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Interesting image

Acute myeloid leukemia detected on fluorine- 18 fluorodeoxyglucose positron emission tomography/computed tomography imaging in a patient with fever of unknown origin

Leucemia mieloide aguda detectada en tomografía por emisión de positrones de flúor-18 fluorodeoxiglucosa/TC en un paciente con fiebre de origen desconocido

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A 36-year-old male patient who met the revised definition criteria of FUO (febrile illness of > 3 weeks' duration, temperature > 38,3 °C, and no diagnosis after 3 days of in-hospital investigation) was referred for FDG PET/CT imaging for detecting primary origin of fever. The patient underwent FDG PET/CT scan 60 minutes after intravenous injection of 10 mCi FDG. Disseminated bone marrow infiltration and diffuse uptake in spleen (fig. 1 [a, b]) were demonstrated with FDG PET/CT. Additionally, left supraclavicular, mediastinal and left inguinal lymphadenopathy (fig. [c, d]) with increased FDG uptake was detected. Findings on FDG PET/CT were suspicious for leukemia and bone marrow biopsy confirmed the diagnosis of AML. The patient started on induction therapy. Figure 2 illustrates coronal FDG PET/CT imaging demonstrating bone marrow infiltration. The patient initially presented with sudden onset of high fever, fatigue, abdominal pain and weight loss. His blood level of white blood cell (WBC) count 2.77 K/ul (normal ranges: 4–10 K/uL), hemoglobin (Hb) 9.9 g/dl (normal: 12.1–17.2 g/Dl), mean corpuscular volume (MCV) 84.1 Fl (normal: 82.2–99 Fl), and platelet count 207,000/Ul (150–400) with neutrophils 52.9%, lymphocytes 34.6%, and monocytes 4.6%. Because of blood discrasia in the hematological series bone marrow aspiration was performed and found non-diagnostic. Thus, leukemia was not diagnosed initially. After PET/CT scanning bone marrow core biopsy was repeated and leukemia was diagnosed with hypercellular bone marrow and blast transformation. Multiparameter flow cytometry from the spleen supported diagnosis of AML. Although a bone marrow core biopsy may not be required in every case, an adequate biopsy does provide the most accurate assessment of the marrow cellularity, topography, stromal changes, and maturation pattern of the hematopoietic lineages[1]. Most cases of leukemia is diagnosed by peripheral blood or bone marrow. However, insufficient specimens can cause misleading as in this case. PET/CT has been useful for the initial diagnosis of the patient while re-directing to the diagnosis of leukemia and because of providing to screen whole-body in a single scan, PET/CT accelerated the diagnosis.

Despite modern diagnostic techniques, no diagnosis can be reached in up to 53% of all patients with fever of unknown origin. FDG uptake is well established as a marker of malignant disease due to the increased glycolytic activity of neoplastic cells. Furthermore, activated inflammatory cells are also known to have increased glucose utilisation, which makes FDG PET imaging useful in detection of inflammatory and infectious processes. Since most cases of FUO have either an infectious/inflammatory or a neoplastic cause, FDG PET/CT could be valuable in the diagnosis of patients with FUO. In a prospective multi-centre study by Bleeker-Rovers CP et al[2] in 70 patients with FUO, FDG-PET was found clinically helpful in 33% of all scans. FDG-PET contributed significantly more often to the final diagnosis in patients with continuous fever than in patients with periodic fever. Whole-body PET scanning with FDG has been used in detection, staging, and restaging of solid tumors, including lymphomas and Richter transformation[3]. However, there are few reports explaining its role in the management of AML.

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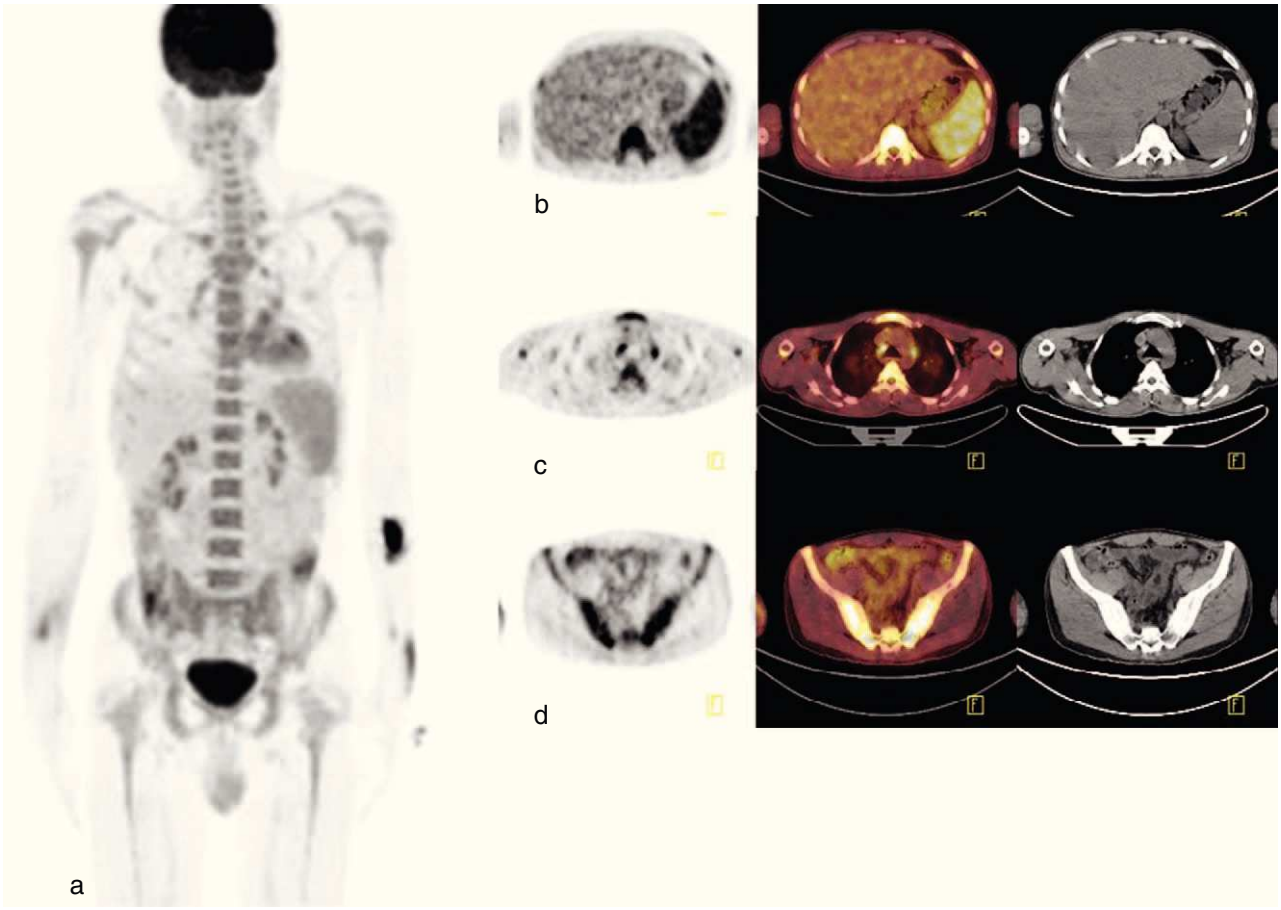

Figure 1. FDG PET/CT.

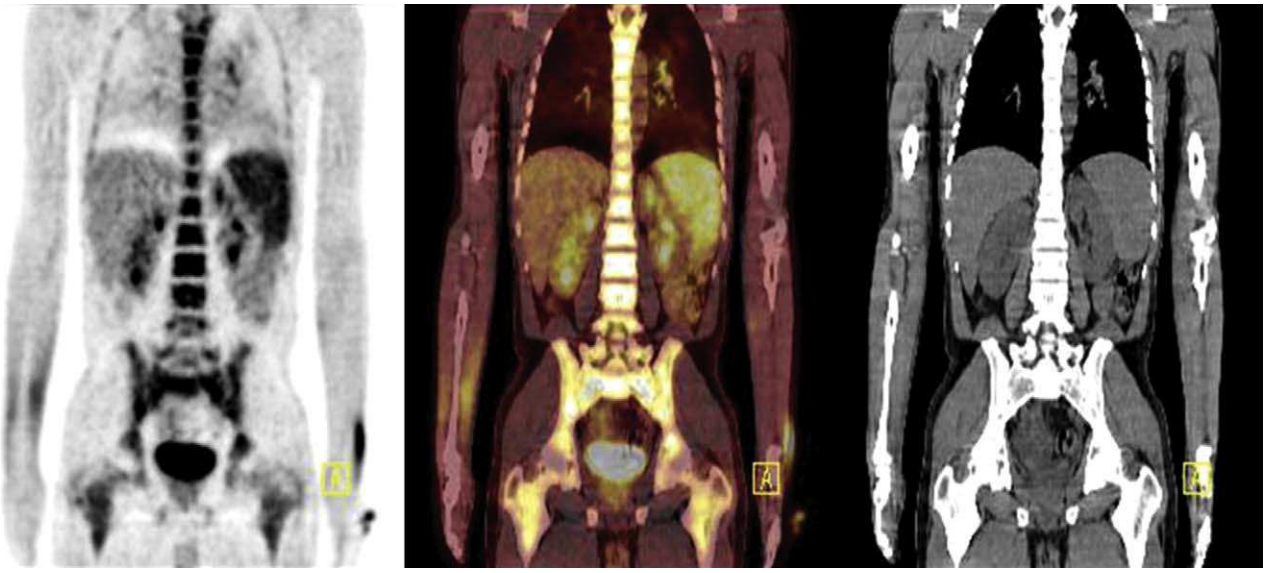

Figure 2. Coronal FDG PET/CT imaging demonstrating bone marrow infiltration.

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