

# Myositis Ossificans of the Psoas Muscle After Compression Fracture of Lumbar Spine: CT and MR Imaging Findings<sup>1</sup>

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Myositis ossificans is a benign, self-limiting and non-neoplastic development of heterotopic bone in skeletal muscle following trauma. Although myositis ossificans can occur anywhere in the body, psoas muscle involvement is very rare. To the best of our knowledge, CT and MR imaging findings of myositis ossificans in the psoas muscle secondary to lumbar spine fracture have not been reported in the radiological literature. In this article, we describe the CT and MR imaging findings of myositis ossificans of the psoas muscle after lumbar spine fracture in a 64-year-old man, and conduct a review of the relevant literature.

**Index words :** Myositis Ossificans

Tomography, X-Ray Computed

Magnetic Resonance Imaging

Psoas Muscles

Myositis ossificans is a benign, self-limiting, non-neoplastic formation of heterotopic bone in the skeletal muscle (1-5). Although myositis ossificans can occur anywhere in the body following trauma, it is predominantly localized to high-risk sites of injury, such as large muscles of the extremities (2-4). Most lesions are related to direct major trauma or repeated minor injuries. No history of trauma is present in approximately 40% of patients (2, 3).

In the English medical literature, there are many reports on myositis ossificans that included radiographic, CT and MR imaging findings (1-7). The CT and MR imaging findings of myositis ossificans involving the

psoas muscle have been reported twice (2, 7).

We could not identify any reports on CT and MR imaging findings of the psoas muscle following lumbar spine fracture in the radiological literature. We report the CT and MR imaging findings of a 64-year-old man who developed myositis ossificans of the psoas muscle following lumbar spine fracture.

## Case Report

A 64-year-old man presented with a 5-day history of lower back pain after a fall. On admission, his vital signs were normal. Laboratory values, including C-reactive protein and erythrocyte sedimentation rate, were within the normal limits.

Plain radiography of the lumbar spine revealed compression fracture in L3. MRI examination was performed on a 1.5T MR unit (Siemens, Erlangen, Germany). Spin-echo T1- and turbo spin-echo T2-weighted MR images demonstrated L3 compression fracture and a left psoas mass on the fifth post-trauma

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day. The mass was of high signal intensity with no peripheral hypointense rim on turbo spin-echo T2-weighted images (Fig. 1A, B). The mass was isointense on spin-echo T1-weighted image, compared to the muscle (Fig. 1C). Gadolinium-enhanced T1-weighted images showed diffuse homogenous enhancement of the mass without central necrosis (Fig. 1D, E). A pre-contrast CT scan was taken in the third post-trauma week showed a well defined ossified peripheral rim and a central non-ossified area of low attenuation (Fig. 2A, B).

Myositis ossificans was diagnosed based on these CT findings. We chose to manage the patient conservatively and avoided invasive diagnostic and treatment procedures.

### Discussion

Myositis ossificans is a benign, non-neoplastic heterotopic formation of bone within the muscle or soft tissues that usually develops in adolescents and young adults, typically following trauma (1-4). Although myositis ossi-

ficans can occur almost anywhere in the body, it commonly affects large muscles of the extremities, such as the thigh, buttocks, elbow and less often, the shoulder and calf (2-4). Although the exact etiology remains unknown, the pathophysiology of myositis ossificans is thought to be a post-traumatic inflammatory process within the skeletal muscle (2).

Typical clinical presentation of this condition includes rapid onset of pain, palpable mass, flexion contracture, local heat and swelling as well as decreased range of motion (3). In our patient, the only presenting symptom was lower back pain.

Histologically, myositis ossificans tends to display a typical zonal pattern. At 6-8 weeks, a lacy pattern of new bone formation in the peripheral zone is formed, and the zonal pattern of peripheral maturation is the most important diagnostic feature. Histologically, the central zone is comprised of undifferentiated mesenchymal cells with high-grade mitotic activity, which may suggest malignant neoplasm. Therefore, early biopsy of the center lesion may lead to mis-diagnosis and clini-

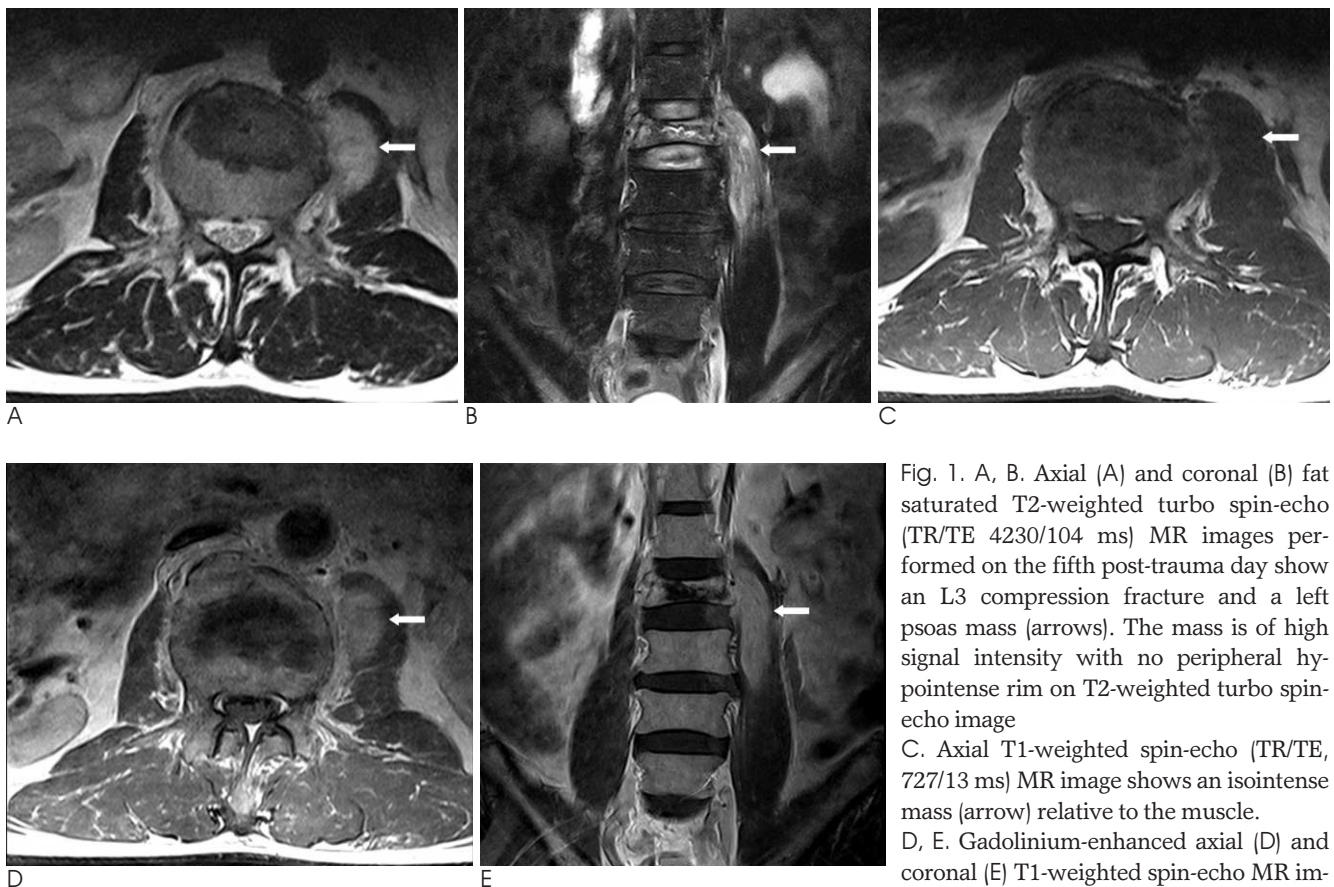


Fig. 1. A, B. Axial (A) and coronal (B) fat saturated T2-weighted turbo spin-echo (TR/TE 4230/104 ms) MR images performed on the fifth post-trauma day show an L3 compression fracture and a left psoas mass (arrows). The mass is of high signal intensity with no peripheral hypointense rim on T2-weighted turbo spin-echo image  
C. Axial T1-weighted spin-echo (TR/TE, 727/13 ms) MR image shows an isointense mass (arrow) relative to the muscle.  
D, E. Gadolinium-enhanced axial (D) and coronal (E) T1-weighted spin-echo MR images show diffuse homogenous enhancement of the mass without a central necrotic portion (arrows).

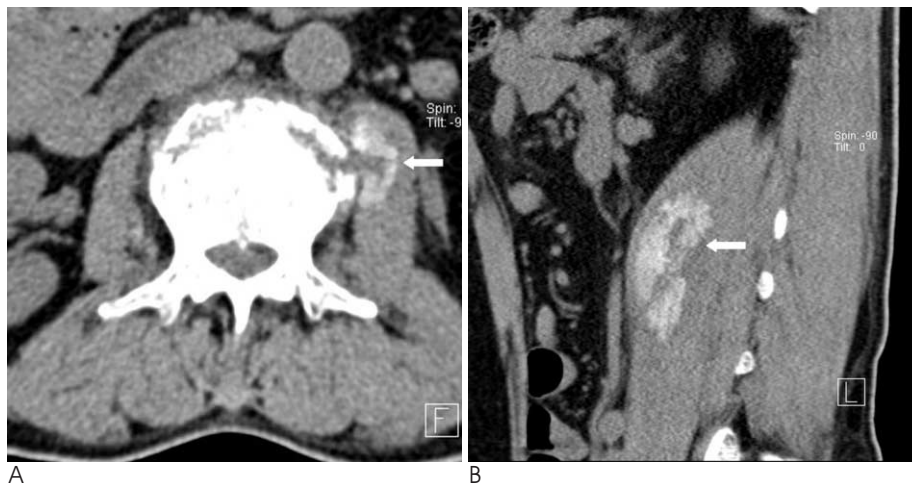


Fig. 2. A, B. Unenhanced axial (A) and reformatted sagittal (B) CT scan performed on the third post-trauma week demonstrate a well-defined, ossified peripheral rim and a central non-ossified area of low density in the lesion (arrows).

cians should exercise caution (3, 6).

The radiologic findings of myositis ossificans mirror the histologic pattern of maturation. The earliest radiologic change appears within 1 to 2 weeks as a soft tissue mass, which may be accompanied by faint periosteal new bone formation. By 3-4 weeks, floccular calcification appears in the soft tissue mass. By 6-8 weeks, a lacy pattern of new bone formation in the peripheral zone is formed. By 5 to 6 months, the mass shrinks and maturation is completed (3).

The cross-sectional CT and MRI findings of myositis ossificans in the English medical literature are well known (1-7). Previously published CT findings of myositis ossificans included a well-defined ossified peripheral rim associated with a central non-ossified area of low density after 4-6 weeks that mimicked the histologic zonal architecture. CT has been the gold standard in characterizing the typical pattern of myositis ossificans (2, 3). In our case, a pre-contrast CT scan was taken in the third post-trauma week which demonstrated a well-defined diagnostic ossified peripheral rim in the psoas muscle.

The MRI appearance of myositis ossificans correlates with the stage of maturation and the histologic pattern of the lesion (1, 3). In the early stages, T2-weighted images may show an in-homogenous focal mass with high central signal intensity. As the lesion matures and the peripheral ossification becomes denser, the images show a hyper-intense center surrounded by a hypo-intense rim corresponding to peripheral ossification (3). In our patient, MRI of the lumbar spine was performed on fifth post-trauma day. It showed high signal intensity with no peripheral hypointense rim, and the appearance appeared to be non-specific. As such, the MRI findings

of myositis ossificans often lead to erroneous diagnosis of sarcoma or infectious myositis (2, 3). In our patient, no clinical or laboratory evidence of infection or tumor was present, and concomitant fracture of L3 along with typical patterns of myositis ossificans on CT excluded sarcoma and infectious myositis. Sirvanci et al. (2) reported the CT and MR imaging findings of myositis ossificans of the psoas muscle, but a history of trauma was not apparent in that case. Kim et al. (7) reported the CT and MR imaging findings of myositis ossificans of the psoas muscle following lumbar compression fracture, and the diagnosis was confirmed with CT-guided biopsy. In our patient, the diagnosis of myositis ossificans was made based on typical CT imaging findings of myositis ossificans. After discussions with other clinicians, we chose not to perform CT-guided biopsy and focused on managing the patient conservatively.

In conclusion, myositis ossificans should be considered a differential diagnosis when a well-defined mass with homogeneous enhancement is seen within the psoas muscle following fracture of the lumbar spine, particularly when tumor and infection have been excluded by investigations.

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## 요추 압박골절 후 요근의 골화성 근염:

### CT 및 MR 소견<sup>1</sup>

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골화성 근염은 외상 후 골격근에 생기는 양성, 자가 치유되는, 비종양성, 이소성 골형성 병변이다. 골화성 근염은 신체의 어느 부위에나 생길 수 있으나 요근에 발생하는 경우는 매우 드물다. 영상의학 문헌에 요추 골절 후 발생한 요근의 골화성 근염에 대한 CT 및 MR 소견에 대한 증례보고가 없다. 저자들은 요추 골절과 동반되어 발생한 요근의 골화성 근염으로 진단된 64세 환자에서 CT와 MR 소견을 문헌 고찰과 함께 보고한다.