Image Findings of Rare Case of Peritoneal Carcinomatosis from Non Small Cell Lung Cancer and Response to Erlotinib in F-18 FDG Positron Emission Tomography/Computed Tomography

Abstract

Lung cancer is currently one of the most common malignancies in the world. Metastatic disease is observed in ~ 40% of patients with lung cancer, with the most common sites of metastasis being the bone, liver, brain and adrenal glands. Peritoneal carcinomatosis (PC) is defined as the progression of the primary cancer to the peritoneum. PC is a rare clinical event in lung cancer. Tyrosine kinase inhibitors targeting the epidermal growth factor receptor (EGFR), such as erlotinib are used for the treatment of patients with advanced non-small cell lung cancer (NSCLC). F-18 FDG PET/CT has proven capable of predicting response to therapy with erlotinib. We present a rare F-18 FDG PET/CT image findings of a 45 year old male with NSCLC with PC treated with erlotinib showing response to the treatment.

Key words: *Carcinomatosis, erlotinib, FDG PET/CT, lung cancer, peritoneal*

Koramadai Karuppusamy Kamaleshwaran, Jephy Joseph, Radha krishnan Kalarikal, Ajit Sugunan Shinto

Department of Nuclear Medicine and PET/CT, Comprehensive Cancer Care Center, Kovai Medical Center and Hospital Limited, Coimbatore, India

Introduction

Lung cancer represents one of the most common malignant diseases worldwide and approximately 40-50% of the patients with lung cancer manifest metastases at the time of diagnosis.[1] The most common regions of metastases are the pleura, lung parenchyma, skeletal system, liver, brain, and the adrenal glands. Metastases in unusual locations like the small intestine and the colon have been reported; however, peritoneal metastases are a rare event.[2] Kinase inhibitors targeting the epidermal growth factor receptor (EGFR) can improve progression-free (PFS) and overall survival (OS) in some non–small cell lung cancer (NSCLC) patients.[3] F-18 FDG PET/CT has proven capable of predicting response to therapy with molecularly targeted agents.[4] We report the rare case of a patient with NSCLC with PC who underwent erlotinib treatment and showing response in F-18 FDG PET/CT.

Case Report

A 45 year-old male patient presented with cough, weight loss and abdominal discomfort found to have large right lower lobe lung lesion. He underwent biopsy from the lung lesion, which showed NSCLC and EGFR positivity. He was referred for whole body F-18 FDG PET/CT, which showed intense hypermetabolic lesion in right lung lower lobe, lymphnodes and diffuse peritoneal thickening. He was treated with erlotinib and the post treatment response assessment FDG PET/CT showed response in peritoneum and in lung lesions [Figure 1 and Figure 2].

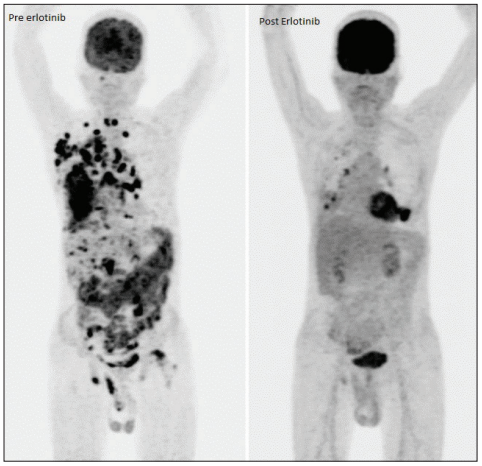

Figure 1: Pre and post erlotinib whole body maximum intensity projection F-18 FDG PET/CT images showing intense tracer uptake in right lower lobe lung mass, lymphnodes and peritoneal carcinomatosis showing response in peritoneum. Minimal residual disease noted in lungs.

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Address for Correspondence:
Dr. Kamaleshwaran K K, Department of Nuclear Medicine, PET/CT and Radionuclide therapy, Comprehensive Cancer Care Centre, Kovai Medical Centre and Hospital Limited, Coimbatore, India.
E-mail: dr.kamaleshwar@gmail.com

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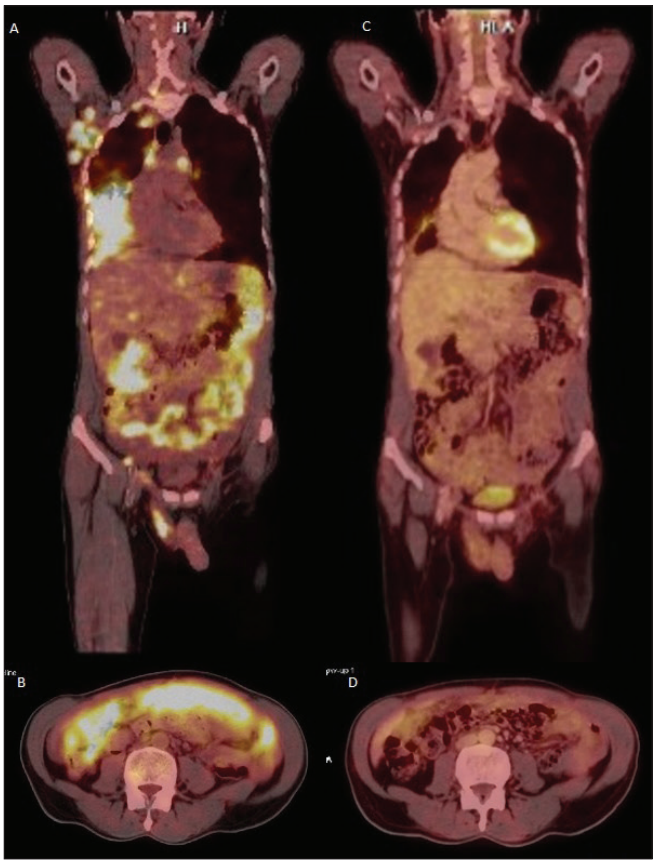

Figure 2: Pre erlotinibcoronal (A) and axial (B) fused PET/CT, and showing soft tissue thickening in peritoneal metastasis. Post erlotinib coronal (C) and axial (D) fused PET/CT showing response to treatment.

Discussion

The common sites of distant metastases in patients with lung cancer have been reported to be in the brain, the bones, the liver, and the adrenal glands. Although the frequency of peritoneal metastases in the autopsy series is 2.7-16%, we are talking about 1-2% in clinical studies.[2] Out of the different types of lung cancers, NSCLC are more likely to metastasize to the peritoneum and account for more than 80% of the cases with peritoneal metastases. Clinically, peritoneal carcinomatosis is usually asymptomatic in the early stages, making early detection less likely. In recent years and with the increasing availability of novel technologies like PET/CT, peritoneal carcinomatosis can be diagnosed more accurately.

Satoh *et al.* reviewed 1,041 lung cancer patients over a 26-year period and 8 cases (0.77%) developed clinical PC. However, signs and symptoms including abdominal distress, distension pain together with respiratory distress, ileus, ascites, peripheral edema, nausea, and vomiting were described during the late stages of the disease. Clinical studies concerning this distant metastasis are rare.[5] Su *et al.* have published a lung cancer and PC study in which four patients presented with EGFR mutations and were treated with the EGFR tyrosine kinase inhibitor, gefitinib. Two patients, who responded to gefitinib therapy, demonstrated improved abdominal conditions with gradually diminishing ascites and survived for 203 and 343 days, respectively.[6] Therefore, according to these data, activating EGFR mutations in lung carcinoma, even in cases with peritoneal disease, are considered positive predictors of anti-EGFR therapy.[7] With the exception of the EGFR-positive tumors, the majority of NSCLC with PC have poor prognoses. Modern treatment methods with molecularly targeted agents have shown promising results in the treatment of advanced NSCLC with significantly improved overall survival in patients independent of their genetic profile when patients are treated with the erlotinib.[8]

Two recently published studies have investigated the usefulness of F-18 FDG PET/CT for predicting responses to first-line treatment with erlotinib in NSCLC patients. In one study, erlotinib was given as neoadjuvant treatment[9] and the second study was performed in unselected patients with advanced disease.[10] Early changes in tumor FDG uptake can predict PFS and OS in unselected patients undergoing treatment with erlotinib. In conclusion, metastases to the peritoneum from NSCLC are rarely encountered, they are usually accompanied by other systemic metastases and F-18 FDG PET/CT showed response to erlotinib.

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Conflicts of interest

There are no conflicts of interest.

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