

SYNOVIAL LIPOMATOSIS IN A 36-YEAR-OLD FEMALE WITH CHRONIC LEFT KNEE PAIN AND MECHANICAL SYMPTOMS

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Synovial lipomatosis, or lipoma arborescens, is a rare, benign intra-articular disorder characterized by diffuse villous proliferation of synovial tissue due to fatty infiltration. This condition often presents with nonspecific symptoms such as chronic knee pain, intermittent swelling, and mechanical dysfunction, including locking.

Materials and methods. Herein, we present the case of a 36-year-old female with chronic left knee pain, intermittent swelling, and episodes of locking.

Results. Magnetic resonance imaging (MRI) suggested intra-articular pathology, which was confirmed by histopathological examination after arthroscopy and biopsy. The patient underwent arthroscopic synovectomy. Postoperatively, she was satisfied with her outcome, with improved pain relief and function in her right knee.

Discussion. In this case, the patient presented with chronic knee pain, intermittent swelling, and occasional mechanical locking, which are hallmark symptoms of intra-articular pathology. However, the imaging findings, including MRI and ultrasound, were insufficient to establish a definitive diagnosis. MRI is typically considered the gold standard for diagnosing synovial lipomatosis due to its ability to visualize the characteristic villous synovial projections with fatty infiltration, which appear hyperintense on T1- and T2-weighted images and suppress on fat-saturated sequences [2]. Ultrasound, while being a more accessible and cost-effective modality, is often limited in its ability to provide clear differentiation from other synovial pathologies such as pigmented villonodular synovitis (PVNS), synovial chondromatosis, or rheumatoid synovitis. In this case, the imaging findings were nonspecific, highlighting the diagnostic challenges in identifying synovial lipomatosis without histopathological correlation.

Conclusion. This case report highlights the clinical manifestations, diagnostic challenges, and therapeutic options for synovial lipomatosis, emphasizing the importance of early recognition and timely intervention.

Keywords: orchiopexy, synovial lipomatosis, knee arthroscopy, lipoma arborescens, arthroscopy, knee pain.

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СИНОВИАЛЬНЫЙ ЛИПОМАТОЗ У 36-ЛЕТНЕЙ ПАЦИЕНТКИ С ХРОНИЧЕСКОЙ БОЛЬЮ В ЛЕВОМ КОЛЕННОМ СУСТАВЕ И МЕХАНИЧЕСКИМИ СИМПТОМАМИ

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Синовиальный липоматоз или липома арборесценс (древовидная липома), представляет собой редкое доброкачественное внутрисуставное заболевание, характеризующееся диффузной ворсинчатой пролиферацией синовиальной ткани вследствие жировой инфильтрации. Это состояние часто проявляется такими неспецифическими симптомами, как хроническая боль в коленном суставе, интермиттирующий отек и механическая дисфункция, включая блокаду (заклинивание).

Материалы и методы. В данной статье представлен клинический случай 36-летней пациентки с хронической болью в левом коленном суставе, интермиттирующим отеком и эпизодами блокады.

Результаты. Магнитно-резонансная томография (МРТ) позволила предположить внутрисуставную патологию, которая была подтверждена гистопатологическим исследованием после артроскопии и биопсии. Пациентке была выполнена артроскопическая синовэктомия. В послеоперационном периоде она была удовлетворена результатом, отметив уменьшение болевого синдрома и улучшения функции правого коленного сустава.

Обсуждение. В данном случае пациентка предъявляла жалобы на хроническую боль в коленном суставе, интермиттирующий отек и периодическую механическую блокаду, что является характерными симптомами внутрисуставной патологии. Однако визуализирующие методы, включая МРТ и ультразвуковое исследование, оказались недостаточными для установления окончательного диагноза. МРТ обычно считается «золотым стандартом» диагностики синовиального липоматоза благодаря способности визуализировать характерные ворсинчатые выросты синовиальной оболочки с жировой инфильтрацией, которые выглядят гиперинтенсивными на T1- и T2-взвешенных изображениях и подавляются на последовательностях с подавлением жирового сигнала [2]. Ультразвуковое исследование, будучи более доступным и экономически эффективным методом, часто ограничено в своей способности обеспечивать четкую дифференцировку от других синовиальных патологий, таких как пигментный villonodularный синовит (ПВНС), синовиальный хондроматоз или ревматоидный синовит. В данном случае результаты визуализации были неспецифическими, что подчеркивает диагностические трудности при выявлении синовиального липоматоза без гистопатологического подтверждения.

Заключение. Данный клинический случай освещает клинические проявления, диагностические трудности и варианты лечения синовиального липоматоза, подчеркивая важность раннего распознавания и своевременного вмешательства.

Ключевые слова: синовиальный липоматоз, артроскопия коленного сустава, липома арборесценс (древовидная липома), артроскопия, боль в коленном суставе.

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Synovial lipomatosis is a rare, benign but distinct pathological condition characterized by the proliferation of mature adipose tissue within the synovial membrane, leading to villous and frond-like projections. First described by Hoffa in 1904 [1], it is most frequently observed in the knee joint, although other joints such as the shoulder, elbow, and hip may also be affected [2].

The etiology remains uncertain, but chronic inflammation, trauma, or degenerative joint disease is considered a potential trigger [3].

Clinically, it manifests as chronic pain, intermittent swelling, and mechanical symptoms, which may mimic other intra-articular pathologies. MRI plays a pivotal role in diagnosis, while arthroscopy combined with histopathology confirms the diagnosis and guides management. This report underscores the diagnostic and therapeutic approach to synovial lipomatosis in a young adult patient presenting with mechanical knee symptoms.

Case presentation.

Our patient is a 36-year-old female [body mass index (BMI): 27 kg/m²], who presented to our clinic with a long-standing history of left knee pain with intermittent swelling and locking episodes.

sodes.

On presentation to our clinic, the patient's main complaints were chronic swelling with mechanical symptoms, specifically popping, catching, and locking while performing daily activities. Pain was exacerbated by physical activities such as prolonged walking, stair climbing, and squatting. She had a history of knee trauma 5 years ago. No history of fever or systemic symptoms. No prior history of joint disease or surgical interventions. No family history of autoimmune or inflammatory joint disorders.

Examination of her knee revealed mild knee effusions with no instability with varus and valgus stress testing. In addition, the patient had a negative posterior and anterior drawer and Lachman's maneuver. She had normal patellar tracking and mildly restricted extension with pain. Flexion was full but accompanied by discomfort. Positive McMurray and Thessaly tests, suggestive of intra-articular pathology.

Diagnostic workup.

X-Ray (Left Knee).

No bony abnormalities or significant degenerative changes, fractures, avascular necrosis, or osteochondral lesions.

Ultrasound report.



Fig. 1 (Рис. 1)

Fig. 1. MRI, left knee.

A – sagittal view, B – axial view, demonstrating a multiloculated intra-articular cystic lesion (largest: 26x22x16 mm) seen posterior between ACL and PCL. The cyst is high signal in T2, low in T1, and contrast shows septal and wall enhancement (yellow arrow).

Рис. 1. МРТ левого коленного сустава.

А – сагиттальная плоскость, В – аксиальная плоскость, демонстрирующие многокамерное внутрисуставное кистозное образование (наибольшие размеры: 26x22x16 мм), расположенное сзади между передней крестообразной связкой (ПКС) и задней крестообразной связкой (ЗКС). Киста имеет высокий сигнал на T2-взвешенных изображениях, низкий – на T1-взвешенных, при контрастировании отмечается усиление перегородок и стенки (желтая стрелка).

Evidence of soft tissue mass in the posterior recess adjacent to the posterior root of the medial meniscus under the medial head of the gastrocnemius muscle suggests suspicion of either soft tissue chondroma or focal pigmented villonodular synovitis.

MRI report.

There is a multi-loculated intra-articular cystic lesion seen posteriorly between the ACL and PCL. The cyst has a high signal in T2 and a low signal in T1; post-contrast shows septal and wall enhancement, suggestive of intra-articular complicated ganglion cysts (fig. 1). MRIs were negative for bony, meniscal, or ligament pathology.

Diagnosis.

The clinical presentation and imaging studies were inconclusive in establishing a definitive diagnosis. Consequently, the decision was made to proceed with diagnostic arthroscopy. Intraoperatively, villous and frond-like synovial proliferation was observed located posterior to the posterior cruciate ligament (fig. 2). The articular surfaces appeared normal, with no evidence of chondromalacia or cartilage damage. The hypertrophic lipomatous-like projections were systematically debrided, and representative samples were obtained and sent for histopathological evaluation to confirm the di-

agnosis.

Gross description revealed multiple pieces of tissue, whitish yellow in colour, soft in consistency. Microscopic description demonstrated villous proliferation of the synovium with extensive replacement of the subsynovial stroma by mature adipose tissue, the surface lined by a thin layer of synoviocytes with scattered areas of focal hyperplasia, and no evidence of atypia. Features consistent with benign synovial lipomatosis /lipoma arborescens (fig. 3).

Postoperative Care and Follow-Up.

Immediate Postoperative Care Pain was managed with NSAIDs and acetaminophen. Early mobilization with a physiotherapy regimen was initiated to improve ROM and strengthen periarticular muscles.

Outcome.

At the 4-week follow-up, the patient reported significant improvement in pain and swelling.

Discussion.

Synovial lipomatosis, also referred to as lipoma arborescens, is a rare benign condition characterized by diffuse villous proliferation of synovial tissue with adipose infiltration. It commonly affects the knee joint but can also involve other synovial-lined joints such as the hip, shoulder, or elbow. While the exact pathogenesis remains unclear, it has been hypothesized to result from chronic synovial irritation or inflammation secondary to trauma, degenerative joint disease, or other predisposing factors [3]. Despite its characteristic imaging features, the diagnosis of synovial lipomatosis occasionally requires histopathological confirmation, especially in cases where imaging is inconclusive.

In this case, the patient presented with chronic knee pain, intermittent swelling, and occasional mechanical locking, which are hallmark symptoms of intra-articular pathology. However, the imaging findings, including MRI and ultrasound, were insufficient to establish a definitive diagnosis. MRI is typically considered the gold standard for diagnosing synovial lipomatosis due to its ability to visualize the characteristic villous synovial projections with fatty infiltration, which appear hyperintense on T1- and T2-weighted images and suppress on fat-saturated sequences [2]. Ultrasound, while being a more accessible and cost-effective modality, is often limited in its ability to provide clear differentiation from other synovial pathologies such as pigmented villonodular synovitis (PVNS), synovial chondromatosis, or rheumatoid synovitis. In this case, the imaging findings were nonspecific, highlighting the diagnostic challenges in identifying synovial lipomatosis



Fig. 2 (Рис. 2)

Fig. 2. Knee arthroscopic view of villous.

frond-like proliferation of fatty tissue replacing the subsynovial layer of the joint.

Рис. 2. Артроскопический вид коленного сустава.

ворсинчатая, перистая (листовидная) пролиферация жировой ткани, замещающая подсиновальный слой сустава.

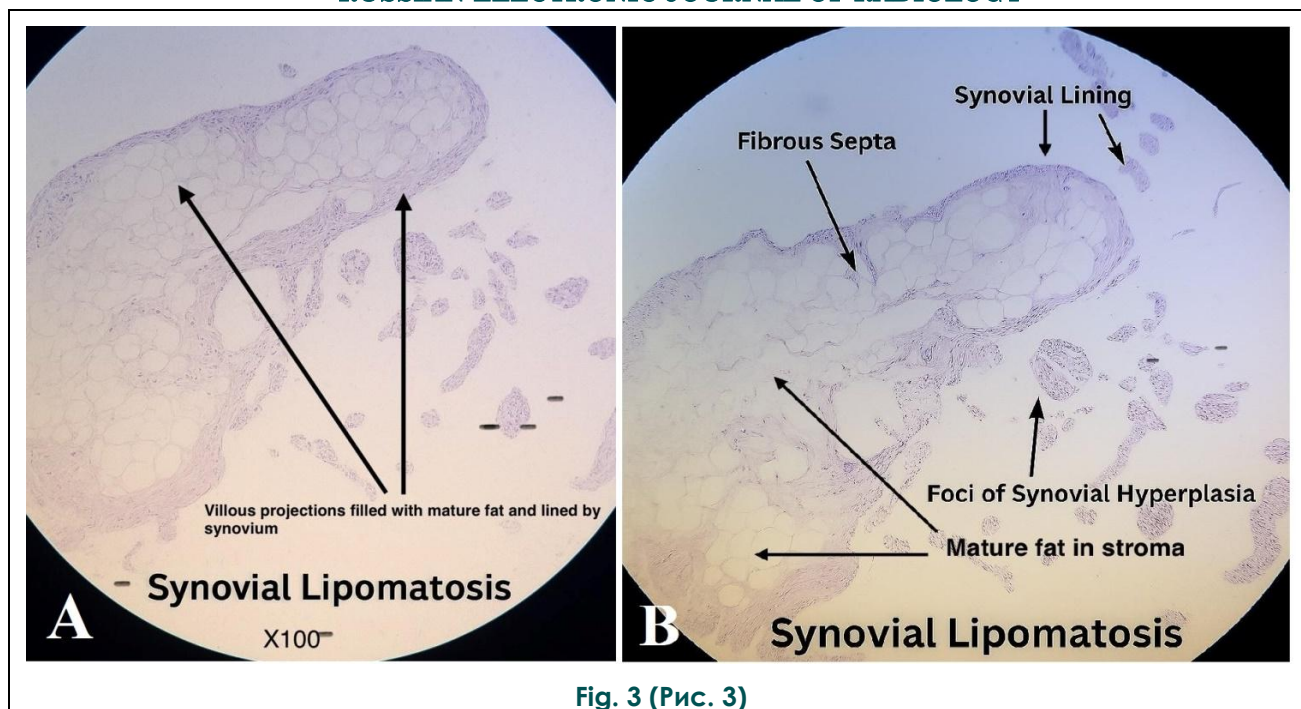


Fig. 3 (Рис. 3)

Fig. 3. Photomicrographs.

Villous projections filled with mature fat and lined by synovial hyperplasia (Hematoxylin / eosin, 100 x) (black arrows).

Рис. 3. Микрофотографии.

Ворсинчатые выросты, заполненные зрелой жировой тканью и выстланные гиперплазированным синовием (гематоксилин и эозин, увеличение $\times 100$) (черные стрелки).

without histopathological correlation.

The decision to proceed with diagnostic arthroscopy was pivotal in this case. Arthroscopy allowed direct visualization of the intra-articular pathology, revealing small, multi-villous projections located posterior to the posterior cruciate ligament (PCL). Importantly, the articular surfaces were found to be normal, with no evidence of chondromalacia or cartilage damage, thus ruling out other degenerative or inflammatory joint conditions. Synovial biopsy obtained during arthroscopy provided the definitive diagnosis. Histopathological examination demonstrated hypertrophic synovial tissue with adipose infiltration, consistent with synovial lipomatosis. These findings confirmed the diagnosis, which could not be reliably established through imaging alone.

The role of arthroscopy in the diagnosis and management of synovial lipomatosis is well established, particularly in cases with inconclusive imaging or atypical presentations [5]. Beyond its diagnostic utility, arthroscopy also serves as a therapeutic intervention, enabling partial or complete synovectomy to reduce mechanical symptoms and inflammation. In this case, arthroscopic debridement of hypertrophic lipomatous synovial projections provided symp-

tomatic relief and prevented further intra-articular damage.

This case underscores the limitations of imaging modalities in certain presentations of synovial lipomatosis and highlights the critical role of arthroscopy and biopsy in establishing a definitive diagnosis. Early recognition and intervention are essential to prevent long-term complications such as joint damage and impaired function. Although synovial lipomatosis is a benign condition, its chronic nature and potential to cause mechanical dysfunction necessitate timely diagnosis and management. Arthroscopic synovectomy, as performed in this case, remains the treatment of choice, offering excellent symptom relief and functional recovery [2, 5].

Conclusion.

This case highlights the diagnostic challenges associated with synovial lipomatosis, particularly in the context of inconclusive imaging findings. It emphasizes the importance of arthroscopy and histopathology in confirming the diagnosis and guiding appropriate management. Clinicians should maintain a high index of suspicion for synovial lipomatosis in patients with chronic knee symptoms and unexplained intra-articular pathology, even when

imaging is nondiagnostic.

Conflict of interest.

The authors declare no conflict of interest.

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