Title:
Taming the Tiger: Insights into Sarcoid Myositis through 18F-FDG PET/MRI Imaging

Running title:
18F-FDG PET/MRI for sarcoid myositis

Authors and affiliations:
Ashjan Kaseb, MD1,2, Margherita Giannini, MD, PhD3,4, Boubacar Dramé, MD1,5, Thibault Willaume, MD6, Alain Meyer, MD, PhD3,4, and Alessio Imperiale, MD, PhD1,7,*

1. Nuclear Medicine, ICANS, University Hospitals of Strasbourg, Strasbourg, France
2. Radiology, College of Medicine, University of Jeddah, Jeddah 23890, Saudi Arabia
3. Rheumatology, Centre de Référence des Maladies Auto-immunes Systémiques Rares, University Hospitals of Strasbourg, France.
4. Physiologie et explorations fonctionnelles musculaires, UR3072 "Mitochondrie, stress oxydant et protection musculaire", Centre de Recherche en Biomédecine, University of Strasbourg, France.
5. Nuclear Medicine, Idrissa Pouye General Hospital (HOGIP), University Cheikh-Anta-Diop (UCAD), Dakar, Sénégal
6. Radiology, University Hospitals of Strasbourg, Strasbourg, France
7. IPHC, UMR-7178, CNRS/Unistra, Strasbourg, France

Corresponding author (*) :
Prof. Alessio Imperiale, MD, PhD
Médecine Nucléaire et Imagerie Moléculaire
Institut de Cancérologie de Strasbourg Europe (ICANS)
17, rue Albert Calmette, 67093 Strasbourg, France
Tel : +33 3 68 76 74 48
Fax : +33 3 68 76 72 56
E-mail: a.imperiale@icans.eu

Article type : Clinical pictures

Word count : 490

Disclosure summary : The authors have nothing to disclose

Keywords : sarcoidosis, myositis, corticoids, FDG, PET, MRI
Myositis, characterized by inflammation of the skeletal muscles, represents a significant manifestation of sarcoidosis, a systemic granulomatous disease. While sarcoidosis traditionally affects the lungs and lymph nodes, its involvement of the musculoskeletal system, termed sarcoïd myositis, presents unique diagnostic and therapeutic challenges (1). In this context, magnetic resonance imaging (MRI) and \(^{18}\text{F-FDG}\) positron emission tomography (PET) play a pivotal role in unraveling the complexities of sarcoïd myositis, assessing the extent and severity of the disease, its progression, and treatment response (2,3). To enhance diagnostic accuracy, the integration of anatomical and functional imaging is often achieved through "hybrid" modalities such as Positron Emission Tomography/Computed Tomography (PET/CT) and, more recently but less clinically available, PET/MRI.

Herein, we present the case of an adult patient with cough, myalgia and recent history of uveitis and epididimitis, addressed for further investigation of multiple enlarged mediastinal lymph nodes and increased serum angiotensin-converting-enzyme. Sarcoidosis was suspected and patient underwent \(^{18}\text{F-FDG}\) PET/MRI whole-body imaging revealing intense radiotracer uptake in thoracic nodes without visceral involvement, particularly heart. However, intense \(^{18}\text{F-FDG}\) uptake with a characteristic "striped" or "tiger-like" pattern (4) was observed in upper and lower leg muscles corresponding to both high signal intensity on water-sensitive T2-weighted MRI, and restricted water diffusion on diffusion-weighted MRI (DWI-MRI) (Figure 1a). These findings reflected the muscle edema related to inflammatory involvement of skeletal muscles. The diagnosis of sarcoïd myositis was confirmed by muscular biopsy and patient started treatment with prednisone (30 mg/d degressive for four months) and methotrexate (25 mg/week for three months, then 20 mg/week for one month). Patient's symptoms greatly improved and follow-up \(^{18}\text{F-FDG}\) PET/MRI, performed after four months of treatment, showed complete resolution of both \(^{18}\text{F-FDG}\) uptake abnormalities and MRI signs of muscular edema (Figure 1b). Accordingly, the treatment was modified by progressively tapering the doses of prednisone and methotrexate.

Prednisone and methotrexate are effective in managing muscular sarcoïdosis. Prednisone is often used as a first-line treatment to provide rapid relief of symptoms, while methotrexate may be added to the treatment regimen for long-term management or to reduce the dose of prednisone needed, thus minimizing potential side effects associated with prolonged corticosteroid use. Regular monitoring and follow-up are essential to ensure the effectiveness of treatment and to manage any potential side effects or complications. By providing both functional and anatomical information within a single imaging modality, \(^{18}\text{F-FDG}\) PET/MRI offers a comprehensive approach for evaluating sarcoïd myositis, facilitating early diagnosis and tailored therapeutic interventions. One of the key advantages of \(^{18}\text{F-FDG}\) PET/MRI imaging is its ability to provide whole-body assessment, allowing for the detection of multifocal muscle involvement and concurrent extramuscular manifestations of sarcoïdosis.

Ultimately, we advocate for the use of \(^{18}\text{F-FDG}\) PET/MRI in assessing sarcoïd myositis, providing insights into disease activity, the extent of muscle involvement, and treatment response. As research in this field continues to evolve, \(^{18}\text{F-FDG}\) PET/MRI is poised to remain a cornerstone in the management of sarcoïdosis-related myositis, contributing to improved patient care and outcomes.

**Liste of acronyms.** MRI : magnetic resonance imaging, \(^{18}\text{F-FDG}\) : \(^{18}\text{F-fluorodeoxyglucose}\), PET : positron emission tomography, PET/CT : Positron Emission Tomography/Computed Tomography, DWI-MRI : diffusion-weighted MRI sequence.
References


Figure 1