

¹⁸F-FDG PET of Thyroid Nodules with Inconclusive Cytologic Results

TO THE EDITOR: We read with great interest the paper by Lioe-Fee de Geus-Oei et al. (1). There is no doubt that the main objective of preoperative evaluation of patients with thyroid nodules is to avoid unnecessary surgery. This will pose no problem for patients with a positive result for cancer on fine-needle aspiration biopsy (2). However, fine-needle aspiration biopsy will fail to give either a clearly positive (malignant) or clearly negative (benign) result in an important percentage of patients; the result will instead be inconclusive. For these patients, diagnostic/therapeutic surgery may be indicated as the next step (3,4), but for most the final diagnosis will be that of a benign lesion. Therefore, a large number of unnecessary surgical interventions are still being performed around the world, adding to the morbidity and mortality of thyroidectomy.

Lioe-Fee de Geus-Oei et al. (1) reported a negative predictive value of 100% for ¹⁸F-FDG PET in 44 patients (only 6 with cancer). Recently, our group addressed this problem using ^{99m}Tc-methoxyisobutylisonitrile (MIBI) thyroid scanning (5), which is a less expensive and more readily available diagnostic test than ¹⁸F-FDG PET.

Our results on 130 consecutive patients who had hypofunctioning thyroid nodules and underwent thyroidectomy (50 patients with proven thyroid cancer) showed that lack of ^{99m}Tc-MIBI uptake in the nodules always ruled out thyroid cancer (negative predictive value of 100%).

Lioe-Fee de Geus-Oei et al. (1) concluded that ¹⁸F-FDG PET reduces the number of futile hemithyroidectomies and outweighs the costs of unnecessary thyroid surgery, but ^{99m}Tc-MIBI thyroid scans are considerably less expensive than ¹⁸F-FDG PET studies. We believe that ^{99m}Tc-MIBI scans should be the first study to be performed in the diagnostic algorithm of patients with thyroid nodules and inconclusive cytologic results to avoid unnecessary thyroid surgeries.

However, because of the higher resolution of PET over conventional γ -cameras, research with ¹⁸F-FDG PET should be undertaken on patients with small-size incidentomas to determine if the diagnostic test can help in the diagnostic algorithm of those patients.

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REPLY: We thank Martínez-Duncker and Hurtado-López for their comments about our paper on ¹⁸F-FDG PET in thyroid nodules with inconclusive cytologic results (1). We agree with them that several other radiopharmaceuticals besides ¹⁸F-FDG PET can be considered for evaluation of solitary thyroid nodules. They refer to their recent paper on the use of ^{99m}Tc-MIBI for this purpose (2). Like ¹⁸F-FDG PET, ^{99m}Tc-methoxyisobutylisonitrile (MIBI) was positive in all patients with thyroid cancer (1,2). For ¹⁸F-FDG PET, this is in line with data in the literature (3,4). However, several studies in the literature do report false-negative ^{99m}Tc-MIBI findings in thyroid cancer (5,6).

Furthermore, their study (2) was designed differently from ours (1). First, 78 of 130 patients (60%) underwent diagnostic fine-needle aspiration biopsy (FNAB). These patients do not require any additional imaging—neither ¹⁸F-FDG PET nor ^{99m}Tc-MIBI. This type of group was not included in our study. The remaining 52 patients (40%) had inconclusive FNAB results (2). This is a relatively large percentage of patients, because inconclusive aspirates typically are reported in up to 20% of cases (7,8). The number of patients in the inconclusive-FNAB group who ultimately had thyroid cancer was also relatively high (18/52, or 35%) (2), whereas approximately 20% is typical (9). In our series, the prevalence of thyroid cancer was 14% (1).

When they separately analyzed the results of ^{99m}Tc-MIBI imaging in the 52 patients with inconclusive FNAB results (2), 20 of 52 patients (38%) showed negative findings on ^{99m}Tc-MIBI scintigraphy and were diagnosed with benign disease. In our study (1), ¹⁸F-FDG PET findings were negative in 25 patients (57%), all of whom had benign thyroid nodules.

In conclusion, ¹⁸F-FDG seems to be less prone to accumulation in benign thyroid nodules than is ^{99m}Tc-MIBI, thereby allowing better selection of patients with inconclusive FNAB results who require surgical intervention. Furthermore, unlike ¹⁸F-FDG PET, the literature contains evidence that false-negative ^{99m}Tc-MIBI findings do occur in thyroid cancer. For these reasons, we do not support the recommendation of Martínez-Duncker and Hurtado-López that ^{99m}Tc-MIBI scans should be the first study performed in the diagnostic algorithm of patients with thyroid nodules and inconclusive cytologic results to avoid unnecessary thyroid surgery. However, a definite conclusion in favor of either ¹⁸F-FDG PET or ^{99m}Tc-MIBI can be drawn only in a prospective comparative study with appropriately selected patients, especially in view of the high percentage of inconclusive FNAB results and the high prevalence of thyroid cancer in their series (2).