Non-visualized Thyroid Gland by Tc-99m MIBI Scan with Normal Thyroid Scan

Gokhan Koca · Hasan Ikbal Atilgan · Aylin Baskin ·
Koray Demirel · Meliha Korkmaz

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We present the case of a 21-year-old man who was referred to us for parathyroid scintigraphy with high blood levels of intact parathormone and osteoporosis. Several methods and radiopharmaceuticals, e.g., Tc-99m MIBI and Tl-201 chloride/Tc-99m pertechnetate (Tl-201/TcPO₄) subtraction, are commonly used for this purpose. We present the case of a thyroid gland that demonstrates quite normal Tc-99m pertechnetate uptake, no accumulation of Tc-99m MIBI, and very low grade Tl-201 uptake. To the best of our knowledge, no similar case has been reported previously.

A 21-year-old male with osteoporosis and growth-development retardation was referred for MIBI parathyroid scan because of high blood levels of intact parathormone and bone-specific alkaline-phosphatase, which were 219.4 (15–88 pg/ml) and 355 (21–58 U/L), respectively. In his Tc-99m pertechnetate (TcPO₄) pinhole scintigraphy, bilateral clearly visualized radioactivity accumulation in the thyroid gland was seen (Fig. 1a). In both early or late images of the Tc-99m MIBI parathyroid scan, the thyroid gland was not visualized (Fig. 1b). Therefore, a Tl-201/TcPO₄ subtraction scan method was used. However, the Tl-201 accumulation level in the thyroid gland was not sufficient for the subtraction method (Fig. 1c). In his thyroid ultrasonography, the thyroid gland echo was homogenous, and there was neither any solid nor cystic lesion. The physical examination of his neck was normal. Other laboratory findings were all normal

as follows. TSH: 3.03 (0.35–5.6 IU/mL), free T3: 3.66 (2.5–3.9 pg/mL), free T4: 0.90 (0.59–1.3 ng/dL), Anti-TPO:0.3 (0–40 IU/mL), Anti-TG-Ab: <2.2 (0–+u/L), TSH receptor Ab: 1.0 (0–14 U/L), osteocalcine: 9.13 (1.5–15 ng/dL), growth hormone: 1.3 (0.014–5.21), calcitonin:17 (0–150 ng/mL), sedimentation:6 (0–15 mm/h). There were no significant symptoms of acute or chronic thyroiditis. The cause for discordant uptake in the thyroid gland with Tl-201 and Tc-99m MIBI scan could not be provided through clinical or laboratory examinations. Parathyroid scan is a noninvasive method used in determining parathyroid adenoma, and Tc-99m MIBI and Tl-201/TcPO₄ subtraction methods are commonly applied [1–3]. The thyroid gland was not visualized on Tc-99m MIBI scintigraphy of suppressed thyroid tissue in a study by Turkolmez et al. [4]. It should be taken into account that sometimes we may not be able to visualize a normal thyroid gland, and in these cases we might encounter suboptimal visualization in Tl-201 subtraction method as well. Erdil et al. found that Tl-201 is superior to Tc-99m MIBI in the visualization of suppressed thyroid tissue with a toxic thyroid nodule [5]. Kiratli et al. mentioned decreased uptake of Tc-99m MIBI in the thyroid gland in hemodialysis patients. However, no patient presented an absence of Tc-99m MIBI uptake in the thyroid gland with secondary hyperthyroidism [6]. In this case, the thyroid was not suppressed and the TcPO₄ scan thyroid gland was normal, but the thyroid gland was not visualized with Tc-99m MIBI parathyroid scan, and Tl-201 accumulation in the thyroid gland was not sufficient. To the best of our knowledge, from a search of the published literature, there has been no case like this previously reported.

G. Koca (✉) · H. I. Atilgan · A. Baskin · K. Demirel ·
M. Korkmaz
Department of Nuclear Medicine, Ankara Training and Research
Hospital, Ankara, Turkey
e-mail: drgokko@gmail.com

Fig. 1 Scintigraphy of a 21-year-old male with high blood levels of intact parathormone and osteoporosis. **a** Tc-99m pertechnetate (TcPO₄) pinhole scintigraphy shows bilateral accumulated radioactivity in the thyroid gland. **b** Thyroid gland is not visualized in early and late Tc-99m MIBI parathyroid scans. **c** Tl-201 accumulation level was not sufficient for the subtraction method

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