

Synchronous Intra-Articular Osteochondroma and Reactive Synovitis Mimicking Diffuse Tenosynovial Giant Cell Tumor of the Knee: A Case Report

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Abstract

Introduction: True intra-articular osteochondroma of the knee arising from the femoral condyle is exceptionally rare, and to our knowledge its coexistence with a synovial lesion that macroscopically mimics diffuse tenosynovial giant cell tumor (TGCT) has not been previously reported.

Case presentation: We describe a 59-year-old woman with a two-year history of right knee pain and a progressively enlarging soft-tissue mass that had been attributed to osteoarthritis. Magnetic resonance imaging showed an exophytic osteocartilaginous lesion of the anterior medial femoral condyle, together with a heterogeneous intra-articular effusion with fluid-fluid levels and synovial thickening. After review by the oncologic tumor board, the patient underwent excisional resection with synovial margins. Two grossly distinct lesions were found at surgery: a synovial lesion with a macroscopic appearance suggestive of TGCT, and a separate intra-articular osteocartilaginous lesion. Histopathology showed reactive synovitis with old hemorrhage and no malignant component, and a benign osteocartilaginous lesion most compatible with osteochondroma, with a 5 mm cartilage cap. Her early postoperative course showed gradual functional recovery consistent with expected timelines after extensive synovectomy.

Conclusion: This case illustrates two points relevant to clinical practice: the potential for reactive, hemorrhagic synovitis to mimic TGCT macroscopically, and an oncologic decision-making approach for intra-articular lesions in which preoperative cartilage-cap measurement and biopsy are unreliable or risk violating tumor margins.

Keywords: Osteochondroma; Tenosynovial Giant Cell Tumor; Synovitis; Knee Joint; Diagnosis, Differential; Case Report

Introduction

Osteochondroma is the most common benign bone tumor.^[1] It typically arises from the metaphysis of long bones and migrates away from the adjacent joint as the bone remodels with growth. A true intra-articular osteochondroma, one that arises and remains within the joint capsule rather than a metaphyseal exostosis that secondarily encroaches on a joint, is a distinct and considerably rarer presentation. Most published cases are isolated reports, and several authors have noted that only a handful of true intra-articular knee osteochondromas had been documented at the time of their writing. [2,3]

Tenosynovial giant cell tumor (TGCT), which includes what was historically called pigmented villonodular synovitis, is a locally aggressive synovial proliferation known for its diagnostic mimicry. It has been reported to resemble septic arthritis [7], synovial sarcoma [8], and other intra-articular pathology on both imaging and gross inspection at surgery. This mimicry can shape intraoperative decisions and the extent of resection before histology is available.

In the case reported here, both entities occurred synchronously within the same knee: a true intra-articular osteochondroma of the anterior distal femur, and a separate synovial lesion whose intraoperative appearance strongly suggested diffuse TGCT but proved on histology to be reactive synovitis with old hemorrhage. We are not aware of a prior report of this combination. The case also illustrates a practical approach to oncologic decision-making when imaging cannot reliably exclude malignancy and biopsy risks violating a lesion's margins.

Case Presentation

Patient Information

A 59-year-old woman who worked in domestic and general services presented with a two-year history of right knee pain and a progressive sensation of soft-tissue mass. She had been evaluated several times by physiotherapy under a working diagnosis of osteoarthritis and had not previously undergone formal orthopedic assessment. She presented to the Emergency Department on March 10, 2026, after worsening of pain in the affected knee.

Clinical Findings

On examination, a hard, well-defined mass was palpable in the suprapatellar region. It was mobile and tender, with shiny overlying skin changes, in a medial parapatellar location. Range of motion was 0-90° without pain or locking, and no distal neurovascular deficit was found.

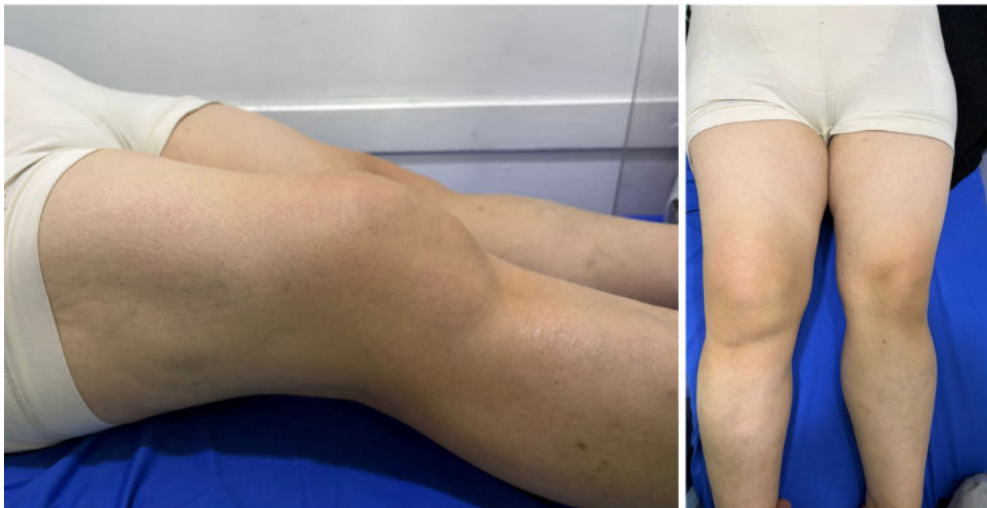


Figure 1. Clinical photograph at admission (March 10, 2026).

Timeline

Date	Event
~March 2024 (2 yrs prior)	Onset of right knee pain and progressive soft-tissue mass sensation; evaluated repeatedly by physiotherapy under a working diagnosis of osteoarthritis; no prior orthopedic assessment
March 10, 2026	Presentation to the Emergency Department; physical exam and radiographs obtained
March 11, 2026	MRI (knee) and contrast-enhanced chest CT (oncologic staging) performed
March 2026 (pre-op)	Oncologic tumor board review (Drs. Linares, Macallister, De los Santos, Arbeláez); decision for excisional resection with synovial margins
March 16, 2026	Surgery: medial parapatellar approach; resection of (1) synovial lesion with macroscopic TGCT-like appearance and (2) intra-articular osteocartilaginous lesion of the anterior distal femur
April 14, 2026	Pathology report finalized (Dr. Peña Carvajalino)
April 9, 2026 (3 wks post-op)	Follow-up: significant improvement in pain and function; mild limp; referred to 10 sessions of physiotherapy
May 14, 2026 (2 mo post-op)	Follow-up: further pain improvement; 45° flexion achieved; next control in 4 months with X-ray

Diagnostic Assessment

Imaging

Plain radiographs obtained on March 10, 2026 showed an anterior exostotic formation dependent on the medial femoral condyle, raising the possibility of osteochondroma, together with occupation of the suprapatellar recess and medial femorotibial osteoarthritic changes with marginal osteophytes.



Figure 2. Anteroposterior and lateral knee radiographs (March 10, 2026) showing an exostotic formation dependent on the medial femoral condyle and suprapatellar recess occupation.

Diagnostic Assessment

MRI of the knee (March 11, 2026, 1.5T with gadolinium) showed an exophytic lesion with regular, well-defined contours on the anterior aspect of the medial femoral condyle, measuring 27 × 30 × 14 mm, with signal intensity similar to the adjacent femoral bone and no abnormal contrast enhancement. There was associated thinning of the overlying articular cartilage. A heterogeneous intra-articular effusion with fluid-fluid levels extended into the suprapatellar and lateral patellar recesses, with mild synovial thickening and heterogeneous enhancement. Tricompartmental patellofemoral osteoarthritic changes and an uncomplicated Baker's cyst were also present. The impression favored sessile osteochondroma as the leading possibility, with associated synovitis.

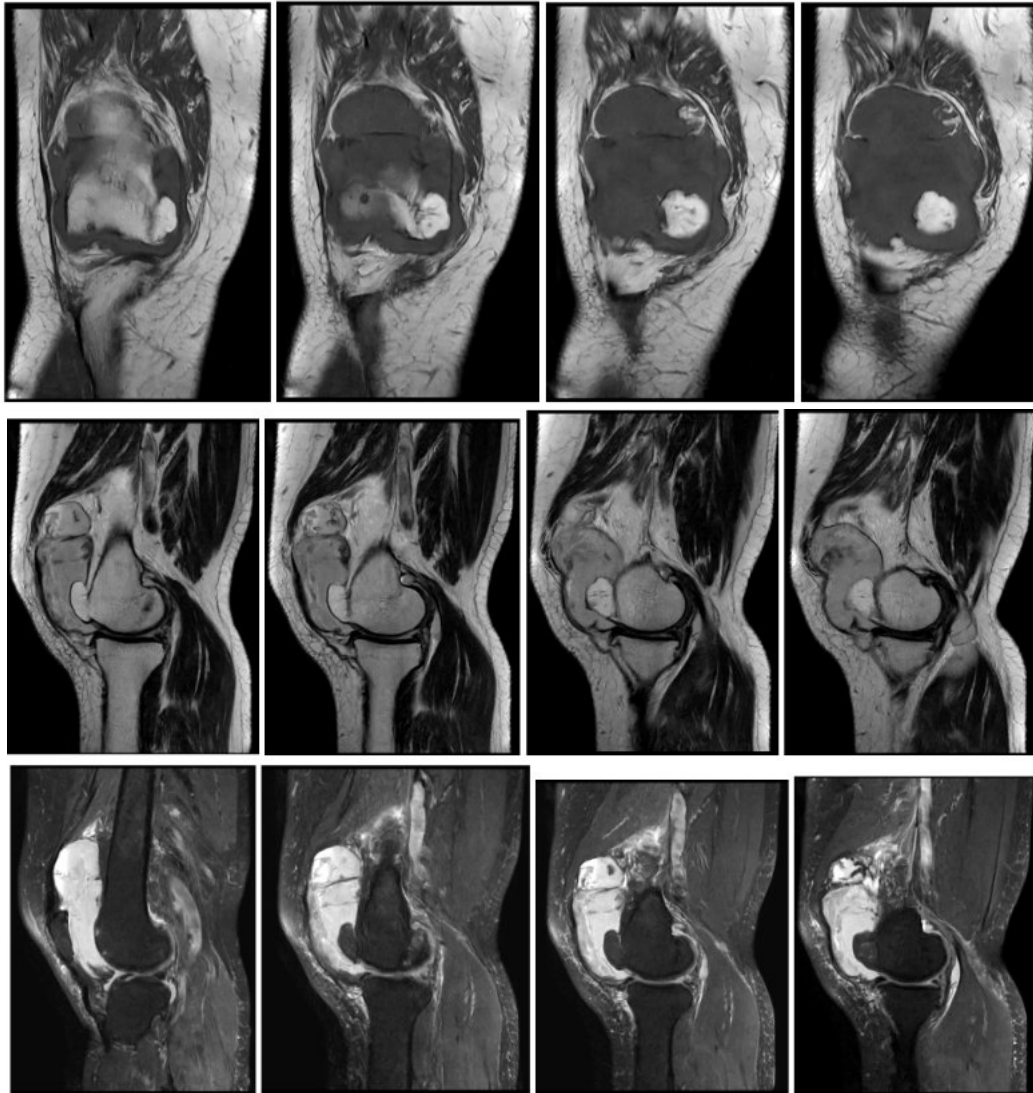


Figure 3a-c. MRI of the right knee (March 11, 2026): coronal T1, sagittal T2, and sagittal DP SPAIR sequences, demonstrating the osteocartilaginous lesion of the anterior medial femoral condyle and the intra-articular effusion with fluid-fluid levels.

Contrast-enhanced chest CT performed for oncologic staging showed no intrathoracic metastatic disease. An incidental 19 mm solid nodule was found in the right retroareolar breast, for which ultrasound characterization was recommended.

Laboratory Studies

Bone metabolism studies at admission were within normal limits: alkaline phosphatase 89 U/L, LDH 212.78 U/L, calcium 9.9 mg/dL, phosphorus 4.4 mg/dL, albumin 4.6 g/dL, and total protein 7.45 g/dL. These findings were

Diagnostic Reasoning and Tumor Board Decision

Imaging alone could not reliably exclude low-grade chondrosarcoma, a preoperative cartilage-cap measurement could not be obtained with confidence, and percutaneous biopsy carried a risk of transgressing the cap. For these reasons, the oncologic tumor board elected against biopsy and proceeded directly to excisional resection with synovial margins, which would also serve as an excisional biopsy. Reconstruction options, including an endoprosthesis if needed, were preserved in case a higher-grade malignancy was identified on final pathology. This reflects a broader principle in the management of ambiguous intra-articular lesions: when the cartilage cap cannot be measured reliably before surgery and biopsy carries a meaningful risk of violating the tumor, a margin-preserving excisional strategy can be justified even without a confirmed preoperative diagnosis.

Diagnostic and Therapeutic Intervention

Surgery was performed on March 16, 2026 by Dr. Linares, assisted by Dr. Macallister, under general anesthesia with tourniquet control, through a medial parapatellar approach. Intra-articular fluid was aspirated and sent to pathology. Capsulotomy was performed.

Two grossly distinct lesions were identified and resected. The first had the macroscopic appearance of a tenosynovial giant cell tumor and involved the suprapatellar pouch, the medial and lateral recesses, the anterior cruciate ligament, and the lateral meniscus; it was resected with wide margins using electrocautery and a harmonic

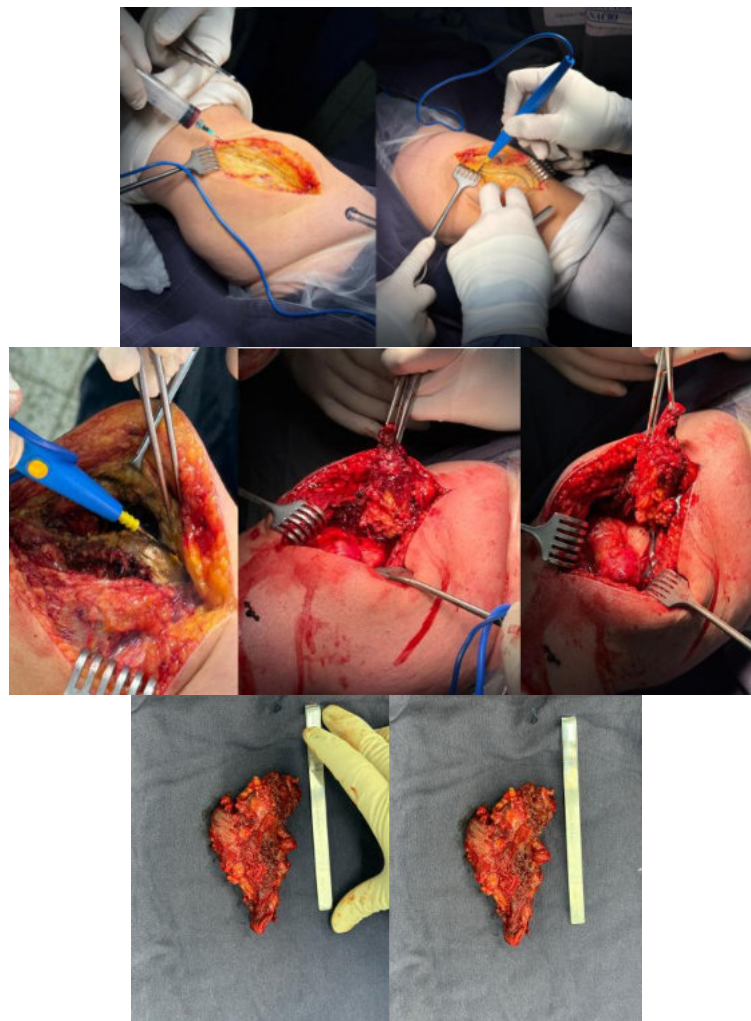


Figure 4a

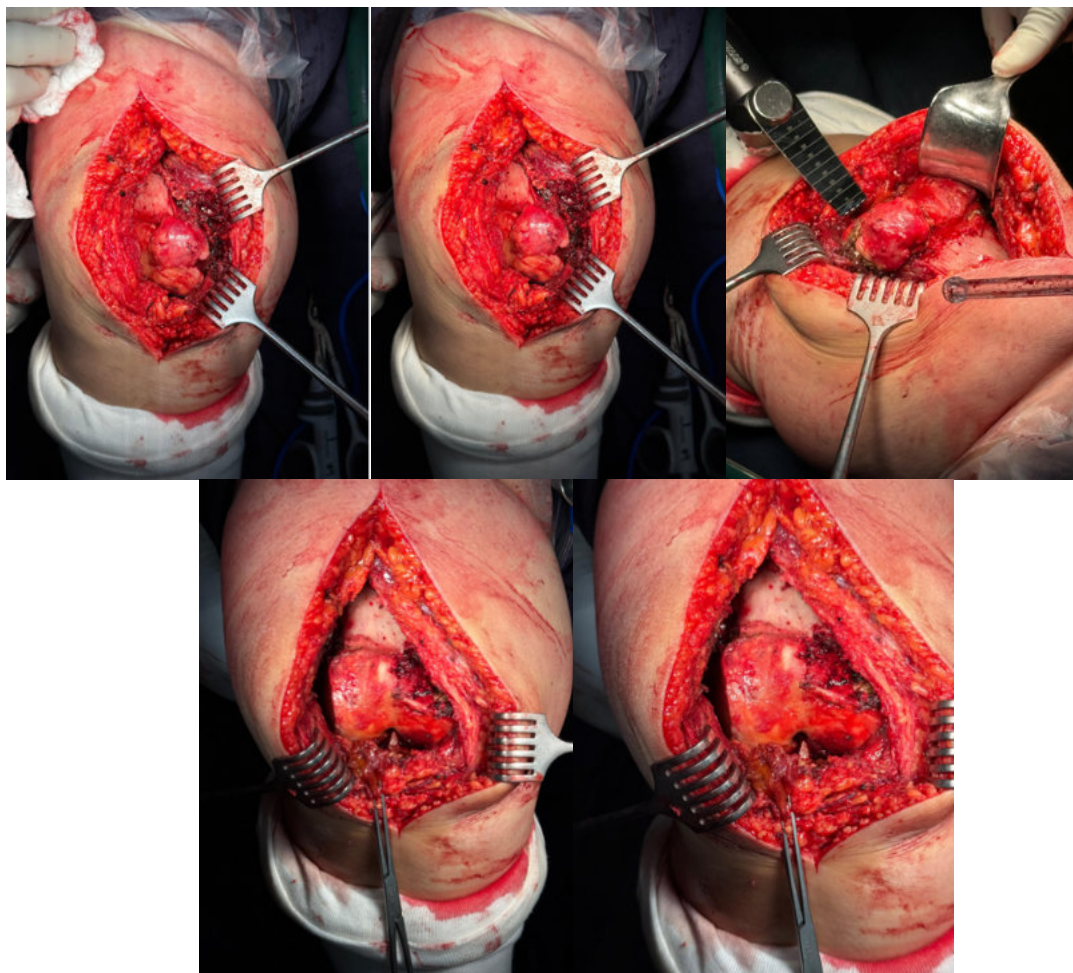


Figure 4. Intraoperative photographs showing (a) the synovial lesion with a macroscopic appearance suggestive of TGCT prior to resection, and (b) the intra-articular osteochondroma of the anterior distal femur.

Both specimens were sent for pathology and immunohistochemistry. Closure was performed in anatomical planes, and a Jackson-Pratt drain was placed.



Figure 5. Postoperative radiograph (March 17, 2026).

Pathology

The soft-tissue specimen (8.5 × 5 × 3 cm) showed synovium with reactive changes, mild chronic inflammation, and old hemorrhage; no malignant component was identified on extensive sampling. The bone fragment (3.2 × 2.7 × 2.5 cm) was a benign osteocartilaginous lesion with a cartilage cap measuring 5 mm at its greatest extent, most compatible with osteochondroma; additional cuts and extensive sampling showed no features suggesting malignant behavior.

Postoperative bone metabolism labs normalized: alkaline phosphatase 61 U/L, LDH 153.11 U/L, calcium 9 mg/dL, phosphorus 3.5 mg/dL.

Follow-up and Outcomes

At three weeks (April 9, 2026), the patient reported significant improvement in pain and function, with a mild limp on ambulation, and was referred for ten sessions of physiotherapy.

By two months (May 14, 2026), pain had improved further and she had reached 45° of knee flexion, with an overall favorable evolution noted by the treating surgeon. Control radiographs were scheduled at four months.

This degree of flexion at two months should be read against the expected recovery trajectory after extensive knee functional recovery may take 6 to 12 months.[9] This patient's baseline also included pre-existing tricompartmental osteoarthritis and intraoperative involvement of the ACL and lateral meniscus, both of which would be expected to slow recovery further. The 2-month finding is therefore consistent with an early point on a longer recovery curve rather than a poor outcome.

Discussion

Three features of this case set it apart from prior reports. True intra-articular osteochondroma of the knee, as distinct from a metaphyseal exostosis that secondarily encroaches on the joint, remains uncommon; several prior reports describe only a small number of comparable cases. [2,3,4,5] The synovial component's macroscopic resemblance to diffuse TGCT is itself a recognized pattern, since TGCT is well documented to mimic other intra-articular pathology on imaging and at surgery; in this case, however, the direction of mimicry was reversed, with a reactive, hemorrhagic process resembling TGCT rather than the converse. The synchronous occurrence of both lesions in a single joint appears, to our knowledge, not to have been reported previously. The patient's age is also notable: intra-articular osteochondroma of the knee is described disproportionately in children and young adults, and a presentation in a 59-year-old woman falls outside the age range typically reported for this entity. This likely reflects referral and detection patterns rather than a true age restriction, since an asymptomatic osteochondroma can persist unrecognized for decades before a separate process brings it to attention.

The presenting complaint is also worth noting. Most reported intra-articular osteochondromas of the knee come to attention because of mechanical symptoms attributable to the bony lesion itself, such as pain, clicking, or locking. In this patient, the complaint that ultimately prompted evaluation was a palpable, enlarging soft-tissue mass, a finding more consistent with the much larger synovial component (8.5 × 5 × 3 cm) than with the osteochondroma itself. This fits with the two-year delay in diagnosis and the initial attribution of her symptoms to osteoarthritis: a small intra-articular bony lesion may have gone clinically unrecognized on its own, while the growing synovial mass was what eventually prompted imaging. The reactive synovial component therefore appears to have shaped not only the intraoperative diagnostic impression but the entire path to diagnosis.

One possible explanation links the two lesions mechanistically. Chronic mechanical irritation from the intra-articular osteochondroma against the adjacent synovium may have caused repeated microhemorrhage, with hemosiderin deposition producing the yellow-brown appearance that suggested TGCT at surgery and that histology later attributed to reactive synovitis with old hemorrhage. This explanation is consistent with the hemorrhagic joint fluid found intraoperatively and with the histologic finding of old hemorrhage in the synovial specimen, though it remains an interpretation rather than a confirmed mechanism.

The tumor board's decision to proceed directly to excisional resection, without prior biopsy, illustrates a workable approach to ambiguous intra-articular lesions. When the cartilage cap cannot be measured reliably before surgery and percutaneous biopsy risks violating it, with the attendant risk of a worse oncologic outcome should malignancy later be confirmed, proceeding to excision with adequate margins while preserving reconstructive options can be reasonable even without a definitive preoperative diagnosis. This is consistent with the radiologic literature identifying cartilage cap thickness as the most reliable predictor of malignant transformation; Bernard et al. found a threshold of 2 cm in skeletally mature adults to have 100% sensitivity and 98% specificity for secondary chondrosarcoma.[6] The final pathologic cap measurement in this patient, 5 mm, fell well below that threshold and below the imaging-based concern that had partly motivated surgery. This discrepancy does not undermine the surgical rationale: the justification for excision rested on the acknowledged unreliability of preoperative cap measurement, not on a specific numeric threshold taken in isolation.

Limitations

- This report describes a single case, which limits generalizability.
- Follow-up is currently limited to two months postoperatively. Longer-term functional data, targeted at 6 and 12 months in keeping with the recovery timelines reported for TGCT synovectomy[9,10], will be needed to confirm the expected trajectory.

Conclusion

Synchronous intra-articular osteochondroma and reactive synovitis mimicking TGCT is, to our knowledge, a previously unreported combination. The case supports an oncologic decision-making approach that does not rely on a single, often unreliable, preoperative measurement, and it is a reminder that a characteristic macroscopic appearance at surgery should not substitute for histologic confirmation.

Declarations

Patient Perspective

A formal patient-reported statement was not obtained prior to submission.

Conflict of Interest

The authors declare no conflict of interest.

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Use of Artificial Intelligence

During preparation of this manuscript, the authors used an AI language model (Claude, Anthropic) to assist with literature search, drafting, and language editing. All authors reviewed, edited, and approved the final content and take full responsibility for its accuracy.

Author Contributions

Mcallister N: patient care, clinical follow-up, and case conception; critical review of the manuscript. López Avella E: literature search, manuscript drafting, and revision. Ramirez MA: critical review of the manuscript. Linares Restrepo FB: senior clinical oversight and supervision; critical review of the manuscript. All authors approved the final version of the manuscript and agree to be accountable for all aspects of the work.

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