Original article

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Malignant disease as an incidental finding at ^{18}F-FDG-PET/CT scanning in patients with granulomatous lung disease

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Purpose **Fluorine-18 fluorodeoxyglucose (^{18}F-FDG)-PET/computed tomography (CT) is used for assessment of the extent and activity of disease in patients with inflammatory granulomatous lung disease, in particular sarcoidosis and tuberculosis. The aim of this retrospective analysis was to assess the value of ^{18}F-FDG-PET/CT in the identification of previously unknown malignant disease during routine investigation of granulomatous lung disease.**

Materials and methods **From July 2008 to December 2013, a total of 122 patients with tuberculosis (76 male and 46 female patients; age range 19.6–88.6 years, mean 52.8 ± 16.6 years) and 85 patients with sarcoidosis (46 male and 39 female patients; age range 17.8–76.5 years, mean 48.6 ± 13.8 years) underwent ^{18}F-FDG-PET/CT. Reports were generated in consensus by both a nuclear medicine physician and a radiologist. Possibly malignant findings underwent biopsies and/or follow-up. Quantitative parameters (maximum standardized uptake value) were pooled and compared from reference lesions in each group.**

Results **Malignant disease was suspected in 18 of 122 tuberculosis patients and in eight of 85 sarcoidosis patients. Malignancy was finally confirmed in six patients with tuberculosis and in two patients with sarcoidosis. In one single case a malignant lung tumour had been overlooked on PET/CT. Patients were also analysed according to their age. In the patient group older than 60 years, four malignancies were confirmed in 44 tuberculosis patients and in one in 20 sarcoidosis patients, whereas in patients aged between 30 and 60 years only three of 63 tuberculosis and one of 58 sarcoidosis cases showed malignancy compared with the 18 false-positive findings on a total patient basis. The most common site of malignant disease was the chest. Besides the intrathoracic findings, two cases of malignancy were detected outside the thorax. Quantitative evaluation did not reveal any statistically significant difference between the tuberculosis and sarcoidosis groups.**

Conclusion **Differentiation between granulomatous inflammation and malignancy is challenging with ^{18}F-FDG-PET/CT because of a large number of false-positive findings. The highest probability of detecting coexistent malignant disease was seen in patients older than 60 years who were suffering from tuberculosis. An important feature for identification of malignant disease, especially in the assessment of intrathoracic findings, has turned out to be the CT pattern; quantitative evaluation, in contrast, seems to have little clinical value.** *Nucl Med Commun* **00:000–000**

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Introduction

Fluorine-18 fluorodeoxyglucose (^{18}F-FDG) is by far the most frequently used tracer for PET/computed tomography (CT) studies in clinical routine for patients with oncological or inflammatory disease.

The mechanism of tracer uptake is similar in both lesion types and is mediated by glucose transporters Glut 1–Glut 5 [1] representing the cellular energy consumption at the molecular level. In inflammatory processes, activated leucocytes, macrophages and T-lymphocytes express glucose transporters, especially Glut 1, which is greatly responsible for ^{18}F-FDG accumulation in cells [2–4].

Sarcoidosis and tuberculosis are both systemic granulomatous diseases showing similar clinical features and are sometimes defined as 'the same disease with different or similar manifestations of different disorders' [5].

Sarcoidosis is a multisystem granulomatous disease of unknown origin with noncaseating granuloma consisting of epithelioid and multinucleated giant cells activated by

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