

F-18 FDG Uptake in a Toxic Autonomous Thyroid Nodule

Myoung-Hoon Lee, M.D., Chan. H. Park, M.D., Hyun-Soo Kim, M.D.¹, Seok Nam Yoon, M.D., and Kyung-Hoon Hwang, M.D.

Departments of Nuclear Medicine and Hemato-Oncology¹, School of Medicine, Ajou University, Suwon, Korea

Abstract

A 44 year-old male patient was undergoing diagnosis and therapy for acute myelogenous leukemia (AML, M2). On physical examination a thyroid mass was palpated in the left lower lobe. He had palpitation and intolerance to heat. Thyroid function tests revealed hyperthyroidism: T3: 150ng/dl (N:60-90), fT4: 2.26 ng/dl (N:0.70-1.80), TSH: 0.01 uIU/ml (N:0.25-5.00). Ultrasonography demonstrated a hypoechoic mass with scattered calcifications measuring 2.55 2.03 3.64 cm in size. F-18 FDG camera-based PET scan performed as a follow-up study of AML revealed a focal increased uptake in the left neck, where an autonomous nodule was detected on Tc-99m thyroid scan. After the diagnosis of toxic autonomous nodule, Goetz disease, he underwent surgical nodulectomy. Microscopically, the nodule contained follicular proliferation with degenerative change but without evidence of thyroid carcinoma. Focal uptake in autonomous thyroid nodules is due to increased glycolysis within the nodules. (Korean J Nucl Med 2001;35:286-287)

Key Words: Thyroid, Autonomy, FDG, PET

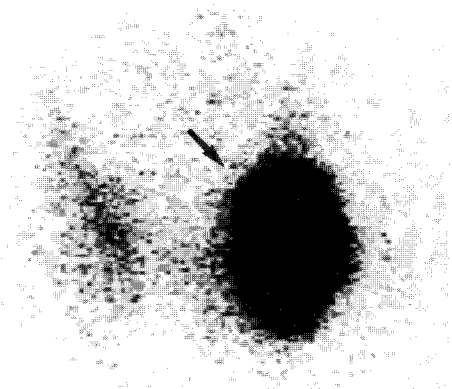


Fig. 1. 44 year-old male patient underwent Tc-99m thyroid scan for the evaluation of a palpable nodule in the left lobe. The scan revealed an area of increased uptake in the nodule (arrow) with an incomplete suppression of the remaining right lobe and left upper pole. The diagnosis of a toxic autonomous nodule, Goetz disease, was established in light of his symptoms of palpitation, heat intolerance, and abnormal thyroid function tests.

Received Aug. 7, 2001; accepted Aug. 7, 2001

Corresponding author: Chan H. Park, M.D., Department of Nuclear Medicine School of Medicine, Ajou University San 5, Wonchon-dong, Paldal-gu, Suwon 442-749, Korea Tel:031-219-5948(7) Fax:031-219-5950 E-mail: chpark@madang.ajou.ac.kr

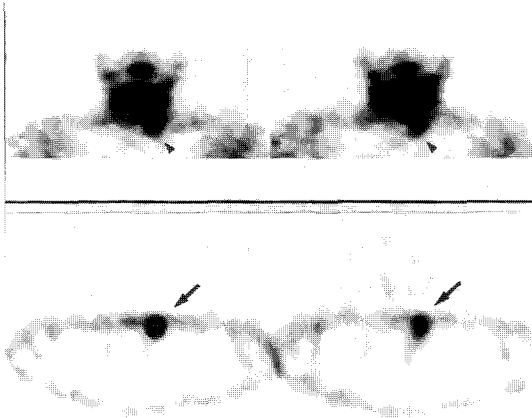


Fig. 2. F-18 FDG (fluorine-18-fluorodeoxyglucose) CoDe PET (coincidence detection positron emission tomography) of whole trunk was performed for the evaluation of acute myelogenous leukemia utilizing a dual-head gamma camera (Varicam VG, Elscint Haifa, Israel). The scan was unremarkable except for a focal area of increased glucose metabolism in the left thyroid lobe (arrow heads on coronal views and arrows on transaxial views). Then the patient was treated by nodulectomy for the toxic autonomous nodule, which depicted follicular proliferation and degenerative changes on microscopic examination. There were no malignant features. Diffuse or focal increased FDG uptake has been described in nodular goiter and thyroid carcinoma (1-5). Although it is difficult to discriminate benign from malignant lesion, focal FDG uptake in the thyroid gland is often seen in carcinoma of primary and metastatic origin (7-8). Toxic autonomous thyroid nodules were found to be the FDG and I-131 avid (6). Therefore, careful interpretation of FDG thyroid scan is essential in conjunction with clinical and laboratory findings for an accurate diagnosis.

References

- 1) Gordon BA, Flanagan FL, Ehdashti F. Whole-Body Positron emission tomography: normal variations, pitfalls, and technical considerations. *AJR* 1997;169:1675-80.
- 2) Engle H, Steinert H, Buck A, Berthold T, Boeni RAH, Schulthess GK. Whole-Body PET: physiological and artificial fluorodeoxyglucose accumulations. *J Nucl Med* 1996;37:441-6.
- 3) Shreve PD, Anzai Y, Wahl RL. Pitfalls in oncologic diagnosis with FDG PET Imaging: physiologic and benign variants. *Radiographics* 1999;19:61-77.
- 4) Bloom AD, Adler LP, Shuck JM. Determination of thyroid nodule with positron emission tomography. *Surgery* 1993;114:728-34.
- 5) Adler LP, Bloom AD. Positron emission tomography of thyroid masses. *Thyroid* 1993;3: 195-200.
- 6) Boerner AR, Voth E, Theissen P, Wienhard K, Wagner R, Schicha H. Glucose metabolism of the thyroid in autonomous goiter measured by F-18-FDG PET. *Exp Clin Endocrinol Diabetes* 2000;108:191-6.
- 7) McDougall IR, Davidson F, Segal GM. Positron emission tomography of the thyroid, with an emphasis on thyroid cancer. *Nuclear Medicine Communications* 2001;22:485-92.
- 8) Yasuda S, Shohtsu A. Cancer screening with whole-body F-18-fluorodeoxyglucose positron-emission tomography. *Lancet* 1997;350:1819.