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Neurogenic Para-Osteo-Arthropathy of the Hip Following Spinal Cord Injury: A Case Report and Review of the Literature

A. Melgaoud[1]*, M.R. Bouroumane[1],A. Fadde[1] , A. Diani[1], M. Benzalime[1], S. Alj[1]

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

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***Corresponding author:** A. Melgaoud
Department of Radiology, Ibn Tofail Hospital, University Hospital of Mohamed VI, Marrakech, Morocco

Abstract **Case Report**

We report the case of a 19-year-old patient presenting with complete and painless functional impotence of the left hip, 8 months after a spinal cord injury with neurological lesions followed by prolonged immobilization. Clinical examination revealed a hard deforming peri-articular mass without local signs of inflammation, in a context of apyrexia, preserved general condition, negative infectious workup, and elevated serum alkaline phosphatase. Pelvic computed tomography (CT) revealed giant neurogenic para-osteo-arthropathy (NHO), forming bridging bone and anteromedial neo-articulations between the iliac bone and the femur, while sparing the displaced iliac vascular pedicle. This case illustrates a major extensive form of neurogenic osteoma, where meticulous CT mapping is indispensable to rule out infectious or malignant etiologies and to plan surgical resection.

Keywords: Neurogenic para-osteo-arthropathy (NHO); Heterotopic ossification; Spinal cord injury; Computed tomography (CT); Left hip.

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INTRODUCTION

Neurogenic para-osteo-arthropathy (NHO), historically described by Déjerine and Ceillier in spinal cord-injured patients, constitutes a major orthopedic complication following a spinal cord injury [1]. Characterized by heterotopic bone metaplasia within peri-articular soft tissues, it induces progressive joint limitations that can evolve into complete ankylosis [3,5]. Although the occurrence of small calcifications is common, the development of exuberant bone masses forming true bone bridges remains a therapeutic challenge [2]. Through this observation of a giant NHO of the hip in a 19-year-old patient, we detail the contribution of computed tomography (CT) in characterizing these extensive lesions [4].

CASE PRESENTATION

Clinical data

A 19-year-old male patient was evaluated for progressive stiffness of the left hip, leading to complete functional impotence. He suffered a spinal cord injury sustained 8 months prior, causing neurological lesions with fractures and compression of the vertebral bodies, it required a prolonged period of bed rest and a surgical stabilization afterwards. The overall condition evolved under strict apyrexia and with a preserved general state. Clinical examination revealed a deforming swelling of the left hip, which was painless and hard upon palpation, associated with a total limitation of joint mobility and a complete absence of local inflammatory signs.

Laboratory Investigations

The biological workup demonstrated a completely negative infectious profile (normal leukocyte count and C-reactive protein levels) along with a significantly elevated serum alkaline phosphatase (ALP) level.

Radiological Investigations

A hip X-ray [Figure 1] was performed as the initial imaging modality. It demonstrated a large, dense, and heterogeneous cloud-like calcareous opacity developing within the peri-articular soft tissues surrounding the coxo-femoral joint, suggesting an advanced stage of heterotopic ossification and structural remodeling.

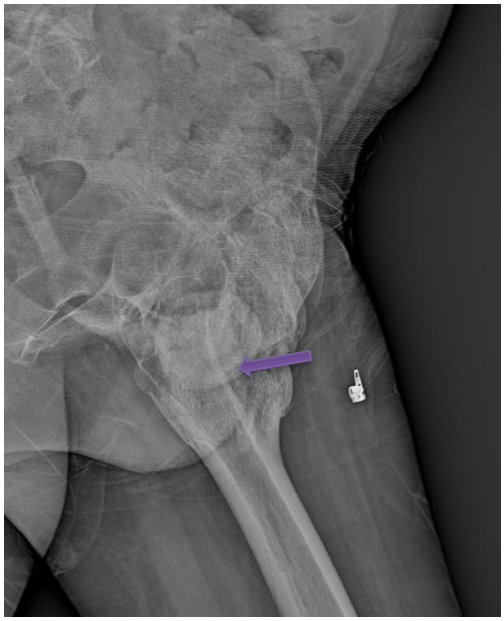


Figure 1: X-ray (frontal view) of the Left Hip: Massive osseous excrescence (purple arrow) originating from the left iliac wing, extending to the acetabulum and diaphysis, forming bone bridges, relatively well-defined with irregular and lobulated contours

The CT scan of the pelvis was subsequently performed to better characterize the lesion. It revealed major, asymmetrical architectural remodeling, exclusively predominating on the affected side:

- At the level of the pathological hip (left hip): The CT scan showed voluminous, heterogeneous osseous excrescences combining areas of osteosclerosis and osteolysis with irregular and lobulated margins [Figure 1, Figure 3]. These structures developed from the iliac wing and extended to the anterior acetabular wall and the femoral diaphysis, thereby creating true bridging bone and anteromedial neo-articulations causing a displacement of the surrounding muscles and the homolateral iliac vascular pedicle (which remained patent and spared). Additionally, femoral bone demineralization, hypotrophy of the pelvic muscular girdle, anterior narrowing of the coxo-femoral joint space, and a thin layer of joint effusion were noted, while the sphericity of the left femoral head was preserved.
- We concluded to a voluminous osseous excrescences involving the anteromedial aspect of the pelvic girdle (iliac bone, acetabulum, and femoral diaphysis) forming bone bridges and neo-articulations, highly compatible with neurogenic para-osteo-arthropathy.

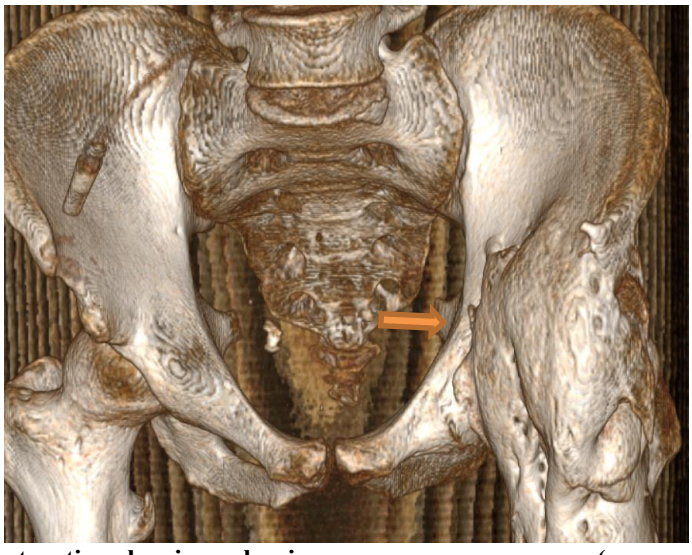


Figure 2: VRT reconstruction showing voluminous osseous excrescences (orange arrow) involving the anteromedial aspect of the left pelvic girdle

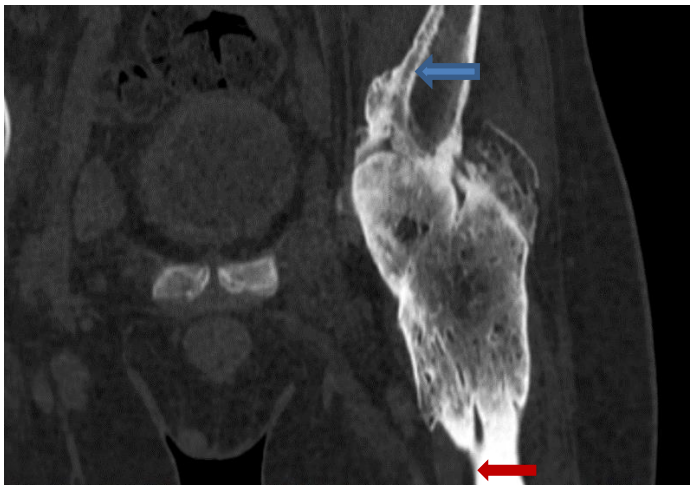


Figure 3: Pelvic CT scan: Coronal view showing voluminous osseous excrescences originating from the iliac wing (blue arrow), extending to the anterior acetabular wall and the left femoral diaphysis (red arrow)

DISCUSSION

This clinical observation is remarkable for the exceptional volumetric mass of the neurogenic para-osteo-arthropathy. The patient's profile aligns perfectly with the known pathophysiology of the condition: spinal cord injury and the resulting neurological lesion create a favorable environment, while prolonged pre-operative bed rest promotes venous stasis, systemic bone demineralization (as seen on the CT scan), and tissue metaplasia [5].

The role of the pelvic CT scan here is twofold: diagnostic and surgical [4]. Diagnostically, the CT scan eliminates differential diagnoses by demonstrating a true, organized bone structure combining well-defined areas of osteosclerosis and osteolysis, thus excluding a primary malignant tumor process or chronic osteomyelitis, in perfect correlation with the apyrexia and the negative infectious workup [2,4]. The presence of bone bridges and anteromedial neo-articulations perfectly explains the clinical presentation of functional impotence and complete joint locking [2].

Surgically, CT imaging is mandatory for planning the bone resection [4]. It assesses pelvic girdle muscle hypotrophy induced by neurological dysfunction and muscular displacement [3]. Most importantly, it reassuringly confirms that the homolateral iliac vascular pedicle is spared, despite being displaced by the bone mass [4]. This anatomical relationship is paramount for the orthopedic surgeon to minimize intraoperative bleeding risk during hip liberation [4]. The elevation of Alkaline phosphatase ALP correlated with these heterogeneous images indicates a process nearing the end of its maturation phase, opening the discussion for a surgical release to restore mobility [4,5].

CONCLUSION

Neurogenic para-osteo-arthropathy of the hip represents a severe locoregional complication of spinal cord injury [1]. The computed tomography findings highlight the macroscopic aggressiveness of this condition, which is capable of generating exuberant bone bridges and neo-articulations [4]. In the presence of a hard, painless, and completely locked joint swelling in a young bedridden patient, a pelvic CT scan stands out as the key gold-standard examination to map the osseous links and plan surgical resection, which remains the only guarantee for a hope of functional recovery [4].

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