FDG uptake in sternoclavicular joint synovitis: Mimic of internal mammary adenopathy.

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Radiology Case. 2010 Mar; 4(3):31-34 :: DOI: 10.3941/jrcr.v4i3.352

ABSTRACT

False-positive FDG uptake has been noted in a wide range of benign processes. In this report, we describe a case of FDG uptake in unilateral sternoclavicular synovitis which mimicked an internal mammary node in appearance. Knowledge of this potential false-positive is particularly important in breast cancer patients with a propensity of internal mammary nodal metastases.

CASE REPORT

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A 60 year old female with a history of breast cancer was referred for whole body FDG PET/CT to evaluate for disease recurrence. The patient was diagnosed 2 years prior (stage IIA), had bilateral mastectomies, and was treated with tamoxifen. The PET/CT (figures 1,2) demonstrated focal uptake in an area of increased soft tissue posterior to the right sternum. Given the patient's history, the focal nature of the FDG uptake, and the location of the uptake, this was initially suspicious for an internal mammary nodal metastasis. However, the soft tissue was noted to extend into the right sternoclavicular joint, and there was also comparable soft tissue on the contralateral side, although this contralateral soft tissue was smaller. The PET/CT was followed by a bone scan and a contrast-enhanced CT. The bone scan (figure 3) demonstrated increased uptake in the right sternoclavicular joint consistent with a process related to the sternoclavicular joint. The contrast-enhanced CT demonstrated peripheral enhancement (figure 4) of the right-sided soft tissue density, consistent with synovial enhancement. The FDG uptake was recognized as being secondary to right-sided sternoclavicular synovitis. The patient had a history of rheumatoid arthritis, and upon questioning had recent pain and swelling in the right sternoclavicular region. This substantially improved after non-steroidal anti-inflammatory medication.

DISCUSSION

FDG uptake is noted in a wide range of inflammatory and other benign processes (1). Many of these varied causes of FDG uptake, such as brown fat, sarcoidosis, bowel activity, and non-ossifying fibromas, could mimic neoplastic findings (2). In many cases, uptake in inflammatory and other benign processes can be differentiated from neoplastic processes with the aid of combined PET/CT imaging and clinical history. This particular case presented some initial difficulty due to the coincidence of the patient's particular cancer, which has a propensity for internal mammary nodal metastases, and the location of the increased soft tissue in the region of the internal mammary nodal chain. Lymphatic drainage to the internal mammary chain is an important pathway of spread of breast cancer at initial diagnosis, and after treatment. Metastases to internal mammary nodes occur in approximately 1 in 5 patients with resectable stage II to III breast cancer (3). FDG PET may be more accurate than CT for the diagnosis of internal mammary and mediastinal nodes (4,5) in patients with breast cancer. In one study (5), 44% of patients had suspected internal mammary or mediastinal nodes identified by FDG PET compared to 23% by CT. Given the increased sensitivity of FDG PET for internal mammary metastases, it is important to maximize the specificity as well by recognizing false-positive findings.

Non-traumatic causes of sternoclavicular joint pain and swelling include osteoarthritis, inflammatory arthritides, septic arthritis, and crystal deposition diseases (6). Of the inflammatory arthritides, both rheumatoid arthritis and the seronegative spondyloarthropathies can involve the sternoclavicular joint. The sternoclavicular joint can be involved in up to one-third of patients with rheumatoid arthritis (6), although radiographic changes may be minimal. Of the seronegative spondyloarthopathies, psoriatic arthritis is the most likely to involve the sternoclavicular joint, with involvement of the joint in 90% of patient with severe arthropathy, and clinically significant involvement in 50% (7).

The degree of FDG uptake in this case is unusual and has not been previously noted by the author. Despite the lack of osseus changes on the CT and the relatively mild degree of the uptake on the bone scan, the FDG uptake and the synovial enhancement seen on the CT suggests a substantial degree of synovitis.

FDG uptake in synovitis, particularly related to rheumatoid arthritis, has been well-described and the degree of FDG uptake has been used to monitor disease activity (8-12). In the locations in which synovitis is typically seen, synovitis typically does not present a diagnostic difficulty in oncologic FDG PET/CT. The sternoclavicular joint is one area where FDG uptake in synovitis could potentially present a diagnostic difficulty.

TEACHING POINT

Sternoclavicular joint synovitis can result in both asymmetric soft tissue and unilateral FDG uptake in the internal mammary region on FDG PET/CT studies. This can mimic internal mammary adenopathy.

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FIGURES

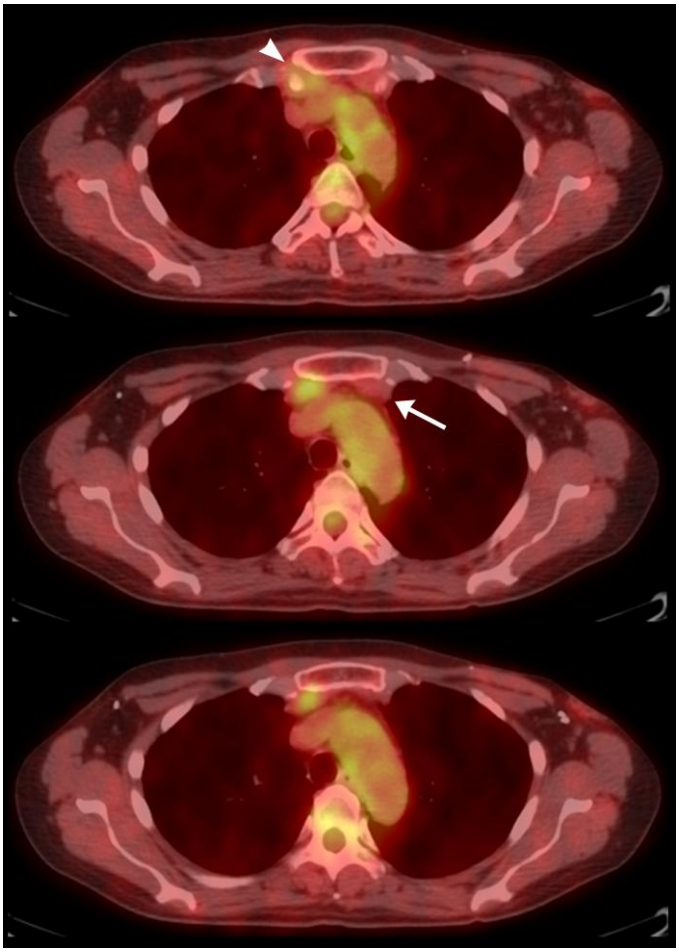

Figure 1: 60 year old woman with a history of breast cancer and sternoclavicular joint synovitis mimicking internal mammary adenopathy. FDG PET/CT was performed 60 minutes after the injection of 19.8 mCi of FDG. Three axial images from this study are provided from superior (top) to inferior (bottom). This demonstrates soft tissue posterior to the right sternum with focal FDG uptake. However, the superior aspect of this soft tissue extends to the sternoclavicular joint (arrowhead). Another clue that this may not be internal mammary adenopathy is that the internal mammary nodes are typically just lateral to the sternum, while this tissue is slightly more medial. In addition, there is also soft tissue on the left side (arrow); however, the right-sided soft tissue is larger.

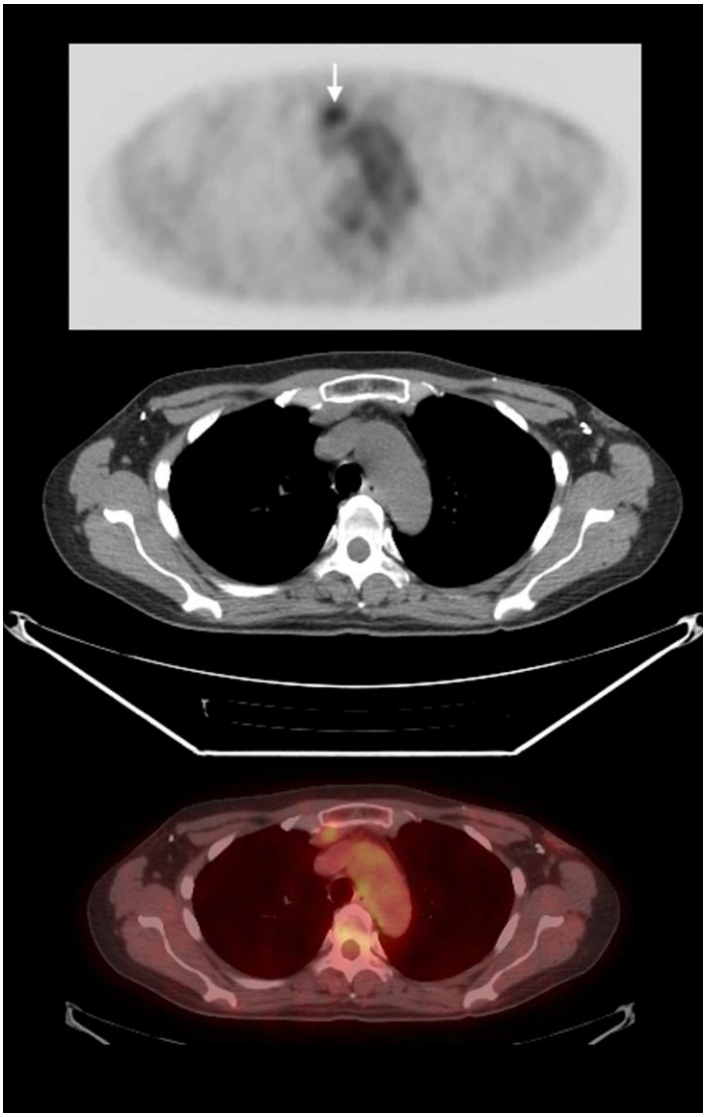

Figure 2: 60 year old woman with a history of breast cancer and sternoclavicular joint synovitis mimicking internal mammary adenopathy. PET, CT, and fused PET/CT images from the same study as figure 1 (FDG PET/CT was performed 60 minutes after the injection of 19.8 mCi of FDG.), demonstrate the FDG uptake on the PET image (arrow) which fuses to soft tissue adjacent to the sternoclavicular joint on CT.

Figure 3: 60 year old woman with a history of breast cancer and sternoclavicular joint synovitis mimicking internal mammary adenopathy. Bone scan performed 4 hours after the injection of 24.2 mCi of Tc-99m methylene diphosphonate demonstrates increased uptake in the right sternoclavicular joint (arrow).

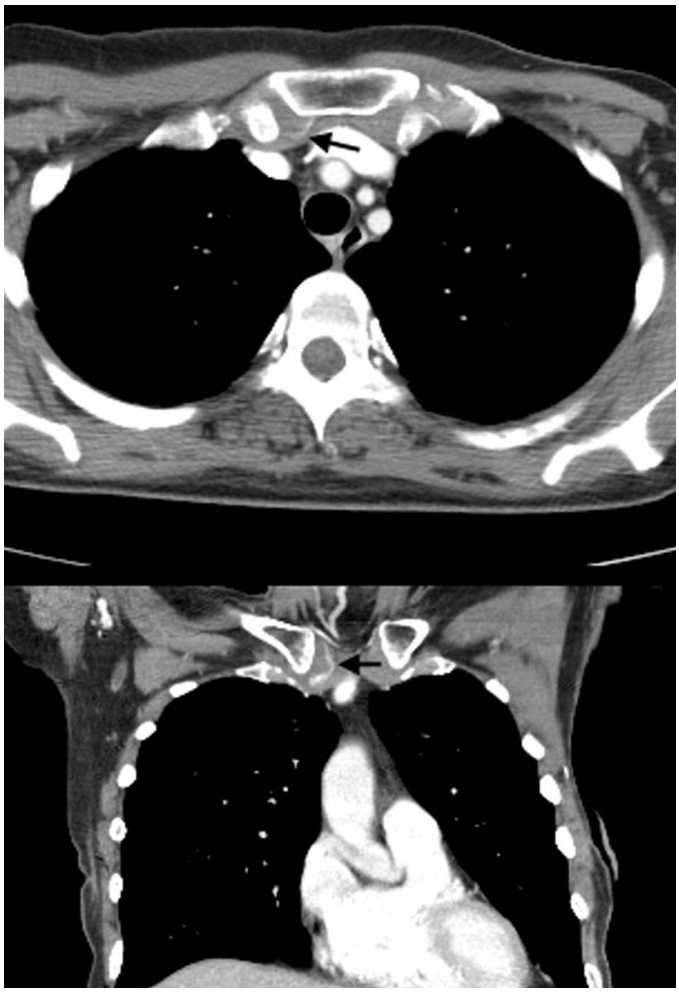

Figure 4: 60 year old woman with a history of breast cancer and sternoclavicular joint synovitis mimicking internal mammary adenopathy. Axial and coronal reconstructed image from a CT (General Electric Lightspeed VCT, kVp 120, mAs 266, 5 mm reconstruction) performed with 125 cc of Isovue-370 contrast demonstrates peripheral enhancement of the right-sided soft tissue (arrows) noted on the prior FDG PET/CT. On this study, the peripheral enhancement demarcates the area of soft tissue, which is seen to arise from the sternoclavicular joint.

ABBREVIATIONS

FDG = F18-fluorodeoxyglucose
PET = positron emission tomography
CT = computed tomography

KEYWORDS

Positron emission tomography, fluorodeoxyglucose, sternoclavicular joint, breast cancer, synovitis, arthritis

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