

Case Report

Unusual etiology of anterior knee pain in a young athlete engaged in chronic jumping exercises: The intratendinous ganglionic cyst of the patellar tendon

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ABSTRACT

Intratendinous ganglionic cysts within the patellar tendon represent an exceedingly rare pathological entity, the clinical presentation of which is poorly understood and infrequently reported. We present a comprehensive case report of a young male athlete with persistent anterior knee pain, which was ultimately attributed to the presence of an intratendinous ganglionic cyst within the patellar tendon. This report provides a detailed analysis of the clinical presentation, radiological findings, differential diagnoses, and management strategies in the context of this rare condition.

Keywords: Patellar tendon cyst, Knee pain, Tendon pathologies, Athlete knee injury

INTRODUCTION

Anterior knee pain is a common complaint among athletes, often attributed to overuse, trauma, or underlying musculoskeletal conditions.^[1] However, in the spectrum of anterior knee pathologies, certain cases present a diagnostic challenge due to their rarity and atypical nature.^[1-9] One such rare presentation is the occurrence of intratendinous ganglionic cysts within the patellar tendon.^[1,2,6-9]

Ganglionic cysts, typically associated with joint capsules and tendon sheaths, are benign, fluid-filled cystic lesions often observed in the context of articular or tendon-related structures.^[2-8] However, the presence of a ganglionic cyst within the substance of a tendon, especially the patellar tendon, is an exceedingly rare phenomenon, with only a handful of cases reported in the medical literature.^[1,2,6-9]

The origin and etiology of intratendinous ganglionic cysts remain incompletely understood, and their association with specific athletic activities and underlying knee conditions further complicates the diagnostic process.^[1,2,5-7] This case report presents a unique clinical scenario involving a young jumping athlete who presented with anterior knee pain. The anterior knee pain in this jumper's knee is ultimately attributed to the presence of an intratendinous ganglionic cyst within the patellar tendon.

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This report aims to shed light on this exceptionally rare condition, providing insights into its clinical presentation, diagnostic evaluation, and management strategies. Moreover, it underscores the importance of considering such unusual pathologies in the differential diagnosis of anterior knee pain, particularly in the context of athletes with jumping exercises, and highlights the need for further research and awareness surrounding this distinctive clinical entity.

By presenting this case, we hope to enhance the awareness among clinicians and radiologists of the possibility of isolated patellar tendon cysts in athletes with jumping exercises and stimulate further research into the pathophysiology and management of such intriguing musculoskeletal conditions.

CASE REPORT

A young male, jumping athlete, presented to us with a chief complaint of persistent anterior knee pain that had progressively worsened over the past 2–3 months. The patient reported no history of trauma or acute injury to the affected knee. He had a history of active participation in gym, and high-impact sports, including jumping and squatting, for the past 7–8 years. The patient's medical history was otherwise unremarkable, with no known systemic illnesses or previous knee-related conditions.

The patient described the pain as localized to the inferior aspect of the right patella. He noted that the pain was exacerbated during weight-bearing activities, such as jumping and squatting, and was relieved with rest. The pain was accompanied by occasional swelling and crepitus in the anterior aspect of the knee joint. Notably, the patient had been using over-the-counter non-steroidal anti-inflammatory drugs intermittently to manage the discomfort, but the pain persisted.

On physical examination, there was tenderness over the distal pole of the right patella. The range of motion of the knee was preserved, with no significant effusion, which is the classical site of pain in the jumper's knee. The patellar apprehension test was negative, ruling out patellar instability. No signs of localized warmth or erythema were noted. The rest of the knee examination, including ligamentous stability and meniscal tests, was unremarkable. No palpable masses or abnormal soft-tissue findings were noted on examination.

Given the persistent nature of the symptoms and the inconclusive clinical examination, further diagnostic evaluation was warranted.

Radiological assessment

To further investigate the etiology of the persistent anterior knee pain in the young jumping athlete, a magnetic resonance imaging (MRI) scan of the right knee was performed. The

MRI findings provided valuable insights into the nature and extent of the intratendinous ganglionic cyst within the patellar tendon. The MRI scan of the right knee revealed a well-defined, oval-shaped cystic lesion located within the substance of the right patellar tendon. The cyst exhibited distinctive characteristics on various MRI sequences. In T1-weighted Imaging (T1WI), the intratendinous cyst appeared as a hypointense lesion, consistent with the low protein content and viscous nature typical of ganglionic cysts [Figure 1]. In T2-weighted imaging (T2WI) and proton-density fat-saturated imaging, the cystic lesion displayed hyperintensity on T2WI, indicating a high water content, which is a characteristic feature of ganglionic cysts [Figures 1 and 2]. Importantly, there were no visible septations or solid components within the cyst, suggesting a homogeneous fluid-filled structure. There is evidence of a partial tear of a few fibers of the patellar tendon. Notably, the cyst was located in the proximal and part of the midportion of the patellar tendon, which corresponded to the site of the patient's reported pain. The lesion's proximity to the inferior pole of the patella was confirmed, corroborating the patient's clinical complaints. In addition to the cystic lesion, the MRI did not reveal any evidence of significant intra-articular pathology, such as meniscal tears or cartilage abnormalities, except for the mild anterior cruciate ligament and posterior cruciate ligament strain. The surrounding soft tissues and bony structures appeared unremarkable, with no signs of inflammation or neoplastic changes.

The characteristic MRI findings, including the cyst's location, size, and signal characteristics on T1WI and T2WI, were consistent with an intratendinous ganglionic cyst of the patellar tendon. This imaging-based diagnosis was further supported by the absence of any alternative pathologies that could account for the patient's clinical presentation.

DISCUSSION

Intratendinous ganglionic cysts within the patellar tendon are exceedingly rare, with only a limited number of cases reported in the existing medical literature.^[1,5-10] This case presentation sheds light on the unique occurrence of such a cyst in a young jumping athlete presented with symptoms like jumper's knee, adding to the limited body of knowledge regarding this uncommon condition.^[1]

The development of cysts in the patellar tendon is influenced by repetitive stress, tissue degeneration, and partial tears. Anatomical factors, such as variations in tendon structure and proximity to synovial structures, also play a role. Issues such as misalignment and abnormal biomechanics add mechanical stress, which can contribute to cyst formation.

The precise etiology of intratendinous ganglionic cysts within the patellar tendon remains unclear. These

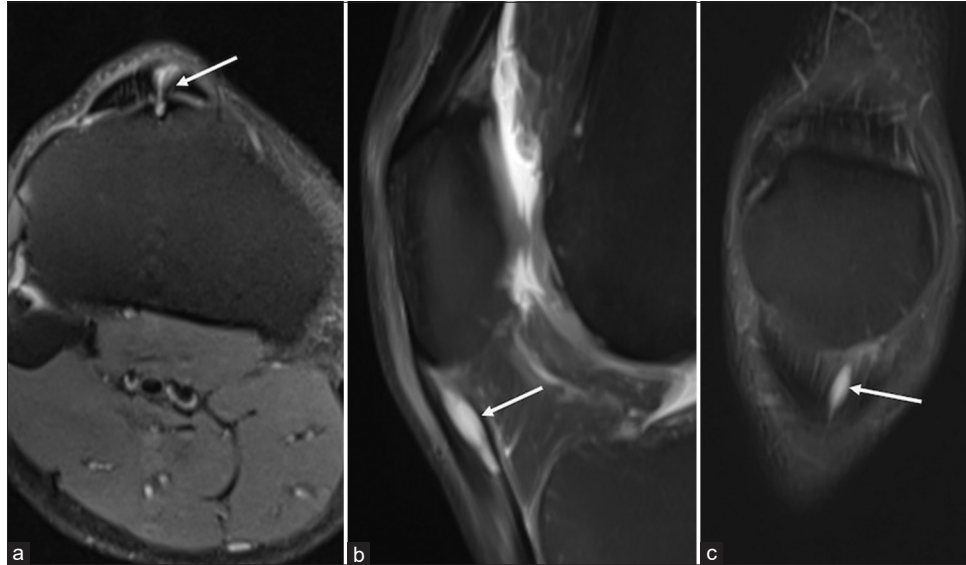


Figure 1: (a) Axial, (b) sagittal, and (c) coronal proton-density fat-saturated (PDFS) images of magnetic resonance imaging knee at the level of cyst show a well-defined PDFS fluid intensity oval-shaped lesion noted just distal to the inferior pole of the patella in the patellar tendon (White arrow). The cyst has caused mild local expansion of the patellar tendon, resulting in a focal fusiform enlargement. Note the partial tear of a few fibers of the patellar tendon (White arrow).

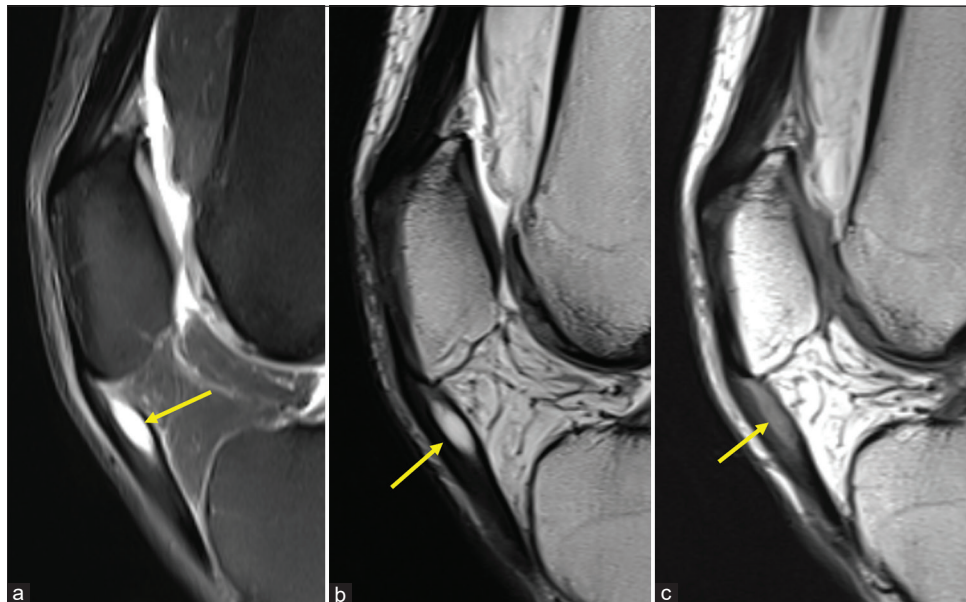


Figure 2: A well-defined (a) Hyperintense on proton-density fat-saturated and (b) T2, (c) Hypointense on T1 oval Shaped lesion noted just distal to the inferior pole of patella in the patellar tendon (Yellow arrow). The cyst has caused mild local expansion of the patellar tendon, resulting in a focal fusiform enlargement. Note the partial tear of a few fibres of the patellar tendon (Yellow arrow).

cysts are thought to originate from the synovial-lined connective tissue around the tendon.^[1-4,6,7,10] The synovial tissue may herniate into the tendon structure, forming a cystic lesion^[2-4,7,10] (can give rise to Tail Sign: tail-shaped extension coming out from a ganglion cyst. It's a key detail seen in imaging studies, showing that the cyst is

connected to the joint or tendon sheath nearby). The exact triggers for this herniation are not well understood, but it is theorized that repetitive microtrauma and mechanical stress on the tendon may contribute to the development of these cysts.^[6-8,10] It is noteworthy that this case involving a jumping athlete underscores the potential association

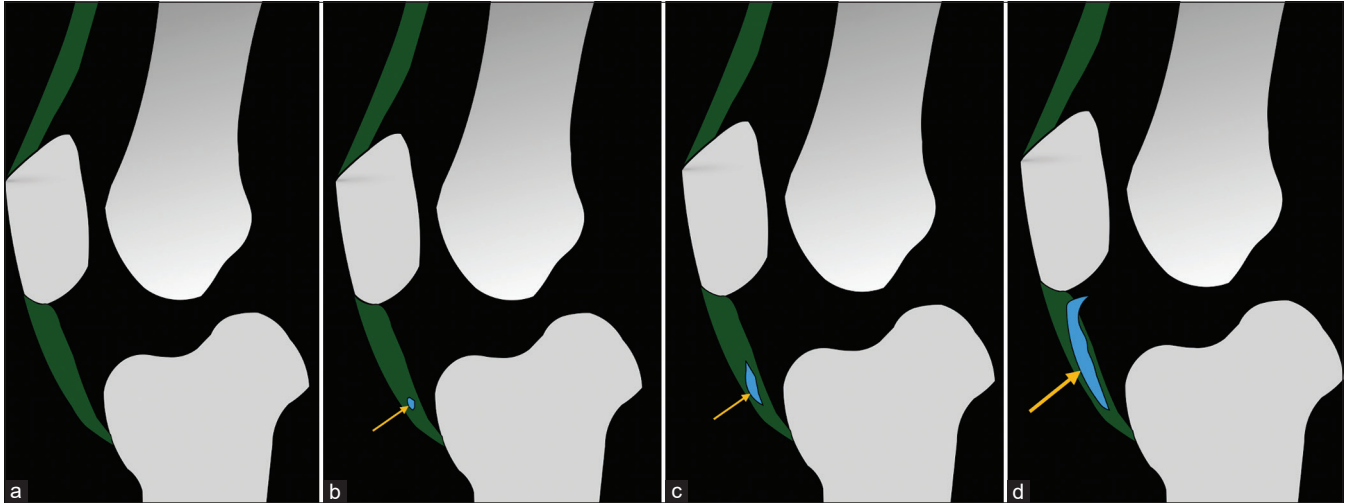


Figure 3: A series of illustrations. Image (a) depicts a healthy patellar tendon. Images (b-d) collectively demonstrate the potential gradual development of an intratendinous ganglion cyst within the patellar tendon (Yellow arrow).

between high-impact activities and the development of such cysts.

Intratendinous ganglionic cysts can be clinically significant due to their potential to cause anterior knee pain and discomfort^[1,2,4,6-9], as observed in this case. The cyst's location within the patellar tendon, as demonstrated by MRI, correlated with the patient's reported pain. In addition, it is important to highlight the association of these cysts with Osgood-Schlatter disease^[7] and lateral femoral condyle friction syndrome,^[6] as reported in a subset of cases. The presence of these cysts may exacerbate symptoms in patients with these conditions, warranting careful evaluation in cases of unresolved anterior knee pain.^[6-8]

In young athletes who regularly perform jumping exercises, chronic repetitive microtrauma to the patellar tendon increases the likelihood of developing intratendinous ganglion cysts. This occurrence is attributed to the degenerative changes associated with tendinosis and the potential for partial tears, resulting in the formation of fluid collections within the tendon [Figure 3].

Diagnosing intratendinous ganglionic cysts of the patellar tendon can be challenging due to their rarity and the absence of specific clinical signs.^[7-9] In this case, the diagnosis was confirmed through MRI, which provided crucial insights into the cyst's location, size, and characteristic signal properties.^[1-6] Differential diagnoses should include other causes of anterior knee pain, such as patellar tendinopathy, meniscal pathology, and ligamentous injuries.^[5,7-9] The diagnostic challenge lies in distinguishing these cysts from other conditions and recognizing their potential to be a source of pain.^[7-9]

Apart from the patellar apprehension test, other tests help understand knee pain. The Lachman test checks knee

stability, the McMurray test looks for meniscal issues, and the Thessaly test assesses knee movement. The Patellar Grind test checks the patellofemoral joint, and Collateral Ligament Stress Tests assess ligament stability. The Osgood-Schlatter evaluation is for cases related to Osgood-Schlatter disease. Together, these tests guide decisions on further checks for a better understanding and management of knee pain.

The management of intratendinous ganglionic cysts of the patellar tendon can be approached conservatively or surgically, with the choice depending on the patient's symptoms and individualized assessment.^[8,9] Conservative management often includes activity modification, physical therapy to address biomechanical factors contributing to the cyst formation, and aspiration of the cyst followed by steroid injection, although the latter may offer temporary relief.^[8,9] Surgical excision may be considered when conservative measures prove ineffective or when symptoms are severe and disabling.^[8,9]

Shared decision-making with the patient is essential when determining the optimal treatment approach.^[8,9] In this case, the patient opted for conservative management initially, which aligns with the preference for less invasive approaches. Close follow-up appointments were scheduled to monitor the patient's response to conservative measures, and the possibility of surgical intervention remained an option if needed.

CONCLUSION

This case report presents a rare and intriguing finding of an isolated patellar tendon cyst in a jumping athlete, which, to the best of our knowledge, has not been previously reported in the literature without association with Osgood-Schlatter disease. The uniqueness of this case underscores

the importance of considering uncommon etiologies for musculoskeletal conditions in athletes.

The presentation of this case also highlights the essential role of imaging, particularly MRI, in diagnosing and characterizing patellar tendon cysts. Timely and accurate diagnosis is crucial for appropriate management and ensuring optimal outcomes for athletes.

While the exact etiology of this isolated patellar tendon cyst in a jumping athlete remains speculative, it prompts further exploration into the potential mechanisms that might predispose individuals to such a condition. It raises questions about the biomechanical stresses specific to jumping exercises and their impact on the patellar tendon.

Clinicians, radiologists, and sports medicine specialists should consider the possibility of patellar tendon cysts in athletes presenting with knee pain, even in the absence of other associated conditions. Early recognition and intervention can lead to effective management strategies and a quicker return to sports activity.

Further research and case studies are warranted to understand better the pathophysiology, prevalence, and treatment options for isolated patellar tendon cysts in athletes. This case report serves as a valuable addition to the body of knowledge in sports medicine and musculoskeletal imaging and encourages a broader exploration of this intriguing clinical entity.

Ultimately, this case emphasizes the importance of thorough clinical evaluation and imaging assessment in elucidating unusual musculoskeletal conditions, contributing to the advancement of medical knowledge, and improving the care of athletes with such rare pathologies.

Ethical approval

The Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript, and no images were manipulated using AI.

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