Case Report

Symmetric increased skeletal muscular uptake of F-18 fluoro-deoxyglucose: A clue for the diagnosis of Graves' disease

Sampath Santhosh, Bhagwant Rai Mittal, Raghava Kashyap, Anish Bhattacharya, Baljinder Singh

Department of Nuclear Medicine and PET, Postgraduate Institute of Medical Education and Research, Chandigarh, India

ABSTRACT

F-18 fluoro-deoxyglucose (FDG) uptake in the thyroid and thymus is well reported in patients with Graves' disease. Incidental skeletal muscle uptake has also been reported in other non-musculoskeletal (benign and malignant) pathologies. We report a patient of Graves' disease showing symmetrical skeletal muscle uptake but no thyroidal or thymus uptake of FDG.

Keywords: F-18 FDG, Graves' disease, PET-CT, skeletal muscle, thymus

INTRODUCTION

Incidental skeletal muscle uptake of F-18 fluoro-deoxyglucose (FDG) has been reported in non-musculoskeletal (benign and malignant) pathologies. FDG hypermetabolism may also be seen in Graves' disease.

CASE REPORT

A 64-year-old man was subjected to a whole-body F-18 fluoro-deoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT) scan for detection of primary malignancy, if any. He had history of significant loss of appetite and loss of weight for 6 months. He also complained of intermittent dysphagia and constipation. Upper gastrointestinal endoscopy showed large hiatus hernia and biopsy from the lower end of esophagus was consistent with Barret's esophagitis. His liver function test was in the normal range. There was no personal and family history of diabetes or thyroid disease. Hence, it was planned to do FDG-PET/CT in search of any neoplastic process as a cause for the patient's recent illness. Whole body FDG-PET (maximum intensity projection image) demonstrated symmetrically increased uptake of F-18 FDG in the skeletal muscles, with no other focal abnormal FDG uptake [Figure 1]. The uptake was much higher compared to the physiological uptake in the liver. This unusual finding raised the suspicion of Graves' disease and the patient was investigated further.

Tc-99m pertechnetate scan showed homogeneous increased uptake (9.9%) in both lobes of the thyroid [Figure 2]. The thyroid hormone profile was also done and the values were: T3: 2.9 ng/mL (normal = 0.8–2.0 ng/mL); T4: 17.47 g/dL (normal = 5.1–14 g/dL) and thyroid-stimulating hormone: 0.005 μIU/mL (normal = 0.27–4.2 μIU/mL). In view of these findings, Graves' disease was diagnosed and the patient was started on treatment with anti-thyroid drug.

DISCUSSION

Chen *et al.* had described the visualization of skeletal muscle on F-18 FDG PET in patients with Graves' disease.[1,2] The authors had suggested that incidental finding of skeletal muscle hypermetabolism on F-18 FDG is a clue to the diagnosis of Graves' disease as an etiology. Increased glucose transporter GLUT-4 expression has been suggested as the cause for the high peripheral glucose utilization observed in skeletal muscles.[3] Hyperthyroidism-mediated increase in the sensitivity of glucose transport to insulin and in the activity of hexokinase has also been suggested.[4]

Although F-18 FDG uptake in the thyroid and thymus has been reported in Graves' disease,[5,6] in our patient, no such uptake was noticed. Chen *et al.* reported only 6 of the 20 Graves' disease patients having thyroidal FDG uptake and fewer patients with age more than 45 years showed thymic FDG uptake.[1] Incidental skeletal muscle uptake has also been reported in other

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Address for correspondence:
Dr. Bhagwant Rai Mittal, Department of Nuclear Medicine and PET, PGIMER, Chandigarh – 160 012, India. E-mail: brmittal@yahoo.com

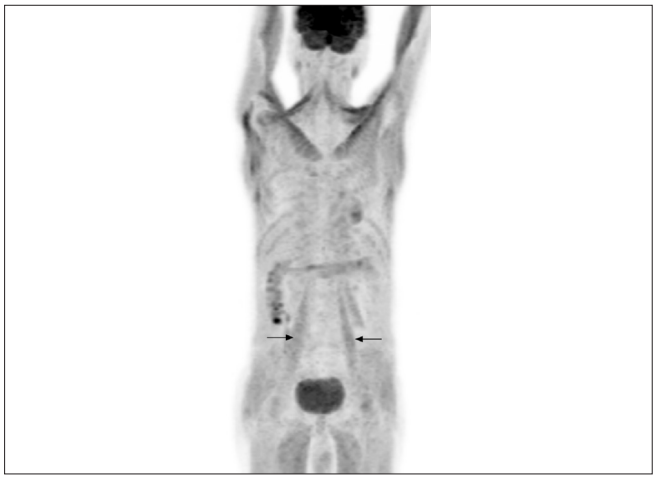

Figure 1: Whole body FDG-PET (maximum intensity projection image) showing symmetrically increased uptake of F-18 FDG in the skeletal muscles, with no other focal abnormal FDG uptake. The uptake is much higher compared to the physiological uptake in the liver

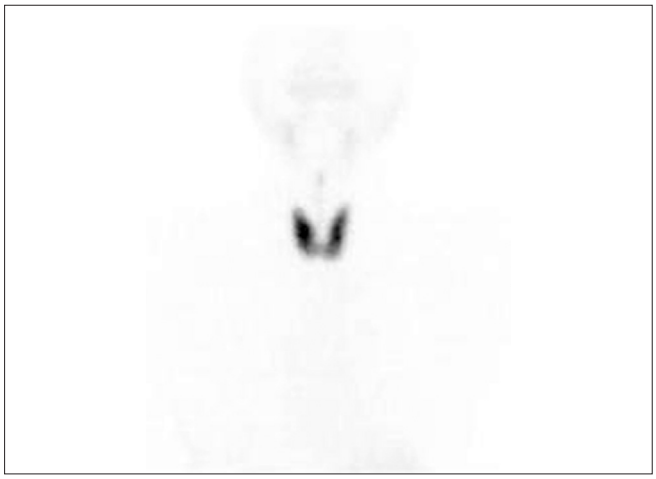

Figure 2: Tc-99m pertechnetate scan showing homogeneously increased uptake in both the lobes of thyroid. The total pertechnetate uptake is 9.9%, much higher than the normal values

non-musculoskeletal (benign and malignant) pathologies.[7-10] However, symmetric uptake in the psoas is considered as the most specific finding for Graves' disease[1] as seen in our patient. Thus, Graves' disease should be considered as a possible etiology, with the characteristic finding of symmetrical Psoas muscle uptake in patients being evaluated by FDG-PET.

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