False Positive Imaging in PET-CT: When CT makes the difference
Case-based

L. Lepore (1), MD; S. Rossi (1, 2), MD; MV. Ramos (1), MD; V. Rubio (1), MD; V. Soroa (1), MD; M. Volpacchio (1), MD

(1) Centro Rossi, Buenos Aires, Argentina
(2) Hospital Centrángolo, Buenos Aires, Argentina
santirossi@cdrossi.com
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Objectives

- Review most sites of physiological FDG-uptake false positive results
- Review metabolic processes mimicking malignant lesions
- Review therapeutic procedures producing false positive images
Lipomatous hypertrophy of interatrial septum

62 year-old woman in evaluation after bilateral breast cancer treatment. FDG uptake in the heart is localized in the interatrial fat (yellow arrows).
Elastofibroma dorsi

74 year-old man with treated gastric carcinoma and hepatic metastases. Moderate increase of FDG uptake within the soft-tissue mass in both infra-scapular regions (yellow arrows). These lesions have similar density to the adjacent skeletal muscles on CT.
82 year-old man presents for lung adenocarcinoma staging. FDG uptake into the right atrium (yellow arrows) consistent with increase myocardial activity. Patient has bicameral pacemaker implant.
Thymic rebound hyperplasia and brown fat

24 year-old woman in evaluation after chemotherapy treatment of thoracic Hodgkin lymphoma. Thymus shows increased metabolic activity and size with normal morphology without focal alterations (yellow arrows). Accumulation of radiotracer is shown in both supraclavicular regions. These areas correlates with low density on CT images indicating fat tissue. (green arrows).
Cystic fibrous dysplasia

62 year-old man with low grade follicular lymphoma presents for staging evaluation. Hypermetabolic focal area is identified in the fourth left costal arch. This finding correlates with an expansive lesion associated with cortical thickening and sclerosis on CT images.
Sarcoidosis

79 year-old woman with history of chronic cough.
Perihilar bilateral hypermetabolic consolidation with peribronchovascular opacities and traction bronchiectasis (stage IV sarcoidosis).
Granulomatous polyangiitis

74 year-old man evaluated for pulmonary nodule. Hypermetabolic nodule in right upper lobe with soft tissue density and irregular margins in correlation with patient’s disease.
Relapsing polychondritis

56 year-old woman with fever of unknown origin. Intense symmetric FDG uptake in tracheobronchial tree and intercostal cartilages. CT images show anterolateral wall thickening of the trachea and bronchi with sparing of the posterior wall.
Lipoid pneumonia

59 year-old man with prostate cancer presents for metabolic evaluation of lung opacities. Patient history showed chronic constipation and ingestion of vegetable oil laxative daily. Lung consolidation in right middle and lower lobe with increased metabolic activity and fat attenuation (yellow arrow).
73 year-old man undergoes metabolic evaluation of lung nodule. Hypermetabolic lung opacity in right lower lobe that correlates with mucous-filling dilated bronchus on CT images.
Pulmonary infarction

64 year-old woman in evaluation of treatment response to lung cancer with brain and hepatic metastasis. Subpleural opacity with "reverse halo sign" in right lower lobe. The peripheral solid component shows hypermetabolism. Central filling defect within segmental branches of lower right pulmonary artery consistent with pulmonary embolism (yellow arrows).
Cavitating pneumonia

62 year-old man undergoes evaluation for pulmonary mass. Lung consolidation in the left upper lobe shows peripheral FDG uptake. Note that the air-fluid level within the lesion, which decreased in size compared to a previous study after antibiotic treatment (inflammatory-infectious process).
Opportunistic infection (mycosis)

24 year-old man evaluated for restaging of Hodgkin lymphoma. Patchy peribronchovascular opacities in left upper lobe with the "halo sign". Discrete FDG uptake (green arrows). Mediastinal nodal recurrence(yellow arrows).
Mycobacterium tuberculosis

56 year-old woman with breast cancer in evaluation for pulmonary nodules. Subpleural hypermetabolic nodular lesion in left upper lobe, along with mediastinal and hilar lymphadenopathy. Pathology confirmed tuberculosis.
54 year-old man in evaluation after non-Hodgkin mediastinal lymphoma treatment. Left pleural effusion. Hypermetabolic pleural thickening in the left hemi-thorax in association to chemical pleurodesis.
Drug toxicity

74 year-old man in evaluation after chemotherapy treatment due to bone marrow invasion of unknown primary lesion.
Bilateral parenchymal diffuse increased FDG uptake. CT scans showed diffuse bilateral ground glass opacities.
Radiation pneumonitis

70 year-old man in evaluation of recent radiotherapy treatment of squamous cell lung cancer.

Hypermetabolic para mediastinal right lung opacity with traction bronchiectasis. Note decreased FDG uptake on follow-up PET-CT (yellow arrow).
Rib fractures

54 year-old man in evaluation for non-Hodgkin's lymphoma in the left parotid (green arrow) with a history of recent trauma. Hypermetabolic foci in topography of right costal ribs in PET images (yellow arrows) that correlate with rib fractures on CT.
67 year-old man with lung cancer and brain metastases after treatment evaluation.

Hypermetabolic left axillary ganglion correlates with benign features on CT (yellow arrows).

Note FDG uptake in left forearm due to extravasation of the radiotracer (green arrow).
References


Santiago Rossi, MD
Centro Rossi / Hospital Cetrángolo
Buenos Aires, Argentina
santirossi@cdrossi.com