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Case Report Open Access

Incidental Detection of Pigmented Villonodular Synovitis by ^{18}FDG PETCT Imaging in a Case of Poorly Differentiated Thyroid Carcinoma

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Abstract

We report the incidental identification of an unsuspected Pigmented Villonodular Synovitis (PVNS) in a patient of known thyroid malignancy (poorly differentiated thyroid carcinoma, PDTC) who underwent whole body 18 Fluorine Flurodeoxyglucose Positron Emission Tomography Computed Tomography (^{18}F FDG PET CT). FDG PET CT showed a FDG avid enhancing lesion in the subscapularis muscle near coracoid process of left scapula. A subsequent MRI showed a lesion anterior to the left glenoid in close proximity to the subcapsularis tendon suggestive of PNVS arising from the subcapsular bursa. This case highlights the non oncological utility of FDG PETCT in musculoskeletal disorders like PVNS.

Keywords: ^{18}F-FDG WB PETCT scan; Pigmented villonodular synovitis, Papillary carcinoma thyroid

Introduction

PVNS is a relatively rare, proliferative synovial disorder of idiopathic origin. It is known to occur in small joints and synovial lining of large joints [1]. Tendon sheaths, bursae or joints could be affected [2]. Knees and hips are commonly affected whereas it less commonly encountered in the ankle, shoulder and wrist [3]. FDG uptake in inflammatory lesions or aggressive benign tumours is due to hyperperfusion and increased glucose metabolism within leukocytes, giant cells and histiocytes [4]. Few cases of PVNS have been reported to have been detected with isotope scans like Thallium-201 Chloride, Gallium-67 Citrate and Tc-99m pentavalent dimercaptosuccinic acid (DMSA) have been reported in literature [5]. Through this incidental detection of an unsuspected PVNS, our case highlights the non oncological utility of FDG PET CT in evaluation of musculoskeletal disorders like PVNS.

Case Report

The patient is a middle aged lady with a poorly differentiated thyroid carcinoma post total Thyroidectomy. Immunohistochemistry revealed CK-7 positivity and Chromogranin, CEA and Thyroglobulin negativity. As radio iodine scan is usually negative in poorly differentiated thyroid malignancy, patient was referred to us for a whole body PET CT for staging. 8 millicurie (mCi) of ^{18}F FDG was injected in euglycemic status and a head to mid thigh PET CT (contrast enhanced) was performed. There was no evidence to suggest residual thyroid malignancy or any lymph nodal and distant metastases. An abnormal focal site of increased FDG uptake was noted at left subscapularis muscle near coracoid process of left scapula with a standardised uptake value (SUV max) 4.9 gm/ml (Figure 1). This corresponded to the enhancing lesion on CT (Figure 1B). As it is an unsuspected and solitary soft tissue FDG avid lesion at an unusual location, an MRI of the left shoulder joint was suggested. MRI revealed a soft tissue lesion measuring approximately 18 × 15 × 15 mm anterior to the glenoid of left scapula. The lesion was hypointense on T1 images (Figure 2A and 2B) and showed mixed signal on T2 images (Figure 2C) with multiple dark foci with homogenous enhancement on post contrast study (Figure 2A), highly pathognomic for PVNS arising from the subcapsular bursa.

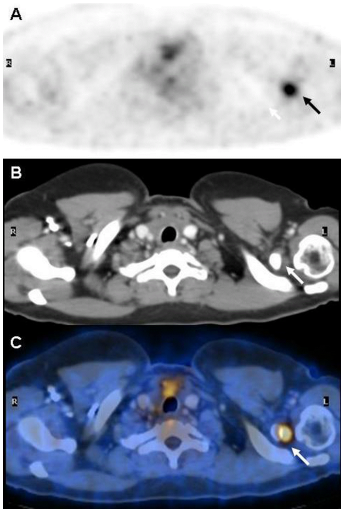

Figure 1: Transaxial 18F FDG PET CT images. (A) 18 F FDG PET image showing abnormal focal uptake of FDG in the left shoulder region (arrow). (B) The corresponding slice of computed tomography (CT) showing an enhancing lesion near coracoid process of left scapula in subscapularis muscle (arrow). PET and CT fusion image. (C) The uptake of FDG to correspond to the enhancing lesion near coracoid process of left scapula in subscapularis muscle on the CT image (B).

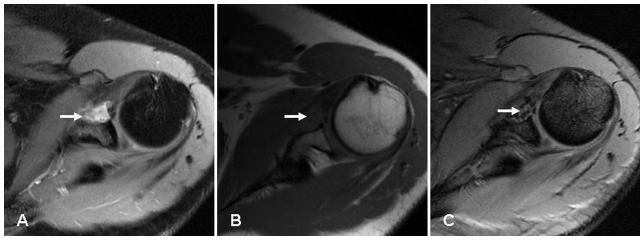

Figure 2: MRI of left shoulder joint showing axial soft tissue lesion measuring ~18 ×15 ×15 mm anterior to the glenoid of scapula on left side. The lesion appears hypointense on T1 images (A and B) and shows mixed signal on T2 images (C) with multiple dark foci with homogenous enhancement on post contrast study (A), suggestive of pigmented villonodular synovitis arising from the subcapsular bursa.

Discussion

FDG PET has been extensively used in oncological as well as in non-oncological imaging. ^{18}F FDG is a glucose analog that demonstrates enhanced uptake in the majority of malignant as well as in inflammatory and infective lesions. In addition to FDG, many radiopharmaceuticals are used for scintigraphic detection of infectious diseases and inflammatory processes, including ^{67}Ga-citrate, 111-Indium, and ^{99m}Tc-HMPAO (hexamethylpropylene-amine-oxime) labeled leukocytes, ^{99m}Tc labeled- antigranulocyte monoclonal antibodies, 111-Indium, and ^{99m}Tc-labeled human immunoglobulin. ^{18}F FDG PET has several advantages over other conventional nuclear medicine techniques for the diagnosis of infectious diseases. It needs a shorter imaging time and results can be obtained within a short time period (1.5-2 hours, generation of images of high spatial resolution and target to background contrast (contrast resolution), providing accurate results in bony structures, and delivering a relatively low radiation dose to the patient. Many a times a focal uptake of FDG in the vicinity of a joint could be a diagnostic dilemma in a patient for oncological workup. In our patient the unusual location of a solitary FDG uptake in a known case of thyroid cancer and the absence of any FDG avid lesions elsewhere prompted us to explore other differential diagnoses. Literature search yielded PVNS as one of the probable differential diagnosis considering its close proximity to the shoulder joint [6]. As in our case, features that should raise suspicion of PVNS include close proximity to a joint, especially with distribution corresponding to that of the synovial cavity. PVNS is known to accumulate FDG but current literature specifically addressing FDG avidity of tenosynovial giant-cell tumors is sparse. SUV max values of upto 25 g/ml have however been reported [7]. However, in our patient the SUVmax was only 4.9 gm/ml. MRI imaging findings are known to be highly specific for PVNS and it is also optimal for evaluating lesion extent which is crucial to guide treatment and to achieve complete surgical resection [8]. Even in a case of wide spread metastatic disease on ^{18}F FDG PET, deposits in joint region should be evaluated with caution keeping in mind various differential diagnoses, one of them being PVNS. Identification of PVNS could be of significant implication as excision of localized PVNS can improve symptoms in symptomatic patients with a return to preoperative activity levels [9]. Apart from that, it has a potential to mimic recurrent or residual disease on follow up PET CT in some cases as chemotherapy etc. will not be therapeutic. Magnetic resonance (MR) imaging findings are highly specific for PVNS. Prominent low signal intensity (seen on T2-weighting) and "blooming" artifact from the hemosiderin (on gradient-echo sequences) are almost pathognomonic of this diagnosis [8]. Additionally a classic feature is fatty signal within the synovium due to the accumulation of lipid-laden macrophages [10].

Conclusion

FDG-PET imaging is a functional, noninvasive imaging modality for staging of various malignancies and detecting sites of metastasis. Nevertheless, accumulation of ^{18}F-FDG occurs in both benign and malignant soft tissue mass like PVNS. Though ^{18}F-FDG uptake is not specific to tumor, focal intense ^{18}F-FDG uptake, on the outside of typical metastatic localization in a patient with known primary tumor, deserves further evaluation to investigate an unexpected secondary malignancy. Also, because of high spatial resolution and benefit of fusion of two modalities (PET and CT) ^{18}F FDG PET could also be an ideal method to assess the completeness of the resection of PVNS in a post resection setting or even assess recurrence. Additionally, ^{18}F FDG PET CT in the form of a whole body imaging as in the case of our patient may be beneficial in patients suspected with multisite PVNS.

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