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The Pancreatic Hypermetabolic Lesions of Lung Carcinoma Patients in F-18-Fluorodeoxyglucose PET-CT: Correlation with Pathology

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Abstract

Aim: The ratio and results of the hypermetabolic lesions of the pancreas in lung carcinoma patients in FDG PET-CT which is rare, wasn't sufficiently evaluated previously in the literature. The aim of this study was to determine these lesions' pathologic correlations.

Materials and Methods: The F-18 FDG PET/CT images of the 516 patients with Lung Carcinoma was evaluated retrospectively by an Experienced Nuclear Medicine Physician and correlation of Pathology results were analyzed.

Results: The ratio of the pancreatic hypermetabolic lesions were 7% (36 patients). Pathology results revealed small cell lung carcinoma metastasis in 23, adenocarcinoma in 8, squamous cell carcinoma in 1 and atypical carcinoid tumor in 1 and other pathology types in rest of the patients in primary lung carcinoma. Five of the pancreatic lesions pathology results could be obtained and three were small cell lung carcinoma, one of them was adenocarcinoma and the squamous cell carcinoma in other one.

Conclusion: The hypermetabolic pancreatic lesions in lung carcinoma patients in F-18 FDG PET/CT should be evaluated and considered carefully. Since unexpected pathology results could be achieved.

***Keywords*:** *F-18 FDG PET/CT, lung carcinoma, pancreas.*

Introduction

Lung carcinoma is the leading cause of mortality in world. The most important imaging modality in the diagnosis, staging, restaging and treatment response evaluation is F-18 FDG PET/CT. A rare phenomenon in the F-18 FDG PET/CT imaging is hypermetabolic lesions in follow up of lung carcinoma. This finding is important however pathologic diagnosis is a significant challenge. Previous analyses have demonstrated that these

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lesions are dominantly originated from the lung carcinoma (1). These lesions might be removed in case of oligometastatic disease (2). Thus, identification and pathologic classification of this lesions is a requirement. This analysis includes the determination of ratio of this rare entity as well as a correlation of the results with pathology.

Materials and Methods

The patients who attended to our clinic for F-18 FDG PET/CT between January 2016-January 2024 with the diagnosis of lung carcinoma were subjects of this study. The 36/516 patients were determined to have hypermetabolic lesions. Standardized uptake value (SUVmax) of the lesions as well as follow up results were compared to gold standard pathology results.

Findings

Among the 36 patients were included in the study (30 M, 6 F, mean: 63.4±10,9 years old). The mean lesion size and SUVmax levels were 31±20.1 mm and 34.2±82.5 respectively. Among the pathological evaluation results three were metastatic small cell lung carcinoma (Figure 1), adenocarcinoma (Figure 2) in one and benign lesion in one patient (Figure 3).

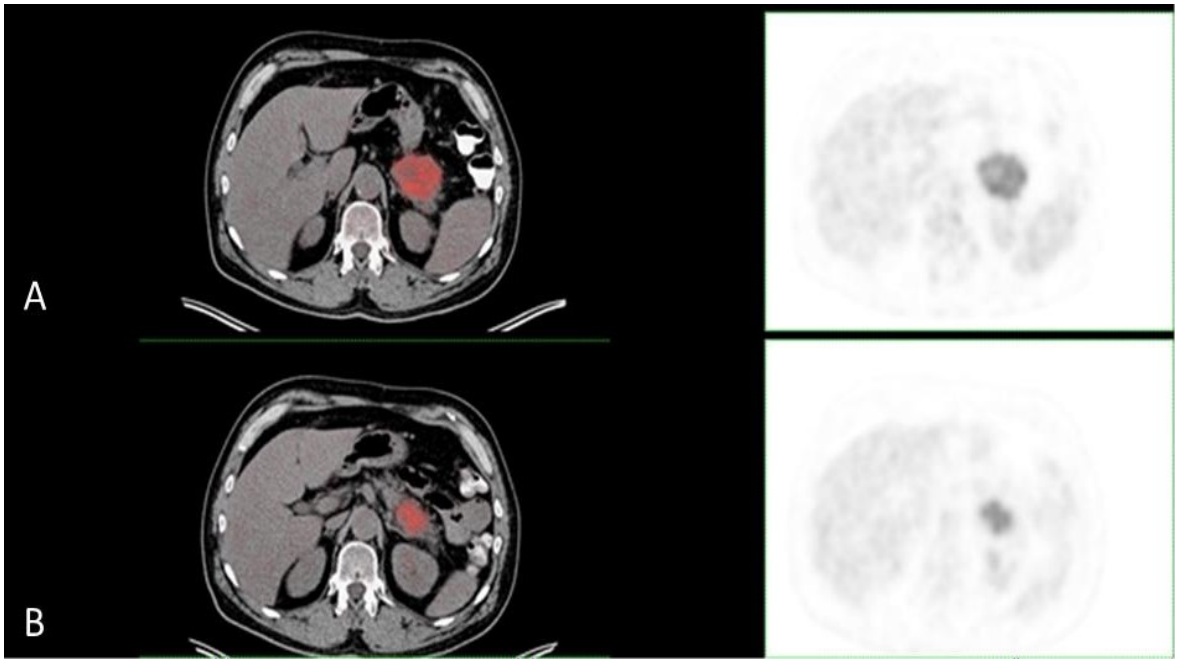

Fig.1: In the PET/CT fusion (B, left) and PET transaxial cross-sectional images (B, right) of a 56-year-old male patient with lung cancer, a lesion measuring 38 mm in size and an SUVmax value of 27.39 was incidentally observed in the pancreatic tail. In the follow-up imaging performed 3 months later (A), the lesion size was measured as 50 mm and the SUVmax value was 29. The pathological evaluation result was found to be compatible with small cell carcinoma metastasis.

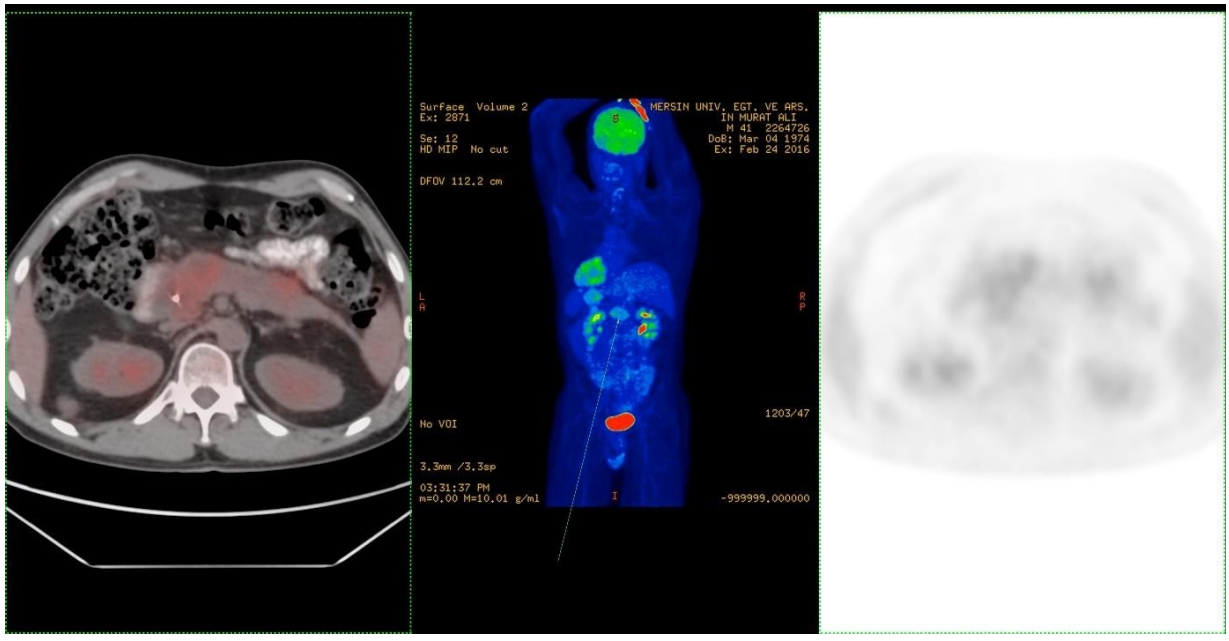

Fig.2: In a 41-year-old male patient with lung cancer, a distinct mass lesion in the head of the pancreas (yellow arrow) and hypermetabolic thickenings in the anterior part of the tail (red arrow) were detected on PET/CT transaxial fusion (A), MIP (B) and PET (C) images, indicating metastasis. was interpreted as suspicious. When the patient developed malignant biliary stenosis, the lesion was evaluated by biopsy. The biopsy result was reported as primary pancreatic adenocarcinoma.

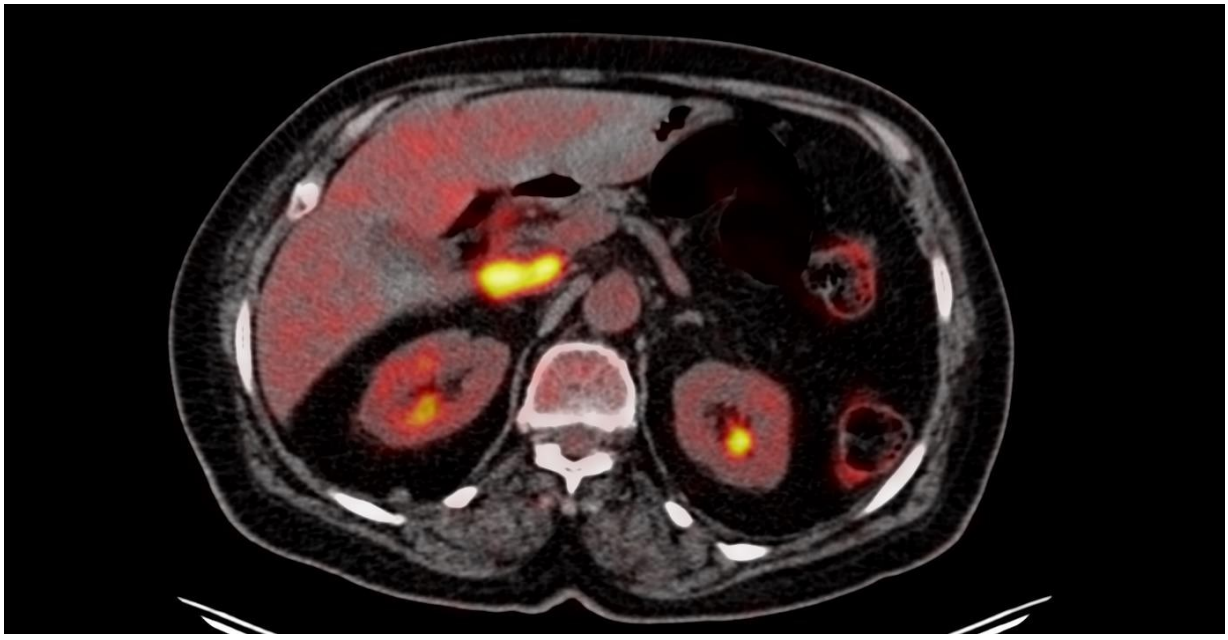

Fig.3: In the initial staging purposes of a 72-year-old female patient with known lung malignancy, PET/CT imaging showed a hypermetabolic mass lesion at the head of the pancreas that was suspicious for metastasis, and the biopsy result was compatible with benign mature lymphoid tissue.

Discussion

According to previous studies, the most common cause of lesions detected in the pancreas in lung carcinoma patients was lung carcinoma metastasis (18-27%) (1). These lesions might determine the stage of the patients and also the management. Additionally, there is a potential risk of clinical symptoms including acute pancreatitis, jaundice, ect (3). There is only single series including hypermetabolic pancreatic lesions in lung carcinoma in the literature which determined the ratio of these lesions as 1.9% (1). However, we observed the ratio of 7%. Among the lesions one was non metastatic lesion and another one was a second primary tumor. Another patient with both metastatic and second primary tumor was also reported in previous case report (4). Additionally, there is a case with primary squamous cell lung carcinoma and second primary pancreas carcinoma reported in the literature (5).

The limitation of this case series is the limited number of the determined patients due to the rarity of the entity and low ratio of the patients with pathology results because of the difficulty in obtaining biopsy.

Conclusion

There are considerable higher ratio of hypermetabolic lesions of pancreas in lung carcinoma and this entity should be considered and evaluated with the pathology results.

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Authorship Contributions

Concept: G.Y., Z.P.K., P.P.O., K.E., M.Y., **Design:** G.Y., Z.P.K., P.P.O., K.E., M.Y., **Supervision:** G.Y., Z.P.K., P.P.O., K.E., M.Y., **Data Collection and/or Processing: :** G.Y., Z.P.K., **Analysis and/or Interpretation:** G.Y., **Literature Review:** G.Y., **Writer:** G.Y.

Conflict of Interest: No conflict of interest was declared by the authors.

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