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CASE REPORT

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# CT scan in diagnosing focal myositis: A case report

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## ABSTRACT

Focal myositis (FM) is an inflammatory muscle disease of unknown cause. It can simulate sural thrombophlebitis if it affects the lower limb. We report the case of a 15-year-old child with complete post-traumatic quadriplegia who developed edema of the left leg with a tense calf, slight redness, and an increase in local heat. A computed tomography (CT) angiography of the lower limbs excluded deep vein thrombosis and showed a myositis of the posterior compartment of the left leg. The patient was put on an anti-inflammatory drug with the complete disappearance of the edema after 7 days. In this reported case, we highlight the role of CT in the diagnosis and follow-up of FM as it is cheaper and more accessible than magnetic resonance imaging. The outcome is often favorable with spontaneous resolution or under anti-inflammatory treatment after a few weeks.

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Spinal cord injury; tetraplegia; focal myositis; lower limb; computed tomography

## Introduction

Focal myositis (FM) is an inflammatory muscle disease of unknown cause [1,2]. It is a pathology that can affect all age groups and is distinguished by its limited character to one muscle or muscle group with a favorable prognosis [3]. We report the case of a 15-year-old child hospitalized in the Physical Medicine and Rehabilitation department (PM&R) for rehabilitative treatment of complete post-traumatic quadriplegia and who developed FM simulating sural thrombophlebitis. The purpose of this case report is to discuss the utility of computed tomography (CT) in the diagnosis and follow-up of this pathology.

## Case Presentation

A 15-year-old boy was transferred to the PM&R department after a stay of 21 days in the intensive care unit. He was the victim of a diving accident, causing trauma of the cervical spine: fracture of C6 and C7 vertebrae. Clinically, he kept a flaccid ASIA impairment scale (A) level C6 quadriplegia. The evolution during hospitalization was marked by the occurrence of edema of the left lower limb predominantly in the upper third of the leg with a tense calf, slight redness, and an increase in local heat compared to the contralateral limb (Fig. 1).

The infectious etiology (dermohypodermitis) was excluded because the clinical aspect was not suggestive (absence of a clear placard) and the patient was afebrile and his blood tests did not show an inflammatory syndrome (no hyperleukocytosis, negative C-reactive protein, and procalcitonin). The most likely etiology given the clinical presentation and bed rest was deep vein thrombosis (DVT) of the left lower limb. A venous Doppler ultrasound with an exploration of the iliac veins was performed and did not reveal any thrombosis. But it showed an edematous infiltration of soft tissues of the left leg without an individualizable collection. A CT angiography of both lower limbs with venous phase was subsequently done confirming the absence of DVT and showing a thickening of the muscles of the posterior compartment of the left leg (Fig. 2A) with heterogeneous contrast enhancement delimiting

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**Figure 1.** Quadriplegic patient with edema of the left lower limb predominantly on the calf.

hypodense compartments extended over 12 cm height: appearance evoking FM (Fig. 2B).

Blood tests revealed an increase in creatine phosphokinase (CPK) level approximately three times normal (440 IU/l).

A magnetic resonance imaging (MRI) scan of the leg was requested to better characterize the lesions in the calf but was not performed due to a technical problem.

In view of the focal appearance on the CT scan and the ascent of the CPKs, we retained the diagnosis of FM.

The patient was put on a non-steroidal anti-inflammatory drug (indomethacin$_{25}$ 01 capsule × 3/day) and had passive mobilizations with drainage postures as a functional treatment with complete resolution of the edema in the left leg after 7 days.

At 3 months of evolution (Fig. 3), a control CT scan of the left calf was performed showing ad integrum restitution of the leg abnormalities with no signs of myositis.

CPK levels were rechecked at 13 IU/l.

## Discussion

FM is a rare disease [1,2]. It is characterized by its local character limited to a single muscle or a muscle group with no general extra-muscular signs [3]. The first cases of FM were described by Heffner et al. [4–6] and since then around 250 cases worldwide have been recorded [3,6]. All ages can be affected. There are pediatric cases as well as diagnoses made in the elderly. The average age at diagnosis is around 40 years [3,7]. This pathology manifests clinically by an increase in the volume of a segment of a limb with localized myalgia, and a sclerosing appearance of the muscle(s) concerned [5]. The pain can lead to motor impairment due to its intensity [3,8]. In our

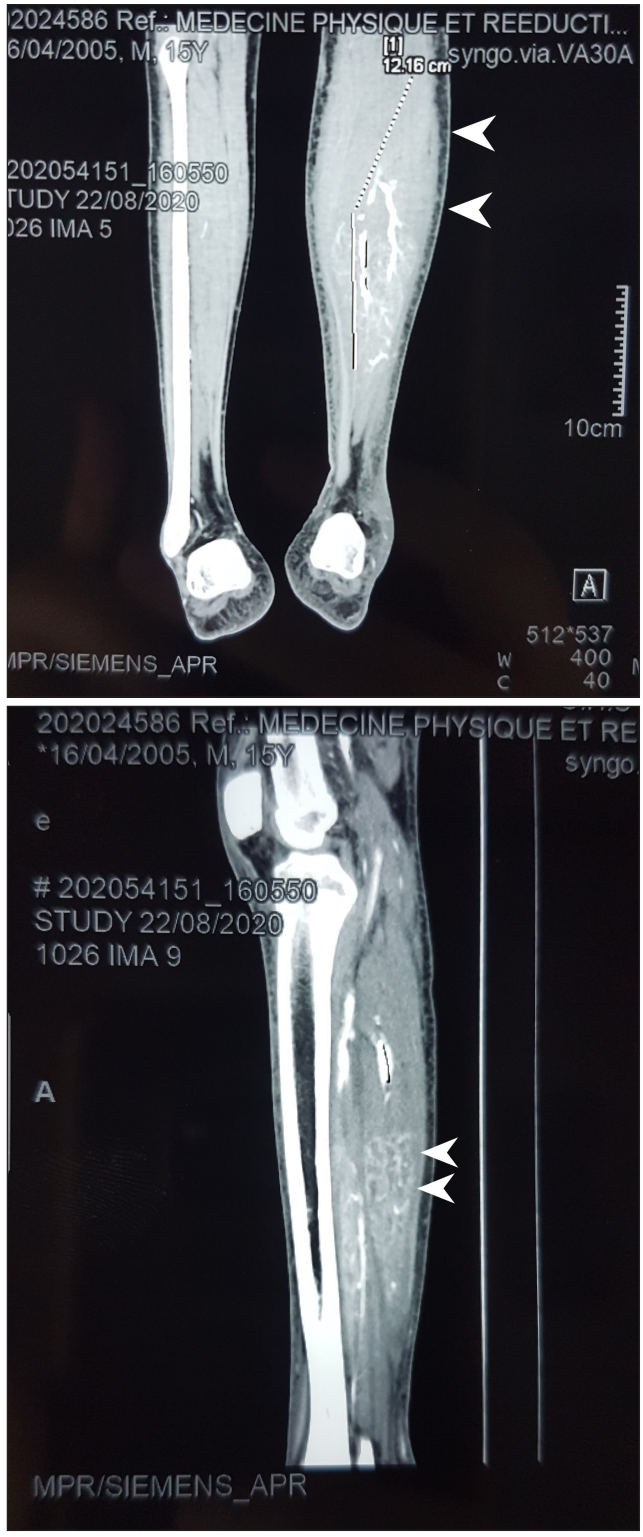



**Figure 2.** CT angiography of the two lower limbs showing: (A) thickening of the muscles of the posterior compartment of the left leg. (B) Contrast enhancement delimiting hypodense cubicles.

reported case, pain and motor deficit are missing as our patient has complete quadriplegia.

The preferential localization of the FM in the lower limbs—the calf and more specifically the



**Figure 3.** Disappearance of the edema of the left lower limb at 3 months of evolution.

gastrocnemius muscles—has been frequently reported in the literature [2,3,7].

The lesion most often affects the thigh (vastus lateralis of the quadriceps or adductor muscle) or the calf (gastrocnemius muscles) unilaterally in 33% and 20% of cases respectively. However, FM can be observed in proximal muscles of the upper limbs (deltoids, biceps, or triceps). It can also affect axial muscles (sternocleidomastoid, pectoral, or abdominal muscles) or even distal muscles (hypothenars or plantar muscles). Very rare cases of FM of the muscles of the stomato-ear, nose, throat sphere have been reported, in particular with lingual involvement [3,5,7].

For blood tests, FM is not associated with characteristic laboratory abnormalities. Modest increases in markers of inflammation can be observed. CPK levels may be normal or slightly increased [1,3,6,9,10].

On imaging, muscle MRI is the gold standard for diagnosing FM [3,6,10,11]. It shows a hypersignal, most often homogeneous, on the T2 Short Tau Inversion Recovery sequences. On conventional T2 sequences, the lesion generally appears as hypersignal, even if it could occasionally be described as hypointense. On T1 sequences without injection, the lesion is generally isointense or sometimes slightly hypointense. The lesion is enhanced on the T1 sequences after injection of contrast product. MRI can also confirm the focal aspect limited to one muscle or muscle group [3,6]. Electromyography shows focal myogenic syndrome [2,3,12]. Muscle biopsy shows the presence of multifocal inflammatory infiltrates usually localized in the endomysium and perimysium [3,6,9,10,13]. In our reported case, we highlight the role of CT in the diagnosis and follow-up of FM if MRI is inaccessible. The resolution of FM is spontaneous after a few weeks. Treatment is mainly based on non-steroidal anti-inflammatory drugs or corticosteroid therapy [2,3,6,9,10,13]. Among the clinical forms described in the literature, in children, calf localization is the most common, especially for recurrent myositis [10].

In adults, cases of FM have been described in association with S1 lumbosciatica. The mechanism would be muscle hypertrophy following chronic denervation, which is a rare phenomenon [12,14]. The essential differential diagnosis of FM is primarily lower limb DVT, so a venous Doppler is initially required to exclude this etiology since several cases of FM described have simulated lower limb DVT [9,13]. The infectious etiology (dermohypodermitis), benign or malignant tumors (sarcomas), trauma (contusions or muscle tears), and myositis ossificans are also diagnoses to be taken into consideration depending on the localization and the clinical context [3,6].

Our study has a limitation which is the absence of a CT control immediately after the disappearance of symptoms which can give us an idea of the necessary time to complete muscle restitution after starting an anti-inflammatory drug with functional treatment.

## Conclusion

FM is a rare and unknown pathology. To our knowledge, our reported case is the first case observed in a PM&R department in the context of complete quadriplegia. After excluding life-threatening diagnoses, FM should be considered. MRI is the most sensitive imaging test to study muscle and confirm the local character of the lesion. CT has a place in the diagnosis and follow-up of FM, and is a cheaper and more accessible imaging test than MRI. The evolution is often favorable with spontaneous resolution of myositis or under anti-inflammatory treatment after a few weeks.

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## List of Abbreviations

CPK, Creatine phosphokinase; CT, Computed tomography; DVT, Deep vein thrombosis; FM, Focal myositis; PM&R, Physical medicine and rehabilitation.

## Conflict of interests

The authors declare that there is no conflict of interest regarding the publication of this article.

## Funding

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## Consent for publication

Informed consent was obtained from the father of the patient to publish this case in a medical journal.

## Ethical approval

Ethical approval is not required at our institution for publishing a case report in a medical journal.

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