper structures but not to the overlying skin. Distal neurovascular status of the limb was intact, with no signs of vascular compression or neurological deficit preoperatively. There were no signs suggestive of systemic illness.

Investigations

MRI of the right knee revealed a well-defined, predominantly T1-isointense and T2-heterogeneous soft tissue mass situated within the intramuscular and subcutaneous planes of the posterior knee The lesion showed moderate post-contrast enhancement and lacked internal calcifications or hemorrhagic components. These findings suggested a benign neoplastic process, but a definitive diagnosis was not possible based on imaging alone. [Figure 1a and b]

Fine needle aspiration cytology (FNAC) of the lesion was performed, which suggested a benign spindle cell tumor. To arrive at a definitive diagnosis and manage the mass appropriately, surgical excision was planned. Preoperative blood investigations and anesthetic fitness assessment were completed without any abnormal findings.

Differential Diagnosis

Given the clinical and radiological presentation of a well-defined soft tissue mass in the popliteal fossa, several differential diagnoses were considered:

1. Vascular tumors or malformations: Popliteal masses are often suspected to be vascular in nature due to their anatomical location and soft tissue characteristics. MRI may mimic features of vascular tumors (e.g., hemangioma or arteriovenous malformation), especially when there is high T2 signal intensity. However, the lack of flow voids, pulsatility, and vascular channels made this less likely.
2. Lipoma or liposarcoma: Soft, slow-growing subcutaneous masses can be either benign (lipoma) or malignant (liposarcoma). The absence of fat signal intensity on MRI and the firm, infiltrative nature of the lesion on clinical examination made this diagnosis unlikely.
3. Neurogenic tumors (Schwannoma or Neurofibroma): These tumors can occur along peripheral nerves and present as firm, well-defined masses. However, the lesion did not demonstrate any nerve-related symptoms such as Tinel's sign, nor did imaging show typical characteristics like a target sign or nerve entry/exit.
4. Synovial sarcoma or soft tissue sarcoma: These are aggressive neoplasms that can appear similar to fibromatosis on imaging and present with non-specific symptoms. However, the relatively slow growth and absence of constitutional symptoms, pain, or bone involvement made this less probable.
5. Desmoid-type fibromatosis: This was ultimately confirmed as the diagnosis. These tumors are rare, benign but locally aggressive fibroblastic neoplasms arising from musculoaponeurotic structures. They often mimic vascular or soft tissue tumors on imaging and are notorious for recurrence and deep tissue infiltration. The MRI findings, absence of systemic symptoms, and FNAC favoring a spindle cell lesion aligned with this diagnosis.

Treatment

The patient underwent surgical excision of the tumor under spinal

anesthesia. Intraoperatively, the mass was found to be approximately 10 × 8 cm in size, located deep within the right popliteal fossa, and was densely adherent to the surrounding muscle structures including the gastrocnemius and peroneus brevis, as well as underlying bone and adjacent neurovascular structures. [Figure 1c]

A vertical incision was made over the mass, and meticulous dissection was performed to separate the lesion from the involved tissues. Complete excision of the tumor was achieved, although the margins were close to critical structures. Hemostasis was secured, and the wound was closed in layers. The excised mass was sent for histopathological examination.

Outcome and Follow-up

Postoperatively, the patient developed a right foot drop, with a decrease in motor power from 5/5 preoperatively to 3/5 in the immediate postoperative period. A physical medicine and rehabilitation (PMR) consultation was obtained, and a rehabilitation protocol was initiated, and the foot drop showed partial improvement.

Histopathological examination revealed a diagnosis of desmoid-type fibromatosis (aggressive fibromatosis). The tumor showed dense collagenous stroma interspersed with uniform spindle-shaped cells without atypia, mitosis, or necrosis.

She was discharged with advice for regular physiotherapy, wound care, and close follow-up in the outpatient clinic. Given the known high recurrence rate of desmoid tumors, especially in cases with close or positive surgical margins, long-term surveillance was advised, with clinical and radiological evaluations at regular intervals.

DISCUSSION

Desmoid tumors comprise approximately 3% of all soft-tissue neoplasms, with an incidence of three to four cases per million population [6]. While most frequently found in the abdominal wall or intra-abdominal locations involving the bowel and mesentery [7], they can occasionally appear at extra-abdominal sites like the shoulder, trunk, inguinal region, and neck. Tumors arising in the popliteal fossa are extremely rare, with only a few documented cases in the literature [7,8].

The exact pathogenesis of desmoid tumors remains unclear. Identified risk factors include female sex, hormonal influence-especially during pregnancy-and potential genetic predispositions such as mutations in the CTNNB1 gene that encodes β-catenin [4,9]. A substantial number of cases are sporadic, and as in the present case, many occur without identifiable risk factors.

Desmoid tumors are frequently misdiagnosed. McKinnon et al. reported that only 50% of cases were accurately diagnosed before surgery [10]. Radiologically, they can resemble vascular tumors, as noted in previous reports, including a case described by Kaygin et al. where a popliteal fossa desmoid was mistaken for a vascular lesion on MRI [7]. In our case, too, the MRI findings suggested a vascular malformation, while the clinical examination revealed a non-pulsatile, firm mass. Histopathological examination ultimately revealed a benign spindle cell tumor consistent with fibromatosis.

Grossly, these tumors appear as firm, rubbery, gray-white, non-encapsulated masses with infiltrative margins. Microscopically, they are composed of uniform spindle cells embedded in a dense collagenous stroma, with no mitoses, pleomorphism, or necrosis. Immunohistochemical staining typically shows nuclear positivity for β-catenin.

There is no universal consensus on optimal treatment. Complete surgical excision remains the cornerstone of therapy; however, recurrence is common, especially following subtotal resection [5]. In cases where complete excision is not feasible or recurrence occurs, adjunctive treatments such as radiotherapy, hormonal therapy, NSAIDs, or chemotherapy may be considered.

This case adds to the limited literature on popliteal desmoid tumors and emphasizes the importance of including desmoid fibromatosis in the differential diagnosis of deep-seated extremity masses, particularly when imaging is inconclusive. Early recognition and prompt histopathological diagnosis are key to achieving better outcomes.

CONCLUSION

Desmoid-type fibromatosis is a rare, benign but locally aggressive tumor that poses a significant diagnostic and therapeutic challenge, especially when it arises in atypical locations such as the popliteal fossa. Its clinical presentation can mimic more common entities like vascular tumors or soft tissue sarcomas, making preoperative diagnosis difficult. Histopathological examination remains the gold standard for diagnosis. Complete surgical excision remains the mainstay of treatment, but recurrence is common, particularly when critical structures limit the extent of resection. Multidisciplinary follow-up with physical rehabilitation is essential, especially in cases with postoperative complications such as nerve injury. Clinicians should maintain a high index of suspicion for desmoid tumors in patients presenting with firm, non-tender extremity masses, even in the absence of classic risk factors.

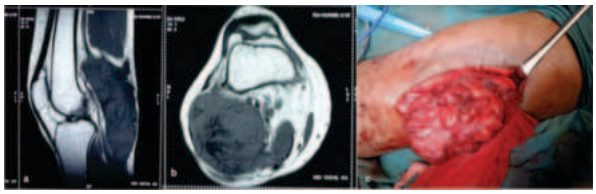

Figure 1: Imaging and intraoperative appearance of the posterior knee mass.
(a) Sagittal MRI of the right knee showing a well-defined, heterogeneous soft tissue mass in the posterior compartment. (b) Axial MRI of the right knee demonstrating the mass encasing the adjacent muscular planes, suggestive of a benign spindle cell lesion. (c) Intraoperative photograph revealing the deep-seated mass in the popliteal fossa after surgical exposure, showing its firm, lobulated appearance adherent to surrounding structures.

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