Iodine-131-SPET/CT and ^{18}F-FDG PET/CT for the identification and localization of mediastinal lymph node metastases from differentiated thyroid carcinoma

Yan-Hong Xu[1,2] MD,
Chen-Tian Shen[1] MD,
Yan-Li Xue[1] MD,
Zhong-Ling Qiu[1] MD,
Quan-Yong Luo[1] MD

1. Department of Nuclear Medicine, Shanghai Sixth People's Hospital, Shanghai Jiao Tong University, Shanghai, China
2. Department of Radiology, Shanghai First People's Hospital, Shanghai Jiao Tong University, Shanghai, China

***

Keywords: ^{131}I-SPET/CT
- ^{18}F-FDG PET/CT
- Mediastinal lymph node metastases
- Differentiated thyroid carcinoma

Correspondence address:
Quan-Yong Luo MD Department of Nuclear Medicine, Shanghai Sixth People's Hospital, Shanghai Jiao Tong University, 600 Yishan Rd., Shanghai, 200233, China, E-mail: lqyn@sh163.net
Tel: 86-21-64369181
Fax: 86-21-64701361

Received:
2 August 2013
Accepted revised:
31 October 2013

Abstract

Mediastinal lymph node metastases (MLNM) from differentiated thyroid carcinoma (DTC) are considered difficult to diagnose. *The aim* of this study was to assess the value of iodine-131 (^{131}I) single photon emission tomography/computed tomography (SPET/CT) and of ^{18}F-fluorodeoxyglucose (^{18}F-FDG) positron emission tomography/computed tomography (PET/CT) for the diagnosis of MLNM from DTC. *Five hundred and eleven consecutive patients* operated for DTC and treated with ^{131}I for ablation of the remnant thyroid and/or for treatment of metastases were enrolled in the study and underwent an ^{131}I whole body scan (^{131}I-WBS). Thirty seven sites of increased ^{131}I uptake, on the ^{131}I-WBS that could be an indication for MLNM were re-evaluated by a ^{131}I-SPET/CT scan. Thirty four other patients with negative ^{131}I-WBS but having elevated serum thyroglobulin (Tg), were examined by ^{18}F-FDG PET/CT to possibly diagnose MLNM. *A total of 44 DTC patients with MLNM were identified*, among the above 37 and 34 cases: 25/37 (67.6%) cases were examined and identified by ^{131}I-SPET/CT and 19/34 (55.9%) cases by ^{18}F-FDG PET/CT. A total of 25 and 19 cases were identified. The male-to-female ratio and the average age in patients with ^{18}F-FDG-avid MLNM were significantly higher than in patients with ^{131}I-avid MLNM. Among the above 44 patients, 40 patients had superior mediastinal nodal metastases, 9 had aortic nodal metastases and only 1 inferior mediastinal nodal metastases. A patient could have metastases in more than one site. *In conclusion*, our study suggests that in 511 operated DTC patients, treated for remnant ablation and/or for metastases and examined by ^{131}I-WBS, there were 37 cases doubtful of having MLNM in the ^{131}I-WBS and 34 cases doubtful, because of negative ^{131}I-WBS and elevated Tg. The ^{131}I-SPET/CT scan was sensitive for detecting MLNM in 25 of the 37 cases and the ^{18}F-FDG PET/CT in 19 of the 34 cases. These hybrid imaging modalities, when applied as above, were suitable for detecting more MLNM and thus, better supporting treatment planning in these DTC patients.

Hell J Nucl Med 2013; 16(3: 199-203 *Published on line: 28 November 2013*