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

Radiology

Trauma-Induced Neurogenic Myositis Ossificans (NMO): A Rare Post-Traumatic Complication

H. Tadili[1*], A. Hafidi[1], A. Diani[1], R. Bouroumane[1], M. Benzalim[1], S. El Alj[1]

[1]Department of Radiology, Ibn Tofail Hospital, University Hospital Center Mohamed VI, Marrakech Morocco

DOI: https://doi.org/10.36347/sjmcr.2025.v13i10.085 | **Received:** 26.08.2025 | **Accepted:** 23.10.2025 | **Published:** 25.10.2025

***Corresponding author:** H. Tadili
Department of Radiology, Ibn Tofail Hospital, University Hospital Center Mohamed VI, Marrakech Morocco

Abstract **Case Report**

Neurogenic Myositis Ossificans (NMO) is a rare form of heterotopic ossification that occurs in approximately 10–20% of patients with severe central nervous system injuries, most commonly after traumatic brain or spinal cord injury. It is characterized by ectopic bone formation within periarticular soft tissues, leading to pain, swelling, and progressive joint stiffness. We report the case of a 54-year-old male who developed a paraplegia after a spine injury. Radiographs revealed early periarticular calcifications that progressively matured into well-organized ossifications on CT, showing cortical and trabecular differentiation without continuity with the adjacent skeleton—features typical of NMO. Laboratory tests showed elevated alkaline phosphatase with no systemic inflammation. The patient was managed conservatively with anti-inflammatory therapy and physiotherapy, resulting in stabilization of the ossifications but no functional recovery. This case illustrates the characteristic imaging evolution of NMO and emphasizes the radiologist's key role in early diagnosis, differential assessment, and follow-up to guide appropriate multidisciplinary management.

Keywords: Neurogenic Myositis Ossificans, Heterotopic Ossification, Traumatic Injury, Hip, CT, Radiology Case Report.

INTRODUCTION

Neurogenic Myositis Ossificans (NMO) is a rare form of heterotopic ossification that occurs in patients with severe neurological injuries, such as spinal cord trauma, traumatic brain injury, or paraplegia. It involves abnormal bone formation in periarticular soft tissues, most commonly affecting the hips, knees, or shoulders, and can lead to pain, swelling, and limited joint mobility. The condition usually develops within weeks after the neurological insult and can cause significant functional impairment if not recognized early.

Imaging is essential for diagnosis and management. Radiographs may show early calcifications, while CT provides detailed assessment of ossification extent and maturation. MRI can detect early soft tissue changes during the inflammatory phase. Prompt radiologic recognition is crucial to distinguish NMO from infection, thrombosis, or tumors and to guide conservative or surgical management.

This report presents a case of post-traumatic NMO in a paraplegic patient, highlighting the clinical and imaging findings that led to diagnosis and management.

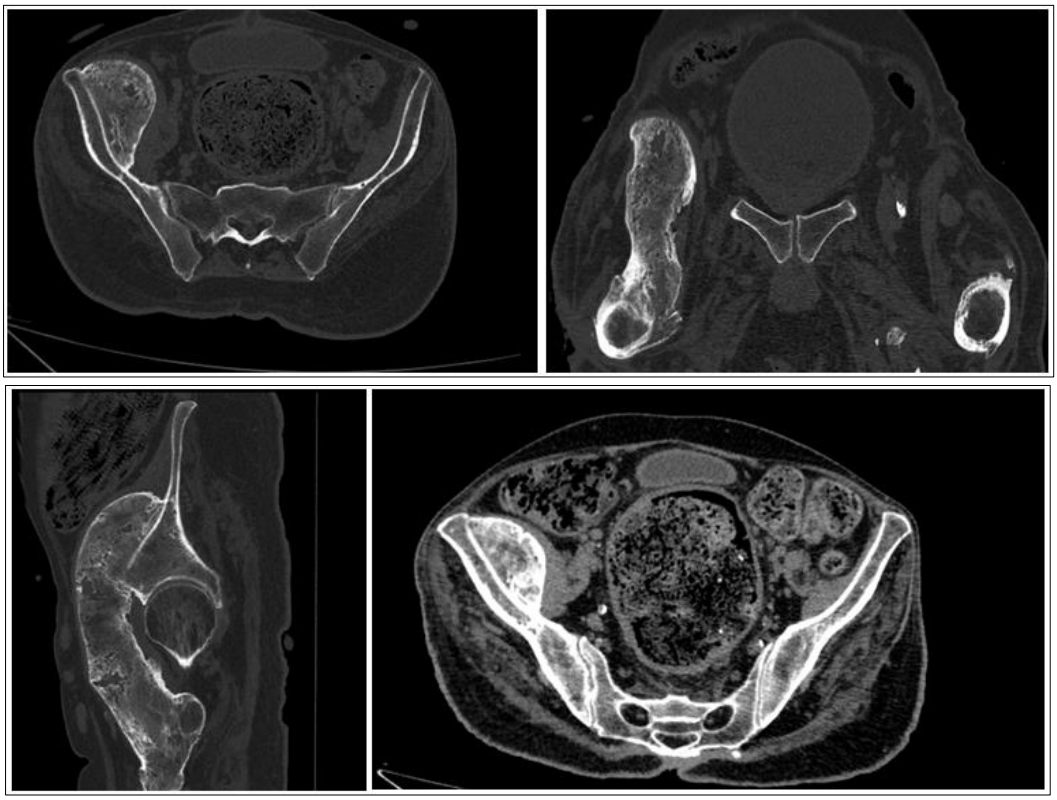
CASE REPORT

A 54-year-old male sustained a spine injury due to a road accident, resulting to a traumatic fracture of D11 and D12 in a previous CT scan.

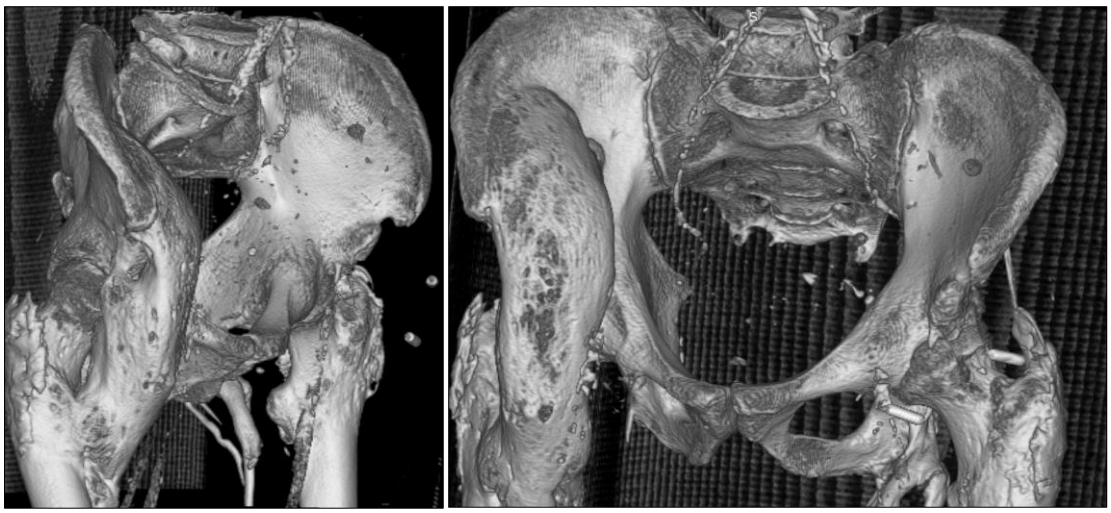
Approximately a few hours after the injury, the patient developed a dorsal pain followed by a paraplegy that has been installed 2 days after the injury. On clinical examination the joint mobility was restricted, laboratory tests revealed elevated alkaline phosphatase, with abnormal inflammatory markers. We realized a hip CT scan to evaluate if the cause of paraplegy was spinal or in the hip area, we then found:

- Hip CT scan: Exuberant bony proliferations involving both hip joints, more pronounced on the right, forming bony bridges with the appearance of mature, corticated bone, with an atrophy regarding the gluteal and lower limb muscles.
- The patient was managed conservatively with anti-inflammatory therapy and physiotherapy,

resulting in stabilization of the ossifications but no functional recovery.



"Figure 1: Images showing an MPR reconstruction, an axial coronal and sagittal view bony proliferations involving both hips hip joints and forming bony bridge'



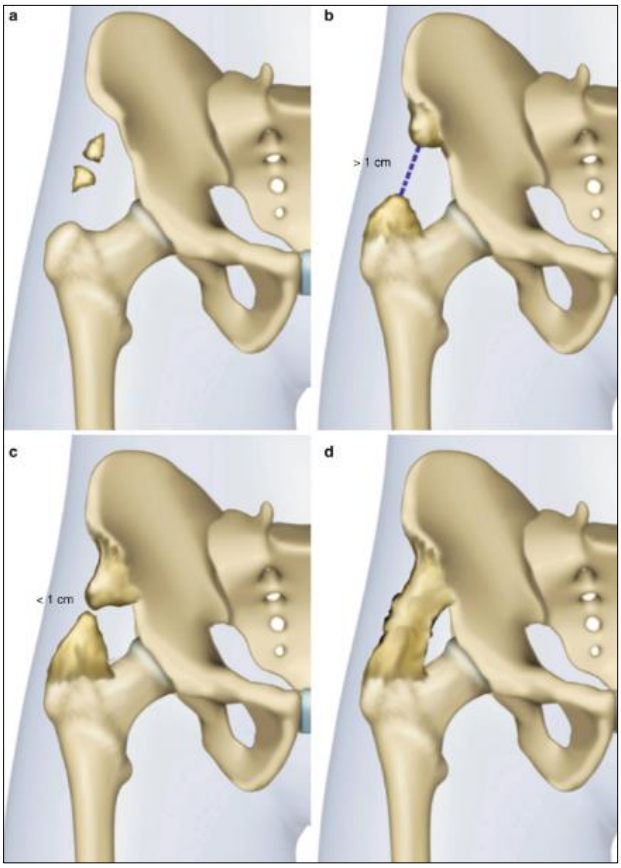
"Figure 2: Images showing the 3d images of the bony bridges forming between the joints and the bony proliferations."

Physiopathology

Neurogenic Myositis Ossificans (NMO) results from heterotopic bone formation in periarticular soft tissues following severe neurological injury, such as spinal cord trauma, traumatic brain injury, or paraplegia. The exact mechanisms are multifactorial. Local tissue inflammation, hypoxia, and prolonged immobilization, combined with abnormal neural signaling and spasticity, trigger mesenchymal stem cells to differentiate into osteoblasts, leading to ectopic ossification. The hips are most frequently affected due to their proximity to large muscle groups and susceptibility to mechanical stress.

Imaging findings correspond to the pathophysiology: early inflammation causes soft tissue edema detectable on MRI, while progressive mineralization produces periarticular calcifications visible on radiographs and organized ossifications on

CT. Understanding these mechanisms helps radiologists distinguish NMO from infection, thrombosis, or soft-tissue tumors and guides timing for conservative or surgical management.



Schematic illustration of the progression of Neurogenic Myositis Ossificans (NMO) around the hip joint. (a) Early phase showing small, isolated periarticular ossifications. (b) Formation of a bony bridge (>1 cm) between the acetabulum and proximal femur. (c) Partial bridging with <1 cm separation as ossifications mature. (d) Advanced phase demonstrating complete bony bridging with corticalized heterotopic bone encasing the periarticular region. This sequence illustrates the typical evolution of NMO and the formation of bony bridges detectable on imaging.

DISCUSSION

Neurogenic Myositis Ossificans (NMO) is a rare complication following severe neurological injury, including spinal cord trauma, traumatic brain injury, or paraplegia. Its pathophysiology is multifactorial, involving local inflammation, tissue hypoxia, immobilization, and abnormal neural regulation, which together trigger mesenchymal cell differentiation into osteoblasts in soft tissues. Clinically, NMO presents with pain, swelling, and progressive joint stiffness, most commonly affecting the hips, knees, or shoulders.

Imaging plays a pivotal role in diagnosis and management. Early radiographs may show amorphous periarticular calcifications, but CT provides superior detail, demonstrating the extent, maturation, and cortical/trabecular pattern of heterotopic ossifications. MRI is particularly useful in the inflammatory phase, revealing soft tissue changes and peripheral enhancement before ossifications are radiographically visible. Recognition of the zonal maturation pattern and the presence of bony bridges is essential to differentiate NMO from myositis ossificans traumatic, infection, deep vein thrombosis, or soft-tissue tumors.

Management is primarily conservative during the active phase, including anti-inflammatory medication and physiotherapy to preserve joint mobility. Surgical excision is considered only after ossification maturation and if functional impairment is significant, as premature surgery may lead to recurrence. Early diagnosis and careful imaging follow-up are crucial to prevent irreversible ankylosis and optimize functional outcomes.

This case underscores the importance of correlating clinical history with radiologic findings, particularly in paraplegic patients, and highlights the key role of radiologists in early detection, differential diagnosis, and guiding multidisciplinary management of NMO.

https://www.researchgate.net/figure/Neurogenic-myositis-ossificans-of-the-right-hip-in-a-3-year-old-girl-2months-post-injury_fig3_314506567

CONCLUSION

Trauma-induced Neurogenic Myositis Ossificans (NMO) represents a rare but significant post-traumatic complication that can profoundly impact patient mobility and recovery. Early recognition through imaging modalities, particularly CT and MRI, is essential for accurate diagnosis, differentiation from malignant lesions, and appropriate management planning. Radiologists play a crucial role in identifying the characteristic features of NMO, monitoring its progression, and guiding multidisciplinary care. Increased awareness of this condition can help prevent misdiagnosis, optimize therapeutic strategies, and ultimately improve patient outcomes following traumatic injuries.

REFERENCES

- Cao J, *et al.,* Case report: Unusual presentation of myositis ossificans of the elbow in a child who underwent excessive postoperative rehabilitation exercise. Front Pediatr. 2021;9:757147. DOI:10.3389/fped.2021.757147
- Chadha M, Agarwal A. Myositis ossificans traumatica of the hand. Can J Surg. 2015;58(5):E284–E285. PMC Article
- Choi KH, *et al.,* Myositis ossificans causing ulnar neuropathy: A case report. J Hand Surg Asian Pac Vol. 2021;26(4):567–570. DOI:10.1177/03000605211002680
- Crundwell M, *et al.,* Non-neoplastic conditions presenting as soft-tissue tumours. Clin Radiol. 2008;63(3):307–316. DOI:10.1016/j.crad.2007.08.008
- Ezra J, *et al.,* Imagerie des complications neuro-orthopédiques des traumatismes graves (rachis exclu). J Radiol. 2009;90(10):1275–1276. DOI:10.1016/S0221-0363(09)75088-7
- https://link.springer.com/chapter/10.1007/978-981-19-0228-4_35
- https://www.researchgate.net/figure/Neurogenic-myositis-ossificans-of-the-right-hip-in-a-3-year-old-girl-2months-post-injury_fig3_314506567
- Law-ye B, *et al.,* Pre-surgical CT-assessment of neurogenic myositis ossificans of the hip and risk factors of recurrence: A series of 101 consecutive patients. J Orthop Surg Res. 2016;11:127. PMC Article
- Medina-Gómez LF, *et al.,* Neurogenic myositis ossificans of the iliac muscle: A case report. Medigraphic. 2024. Medigraphic Article
- Mirra JM, *et al.,* Bone tumors: Clinical, radiologic, and pathologic correlations. Lea & Febiger. 1989.
- Nizar AM, *et al.,* A case report of post-traumatic myositis ossificans in the hip. Galician Med J. 2024;29(4):E202248. DOI:10.21802/gmj.2022.4.8
- Peetrons P. Ultrasound of muscles. Eur Radiol. 2002;12(1):35–43. DOI:10.1007/s003300100700
- Saad A, *et al.,* Myositis ossificans revisited – The largest reported case series. J Radiol Case Rep. 2021;15(4):1–10. PMC Article
- Subramanian S, *et al.,* Can MR imaging be used to reliably differentiate myositis ossificans from sarcoma? Radiology. 2008;246(3):1346–1351. DOI:10.1148/radiol.2463071346
- Tlaite O, *et al.,* Neurogenic myositis ossificans of the hip in a patient with axonal polyneuropathy. Galician Med J. 2022;29(4):E202248. DOI:10.21802/gmj.2022.4.8
- Tyler P, *et al.,* The imaging of myositis ossificans. Thieme Connect. 2010. Thieme Connect Article
- Yoon BH, *et al.,* Ankylosing neurogenic myositis ossificans of the hip. J Korean Med Sci. 2018;33(9):e73. PMC Article