

18F-FDG PET/CT in patients with suspected recurrent or metastatic well-differentiated thyroid cancer

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ABSTRACT

PET using 18F-FDG has been shown to effectively detect various types of cancer by their increased glucose metabolism. The aim of this study was to evaluate the use of coregistered PET and CT (PET/CT) in patients with suspected thyroid cancer recurrence.

Methods

After total thyroidectomy followed by radioiodine ablation, 61 consecutive patients with elevated thyroglobulin levels or a clinical suspicion of recurrent disease underwent 18F-FDG PET/CT. Of these, 59 patients had negative findings on radioiodine (131I) whole-body scintigraphy (WBS). Fifty-three of the 61 patients had both negative 131I WBS findings and elevated thyroglobulin levels. PET/CT images were acquired 60 min after intravenous injection of 400-610 MBq of 18F-FDG using a combined PET/CT scanner. Any increased 18F-FDG uptake was compared with the coregistered CT image to differentiate physiologic from pathologic tracer uptake. 18F-FDG PET/CT findings were correlated with the findings of histology, postradioiodine WBS, ultrasound, or clinical follow-up serving as a reference. The diagnostic accuracy of 18F-FDG PET/CT was evaluated for the entire patient group and for those patients with serum thyroglobulin levels of less than 5, 5-10, and more than 10 ng/mL.

Results

Thirty patients had positive findings on 18F-FDG PET/CT; 26 were true-positive and 4 were false-positive. In 2 patients, increased 18F-FDG uptake identified a second primary malignancy. 18F-FDG PET/CT results were true-negative in 19 patients and false-negative in 12 patients. The overall sensitivity, specificity, and accuracy of 18F-FDG PET/CT were 68.4%, 82.4%, and 73.8%, respectively. The sensitivities of 18F-FDG PET/CT at serum thyroglobulin levels of less than 5, 5-10, and more than 10 ng/mL were 60%, 63%, and 72%, respectively. Clinical management changed for 27 (44%) of 61 patients, including surgery, radiation therapy, or chemotherapy.

Conclusion

Coregistered 18F-FDG PET/CT can provide precise anatomic localization of recurrent or metastatic thyroid carcinoma, leading to improved diagnostic accuracy, and can guide therapeutic management. In addition, the findings of this study suggest that further assessment of 131I WBS-negative, thyroglobulin-positive patients by 18F-FDG PET/CT may aid in the clinical management of selected cases regardless of the thyroglobulin level.