Case Report

An extremely rare case of a glomus tumor in the popliteal fossa

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ABSTRACT

Glomus tumors are the benign perivascular tumors that typically present with hypersensitivity to cold, paroxysmal severe pain, and pinpoint tenderness. This tumor is usually subungual lesions and accounts for 1.6% of all soft-tissue tumors. However, extradigital glomus tumors are extremely rare and can be difficult to diagnose, as they typically have a diameter of less than about 1 cm. We report a glomus tumor in the popliteal fossa of a 17-year-old male patient who experienced severe posterior knee pain while playing sports. A physical examination did not reveal a mass, although a glomus tumor was identified in the popliteal fossa using magnetic resonance imaging. We successfully performed open excision to remove the tumor, and the patient achieved a restored postoperative gait and could perform sports activities with no pain. These tumors are extremely rare in the knee area, and typically have a diameter of less than about 1 cm, which can complicate their diagnosis and treatment, despite the presence of severe pain. Therefore, we recommend that clinicians be aware of extradigital glomus tumors, as careful imaging can facilitate an early diagnosis and treatment.

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1. Introduction

Glomus tumors are the benign neoplasms that are a form of arteriovenous anastomoses, which arise from the neuromyoarterial glomus.¹ These neoplasms are rare, typically arise as subungual lesions, and account for 1.6% of all soft-tissue tumors in the extremities.² Glomus tumors typically have a diameter of less than about 1 cm, and present with a classic triad of hypersensitivity to cold, paroxysmal severe pain, and pinpoint tenderness.^{3,4} Unfortunately, their small size often leads to a delay between the presentation and the diagnosis and treatment, despite severe pain and negative effects on the patient's activities of daily living.⁵ Furthermore, cases of extradigital glomus tumors are often misdiagnosed, owing to their small size and unusual location. Therefore, we report an unusual case of a glomus tumor in the

popliteal fossa of a patient who presented with severe posterior knee pain.

2. Case report

A 17-year-old male patient reported experiencing severe pain in his left popliteal fossa for 3 years, and visited a nearby doctor owing to difficulty in walking. No definite diagnosis was reached, although potential diagnoses included a meniscus injury, medial plica syndrome, or saphenous neuritis after magnetic resonance imaging (MRI). He was subsequently referred to our institution, and we detected a neoplastic lesion in his left popliteal fossa. A physical examination revealed an altered gait and a decreased range of motion in the left knee, as well as severe pain during extension of the left leg. The flexion angle was about 90° and the extension angle was about −30°. The Numerical Rating Scale (NRS) score was 8. There was pronounced tenderness that localized to the left popliteal fossa, although we could not identify a mass. Therefore, we performed MRI, which revealed a 5-mm circumscribed mass in the popliteal fossa (Fig. 1). The lesion exhibited an isointense-to-low-intensity T1-weighted signal and a high-intensity T2-weighted signal.

As the mass corresponded to the site of the patient's pain, we planned open surgical excision. The gross appearance of the lesion

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Fig. 1. The lesion exhibited a high-intensity T2-weighted signal.

was a 5-mm well-circumscribed bluish-red nodule (Fig. 2). The nuclei were moderately enlarged, although we did not observe pleomorphism, and the end of the excised tumor was negative for tumor cells (Fig. 3). Immunohistochemistry revealed that the tumor cells were positive for alpha smooth muscle actin, negative for desmin, and exhibited an MIB-1 index of 3.6%. These findings were consistent with a glomus tumor.

The patient's pain was resolved immediately after the operation, and he recovered his normal gait and range of motion. NRS score improved to 0 after the operation. No recurrence has been detected during the 18-month follow-up.

3. Discussion

Patients with glomus tumors often present with a triad of classic symptoms: hypersensitivity to cold, sudden attacks of severe pain, and pinpoint tenderness to blunt palpation.⁶ Although

Fig. 2. The gross appearance of the lesion was a 5-mm well-circumscribed bluish-red nodule.

Fig. 3. Pathological examination revealed that the tumor comprised vascular, smooth muscle and neural components, as well as solid sheets of glomus cells.

these symptoms are relatively characteristic, many patients do not exhibit all of these symptoms.⁷ For example, the patient in the present case only exhibited sudden attacks of severe pain and pinpoint tenderness, without temperature-regulating pain. In approximately 70% of these cases, the tumor presents in a subungual location and is most commonly diagnosed at the age of 20–40 years.^{4,8,9} However, a few reports have described glomus tumors in the knee area, subcutaneous tissue, infrapatellar fat pad, and lateral femoral condyle.¹⁰ Only one report has described a glomus tumor in the popliteal fossa.¹¹

Despite their small size, glomus tumors can generally be accurately identified using MRI, as they present as a small well-circumscribed mass that is isointense-to-slightly-hypointense on T1-weighted sequences and hyperintense on proton density or T2-weighted sequences with homogeneous enhancement.¹² The differential diagnosis for a popliteal fossa's tumor includes a Baker's cyst, neuroma, hemangioma, angiomyoma, and peripheral nerve sheath tumor.¹³ Therefore, imaging findings must be coupled with the size, location, borders, adjacent tissue involvement, and internal characteristics of the lesion, in order to facilitate the differential diagnosis and surgical planning.¹⁴

Glomus tumors comprise vascular, smooth muscle, and neural components, and typically have a broadest diameter that is less than about 1 cm.¹ These tumors can be histologically classified as solid type, glomangioma, or glomangiomyoma. Glomangiomas consist of vascular malformations with large and often dilated channels that are surrounding nests of glomus cells. Glomangiomyomas exhibit glomus cells, vascular channels, and smooth muscle cell differentiation. The present case involved a solid type glomus tumor, which consisted of microscopic vascular solid sheets of glomus cells.

Although the clinical symptoms and imaging characteristics of a subungual mass can often provide adequate information for the diagnosis of a glomus tumor, delays in the diagnosis can occur for tumors with an atypical location. Therefore, awareness of glomus tumors is important, as 20–30-year delays in diagnoses have been reported.¹⁵ In the present case, the patient had been experiencing severe unexplained pain for 3 years, which had affected his activities of daily living. Thankfully, surgical excision of glomus tumors is usually effective and curative (as in the present case), and the 10% of cases that recur typically involve incomplete excision.

In conclusion, we report a rare case of a glomus tumor in the popliteal fossa, which induced severe pain and limited the patient's activities. These tumors are extremely rare in the knee area, and typically have a diameter of less than about 1 cm, which can

complicate their diagnosis and treatment, despite the presence of severe pain. Therefore, we recommend that clinicians be aware of extradigital glomus tumors, as careful imaging can facilitate an early diagnosis and treatment.

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Conflicts of interest

The authors have none to declare.

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