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Glomus Tumor In The Vastus Lateralis Muscle In Children : A Case Report

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Abstract
Introduction : *Glomus tumors, while typically subungual, rarely present in extradigital locations, especially in pediatric patients. This case highlights the diagnostic challenge and rarity of a glomus tumor in vastus lateralis muscle.*
Case Report : *An 11-year-old with chronic thigh pain and progressive muscle atrophy was evaluated. Magnetic resonance imaging (MRI) revealed a solid tumor within the vastus lateralis muscle. Histopathological examination confirmed the diagnosis of a solid-type glomus tumor. Surgical excision resulted in complete symptom resolution and a smooth postoperative recovery.*
Discussion *: Extradigital glomus tumors in children pose diagnostic difficulties. MRI is crucial for identification, and histopathology remains the gold standard for confirmation. Surgical excision is the preferred treatment, demonstrating excellent outcomes and low recurrence rates.*
Conclusion : *A high index of suspicion for extradigital glomus tumors is essential for timely diagnosis and effective management in pediatric patients. Early surgical intervention leads to resolution of symptoms and restoration of function.*
Keywords : *Case report, glomus tumor, glomus body, extradigital, vastus lateralis muscle.*

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I. Introduction :

Glomus tumors are rare, generally benign vascular neoplasms derived from glomus bodies—specialized neuromyoarterial structures that play a critical role in thermoregulation [1, 2]. These structures are most commonly found in the subungual regions of the fingers, where they act as arteriovenous shunts, modulating blood flow in response to temperature changes [3]. While the majority of glomus tumors are located in the subungual area, they have been reported in atypical sites where glomus bodies are not physiologically present, including visceral organs, the trachea, bone, and neural tissue [4–7]. Clinically, glomus tumors are classically associated with a triad of acute localized pain, pinpoint tenderness, and hypersensitivity to cold [8]. However, these symptoms may be less pronounced or even absent when the tumor arises in unusual locations. This article presents a rare case of a glomus tumor in the vastus lateralis muscle of a pediatric patient, emphasizing its uncommon location and contributing to the understanding of the anatomical and clinical variability of glomus tumors**.**

II. Case Report

An 11-year-old child (born December 6, 2013) presented with a two-year history of progressively worsening neuropathic pain localized to the lateral aspect of the right thigh. On clinical examination, the child was in good general health and afebrile. However, significant muscular atrophy of the right thigh was observed (figure 1). Furthermore, the patient exhibited marked apprehension and prevented palpation of the lateral aspect of his thigh due to sharp pain elicited by contact.

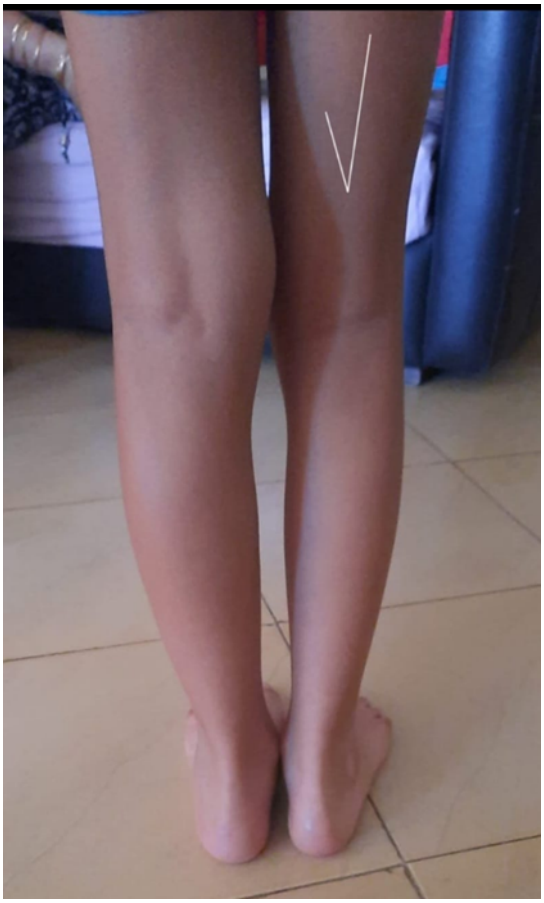

Figure 1: Muscular atrophy of the right thigh.

Imaging Findings:

Initial computed tomography (CT) imaging of the right thigh was unremarkable. However, magnetic resonance imaging (MRI) revealed a well-defined, vascularized lesion within the vastus lateralis muscle, measuring 16 mm × 8 mm × 15 mm. Located 64 mm distal to the greater trochanter and adjacent to the intermuscular septum, the lesion demonstrated isointensity on T1-weighted images, heterogeneous hyperintensity on T2-weighted sequences, and enhancement with gadolinium contrast. No infiltration into surrounding muscles or vascular structures was observed, although significant atrophy of the thigh musculature was noted. The differential diagnosis included hemangioma and rhabdomyosarcoma(figure 2).

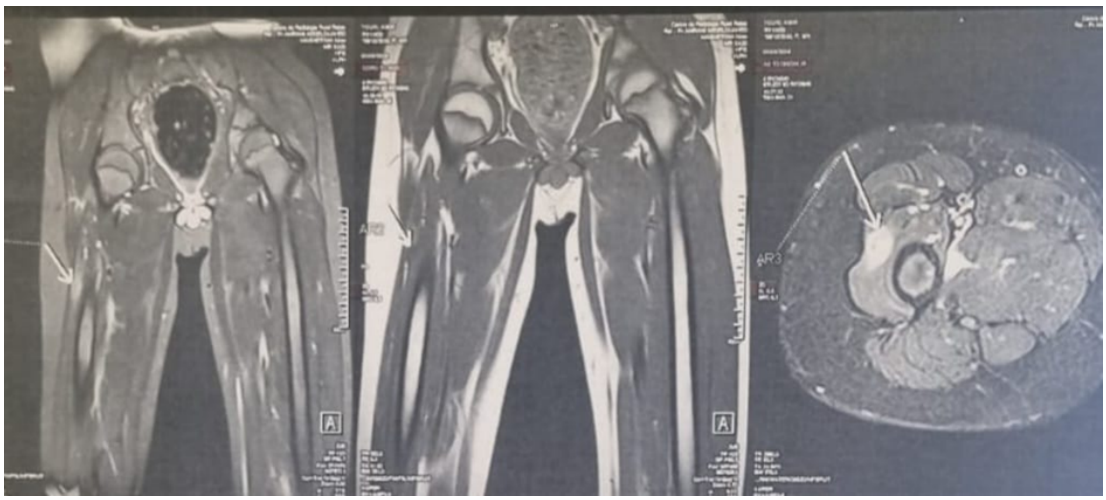

Figure 2: MRI picture showing a well-circumscribed small oval-shaped lesion at the lateral aspect of vastus lateralis in the right thigh.

Surgical excision of the lesion was performed under general anesthesia via a lateral approach to the thigh(figure 3). A femoral nerve block was administered intraoperatively for postoperative analgesia.

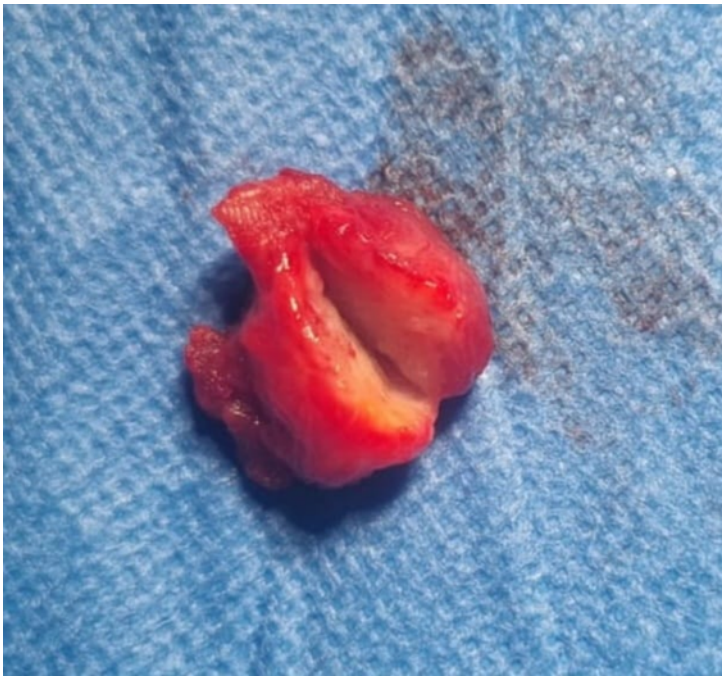

Figure 3: Surgical excision of the mass

Histopathological examination of the excised mass revealed a proliferation of uniform glomus cells within a fibrotic stroma, surrounding and intimately associated with vascular structures. These findings confirmed the diagnosis of a glomus tumor. The tumor was classified as a solitary solid-type glomus tumor, characterized by a predominant population of glomus cells with minimal vascular and smooth muscle components(figure 4).

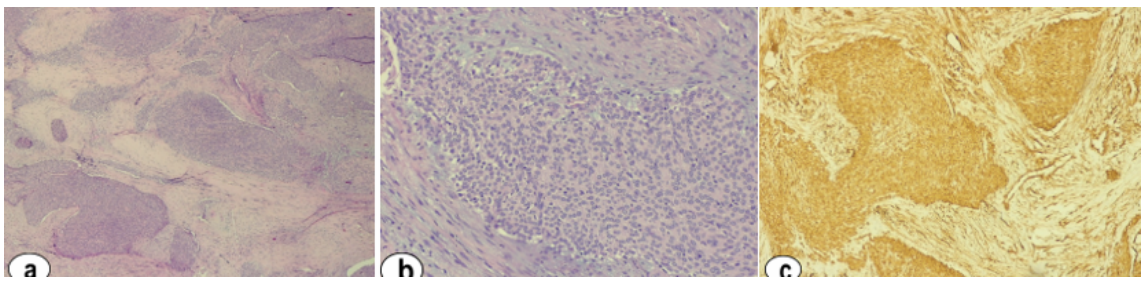

Figure 4: Histopathological examination revealed Glomus Tumor:
a) Hematoxylin and eosin x4, lobular epithelial proliferation within fibrous tissue
b) Hematoxylin and eosin x 20, proliferation of round monomorphic cells that are not very atypical
c) Hematoxylin and eosin x10, Smooth muscle actin demonstrates strong expression in the tumor,
At two-year follow-up, the right thigh surgical site exhibited clean and satisfactory healing.

III. Discussion :

Glomus bodies, specialized neuromyoarterial structures in the deep dermis, are integral to regulating blood flow and temperature[1-8]. Glomus tumors, rare benign neoplasms derived from these structures, exhibit malignant transformation in less than 1% of cases [9].

While these tumors are typically solitary, familial or congenital multiple lesions may arise due to mutations in the glomulin gene on chromosome 1p21-22, demonstrating autosomal dominant inheritance [10].

Although glomus tumors represent only 1.6% of soft tissue neoplasms, they are most prevalent between the third and fifth decades and more common in females [11]. About 75% occur in extremities, predominantly in subungual regions [12]. Extradigital locations, including the thigh, are less frequent and show more gender balance in incidence. Historically, these tumors were first described as “painful subcutaneous tubercles” by Wood in 1812, with Masson defining the term “glomus tumor” in 1924 [11,13].

Pathogenesis remains unclear, with theories suggesting mesenchymal cell differentiation, proliferation of pre-existing glomus cells, or tumor cell invasion of vessel lumens [14]. Extradigital manifestations, especially in pediatric populations, are uncommon and pose diagnostic challenges. These tumors often lack the hallmark triad of pain, pinpoint tenderness, and cold sensitivity [15], as seen in the reported case, where neuropathic pain and muscle atrophy initially misled investigations.

Diagnostic delays are frequently encountered in extradigital glomus tumors. The lack of a palpable mass on physical examination, combined with the presentation of nonspecific symptoms that may mimic musculoskeletal or neurological disorders, often hinders timely diagnosis. Furthermore, the low clinical suspicion associated with the rarity of these tumors outside the subungual region prolongs the patient's diagnostic evaluation.

MRI is the gold standard for imaging, with glomus tumors typically appearing isointense on T1 and hyperintense on T2 sequences, with post-contrast enhancement [16]. Studies by Ham et al. highlighted MRI's precision, detecting lesions as small as 2 mm [17]. In the present case, MRI identified a well-circumscribed vascularized lesion in the vastus lateralis.

Histopathology confirmed the diagnosis, revealing glomus cells surrounding small blood vessels. Glomus tumors are categorized into solid types (75%), glomangiomas (20%), and glomangiomyomas (5%), with malignancy being rare [18]. The reported tumor was a solid type, consistent with abundant glomus cells and minimal vascular or smooth muscle content.

Surgical excision is the treatment of choice, offering curative outcomes when complete removal is achieved. Extradigital tumors may require intricate techniques to preserve adjacent structures. Alternative treatments like irradiation or sclerotherapy lack robust evidence [19]. In this case, modified lateral thigh surgery led to symptom resolution and an uneventful recovery. Recurrence, primarily due to incomplete excision, ranges from 12% to 33% [20]. Follow-up confirmed successful recovery and absence of recurrence, underscoring the importance of meticulous surgical intervention and monitoring.

IV. Conclusion :

This report details a rare pediatric glomus tumor in the thigh, highlighting the diagnostic challenge of extradigital presentations. Magnetic resonance imaging (MRI) plays a vital role in the evaluation of unexplained pain and muscle atrophy, leading to histopathological confirmation. Surgical excision provides definitive treatment, resulting in complete symptom resolution and a low recurrence rate. Timely intervention is critical to avoid complications, and ongoing research is necessary to refine the management of these uncommon cases.

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