

# [<sup>18</sup>F]FDG PET-CT findings in an unusual case of synchronous double primary lung cancer of different histologies

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## Abstract

Double primary lung cancer (DPLC) is a rare occurrence of primaries of different histologies or the same histology in different lobes in absence of advanced nodal or distant metastasis. It could be synchronous or metachronous. They are frequently misdiagnosed as metastasis or recurrence. This study presents the staging [<sup>18</sup>F]Fluorodeoxyglucose positron emission tomography-computed tomography findings in a case of a 74-year-old man with DPLC of different histologies.

**KEY words:** [<sup>18</sup>F]FDG; PET-CT; lung cancer; double primary; staging

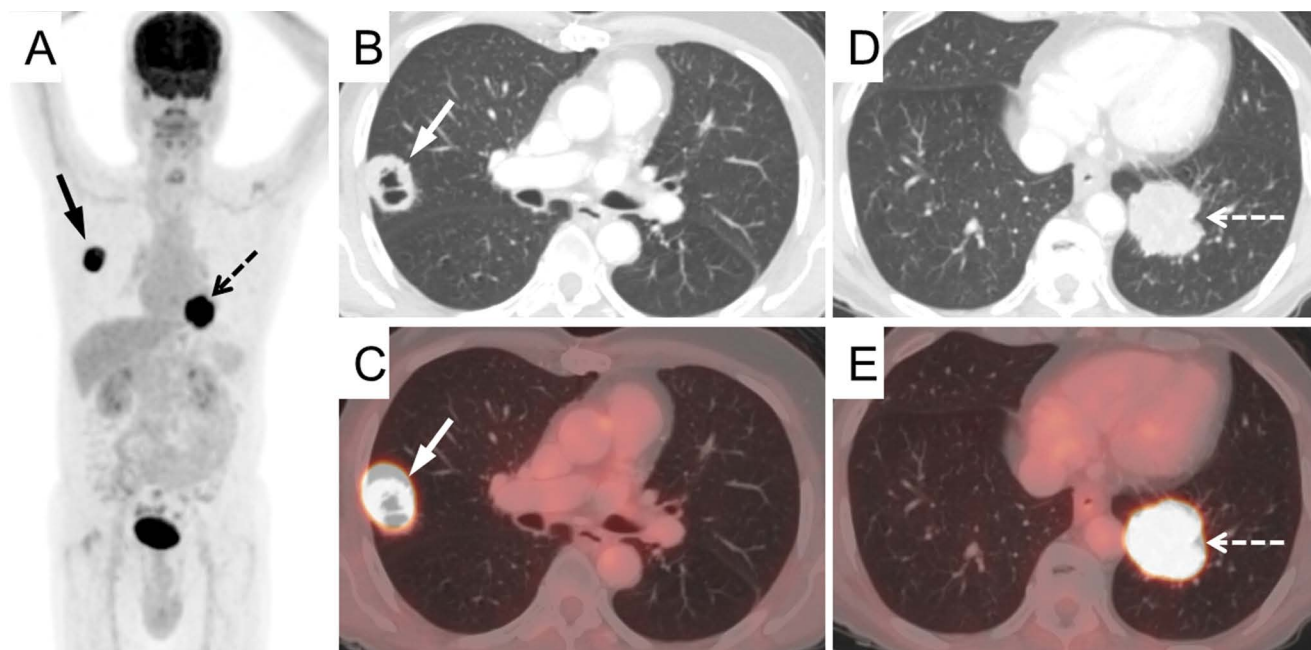
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A 74-year-old man presented at the hospital with a history of cough of 6-week duration. There was no fever or weight loss. He was a heavy smoker but had quit smoking 18 years back. Chest X-ray showed two large, rounded lung opacities, one in the left lower zone and another in the right lung mid-zone. A transbronchial needle sampling was performed from the left lung mass, which showed small cell lung cancer (SCLC), positive for synaptophysin and chromogranin A. Bronchoalveolar lavage from the left lung was negative for malignant cells. Contrast-enhanced [<sup>18</sup>F]Fluorodeoxyglucose ([<sup>18</sup>F]FDG) positron emission tomography-computed tomography (PET-CT) was subsequently performed for staging. Maximum intensity projection PET images (A) showing two rounded areas of intense [<sup>18</sup>F]FDG uptake in the thorax, one in the right lung (arrow) and another in the left lung, close to mediastinum (broken arrow) (Fig 1). No other abnormal focus of [<sup>18</sup>F]FDG uptake is seen in the rest of the body. Transaxial CT (B) and PET-CT (C) images of the thorax showing a peripheral, thick-walled, cavitary mass in the posterior segment of the right lung upper lobe, measuring 3.4 × 2.5 cm and showing intense [<sup>18</sup>F]FDG uptake (arrow, SUV max 15.4). Transaxial CT (D) and PET-CT (E) images of the

thorax also show another solid soft tissue mass in the left lung lower lobe anteromedial segment, measuring 4.9 × 4.5 cm with intense [<sup>18</sup>F]FDG uptake (broken arrow, SUV max 16.3). There was no nodal or distant metastasis. Based on the PET-CT findings, especially because of different morphological characteristics of two lung masses and lack of nodal or distant metastasis, suspicion of double primary lung carcinoma (DPLC) was raised. A CT guided biopsy from the right lung mass was then performed which showed non-small cell lung carcinoma (NSCLC), squamous cell type. Thus, the final diagnosis was synchronous DPLC with different histologies, SCLC of the left lung (limited stage) and NSCLC of the right lung (stage IB). The patient was treated with chemo-radiotherapy for right lung squamous cell carcinoma and chemotherapy followed by primary cranial irradiation for left lung SCLC.

DPLC is an unusual occurrence of either primary lung cancers of different histologies and/or molecular features, or the appearance of the same histological lung primary in different lobes, but without N2/3 nodal or distant metastasis. Depending on the temporal evolution, DPLC can be either synchronous or metachronous. The reported incidence of synchronous DPLC is about 0.5%. It is often misdiagnosed as metastasis or recurrence. Since these patients usually don't have advanced nodal or distant metastasis, this misdiagnosis puts them into therapeutic arms with palliative rather than curative intent. It has been shown that aggressive treatment in DPLC can yield good survival. [<sup>18</sup>F]FDG PET-CT is now an integral part of the management of lung carcinoma for staging, response evaluation, restaging and surveillance. Therefore, when

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**Figure 1.** Positron emission tomography-computed tomography (PET-CT) images of the patient

evaluating PET-CT images in such clinical scenarios, the possibility of DPLC should be kept in mind and pointed out as was done in the present case, as that can have a significant impact on management and prognosis.

#### **Conflict of interest**

The authors declare that they do not have any conflict of interest.