



Original Article

DIFFERENTIAL DIAGNOSIS OF DIFFUSE BONE MARROW UPTAKE ON ¹⁸F-FDG PET/ CT

HABUSARI HAPKIDO¹, BASUKI HIDAYAT^{1,2}, A. HUSSEIN S. KARTAMIHARDJA¹, TRIAS NUGRAHADI¹

AUTHOR DETAILS

¹Department of Nuclear Medicine and Molecular Imaging, School of Medicine, Universitas Padjadjaran / Dr. Hasan Sadikin General Hospital, Bandung, West Java, Indonesia.

²PET and Nuclear Medicine center, Mochtar Riady Comprehensive Cancer Center Siloam Hospital, Semanggi, Jakarta, Indonesia.

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*Corresponding author email:

habusari_hapkido@yahoo.co.id.

ABSTRACT

Background: Bone marrow is a frequent site of metastatic tumors, especially from breast, lung, and prostate cancers. Metastatic tumor in the bone marrow may influence the response to treatment, overall survival, and resulting decreased hematopoiesis. Diffusely and homogeneously bone marrow uptake in ¹⁸F-FDG PET/CT scan is frequently observed which can be caused by many conditions. **Material and methods:** We retrospectively analyzed the consecutive records of F-18 FDG PET scans performed from April 2011 to August 2013 at Mochtar Riady Comprehensive Cancer Center Siloam Hospital. A total of 2952 results were reviewed. 16 patients with diffusely and homogeneously bone marrow uptake in F-18 FDG PET/CT whole body scan between January 2012 and December 2013 were evaluated to find out the etiology. **Results:** From 2952 patients performed ¹⁸F-FDG-PET/CT there are 16 patients (5 men, 11 women) with diffusely and homogeneously increased FDG uptake in bone marrow, mean age: 52 years, range 5–82 years. It was found that 6 of 16 FDG PET/CT positive patients with solid tumors and 10 of 16 FDG PET/CT with nonsolid tumors. Malignancy was observed in 14 patients and benign in 2 patients. Diffusely and homogeneously uptake due to 1 patient with Idiopathic thrombocytopenic purpura (ITP), 6 patients with anaemia, 7 patients with chemotherapy, 1 patient with Granulocyte Colony-Stimulating Factor (G-CSF) and 1 patient with extra-nodal non-hodgkin lymphoma were observed. **Conclusion:** Diffusely and homogeneously increased bone marrow on ¹⁸F FDG PET/CT whole body scan uptake can be seen in malignant or benign disease and history of treatment. Spleen uptake is observed at the initial imaging than bone marrow involvement while spleen uptake more frequently reflects disease involvement.

KEYWORDS

FDG PET. Bone marrow involvement, solid tumor, nonsolid tumor.

INTRODUCTION

The International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization, released the latest data on cancer incidence, mortality, and prevalence worldwide including Indonesia. According to GLOBOCAN 2012, an estimated 14.1 million new cancer cases and 8.2 million cancer-related deaths occurred in 2012. The most commonly diagnosed cancers worldwide were those of the lung (1.8 million, 13.0% of the total), breast (1.7 million, 11.9%), and colorectum (1.4 million, 9.7%). The most common causes of cancer death were cancers of the lung (1.6 million, 19.4% of the total), liver (0.8 million, 9.1%), and stomach (0.7 million, 8.8%).^[1]

Bone marrow (BM) is one of the most common sites to be involved by tumors that metastasize via the bloodstream.^[2] Bone marrow is a frequent site of metastatic tumors, especially from breast, lung, and prostate cancers. Approximately 90% of metastases have been observed in concordance with the distribution of hematopoietic

marrow.^[3] Detection of metastatic tumors to the bone marrow is of great importance for the clinical staging of tumor spread because malignant infiltration of hematopoietic tissue can alter the clinical course of the disease. Metastatic tumor in the bone marrow may influence the response to treatment, overall survival, and resulting decreased hematopoiesis. The bone marrow provides erythrocytes, leukocytes, and platelets to the body, and usually accumulates small amount of F-18 fluoro-2-deoxyglucose (F-18 FDG) on positron emission tomography (PET) images. Bone marrow hypermetabolism might reflect characteristics of the neoplasm, although cytokines are produced not only by neoplasm but also as part of the inflammatory response.^[2,5] Though bone marrow involvement is most commonly seen with myeloid or lymphoid hematological malignancies, solid tumors may also spread to the bone marrow via the hematogenous route.^[2]

Many imaging modalities have been developed to detect and assess bone marrow metastases.^[2] Positron-emission