Case Report

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Histopathological Diagnosis of an Intramuscular Ganglion Cyst: A Rare Case Report with Clinicopathological Correlation

Pathology Section

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ABSTRACT

Ganglion cysts are benign soft-tissue lesions with no true epithelial lining containing gelatinous fluid like material composed of hyaluronic acid and mucopolysaccharides. They usually arise from joint capsule and rarely from the tendon sheath, cartilage, cruciate ligaments, nerves. Hand and wrists are the common sites of occurrence. Intramuscular ganglion cyst arising within the muscle of lower limb is a rare entity with limited number of cases reported in the literature. These deep-tissue lesions present significant diagnostic challenges frequently mimicking other soft-tissue masses or tumours. This case report describes a 28-year-old male who presented with a tender, slow growing swelling on the anterolateral aspect of his left lower limb. It was painful on walking and straining which had persisted for past one month. On physical examination, the swelling measured 10×4 cm on anterolateral aspect of left lower limb, tender, cystic in consistency, non-mobile and fixed deep in the muscle. Skin over the swelling appeared normal. Notably, the patient reported no prior history of trauma or any other surgeries. Radiological investigations like Ultrasonography (USG) and Magnetic Resonance Imaging (MRI) suggested the swelling to be a cystic lesion. Involvement of extensor digitorum longus muscle was suspected. The swelling was excised and sent for histopathological evaluation. The diagnosis of intramuscular ganglion cyst was made. The patient showed recovery postsurgery and there was no recurrence of the swelling seen in the subsequent follow-up. This case demonstrates the necessity of a comprehensive diagnostic workup when evaluating cystic lesions in atypical locations.

Keywords: Atypical, Benign, Cystic, Extensor digitorum longus, Soft-tissue lesion

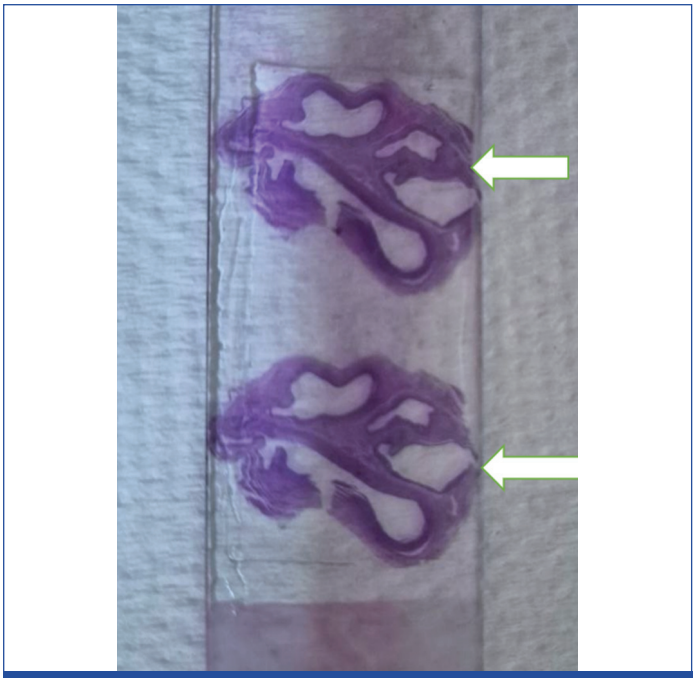
CASE REPORT

A 28-year-old male presented with a one-month history of a painful swelling on the anterolateral aspect of the left lower limb. The swelling was present throughout the day along with the pain during walking or straining. On physical examination the swelling measured 10×4 cm on anterolateral surface of the left lower limb, tender, cystic in consistency, non-mobile and fixed deep in the muscle. Skin over the swelling appeared normal. The patient denied any history of trauma or fever. The patient has no known history of hypertension, diabetes, cardiac disease or any prior surgeries. The patient reported occasional alcohol consumption and tobacco chewing. Bladder and bowel movements were normal. The complete blood count was within normal limits with no significant abnormalities. USG revealed a hypoechoic lesion in the intramuscular plane of anterolateral aspect of left lower limb. MRI suggested longitudinally oriented spindle shaped, multiloculated, tortuous, thin-walled cyst measuring 10×3.4 cm present in intramuscular region of anterolateral compartment of left leg. Involvement of extensor digitorum longus muscle was suspected. Imaging findings indicated that the swelling was characteristic of a cystic lesion. The mass was surgically excised.

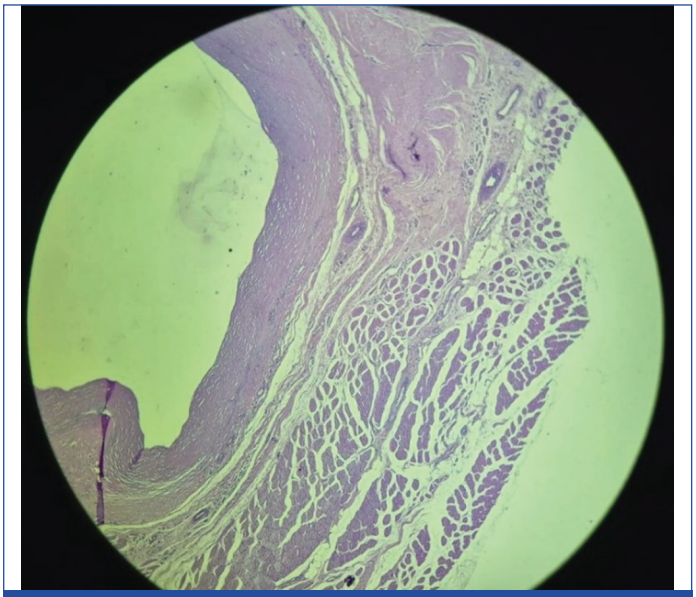
Intraoperatively, the swelling was in the intramuscular plane and was adherent to the adjacent muscle. Following excision, the swelling was submitted for histopathological evaluation. Grossly, the cystic structure measured 10×3.5×2 cm, appeared grey white with smooth surface [Table/Fig-1]. Cut-surface appeared multiloculated and drained clear mucoid fluid [Table/Fig-2,3]. Microscopy revealed a cyst wall made of fibro collagenous tissue embedded within the skeletal muscle fibres with no true epithelial lining. There was no evidence of atypia or any other pathology [Table/Fig-4-6]. The possibility of any vascular lesion was also ruled out as there was no abnormal proliferation of any arterial, venous or small capillary sized vessels infiltrating muscle fibres. No areas of haemorrhage or inflammation seen. Hence, a histopathological diagnosis of

[Table/Fig-1]: Gross image of excised cystic structure appearing grey white with smooth surface.

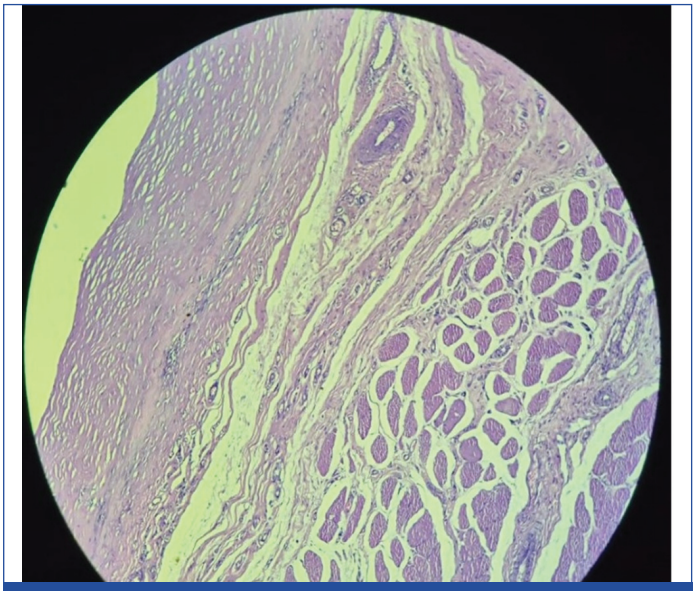
[Table/Fig-2]: Gross image of cut-section of the structure showing multiloculated surface and drained mucoid material from the lumen.



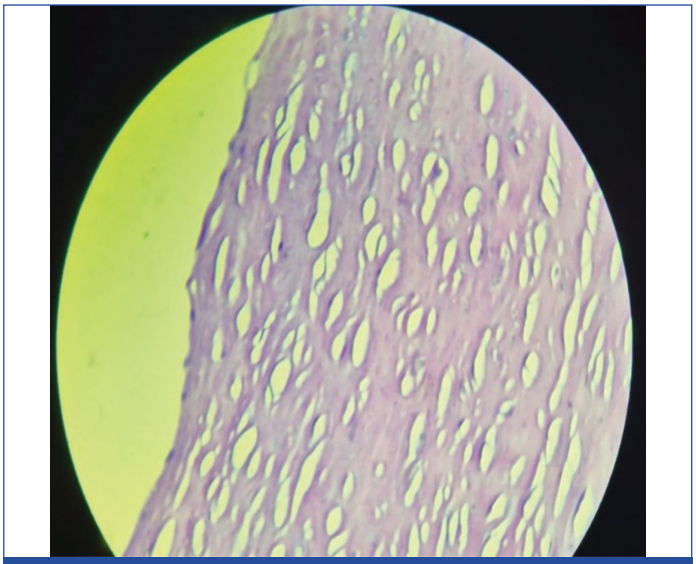
[Table/Fig-3]: Overview from a glass slide showing multiloculated cyst (H & E stain).



[Table/Fig-4]: Microscopic image showing cyst wall surrounded by skeletal muscle fibres (H&E,10x).



[Table/Fig-5]: Microscopic image showing cyst wall surrounded by skeletal muscle fibres (H&E,40x).



[Table/Fig-6]: Microscopic image showing cystwall with no epithelial lining (H&E,40x).

intramuscular ganglion cyst was made. Following surgery, the patient remained haemodynamically stable and underwent postoperative rehabilitation. No complaints of recurrence or any other complication was noted in further follow-up for up to one year.

DISCUSSION

Intramuscular ganglion cysts are benign soft-tissue lesions containing thick mucinous material. The fluid content is highly viscous, which is attributed to its high protein concentration of hyaluronic acid and mucopolysaccharides. These are the most common benign soft-tissue lesions that usually arise from joint capsule and rarely from the tendon sheath, cartilage, cruciate ligaments or nerves. They are often seen in second to fifth decade of life. Common sites are hand and wrist [1]. They may be asymptomatic or tender and present as soft superficial slow growing mass. Overuse of adjacent joints and micro-injuries or trauma are common risk factors for the development of ganglion cysts The pathogenesis of the ganglion cyst formation within the muscle is still unclear. A cyst can be formed secondary to a muscle tear, where the body's healing response or leaking fluid creates a localised cystic pocket. The commonly accepted theory is formation of ganglion cyst from secondary myxoid degeneration of the connective tissue that results from defects in tendon sheaths or joint capsule [2]. The present study shows a deep-seated swelling involving extensor digitorum longus muscle. Since there was no history of trauma, the latter theory can be considered. The intramuscular ganglion cyst is mostly seen in upper limb which is around 70% cases reported in few studies [3].

In a study done by Rohrich RJ and Rich BK the intramuscular ganglion cyst was reported in biceps brachialis muscle of upper limb [4]. The intramuscular ganglion cysts arising in lower extremity are a rare entity. Studies done by Bhushan R et al., and James SL et al., show intramuscular ganglion cyst involving muscle like gastrocnemius [5,6]. Study done by Singh R et al., depicts presentation of intramuscular ganglion cyst in left thigh muscle rectus femoris [7]. Ahmad J et al., and Saade R et al., presented cases of intramuscular ganglionic cyst on lower limb involving extensor digitorum longus muscle which is a rare location [8,9]. The above studies and the literature suggest how important is the preoperative diagnostic workup in such unusual lesions. The differential diagnosis is established through the patient's history, physical assessment, imaging techniques like USG, MRI and occasionally a tissue biopsy. In the study done by McKeon KE et al., preoperative and postoperative MRI findings correlated with the histological findings with an overall sensitivity of 75% [10]. In the present study, radiological investigations suggested the characteristic feature of the lesion to be cystic which correlated with the histopathological

findings. An intramuscular ganglion cyst can mimic similar lesions like soft-tissue tumours as lipoma, myxoid-matrix tumours including intramuscular myxoma, neurofibroma, myxoid liposarcoma, post-traumatic cysts and neurofibroma. To differentiate from the other lesions on microscopy, intramuscular ganglion cyst shows no true epithelial lining and there is no evidence of myxoid stroma, mature adipocytes or atypia [11]. To add diagnostic accuracy further, immunohistochemistry can be done using markers such as vimentin, smooth muscle actin, desmin, beta catenin, calponin, Podoplanin, S-100 to detect histogenetic origin and to rule out similar benign and malignant lesions [12]. However, in the present study diagnosis was confirmed on routine Haematoxylin and Eosin (H&E) staining which is the standard diagnostic method. Recurrence is the most common complication postoperatively. Intramuscular or deeper ganglion cysts are highly rare and complex to excise which increase the risk of recurrence. Long-term postoperative monitoring is essential in these cases [13].

CONCLUSION(S)

Presentation of intramuscular ganglion cyst in lower extremity is rare. In the present case, radiological investigations suggested the characteristic feature of the lesion to be cystic. Such swellings can be a diagnostic challenge as these may mimic other soft-tissue swellings. Surgical excision followed by histopathological evaluation confirmed the diagnosis of an intramuscular ganglion cyst. This case demonstrated that a thorough diagnostic work-up is pivotal to deal with such type of unusual lesions for better management and will also avoid the complication of recurrence.

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