Case Report

# A Rare Case of Sarcoidosis Presenting as Diffuse Contracturing Granulomatous Myositis on Fluorodeoxyglucose Positron Emission Tomography/Computed Tomography

**Abstract**

Fluorodeoxyglucose positron emission tomography/computed tomography (PET/CT) is an established imaging modality in diagnosis and treatment response monitoring of sarcoidosis. Multisystemic involvement of sarcoidosis is characteristically seen on PET/CT; however, isolated organ involvement is rare. We describe here a case of a 52-year-old male with generalized muscle weakness, an extremely rare clinical manifestation of sarcoidosis.

**Keywords:** *Diffuse, fluorodeoxyglucose, granulomatous, myopathy, myositis, positron emission tomography/computed tomography, sarcoidosis*

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## Introduction

Sarcoidosis is multisystem granulomatous disease of unknown cause. Its exact incidence in India is unknown, but one study found about 61 cases per 100,000 respiratory patients.[1] Symptomatic skeletal muscle involvement in sarcoidosis is exceedingly rare and is estimated to be about 0.5–2.5% of patients with sarcoidosis.[2-4] Granulomatous inflammation in muscle biopsy is also considered a rare finding and one study found around 0.4% over 12-year period.[5] In this case report, we describe our experience in the diagnoses of this rare condition, the importance of an early diagnoses, the use of positron emission tomography/computed tomography (PET-CT) to aid in early diagnoses, the use of PET/CT to aid in early diagnosis, identification of suitable and representative muscle biopsy site, and the difficulties of management.

## Case Report

A 52-year-old retired military man on treatment for hypertension and a 25 pack-year smoking history, progressively developed difficulty in getting up from the squatting position, difficulty in chewing and swallowing food, hardening of both hands, generalized body pain, and swelling in all the limbs. He had considerable difficulty in using the squatting toilet as he required help to stand up after use. His sexual, bladder, and bowel functions were unaffected.

Significant examination findings included anasarca, hardened contractures of the thenar muscles of both hands, weak abduction of both shoulders, difficulty to stand up from squatting position, and early myopathic gait. Power was 3/5 in the bilateral proximal muscle groups and 4/5 in the bilateral distal muscles groups with preserved bilateral deep tendon reflexes and flexor plantar reflexes bilaterally; sensation and coordination were normal.

Laboratory investigations showed mild normocytic normochromic anemia, hypoalbuminemia 24 g/L, erythrocyte sedimentation rate – 79 mm in 1 h, C-reactive protein (CRP) – 85 mg/L (reference range <10 mg/L), and hypercalcemia (13.4 mg/dl) with suppressed intact parathyroid hormone; renal and liver functions were normal; urine protein loss was physiological; upper gastrointestinal endoscopy was unremarkable with normal duodenal biopsy; no evidence for malabsorption found; 25-hydroxy Vitamin D was low; 1,25 hydroxy Vitamin D assay was not available in our center. Serum angiotensin-converting enzyme (ACE) level mildly elevated but <2 times the upper limit of normal. Serum protein electrophoresis

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and free light chain assays excluded myeloma; complete autoimmune screen including antinuclear (ANA), antidouble strand DNA (anti ds-DNA), anti-histidyl-tRNA synthetase (anti-Jo1), anti-topoisomerase I (anti-Scl 70), and antiribonuclear proteins (u1RNP) antibodies were all negative. Hand X-ray showed diffuse faint calcification of the intrinsic muscles of the hands [Figure 1]. Whole body PET/CT was done to rule out an underlying malignancy. PET/CT showed symmetrical diffuse increased fluorodeoxyglucose (FDG) uptake in the multiple skeletal muscles predominantly involving bilateral gluteus muscles/bilateral external oblique abdominal muscles with associated fatty atrophy and calcification on CT [Figure 2]. Gluteal muscle biopsy was done which showed florid noncaseating granulomatous inflammation [Figure 3].

A diagnosis of sarcoidosis was made given noncaseating granuloma in biopsy, mildly elevated serum ACE level, and hypercalcemia. The patient was initially given oral prednisolone 40 mg daily for 4 weeks; after that, he did not show any clinical improvement and therefore given 1 g methylprednisolone pulse therapy weekly for 8 weeks along with weekly methotrexate; he was reviewed after 12 weeks and had significant subjective improvement in pain, gait, proximal muscle function, and chewing but hand weakness remained the same. Serum calcium was normalized. His CRP levels were persistently elevated (86 mg/dL) and albumin remained low. The patient was explained about the guarded prognosis given extensive disease and discharged on oral methotrexate 15 mg once weekly, folic acid, hydroxychloroquine, and prednisolone 20 mg daily.

## Discussion

Since there is no single test diagnostic of sarcoidosis, imaging plays an important adjuvant role to clinical and laboratory investigations in earlier and accurate diagnosis. PET/CT is an established imaging modality in diagnostic evaluation of sarcoidosis and has been increasingly preferred to the traditional gallium-67 scintigraphy. PET/CT has higher sensitivity than gallium 67 scintigraphy especially for mediastinal lymphadenopathy and for detecting extrathoracic manifestations.[6] FDG PET/CT is now included in the World Association of Sarcoidosis and other Granulomatous Disorders (WASOG) organ assessment instrument based on the promising evidences from the past decade. FDG uptake in the mediastinal/hilar adenopathy, parotid, and/or bone marrow are included in the highly probable criteria (high probability may obviate a need for biopsy confirmation) for diagnostic evaluation of a clinically suspected case of sarcoidosis.[7] PET/CT especially has an important role in monitoring disease activity and has been shown that patient who show a response to treatment on PET have a low likelihood of relapse.[8] In perspective, PET/CT including

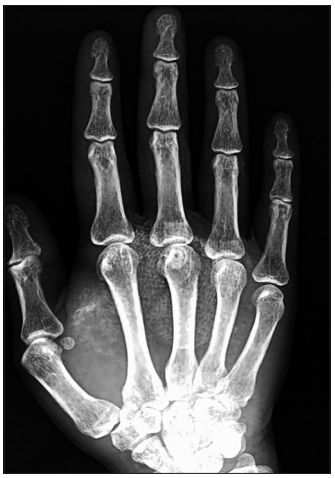

**Figure 1: X-ray of hand showing diffuse faint calcification of the soft tissue**

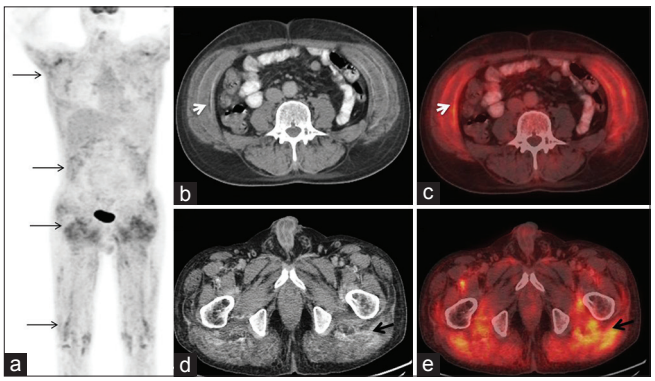


**Figure 2: Maximum intensity projection image (a) shows increased fluorodeoxyglucose uptake in the muscles of shoulder, bilateral lateral abdominal wall, bilateral glutei, and in few muscles of bilateral thigh (multiple thin black arrows). Noncontrast transaxial computed tomography (b) and transaxial positron emission tomography/computed tomography (c) showing increased fluorodeoxyglucose uptake in the oblique muscles with hyperdensity (suggestive of calcifications) in the lateral abdominal wall muscles and along the fascial plane (white arrowheads). Transaxial computed tomography (d) and transaxial positron emission tomography/computed tomography (e) showing diffusely increased fluorodeoxyglucose uptake in the bilateral glutei muscles with areas of intramuscular hyperdensities (likely calcifications) (black arrowheads)**

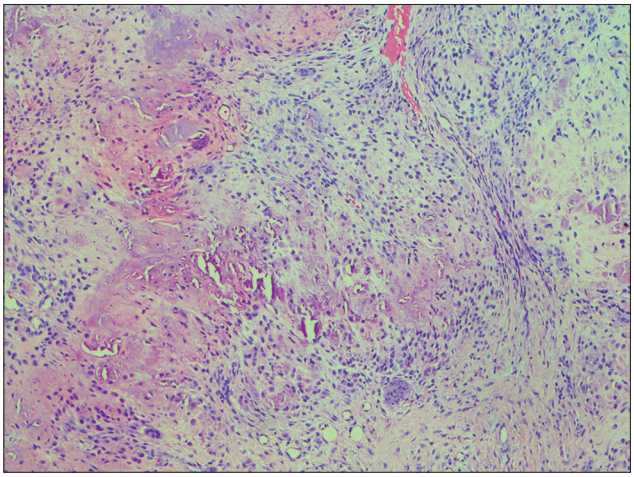

**Figure 3: Histopathology from the gluteal muscle biopsy revealed interstitial diffuse infiltration of scattered epithelioid cells, lymphocytes, and multinucleated giant cells in muscle tissue, without any evidence of necrosis**

the diagnostic HRCT of the thorax in the same setting promises to be the single best imaging for accurate evaluation of thoracic and extrathoracic disease burden in sarcoidosis.

Majority of the patients with extrapulmonary sarcoidosis do have lung involvement; however, isolated muscular sarcoidosis is an exceedingly rare entity. WASOG devised an instrument to analyze clinical manifestations by classifying them as highly probable, probable, and possible sarcoidosis provided they fulfill the two criteria which were (1) histological evidence of granulomatous inflammation of unknown cause in the organ studied and (2) alternative causes other than sarcoidosis were reasonably excluded.[7] Although the WASOG instrument emphasizes that diagnosis of sarcoidosis requires the presence of granulomatous inflammation in at least two organs, Vitamin D–Calcium dysregulation by itself has been considered an end-organ sarcoid involvement and as a highly probable criterion. Hence, in our report, although noncaseating granulomas were demonstrated only in a single organ, the metabolic component helped us conclude this as a case of likely sarcoidosis. Sarcoidosis is the most common cause of granulomatous myositis with patients usually presenting with weakness, muscle pain, and weight loss.[5] Other causes of granulomas being infections (such as histoplasma, cryptococcus, aspergillus, and mycobacteria), foreign body giant cell reaction, or idiopathic in the absence of an identifiable cause. While there can be an asymptomatic involvement of muscle in sarcoidosis, some patients can develop muscle weakness which is termed as sarcoid myopathy. Sarcoid myopathy causes predominantly proximal muscle weakness, as seen in our case report. On the contrary, distal muscle involvement occurs in idiopathic granulomas although this rule is not strictly applicable. Severe hypercalcemia resulting from the increased production of 1,25 hydroxy Vitamin D by sarcoid granulomas can be life threatening, and hence, earlier detection of this entity is important. Even though both sarcoid and idiopathic granulomas respond to steroids, sarcoid may be difficult to treat requiring other immunosuppressants as well. This disease is generally considered to be steroid sensitive. Our patient, however, although responded initially to steroids, remained still disabled mostly due to the contractures and calcification.

The potential use of FDG PET/CT in diagnostic evaluation and monitoring treatment response in granulomatous myositis secondary to sarcoidosis has already been reported in few case studies in the past.[9-11] PET/CT can also help in guiding biopsy from the most accessible site which is showing high degree of FDG uptake. Diffuse FDG in the skeletal muscles is, however, not a specific finding for granulomatous myositis; it can also be seen in the patients with dermatomyositis/polymyositis, thyrotoxicosis, and in patients where PET/CT scans was done in fed state or hyperinsulinemia.[12,13] Hyperdensities in skeletal muscles on CT, as seen in our case (suggestive of calcium deposition), is however not described with polymyositis and can help in differentiation.

This patient had a rare form of sarcoid granulomatous myositis with rapid progression to calcific contractures as evidenced by the CT images and hand X rays. The objective of our case report is to bring attention to this particularly virulent form of sarcoidosis and the use of PET-CT scan to enable early diagnosis so that potent immunosuppressive therapy such as high-dose pulse steroids could be initiated which can reduce the risk of contracturing and dystrophic calcification, thereby reducing symptoms and disability.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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### Conflicts of interest

There are no conflicts of interest.

## References

1. Sharma SK, Mohan A. Uncommon manifestations of sarcoidosis. J Assoc Physicians India 2004;52:210-4.
2. Baydur A, Pandya K, Sharma OP, Kanel GC, Carlson M. Control of ventilation, respiratory muscle strength, and granulomatous involvement of skeletal muscle in patients with sarcoidosis. Chest 1993;103:396-402.
3. Fayad F, Lioté F, Berenbaum F, Orcel P, Bardin T. Muscle involvement in sarcoidosis: A retrospective and followup studies. J Rheumatol 2006;33:98-103.
4. Simmonds NJ, Hoffbrand BI. Contracturing granulomatous myositis: A separate entity. J Neurol Neurosurg Psychiatry 1990;53:998-1000.
5. Prayson RA. Granulomatous myositis. Clinicopathologic study of 12 cases. Am J Clin Pathol 1999;112:63-8.
6. Nishiyama Y, Yamamoto Y, Fukunaga K, Takinami H, Iwado Y, Satoh K, *et al.* Comparative evaluation of 18F-FDG PET and 67Ga scintigraphy in patients with sarcoidosis. J Nucl Med 2006;47:1571-6.
7. Judson MA, Costabel U, Drent M, Wells A, Maier L, Koth L, *et al.* The WASOG sarcoidosis organ assessment instrument: An update of a previous clinical tool. Sarcoidosis Vasc Diffuse Lung Dis 2014;31:19-27.
8. Maturu VN, Rayamajhi SJ, Agarwal R, Aggarwal AN, Gupta D, Mittal BR, *et al.* Role of serial F-18 FDG PET/CT scans in assessing treatment response and predicting relapses in patients with symptomatic sarcoidosis. Sarcoidosis Vasc Diffuse Lung Dis 2016;33:372-80.

9. Mageau A, Rigolet A, Benali K, Chauchard M, Ladjeroud S, Mahe I, *et al.* Life-threatening hypercalcemia revealing diffuse and isolated acute sarcoid-like myositis: A New entity? (A case-series). Medicine (Baltimore) 2016;95:e3089.
10. Caré W, Blanc E, Cournac JM, Doutrelon C, Aletti M, Lecoules S, *et al.* Hypercalcemia revealing diffuse granulomatous myositis. Eur J Nucl Med Mol Imaging 2017;44:1413-4.
11. Han EJ, Jang YS, Lee IS, Lee JM, Kang S, Kim HS, *et al.* Muscular sarcoidosis detected by F-18 FDG PET/CT in a hypercalcemic patient. J Korean Med Sci 2013;28:1399-402.
12. Santhosh S, Mittal BR, Kashyap R, Bhattacharya A, Singh B. Symmetric increased skeletal muscular uptake of F-18 fluoro-deoxyglucose: A clue for the diagnosis of graves' disease. Indian J Nucl Med 2011;26:155-6.
13. Tanaka S, Ikeda K, Uchiyama K, Iwamoto T, Sanayama Y, Okubo A, *et al.* [18F] FDG uptake in proximal muscles assessed by PET/CT reflects both global and local muscular inflammation and provides useful information in the management of patients with polymyositis/dermatomyositis. Rheumatology (Oxford) 2013;52:1271-8.