Scholars Journal of Medical Case Reports
Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Pathology

Non-Traumatic Myositis Ossificans: A Rare Mimicker of Soft Tissue Sarcoma

Dr. Tazi I[1*], Pr. Allaoui M[1], Pr. Azzekhmam M[1], Pr. Elktaibi A[1], Pr. Essaoudi A[1], Pr Elouchi M[1], Pr. Oukabli M[1], Pr. Chahdi H[1]

[1]Pathology Department, Military Hospital of Instructions Mohamed V

DOI: https://doi.org/10.36347/sjmcr.2026.v14i02.004 | **Received:** 08.12.2025 | **Accepted:** 31.01.2026 | **Published:** 07.02.2026

***Corresponding author:** Dr. Tazi I
Pathology Department, Military Hospital of Instructions Mohamed V

Abstract **Case Report**

Myositis ossificans is a benign, self-limiting lesion characterized by heterotopic bone formation within soft tissues, often following trauma but occasionally arising spontaneously. Its clinical and radiological features frequently mimic malignant tumors, making accurate diagnosis challenging. Understanding its evolution from early inflammatory stages to mature ossified lesions is essential to prevent mismanagement. The purpose of this case is to highlight a rare non-traumatic presentation that closely simulated a soft tissue sarcoma. Major findings include the absence of trauma, misleading MRI features, and confirmation of the characteristic zonal pattern on histopathology. This case underlines the importance of correlating imaging with tissue diagnosis to avoid overtreatment. In conclusion, early recognition of this benign entity remains crucial to prevent unnecessary aggressive management.

Keywords: Myositis Ossificans, Non Traumatic, Case Report.

INTRODUCTION

Myositis ossificans is a non-cancerous, solitary, and self-limiting soft tissue lesion characterized by abnormal bone formation, usually developing within skeletal muscle [1]. Usually there is no specific cause identified. However, around 60–70% are linked to repetitive minor mechanical trauma, while other potential contributing factors include ischemia, inflammation, infections, burns, neuromuscular disorders, hemophilia, and drug abuse [2].

This report highlights a rare presentation of non-traumatic myositis ossificans in the thigh of a young adult and places it in context through a focused review of the existing literature.

CASE REPORT

A 29-year-old woman developed a progressive, painful swelling in the left anterior thigh over six weeks. Examination found a firm 8 cm quadriceps mass without skin or neurovascular involvement and no history of trauma or infection. Lab tests were normal. Imaging showed a well-encapsulated intramuscular lesion (85 × 60 × 55 mm) T1 hypointense, T2 hyperintense, with peripheral enhancement and edema, initially suggesting a soft tissue sarcoma.

Incisional biopsy showed characteristic histological zonation: central immature fibroblastic proliferation transitioning to osteoid deposition and trabecular bone formation peripherally, with an outer rim of mature lamellar bone. No atypia or malignancy was identified, confirming myositis ossificans **(figure1 A and B)**.

The diagnosis was confirmed morphologically on routine H&E staining, without the need for immunohistochemistry.

Conservative treatment with NSAIDs and physiotherapy led to progressive improvement. At 05-month follow-up, the patient achieved near-complete functional recovery.

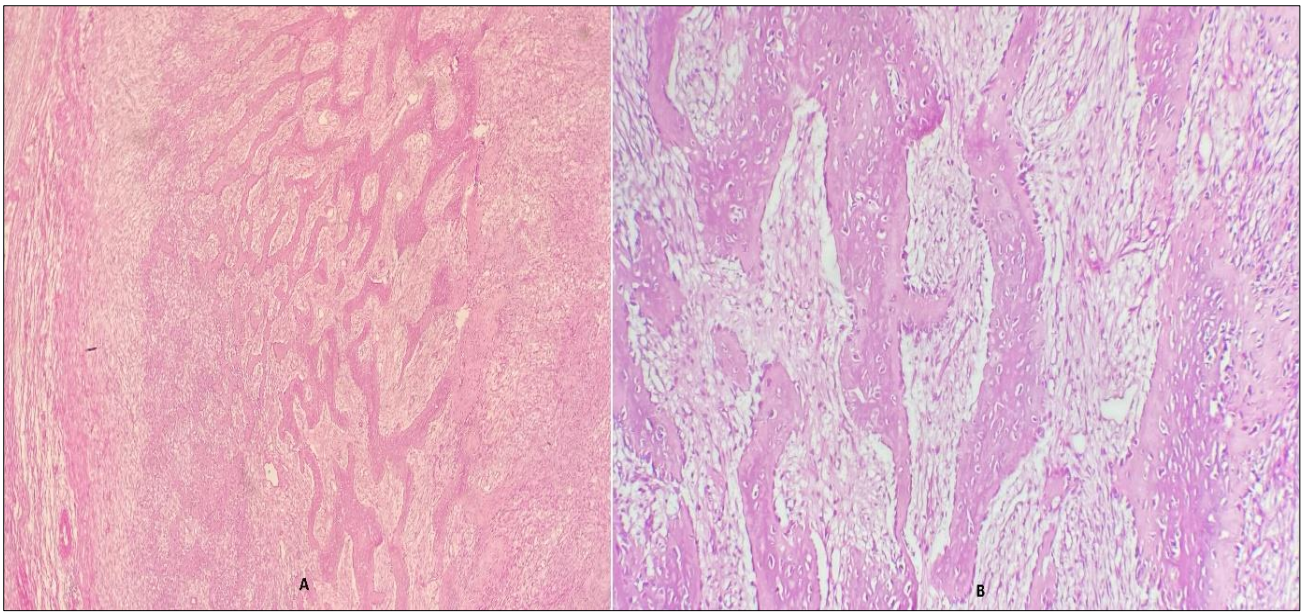

Figure 1: A: Low-power view (×20) showing the characteristic zonal pattern of myositis ossificans, with a central fibroblastic proliferation gradually transitioning toward peripheral ossification. The lesion is well circumscribed and separated from adjacent muscle fibers by a thin fibrous capsule. B: High-power view (×40) revealing immature osteoid trabeculae rimmed by osteoblasts at the periphery, without cytologic atypia or abnormal mitotic figures, confirming the benign reactive nature of the lesion.

DISCUSSION

Myositis ossificans (MO) is an uncommon, non-malignant ossifying lesion defined by localized development of heterotopic bone and cartilage within extraskeletal soft tissues [3]. It can occur at any age, but it most frequently affects young, physically active adolescents and adults, particularly those engaged in athletic activities [4].

The cause varies depending on the specific type of myositis ossificans involved. In fact In 1924, Noble categorized myositis ossificans (MO) into three subtypes: (A) myositis (fibrous) ossificans progressiva, (B) traumatic MO, and (C) MO circumscripta, which occurs without any history of trauma [5], with the traumatic one being the most common subtype.

Progressive myositis ossificans is a rare autosomal dominant disorder caused by BMPR1 gene mutations, leading to fibrosis and bone formation in muscles. It usually appears before age five and causes severe disability [6].

Non-traumatic circumscripta myositis ossificans is a rare form of the condition characterized by the absence of any prior history of trauma. Which we describe in this case report [7].

Non-traumatic circumscribed myositis ossificans is an uncommon condition that shows no sex predominance or specific anatomical predilection. It mainly affects adolescents and young adults under 30 years old [8], most often involving the arm's flexor muscles and the thigh's extensor muscles [2].

Myositis ossificans results from an abnormal transformation of fibroblasts into bone-forming cells after muscle injury. The inflammatory response releases cytokines (notably BMP-2, BMP-4, and TGF-β) that induce vascular cells to become mesenchymal stem cells, which then differentiate into chondrocytes or osteoblasts, forming heterotopic bone through an endochondral ossification process [9].

Myositis ossificans presents as a painful, rapidly enlarging inflammatory muscle swelling that hardens over weeks into a firm mass. The lesion then ossifies and generally becomes painless within 6 to 12 months [3].

This lesion exhibits a clinical growth pattern that corresponds with imaging and histology, progressing through three phases: early, intermediate, and mature.

In the first four weeks, the lesion shows mainly inflammation, with no visible calcifications on imaging. Between four and eight weeks, calcifications appear as the lesion enters the intermediate phase. Later, during the mature phase, peripheral bone formation becomes evident, leading over time to lesion consolidation and gradual shrinkage [10].

Thomas *et al*., emphasized the usefulness of ultrasound for early detection of heterotopic bone formation, identifying three concentric zones:an outer hypoechoic zone (surrounding tissue), a middle

hyperechoic zone (calcifying rim), and a central hypoechoic zone (fibroblastic core) [11].

Radiographs frequently lack diagnostic clarity in the early stages, and MRI results may be inconclusive. Consequently, for lesions with uncertain characteristics, a biopsy is required to confirm the diagnosis and guide the treatment plan [2].

The histological evolution of myositis ossificans spans from a primitive, densely cellular fibroblastic proliferation to a well-developed lesion characterized by peripheral lamellar bone formation. In its initial phases, differentiating myositis ossificans from sarcoma under the microscope may be challenging [12].

At the mature stage, biopsy reveals the three distinctive histological zones of myositis ossificans, providing definitive diagnosis. The central zone displays an inflammatory infiltrate composed of macrophages, lymphocytes, polymorphic fibroblasts, evidence of angiogenesis, and muscle fibers showing atrophy or degeneration. The intermediate zone consists of more organized collagen trabeculae and immature osteoid cells. The peripheral zone is characterized by calcified osteoid, regions of cartilaginous metaplasia, and well-formed lamellar bone, all separated from the adjacent muscle by connective tissue lacking an inflammatory infiltrate [7].

The differential diagnosis of myositis ossificans includes calcified fibromatosis, localized infections, and malignant tumors such as lymphoma, osteosarcoma, and rhabdomyosarcoma. It is often mistaken for extraskeletal osteosarcoma because of their similar clinical and pathological features [13]. **Table 1** summarizes the key histopathological features that help differentiate myositis ossificans from its malignant mimics, emphasizing the diagnostic value of the characteristic zonal architecture.

Table 1: The key histopathological features that help differentiate myositis ossificans from its malignant mimics

Feature	Myositis ossificans (mature stage)	Extraskeletal osteosarcoma	Rhabdomyosarcoma / Soft tissue sarcoma
Architecture	Well-organized *zonal pattern*: central fibroblastic area → intermediate osteoid → peripheral mature bone	Disorganized growth without zonation	Poorly circumscribed, infiltrative growth
Cellularity	Moderate; fibroblastic proliferation centrally	High; pleomorphic, atypical cells	Variable, often high
Nuclear atypia	Minimal to absent	Marked atypia and hyperchromasia	Moderate to severe
Mitotic activity	Scant, normal mitoses	Numerous, often atypical	Frequent mitoses
Osteoid formation	Mature, peripheral, reactive in nature	Immature, malignant osteoid within tumor cells	Absent
Inflammation	Common in early stages	Usually absent	Variable
Necrosis	Rare	Common	Common
Immunohistochemistry	Non-specific; used to exclude sarcoma (SATB2 negative, SMA/fibroblast markers)	SATB2+, MDM2/ CDK4 in some cases	Desmin, MyoD1, Myogenin positive
Prognosis	Benign, self-limiting	Aggressive, poor prognosis	Variable, depends on subtype

Conservative treatment primarily aims to relieve symptoms and maintain function. Since the condition is usually self-limiting, non-surgical management is often sufficient. For initial muscle injuries, Järvinen *et al*., recommend short-term immobilization (3–7 days) combined with rest, ice, compression, and elevation (RICE). Surgery (excision) is only considered for persistent or symptomatic cases that do not respond to conservative therapy [2].

Mature non-traumatic myositis ossificans often requires surgical excision for complete resolution. The prognosis is excellent, as the condition is usually self-limiting and may resolve spontaneously. In early stages, NSAIDs and physiotherapy can be effective conservative treatments [5].

CONCLUSION

Non-traumatic myositis ossificans is a rare benign condition that can mimic soft tissue sarcomas, posing diagnostic challenges. Recognizing its self-limiting nature and zonal histological pattern, and correlating clinical, imaging, and pathological findings, helps avoid unnecessary surgery and ensures an excellent prognosis. It should always be considered in rapidly growing, calcified soft tissue masses, as early diagnosis prevents aggressive, avoidable treatment.

REFERENCES

1. Kransdorf MJ, Meis JM, Jelinek JS: Myositis ossificans: MR appearance with radiologic-pathologic correlation. AJR Am J Roentgenol 1991;157(6): 1243-1248.

2. Walczak BE, Johnson CN and Howe BM: Myositis ossificans. J Am Acad Orthop Surg 23: 612-622, 2015.
3. Rehman N, Sadashiva H, Madakshira MG, Raman DK. Non-traumatic myositis ossificans. Autops Case Rep [Internet]. 2021;11:e2021316. Available from: https://doi.org/10.4322/acr.2021.316
4. Tyler P, Saifuddin A. The imaging of myositis ossificans. Semin Musculoskelet Radiol. 2010;14(2):201-16. http:// dx.doi.org/10.1055/s-0030-1253161. PMid:20486028
5. Rehman N, Sadashiva H, Madakshira MG, Raman DK. Non-traumatic myositis ossificans. Autops Case Rep [Internet]. 2021;11:e2021316. Available from: https://doi.org/10.4322/acr.2021.316
6. Pignolo RJ, Shore EM, Kaplan FS. Fibrodysplasia ossificans progressiva: diagnosis, management, and therapeutic horizons. Pediatr Endocrinol Rev. 2013;10(Suppl 2):437 48
7. El Bardouni A, Boufettal M, Zouaidia F, et al. Non traumatic myositis ossificans circumscripta: a diagnosis trap. J Clin Orthop Trauma. 2014;5(4):261-5. http:// dx.doi.org/10.1016/j.jcot.2014.09.005. PMid:25983509.
8. Saartje Defoort, Arnout NA, Debeer PD. Myositis ossificans circumscripta of the triceps due to overuse in a female swimmer. Int J Shoulder Surg. 2012;6(1):19.
9. Medici D, Olsen BR: The role of endothelial-mesenchymal transition in heterotopic ossification. J Bone Miner Res 2012;27(8):1619-1622.
10. Kaplan FS, Glaser DL, Hebela N, Shore EM: Heterotopic ossification. JAm Acad Orthop Surg 2004;12(2):116-125.
11. Thomas EA, Cassar-Pullicino VN, McCall IW: The role of ultrasound in the early diagnosis and management of heterotopic bone formation. Clin Radiol 1991;43(3):190-196.
12. Folpe AL, Gown AM: Cartilaginous and osseous soft tissue tumors, in Goldblum JR, Folpe AL, Weiss WS , eds: Enzinger & Weiss's Soft Tissue Tumors,ed6. Philadelphia, PA, Elsevier, 2014, pp 917-946.
13. Sorin Claudiu MAN, Schnell CN, Fufezan O, Mihut G. Myositis ossificans traumatica of the neck e a pediatric case. Mædica. 2011;6(2):128.