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Undercover hematoma: A rare presentation of a complete suprapatellar plica

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Abstract

Synovial plicae are remnants of synovial septa that fail to fully resorb during embryonic knee development. In 3 to 30% of cases, they can become symptomatic (synovial plica syndrome), typically presenting with anterior knee pain exacerbated by knee flexion. Plicae are classified based on their location, with the suprapatellar being the most common but typically asymptomatic.

This article describes a clinical case of spontaneous knee pain and swelling revealed to be secondary to an atraumatic hematoma confined to the suprapatellar bursa by the presence of a complete suprapatellar synovial plica. According to the authors' research, there are no described cases with a similar presentation.

Keywords: Synovial plica syndrome, suprapatellar synovial plica, spontaneous knee hemarthrosis, knee

Introduction

Synovial plicae are remnants of embryonic membranes located in the knee, considered normal anatomical structures. By the 8th week of gestation, the patellofemoral, femoromeniscal, and meniscotibial compartments are formed, which will merge into a single joint cavity in the following weeks as the synovial septa are absorbed. If this absorption fails, the remaining mesenchymal tissue can differentiate into synovial folds, which, if large enough, are called synovial plicae, thin and flexible structures ^[1, 2]. According to their location, synovial plicae can be classified as suprapatellar, infrapatellar, lateral, and Medio patellar (the one most commonly associated with symptoms) ^[2-5].

The suprapatellar plica is the most common, described in 20 to 91% of the general population, and although it is rarely symptomatic, its role as a cause of localized knee complaints is increasingly accepted, especially if it is complete ^[5-7]. The suprapatellar plica extends from the inferior and posterior surface of the quadriceps tendon to the medial wall of the suprapatellar pouch, between this pouch and the knee joint cavity ^[2]. It is generally morphologically classified according to the Dandy classification. Simplistically, it can fully or partially separate the suprapatellar bursa from the knee joint cavity ^[5]. Considering that the suprapatellar plica inserts anteriorly into the quadriceps tendon, it changes orientation and size with knee movement, potentially becoming compressed between the tendon and the femoral trochlea between 70 to 100 degrees of flexion (depending on its size and flexibility) ^[2]. Plicae are generally asymptomatic, but in 3-30% of cases, they can be a source of symptoms (synovial plica syndrome) ^[3, 7]. Studies suggest that symptoms occur due to thickening and loss of elasticity of the plica from biomechanical irritation (associated, for example, with trauma or repetitive activity), which may be associated with synovial or intra-articular hematoma, or inflammatory changes in the synovial membrane (such as synovitis secondary to meniscal tear, patellar subluxation, or local surgery) ^[2-5].

The most common symptom is anterior knee pain, worsened by activities loading the patellofemoral joint (such as stair climbing/descending, squatting, kneeling, prolonged knee flexion). Pain may also localize to the upper edge of the patella, which is more suggestive of involvement of a suprapatellar plica ^[5]. Other symptoms include swelling, a sensation of knee giving way, feeling of snapping during knee flexion, and painful locking after prolonged knee flexion in a seated position ^[3, 5]. Sometimes it's possible to palpate a band/mass suprapatellar during the physical examination ^[8]. Symptoms are bilateral in up to 60% of patients, although they may manifest at different timings ^[4].

The diagnosis is primarily based on clinical presentation and physical examination. The fact that clinical findings are nonspecific complicates diagnosis. Although plicae are visible with ultrasound, MRI, and arthrography, these examinations do not distinguish which plicae are pathological, hence their recommendation in recurrent, complex cases, or when considering surgical treatment [3]. Many treatments are suggested in the literature, with evidence of varying quality. An initial trial of symptomatic treatment should be undertaken, including weight reduction, therapeutic exercise, and activity modification (especially if involving jumping and squatting), with the aim of controlling irritation, triggering factors, and inflammation, followed by correction of extensor apparatus biomechanics and strengthening of the limb and core. Some authors advocate for correction of patellofemoral tracking and reinforcement of the femoral quadriceps, especially the vastus medialis obliquus (often weak in cases of anterior knee pain), as well as stretching of the knee flexor muscles to reduce their antagonistic effect [3, 5]. Intra-articular corticosteroid injection appears to reduce pain and facilitate participation in physiotherapy, being only advised as an adjunctive treatment [3].

Surgical treatment (typically arthroscopy) is generally reserved for cases of failure of conservative treatment (3 to 6 months) and in which, during the procedure, it is verified that the plica is pathological (fibrosed and hyalinized),

causing significant movement conflict, and there is no other intra-articular alteration that explains the symptoms. The plica should be completely removed to prevent fibrosis and to avoid symptom recurrence [3, 9].

Case report

Female patient, 34 years old, with no relevant past medical history, referred to the Physical and Rehabilitation Medicine Department for postoperative rehabilitation following right femoroacetabular impingement correction (hip arthroscopy, acetabular rim trimming, and thermal modulation anchor placement with femoroplasty). Regarding the hip, she showed clinical improvement, remaining asymptomatic throughout the rehabilitation process. However, approximately 2 months after the onset of physiotherapy, she developed mechanical right knee pain, without associated trauma or other triggers, accompanied by increased knee volume in the suprapatellar region. It was decided to perform an MRI of the knee, which revealed "diffuse grade II chondropathy of the inner wing of the patella (...) and patellar tendon-lateral femoral condyle friction syndrome (...)", but also the presence of an oval-shaped image in the suprapatellar recess, with regular and well-defined contours, hypointense in T2 weighted imaging, suggestive of hemorrhagic non recent fluid, separated from the joint cavity by a complete suprapatellar synovial plica (Figure 1 and 2).

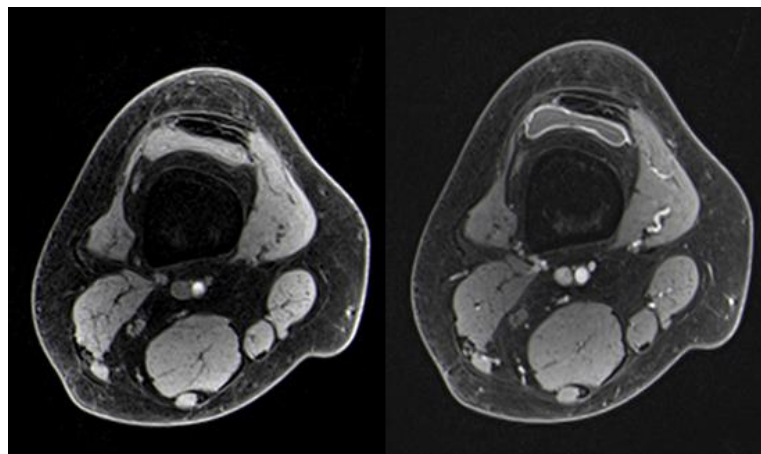


Fig 1: Knee MRI, axial plane

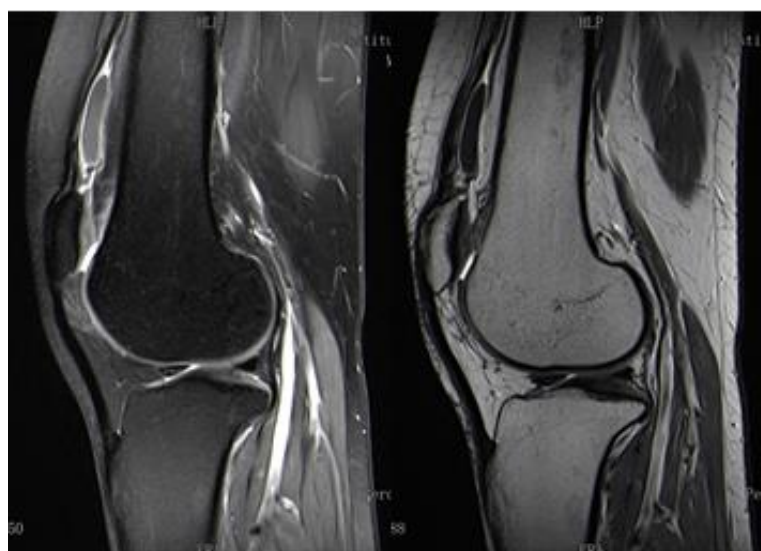


Fig 2: Knee MRI, sagittal plane

Ultrasound-guided drainage of the segmented space was performed, yielding 2mL of hemorrhagic fluid (Figure 3). Considering the absence of an explicit causal factor, a systemic pathology study was conducted through laboratory evaluation of the drained fluid and blood analyses. Regarding the fluid, it was confirmed to be hemorrhagic (erythrocyte count 7447930 cells/mm³), with a cellular differential count predominantly mononuclear (93% lymphocytes). Blood analysis showed no abnormalities in the complete blood count or peripheral blood smear, as well

as in coagulation parameters (PT, aPTT, fibrinogen, lupus anticoagulant, von Willebrand factor, and factor VIII). Platelet function (PFA-100) was also normal. Thus, systemic causes were excluded, and an atraumatic suprapatellar hematoma confined to the suprapatellar bursa by the presence of a complete suprapatellar synovial plica was assumed. An MRI of the contralateral knee was also performed, also showing evidence of an incomplete suprapatellar plica, which was asymptomatic.

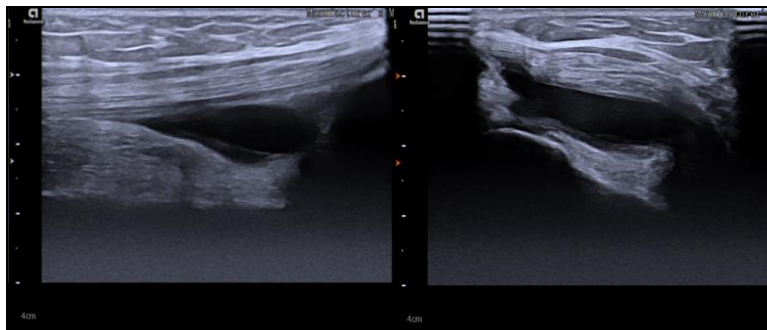


Fig 3: Ultrasound of the suprapatellar recess with anechoic fluid

Due to persistent knee complaints despite conservative treatment, she underwent knee arthroscopy, with excision of the mentioned plica and debridement of the suprapatellar recess, including organized hematoma. Subsequently, targeted rehabilitation was performed, resulting in complete resolution of symptoms within 8 weeks. Afterwards, she returned to her previous functional status.

Discussion

Knee plicae, as mentioned, are embryonic remnants relatively common in the population, mostly benign due to their elastic and flexible nature. Although the most common, the suprapatellar plica is not the most commonly associated with symptoms. Nevertheless, the most frequently symptomatic forms are complete plicae, as observed in this patient.

Symptoms arise due to a structural alteration of the plica, as previously mentioned. The majority of symptomatic cases are idiopathic, but associations with acute or overuse trauma, inflammatory arthropathies, hematologic disorders leading to hematomas, diabetes mellitus, etc., have been described. Muscle weakness at the knee level, especially of the femoral quadriceps, can be considered a risk factor due to their close relationship^[3]. In this clinical case, there was no history of trauma, so a systemic pathology study, including coagulation, was performed, which was all normal. Thus, a spontaneous hematoma was assumed. From the research conducted, no cases of atraumatic suprapatellar hematomas without any other identified cause, isolated from the joint cavity by a complete plica, were found.

Plica syndrome should be differentiated from other pathologies such as tendinopathy, meniscal, ligamentous, cartilage or osteochondral injuries, patellofemoral subluxation, Hoffa fat pad syndrome, among others^{2,3}. Especially in the case of isolated suprapatellar edema, it is essential to exclude pathologies that present with synovial hypertrophy, such as pigmented villonodular synovitis^[10]. In this clinical case, only patellar chondropathy was found, a diagnosis that does not explain all of the patient's findings.

Currently, MRI is the most commonly used examination to complement the clinical history and physical examination, in which the plica appears as a hypointense band in T2 weighted imaging, more easily visible in sagittal views. This examination is also useful for excluding other potential causes of pain^[2, 6]. Arthroscopy is the most reliable way to confirm the diagnosis and exclude others^[3, 9], but it is usually only performed in cases of failure of conservative treatment. In cases where it is necessary, the resolution of symptoms with plica removal also supports the diagnosis of synovial plica syndrome^[2, 6].

The effectiveness of conservative treatment varies widely, but it seems to be more favorable in younger patients, with a shorter duration of symptoms and associated with trauma^[2]. Despite being a 34-year-old patient, conservative treatment was not effective, which may have been influenced by the presence of a hematoma collected by the plica rather than just knee pain. Therefore, arthroscopy with hematoma drainage and plica removal was necessary, with subsequent resolution of the symptoms. Indeed, the results of surgical treatment are positive, especially in young patients with localized and short-duration symptoms and in the absence of associated chondromalacia. It has been found that the majority (64%) become asymptomatic and are able to return to their previous activity level, 26% have occasional complaints that do not affect their activity level, and 10% continue to have disabling complaints. On average, return to physical activity occurs within 3 to 6 weeks of proper postoperative rehabilitation^[2].

In conclusion, with this article, the authors presented a rare case of anterior knee pain and swelling that turned out to be caused by a spontaneous hematoma in the suprapatellar recess, not continuous with the knee joint cavity due to the presence of a complete suprapatellar plica. They highlight that synovial plicae should be reminded in the differential diagnosis of anterior knee pain and swelling.

Acknowledgments

The authors declare no conflicts of interest.

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