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

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. 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. F-18 FDG PET/CT has proven capable of predicting response to therapy with molecularly targeted agents. 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, 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.

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

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: drkamaleshwar@gmail.com

Access this article online
Website: www.indjsp.org
DOI: 10.4103/0972-3919.202239

How to cite this article: Kamaleshwaran KK, Joseph J, Kalarikal Rk, Shinto AS. 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. Indian J Nucl Med 2017;32:140-2.

For reprint contact: reprints@medknow.com

© 2017 Indian Journal of Nuclear Medicine | Published by Wolters Kluwer - Medknow
Kamaleshwaran, et al.: FDG PET/CT response to erlotinib in peritoneal carcinomatosis

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.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. CA Cancer J Clin 2011;61:69-90.
2. Loannidis O, Iordanidis F, Paraskevas G, Chatzopoulos S, Kotronis A, Papadimitriou N. et al. Omental metastases from primary lung adenocarcinoma. Rev Invest Clin 2012;64:308-10.
3. Shepherd FA, Rodrigues Pereira J, Ciuleanu T, Tan EH, Hirsh V. et al. Erlotinib in previously treated non-small-cell lung cancer. N Engl J Med 2005;353:123-32.
4. Benz MR, Herrmann K, Walter F, Garon EB, Reckamp KL, Figlin R. et al. 18F-FDG PET/CT for Monitoring Treatment Responses to the Epidermal Growth Factor Receptor Inhibitor Erlotinib. J Nucl Med 2011;52:1684-9.
5. Satoh H, Ishikawa H, Yamashita YT, Kurishima K, Ohtsuka M, Sekizawa K. Peritoneal carcinomatosis in lung cancer patients. Oncol Rep 2001;8:1305-7.
6. Su HT, Tsai CM. Peritoneal carcinomatosis in lung cancer. Respir Med 2008;13:465-7.
7. Yang CJ, Hwang JJ, Kang WY, Chong IW, Wang TH, Sheu CC. et al. Gastro-intestinal metastasis of primary lung carcinoma: clinical presentations and outcome. Lung Cancer 2006;54:319-23.
8. Cappuzzo F, Ciuleanu T, Stelmakh L, Cienas S, Szczesna A, Juhász E. et al. Erlotinib as maintenance treatment in advanced non-small-cell lung cancer: a multicentre, randomised, placebo-controlled phase 3 study. Lancet Oncol 2010;11:521-9.
9. Aukema TS, Kappers J, Olmos RA, Codrington HE, van Tinteren H, van Pel R, et al. Is 18F-FDG PET/CT useful for the early prediction of histopathologic response to neoadjuvant erlotinib in patients with non-small cell lung cancer? J Nucl Med 2010;51:1344-8.

10. Zander T, Scheffler M, Nogova L, Kobe C, Engel-Riedel W, Hellmich M, et al. Early prediction of non progression in advanced non-small-cell lung cancer treated with erlotinib by using [18F] fluorodeoxyglucose and [18F] fluorothymidine positron emission tomography. J Clin Oncol 2011;29:1701-8.