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Case Report

Case series of rhomboid ligament degeneration, mimicking a supraclavicular adenopathy ☆

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ABSTRACT

A case series of 3 different patients showing very rare costoclavicular ligament increased SUV uptake on PET/CT with history of different types of cancer. This finding has not been described before especially that it corresponds to benign degenerative rather than sinister process. This is supported by low SUV and stability over months of follow up. Furthermore, even in degenerative joint diseases we have found very rare cases of such uptake. Experienced radiologists need to be always involved in the multidisciplinary team approach and be very cautious when approaching such findings to avoid any unnecessary medical interventions.

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Introduction

Previously, PET had limited use in the musculoskeletal disorders and still has major role in neoplastic diseases. However, with the advances in PET/CT there is a rising interest in PET as main or supplementary modality when approaching rheumatologic and orthopedic diseases [1]. Infections and inflammation can also produce localized FDG uptake and to avoid making a false diagnosis, interpreting physicians need to be aware of these possible hazards [2]. High FDG uptake occurs often in osteoarthritic joints. Upon reviewing over a

thousand ¹⁸F-FDG PET/CT scans, Metser et al. discovered that accidental foci of benign FDG uptake were present in 25% of the exams [3]. Incidental inflammatory uptake from degenerative osteoarthritis is also common. In addition, conditions such as osteomyelitis, discitis, and septic arthritis can be misdiagnosed as metastases [4]. Osteoarthritis, is a degenerative joint disease characterized by cartilage destruction, subchondral bone sclerosis, and osteophyte appearance [5]. Depending on whether synovitis is present or not, osteoarthritis may or may not cause FDG uptake [6]. In a research assessing 150 patients' whole-body FDG PET/CT scans of their cervical, thoracic, and lumbar spines, aberrant uptake matching to

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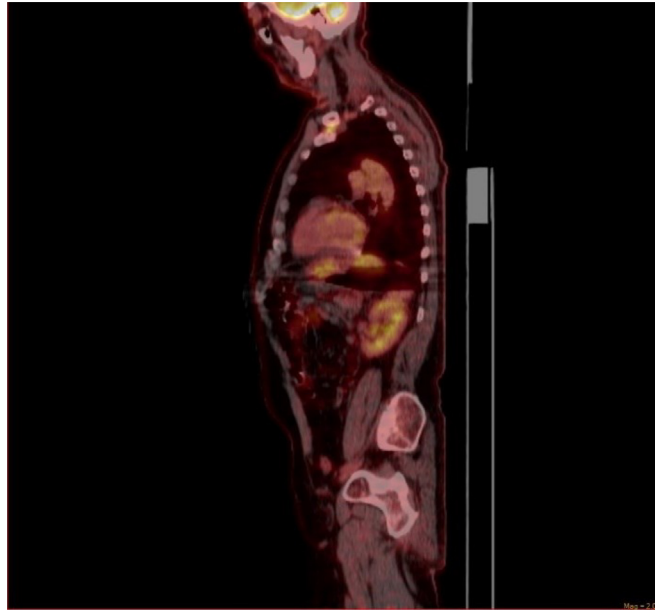


Fig. 1 – Fusion sagittal reformatted images of a PET-CT Scan show nodular radiotracer uptake in the region corresponding to the left costoclavicular ligament.

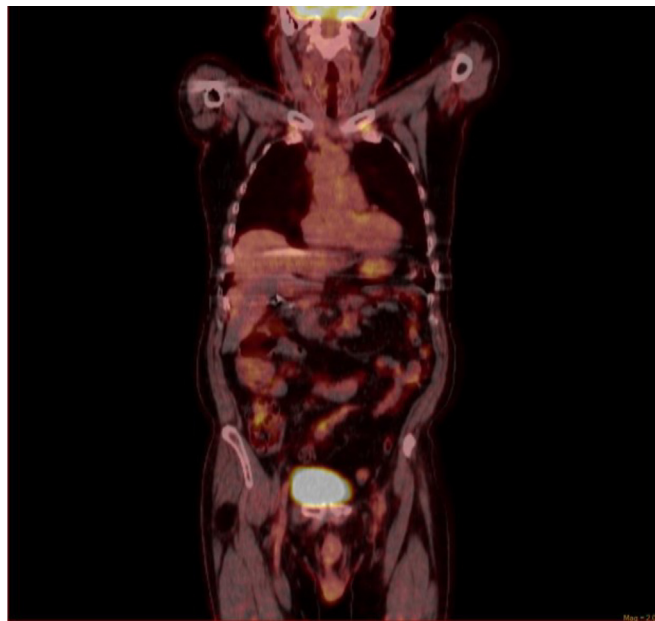


Fig. 2 – Coronal PET imaging nodular radiotracer uptake in the region corresponding to the left costoclavicular ligament.

accidental degenerative change was seen in 22% of the case [7].

In our case we will discuss 3 very rare cases of calcified costoclavicular ligament increased uptake on PET/CT suggesting degenerative changes of the joint. The costoclavicular ligament, also known as the rhomboid ligament (or Halsted's ligament), is the primary stabilizing element of the sternoclavicular joint and serves as the joint's axis of movement [8].

Case 1

A 65-year old gentleman with history of lung adenocarcinoma without metastasis presented for PET/CT follow up, which showed increased uptake of SUV 2.3 in the costoclavicular ligament. The same ligament was seen on CT Scan and showed calcifications and low SUV which is suggestive of benign degenerative process. Images are shown in [Figures 1-4](#).



Fig. 3 – Axial CT scan at the level of the lung apices shows a calcification at the location of the radiotracer uptake.

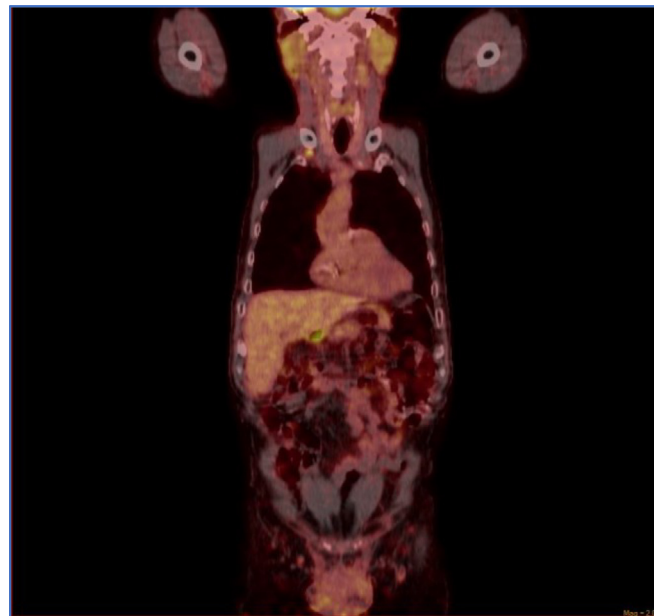


Fig. 4 – Fusion coronal reformatted images of a PET CT Scan show nodular radiotracer uptake in the region corresponding to the right costoclavicular ligament.

Case 2

A 75-year old gentleman with history of bladder cancer presented for PET/CT follow up, which showed an increased uptake in the costoclavicular ligament. The same ligament was seen on CT Scan and showed calcifications and low SUV which is suggestive of benign degenerative process (Figures 5-8).

Case 3

A 50-year old gentleman with history of lymphoma presented for PET/CT follow up, which showed an increased uptake in the costoclavicular ligament. The low SUV and the stability of the lesion over time suggests its benign origin.

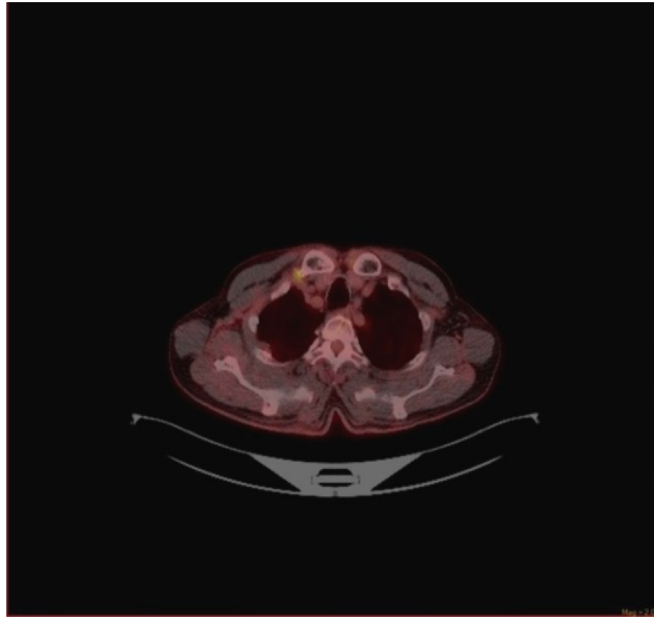


Fig. 5 – Fusion axial reformatted images of a PET\CT Scan show nodular radiotracer uptake in the region corresponding to the RIGHT costoclavicular ligament.

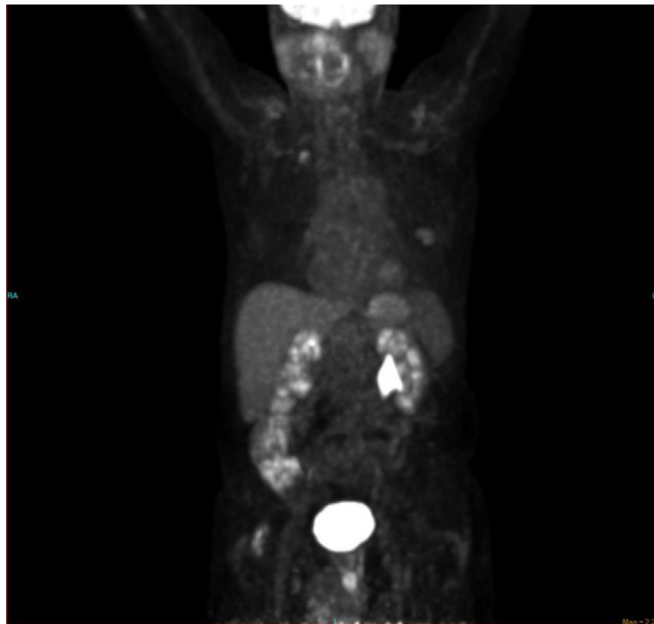


Fig. 6 – Coronal PET imaging shows nodular radiotracer uptake in the region corresponding to the right costoclavicular ligament.

Discussion

Costoclavicular ligament ossification—can occur in very rare conditions such as SAPHO syndrome, ankylosing spondylitis, trauma, and renal failure [8]. Throughout literature review, we have not found any PET\CT showing increased uptake of this ligament which is in our case and suggesting a nonneoplastic degenerative process. For these reasons, radi-

ologists are extra cautious when interpreting increased uptake in such ligament and would suggest something sinister rather than benign due to rarity of such joint disease in various nonneoplastic conditions such as degenerative joint disease. Thus the interpretation would be worrisome especially if there is history of neoplastic disease. However, a multidisciplinary team approach should be always suggested to avoid any unnecessary laboratory and radiological testing, or even biopsies. If the bone is not fully evaluated on the CT portion

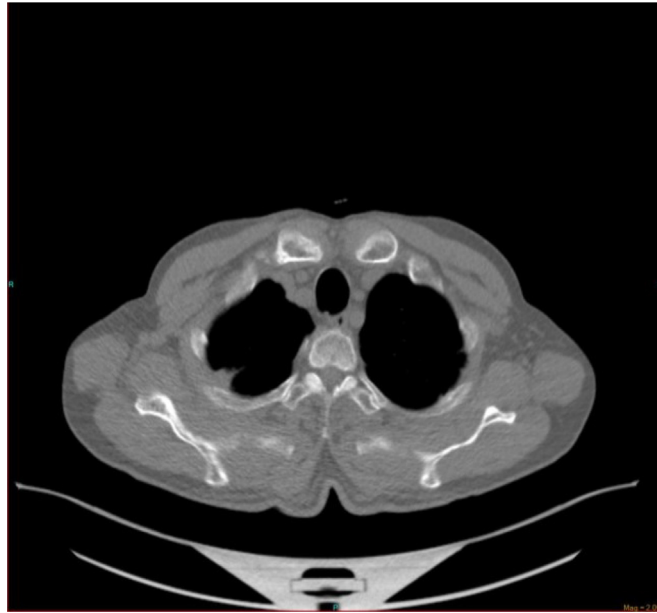


Fig. 7 – Axial unenhanced CT Scan at the level of the lung apices shows a calcification at the location of the radiotracer uptake.



Fig. 8 – Coronal PET imaging shows avidity in the region corresponding to the right costoclavicular ligament, with an SUV of 2.6.

of the PET/CT examination, many benign sources of FDG uptake in the musculoskeletal system can be misinterpreted as aggressive or malignant processes. Examples of these include fractures, osteophytes, and degenerative disc disease. Benign bone and soft-tissue lesions can mimic malignancy, especially if they are highly avid; low-grade malignancies with low FDG uptake can be misinterpreted as benign lesions if the CT and radiographic characteristics of the lesions are not closely studied [7].

In metastatic cancers, such as our cases, this lesion on interest mimics mediastinal prevascular level 3 lymph node which in turn would be very highly suspicious of metastasis to the lymph node, and would therefore need further investigation. However, with the presence of calcification in CT scan done, metastasis or recurrence is highly improbable. This is really significant finding as it manifests the rarity of this ligament calcification and would indeed decrease any chance of false positive findings on PET/CT. In addition, it highlights the

importance of the CT part of PET scan when interpreting the images.

Conclusion

With the advances of radiological imaging and incremental use in the approach of patients in diagnoses and therapeutics, new incidental findings emerge such as incidental uptake in our case. This case remains unproven due to absence of biopsies however very suggestive of non-neoplastic disease. Experienced Radiologists remain the backbone in every multidisciplinary team discussion in approaching such patients.

Contributions

Each author declares substantial contributions through the following: (1) the conception and design of the study, or acquisition of data, or analysis and interpretation of data, (2) drafting the article or revising it critically for important intellectual content.

Patient consent

Complete written informed consent was obtained from the patient for the publication of this study and accompanying images.

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