

Abnormal Fluorodeoxyglucose Uptake in Lung without Structural Abnormality on Computed Tomography

Abstract

Fluorodeoxyglucose (FDG) positron emission tomography-computed tomography (PET-CT) is a useful proven imaging modality in the management of many types of cancers. It is being used at various stages of treatment of cancer. Knowledge regarding the physiological biodistribution and false-positive findings should be kept in mind for correct interpretation. Pulmonary FDG uptake can be due to different causes such as infection, inflammation, and metastases which are invariably associated with structural abnormality on CT. In rare circumstances, there can be a focus of FDG uptake in the lung with no corresponding structural abnormality which might be due to an inflammatory vascular microthrombus or due to iatrogenic microembolism caused during the injection of radiotracer. It is important to be aware of this as it can cause difficulty in interpreting the scan and can lead to false-positive findings. It also highlights the importance of hybrid imaging in the form of PET-CT as there is a definite possibility of misinterpreting this as a site of metastasis in a known carcinoma patient if there was no corresponding CT image.

Keywords: False positive, fluorodeoxyglucose positron emission tomography-computed tomography, iatrogenic, microthrombus and embolism

A 55-year-old patient who is a treated case of tongue carcinoma presented with clinical recurrence. He was referred for a restaging fluorodeoxyglucose (FDG) positron emission tomography-computed tomography (PET-CT) scan. FDG PET-CT images demonstrated a focal area of abnormal tracer uptake in the left lung lower lobe with no corresponding structural abnormality on CT images [Figure 1] in addition to local recurrence and lymph nodal metastases. A repeat FDG PET-CT scan done after a short interval of 5 days showed complete resolution of the FDG focus in the left lung [Figure 2].

Pulmonary FDG uptake can be due to different causes such as infection, inflammation, and metastases. These causes are always associated with definite structural abnormality on the corresponding CT sections. In rare circumstances, there can be a focus of FDG uptake in the lung with no corresponding structural abnormality. There are two main reasons to this finding – it can either be due to an inflammatory vascular microthrombus or due to iatrogenic microembolism caused during the injection of radiotracer.

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Thrombus formation during the injection of FDG can lead to formation of these microemboli. The mechanism thought to be related to this is the formation of an active thrombus at the site of vascular injury. The activated platelets in the thrombus have higher energy requirements in the form of glucose and consequently take up FDG and show as a focus of FDG uptake without corresponding structural abnormality. We assume that in our case, this is due to iatrogenic pulmonary microembolism.

There are few instances of this finding in the literature.^[1-9] All the reported cases showed resolution of FDG uptake in the repeat scans done few weeks to few months later. There was a single report which showed resolution of FDG focus in a brief interval of 4 days. In our case too, there is resolution of FDG focus in a brief interval of 5 days. A repeat scan is necessary to check for resolution of FDG focus and to exclude other consequences such as consolidation and atelectasis.

It is important to be aware of this as it can cause difficulty in interpreting the scan and can lead to false-positive findings. It also highlights the importance of hybrid imaging in the form of PET-CT as there is a definite

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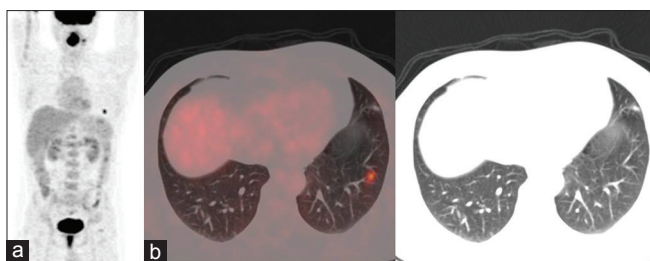


Figure 1: (a) Maximum intensity projection image showing focal fluorodeoxyglucose uptake in the left lung. (b) Focal fluorodeoxyglucose uptake in the left lung lower lobe without structural abnormality

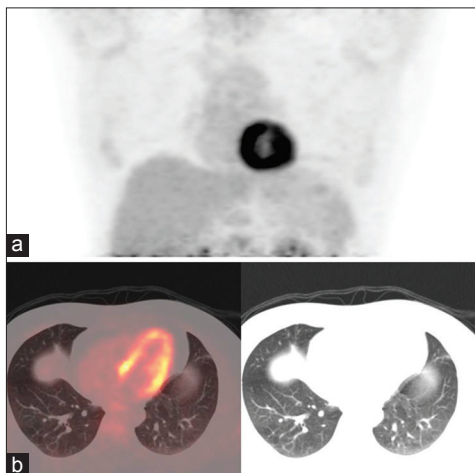


Figure 2: (a) Maximum intensity projection image of limited positron emission tomography-computed tomography chest with no focal abnormal fluorodeoxyglucose uptake. (b) Follow-up scan after 5 days showing resolution of fluorodeoxyglucose focus

possibility of misinterpreting this as a site of metastasis in a known carcinoma patient if there was no corresponding CT image.

In conclusion, knowledge of the causes for abnormal FDG uptake without corresponding structural abnormality should be known as this can lead to false-positive results. Follow-up scan should be done to exclude any dire

consequences. FDG administration should be done with an indwelling intravenous (IV) cannula rather than direct IV injection to prevent vascular injury and subsequent thrombus formation.

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Conflicts of interest

There are no conflicts of interest.

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