

Benign bone cyst mimicking skeletal metastasis on ^{18}F -FDG-PET

To the Editor: We read with interest in Hell J Nucl Med the letter by Seven B. et al. on: "Aneurysmal bone cyst of the second metatarsal: three-phase bone scan findings and radiological assessment" published in 2008; 11(3): 189-190 [1]. We now report another case of "active/viable" bone cyst shown in the fluorine-18 fluoro de oxyglucose, positron emission tomography (^{18}F -FDG PET) scan with increased maximum standardized uptake value (SUVmax). Benign lesions like eosinophilic granuloma, fibrous dysplasia, aneurysmal bone cyst, and giant cell tumor, also show increased ^{18}F -FDG uptake [2-4]. Thus, visual evaluation may not be sufficient for the diagnosis of malignancy. Some studies have reported that a cutoff of 2.0 SUV value within osseous lesions was superior to subjective visual analysis for discriminating benign from malignant lesions [5, 6]. However, benign lesions may exhibit a high SUVmax and may be reported as false-positives for metastases like in the present case of a solitary bone cyst.

We have studied a 25 years old woman, with papillary serous cystadenocarcinoma of the right ovary referred to us for a ^{18}F FDG-PET/CT computerized tomography study following completion of treatment to rule out the possibility of residual and/or metastatic disease. She had been treated with total abdominal hysterectomy, bilateral salpingo-oophorectomy, and infracolic omentectomy followed by 6 cycles of carboplatin and gemcitabine based chemotherapy. The ^{18}F -FDG-PET/CT was performed approximately 60min following intravenous injection of 370MBq of ^{18}F -FDG. The patient was positioned supine with hands down on a whole body full ring PET/CT scanner (Discovery STE16-GE) camera). Initial scout was obtained to localize acquisition from the vertex to mid thigh. A low dose CT of this area was done for attenuation correction and co-registration followed by the 3D PET emission scan at 2min/bed position for 7 bed positions. Images were reconstructed using a 3D VUE-a reconstruction algorithm patented by GE- and viewed on the Xeleris workstation (GE, USA) using the volumetric protocol. The ^{18}F -FDG PET/CT revealed low grade residual disease in a soft tissue mass in the rectovesical region with right common iliac lymphadenopathy (Fig. 1). A well defined lytic lesion with sclerotic margins showing increased ^{18}F -FDG accumulation was noted in the left femur neck and the adjacent head region of the femur (Fig. 1 and 2). There was no history of pain or fracture at this site. X-rays of the pelvis in-

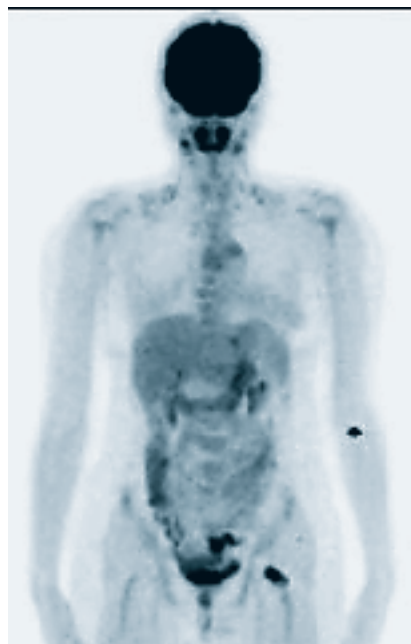


Figure 1. Maximum small intensity projection (MIP) image shows a focal area of intense ^{18}F -FDG uptake mainly in the neck region of the left femur. Average and small maximum standard uptake values were 10.3 and 11.55 respectively. Note is made of low grade uptake in the rectovesical area and the right iliac region corresponding to the residual disease. Focal uptake in the left forearm corresponds to injection site contamination.

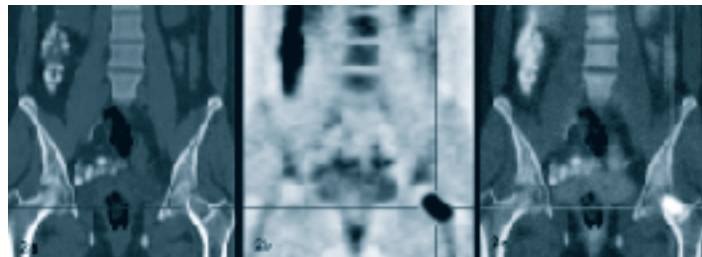


Figure 2. Coronal section of PET (2b) shows intense ^{18}F -FDG uptake in the neck and the adjacent part of the head region of the left femur. PET/CT (2c) image localizes the ^{18}F -FDG uptake to the corresponding lesion on the CT. The corresponding CT image (2a) at the same level shows a well defined cystic lesion, size measuring approximately 29.3x19.9x30.2mm.

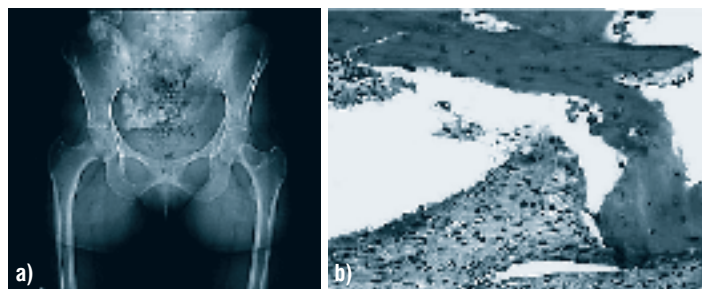


Figure 3. (a) X-ray pelvis with bilateral hip joints AP view shows intense osteoporosis focal oval to orthogonal lytic expansile well defined lesion, with sclerotic margins in the neck region left femur and the adjacent head of the femur. (b) Histological appearance of the benign bone cyst- fibrous tissue and lamellar bone are visualized.

cluding bilateral hip joints in the AP view (Fig. 3a) revealed a focal oval orthogonal well defined "lytic" cold lesion with sclerotic margins in the left femur neck. In comparison to an ^{18}F -FDG PET/CT scan done 6 months before, there was good response of the primary lesion to treatment but this lesion in the left femur remained unchanged. A CT guided biopsy was done which confirmed the benign nature of the lesion (Fig. 3b).

Solitary bone cysts are always unilocular and commoner in males. Their site depends on the patient's age: before epiphyseal fusion most of the cysts occur in the proximal humeri and the femur. While after skeletal maturation cysts are found in smaller bones such as the calcaneum [7], more than half are due to a pathological fracture, few produce minor discomfort and others are found incidentally [7].

In our case, metastatic disease was unlikely because epithelial ovarian cancer normally spreads trans-coelomically in the peritoneal cavity and in more advanced stages via the peritoneal cavity to the intra-abdominal lymph nodes, the liver and lung parenchyma. Metastases to other tissues such as bone are rare (0.1%-0.12%) and reported in a few series. In autopsy series the metastatic pattern of 428 ovarian cancers showed bone metastases in the vertebrae, pelvis and the skull in 0.06%-0.19% and related to epithelial histology [8, 9]. Radiologically osteolytic lesions are the commonest. Cisplatin based chemotherapy in addition to local radiation, results in significant response in about 50% of the patients [10]. Our patient was asymptomatic and had no difficulty with any kind of movements.

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