

Radioiodine SPET/CT guided needle aspiration as a useful technique for recurrence surveillance in a thyroidectomized differentiated thyroid cancer patient with negative US and serum Tg and positive Tg of the lymph node aspirate

To the Editor: Although diagnostic radioiodine scintigraphy or single photon emission tomography/computed tomography (SPET/CT) have been widely used in the evaluation of recurrence in thyroidectomized differentiated thyroid cancer patients, these techniques have not been generally recommended for this purpose or for biopsy purposes, especially in low-risk patients [1-4]. In addition, normal radioiodine uptake in the remnant of the thyroidectomized thyroid tissue without previous iodine-131 (^{131}I) ablation hampers the detection of loco regional metastases. Fusion imaging by SPET/CT can better localize and differentiate radioiodine uptake related to metastases from benign causes of uptake [5, 6].

The author experienced a thyroidectomized, but not ^{131}I ablated, papillary thyroid cancer (PTC) patient in whom radioiodine SPET/CT scintigraphy (Discovery NM/CT 670, GE Healthcare, Waukesha, WI, USA) specified and localized a lymph node metastasis, while ultrasonography (US) (Antares Premium edition, Siemens Medical Solutions USA, Ultrasound Division, Issaquah, WA, USA) and thyroglobulin (Tg) after thyroid stimulating hormone (TSH) stimulation were

negative (Fig. 1). The ^{131}I ablation was not performed to the patient because the patient belonged to the low-risk group according to the 2009 ATA guidelines [1].

A 43 years old female PTC patient, stage I T1MxMx, nine months after total thyroidectomy, in which a 1.5cm sized intrathyroidal tumor, lymph nodes was not assessed, underwent cervical US and diagnostic ^{123}I SPET/CT scintigraphy (Fig. 1). Her Tg after TSH stimulation was 1.61ng/mL. Although the ^{123}I scan revealed three foci of abnormal uptake at the anterior and lateral neck, US showed normal lymph nodes (normal sized, hypoechoic lymph nodes with preserved hilar shadow) on both sides of the neck (Fig. 1). Considering the US findings and the low TSH stimulated Tg, the patient did not undergo further studies of radioiodine uptake.

Six months later, she underwent the same surveillance work up including SPET/CT imaging. Ultrasonography again showed normal lymph nodes on both sides of the neck and TSH stimulated Tg was low: 1.32ng/mL. Two foci of increased uptake at the midline of the neck seemed as thyroid remnant tissue uptake, because there was no

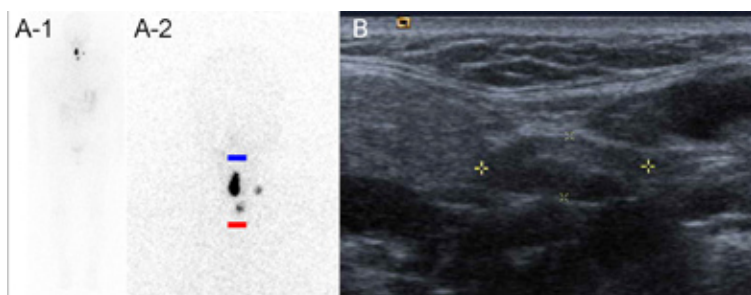


Figure 1. First surveillance for recurrence performed 9 months after total thyroidectomy for papillary thyroid cancer. A-1 and A-2: Diagnostic radioiodine whole body scintigraphy and its magnified image focused on neck (Blue bar indicates location of chin and red bar indicates location of sternal notch.), obtained 24h after oral administration of 185MBq ^{123}I , revealed 3 foci of uptake in the anterior neck. Two foci were located at the midline of the neck and one focus was located at the left lateral neck area. However, B: US of the neck showed normal lymph nodes on both sides of the neck. There was no abnormal lesion or lymph node on the midline of the neck on the US.

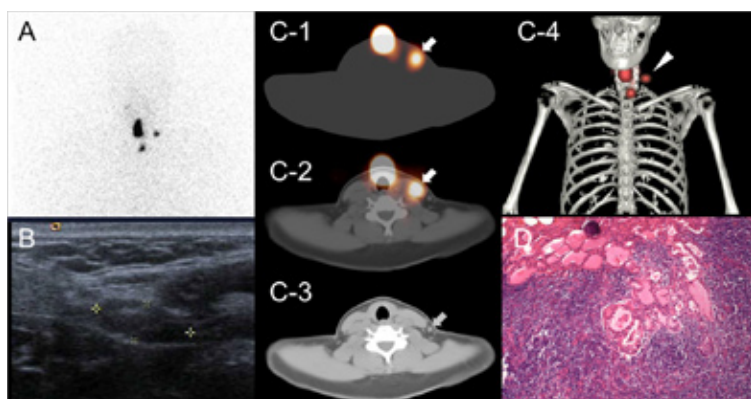


Figure 2. Second surveillance for recurrence performed at 14 months after total thyroidectomy. A, B: Findings of diagnostic ^{123}I scintigraphy and US of the neck were almost the same as on the first surveillance. C-1: ^{123}I SPET and C-2: SPET/CT visualized a focal radioiodine uptake (white arrow) in left lateral neck. C-3: neck CT of SPET/CT visualized a lymph node (gray arrow) at a little lateral to the radioiodine uptake on C-2 image. C-4: maximal intensity projection fusion on 3D scan of bone CT image of the SPET/CT also well visualized the high uptake focus (arrowhead) at left lateral neck. D: After left lateral neck dissection this "hot" lymph node was pathologically confirmed as PTC metastasis.

US indication of corresponding lymph nodes at this area, however, the author considered that the one focus of increased uptake (marked on Fig. 2C) lateral to the left sternocleidomastoid muscle seen on the SPET/CT scan suggested lymph node uptake (Fig. 2). Fine needle aspiration of this "hot" lymph node was performed by a radiologist who was aware of the SPET/CT result and showed: "reactive hyperplasia". The Tg level of the aspirate was higher than 500ng/mL. The patient underwent left neck dissection, and among 14 retrieved lymph nodes, one, the "hot" lymph node, had PTC metastases.

In this case of low-risk differentiated PTC, diagnostic ¹²³I SPET/CT scintigraphy was the sole invaluable diagnostic tool providing a clue of a hidden PTC metastatic lymph node. Thyroglobulin of the aspirate was also very positive.

Fusion SPET and CT images can provide functional and anatomical information of the foci with increased radioiodine uptake [5].

In the current case, SPET/CT technology showed that a "hot" area in the left lateral side of the neck among several other US normal looking lymph nodes, could be aspirated successfully under US guidance and thus, identify a lymph node PTC metastasis. Thyroglobulin level of the aspirate was also diagnostic (>500ng/mL), while US and TSH stimulated Tg were normal.

In conclusion, SPET/CT radioiodine scan can be used as a novel application for the detection of metastases in lymph nodes, while TSH stimulated Tg and cervical US were negative.

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Byeong-Cheol Ahn MD, PhD

Department of Nuclear Medicine and Internal Medicine, Kyungpook National University School of Medicine and Hospital, Daegu, Republic of Korea

Byeong-Cheol Ahn MD, PhD, Director and Professor

Department of Nuclear Medicine, Kyungpook National University School of Medicine and Hospital, 50, Samduk 2-ga, Jung Gu, Daegu, 700-721, Republic of Korea. Tel: 82-53-420-5583, Fax: 82-53-420-0864, E-mail: abc2000@knu.ac.kr

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