The Extreme SUV Ranges in ^{18}F-FDG PET/CT Diagnostic Accuracy of Intrathoracic Neoplastic Disease

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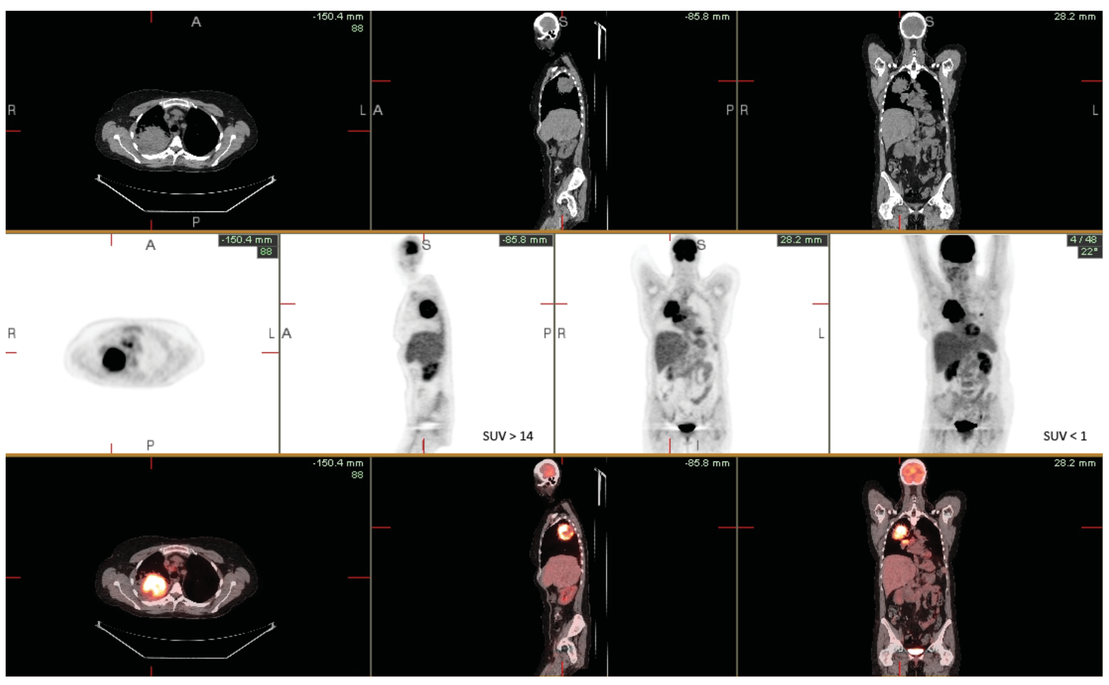
Introduction

The use and quantitative criteria of the standard uptake value (SUV) in the diagnosis and staging of neoplastic disease has been a subject of controversy with the still unresolved question of the value of 2.5 thresholds, which has never been verified as a respective studies cutoff point. However, the highest cutoff points are generally in a direct proportion with the highest false-negative rates. In a view of receiver operating analytical data (ROC), it has been suggested that the highest accuracy is achieved at a cutoff point of 4, which most recent studies suggest that a conventional threshold of 2.5 is justified because of balanced false-positive and false-negative rates.



Patient 1

Methods

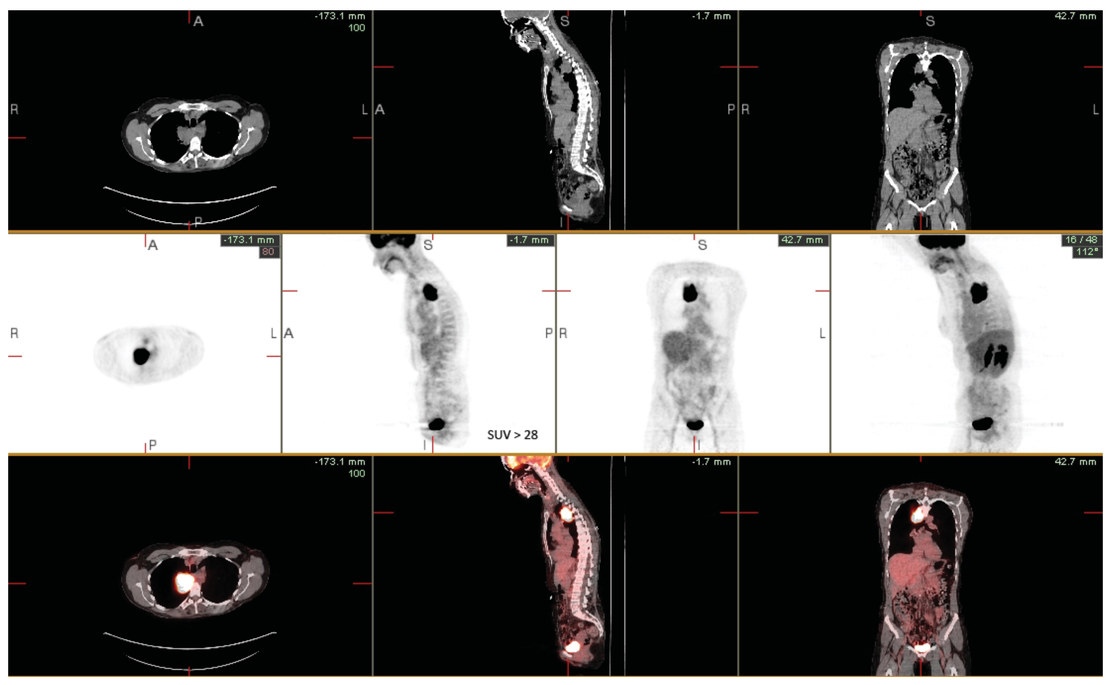
The study included 45 most recent randomly selected patients with clinical and chest radiography findings suggestive of intrathoracic malignant disease, all of which were further studied by ^{18}F-FDG PET/CT methodology utilizing dedicated PET/CT equipment. The CT component and fusion images were used for attenuation purposes only. All studies were visually interpreted in the transaxial, sagittal, and coronal planes with the additional rotating whole body CINE format views. The SUV was determined by identifying a point of the highest ^{18}F-FDG concentration, within the lesion. All of the PET/CT data were evaluated in comparison with dedicated computerized tomography (CT) studies generally performed with and without contrast enhancement and analyzed in standard orthogonal planes. All studies were ultimately verified by the tissue samples histopathological analysis.

Results

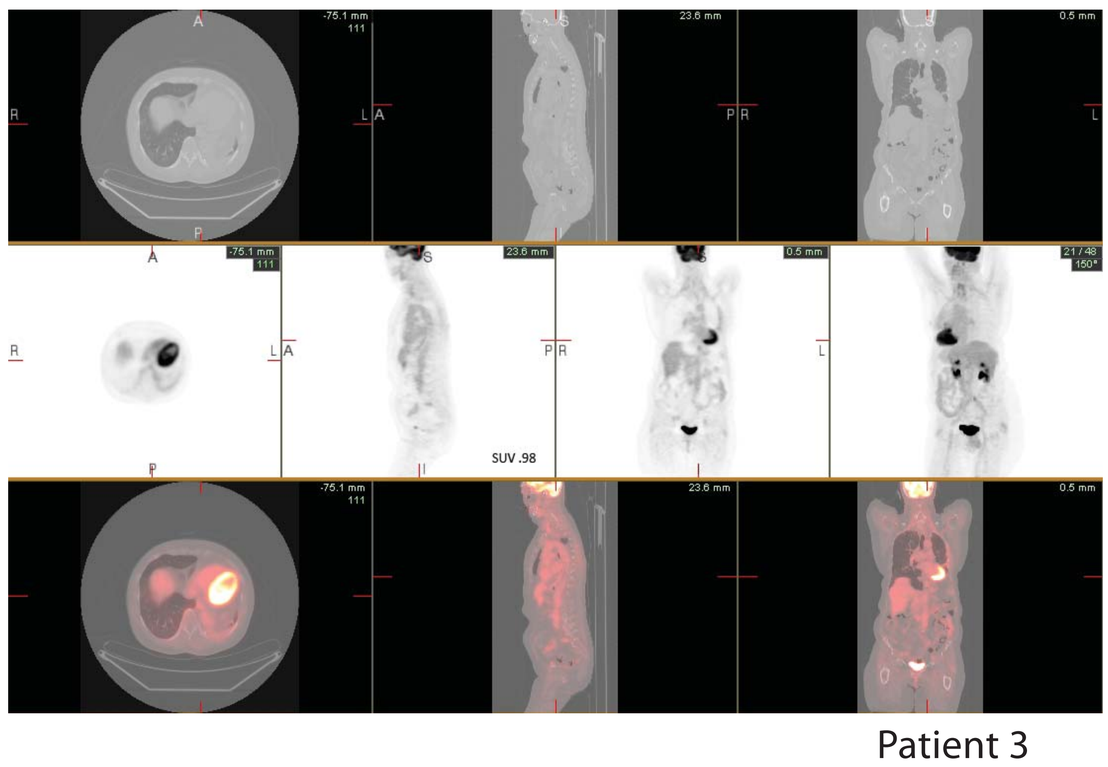
Our findings demonstrate and overall agreement between ^{18}F-FDG PET/CT and dedicated CT studies in the diagnostic accuracy of intrathoracic malignant disease. There was no evidence of false-negative rates even in the extremely high (>28) or false-positive in the extremely low (<1.0) SUV ranges, as confirmed by the histopathological diagnosis in all of the 45 cases.

Conclusion

Our data indicates that while the SUV analysis continues to be a valuable supportive addition to the visual diagnostic evaluation of ^{18}F-FDG PET/CT interpretation of the intrathoracic neoplastic disease it ought to be used with caution. The recent reports of ^{18}F-FDG staging of lung cancer suggest the choice of 2.5 is justified because of minimized false positive and false negative rates. Our findings suggest a need of further assessment of SUV thresholds in the intrathoracic neoplastic disease.



Patient 2



Patient 3