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Nuclear Medicine

Autosomal dominant polycystic kidney disease: a potential mistake in the interpretation of radioiodine whole-body scintigraphy

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ABSTRACT

There are a few case reports of renal cysts demonstrating radioiodine uptake on scintigraphy. In this case, we report a 49-year-old man who had undergone total thyroidectomy and had been treated with radioiodine. After conventional levothyroxine withdrawal, the patient underwent thyroid remnant ablation by oral administration of 125 mci ^{131}I. Seven days later, post-therapy whole-body scan demonstrated thyroid remnant tissue and bilaterally multifocal radioiodine uptake in the upper abdomen. By ultrasonography and abdominal computed tomography scan, the iodine uptake was proven to be due to the accumulation of ^{131}I in bilateral polycystic kidney disease.

Introduction

Well-differentiated thyroid cancer is an unusual tumor and the main treatment is total or near-total thyroidectomy and, subsequently, ablation therapy with radioiodine [1]. Radioiodine whole-body scan (WBS) is a useful method for differentiating functional lesions of papillary and follicular carcinomas of the thyroid gland [2]. Postoperative follow-up after thyroidectomy for evaluation of thyroid remnant tissue includes WBS with ^{131}I and measurement of serum thyroglobulin (Tg) [2]. These 2 factors are concordant in most cases but can be discordant in other ones. Radioiodine uptake in WBS in patients who underwent thyroidectomy is reliable for indicating the recurrence of cancerous tissues or metastatic functional thyroid tissue [3]. There are many potentially misleading artifacts that appear in ^{131}I WBSs from various anatomic sites and physiological and pathologic processes, such as breasts, salivary glands, thymus, gastrointestinal and urinary systems, pulmonary inflammation, sinusitis, pericardial effusion, ovarian cysts and tumors, and traumatic lesions [3–6], so correlation with other modalities such as computed tomography scan can be useful.

Case report

A 49-year-old man with a history of papillary thyroid carcinoma underwent near-total thyroidectomy and received an

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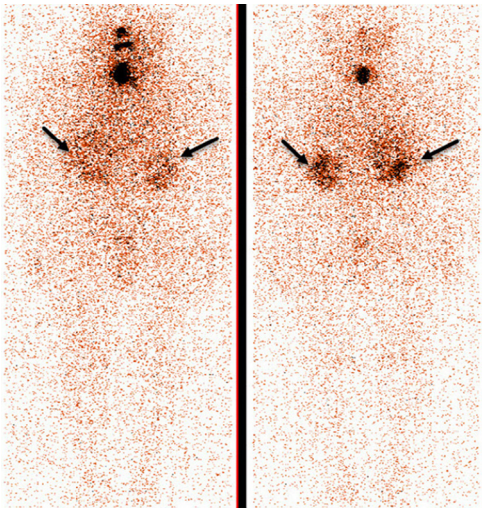

Fig. 1 – Post-treatment whole-body scan shows thyroid remnant tissue and bilaterally radioiodine uptake in the both kidneys.

ablative dose of 125 mCi ^{131}I. In post-treatment WBS, thyroid remnant tissue and bilaterally multifocal radioiodine uptake in the upper abdomen were noted (Figs. 1 and 2). Baseline blood analyses before ablative therapy revealed Tg = 16.5 ng/mL and 0.2 μg/mL of anti-Tg antibody. Further evaluation was done; abdominal ultrasonography and abdominal computed tomography scan showed multiple cortical cysts in both kidneys in favor of autosomal dominant polycystic kidney disease (Figs. 3 and 4) without any evidence of metastasis.

Discussion

It is necessary for patients with thyroid cancer to have follow-up sessions with WBS after thyroid removal surgery. It has been mentioned that sensitivity and specificity of WBS for finding functional thyroid tissue are about 80% and 98%, respectively [7]. There are many false-positive cases of radioiodine uptake including normal or pathologic tissues, which lead to unnecessary interventional surgery or receipt of harmful radioiodine [4]. It has been reported that there are 2 major causes for iodine

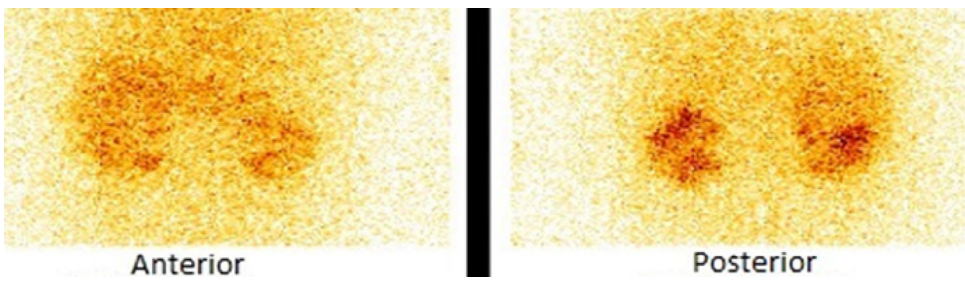

Fig. 2 – Spot view of the same scan.

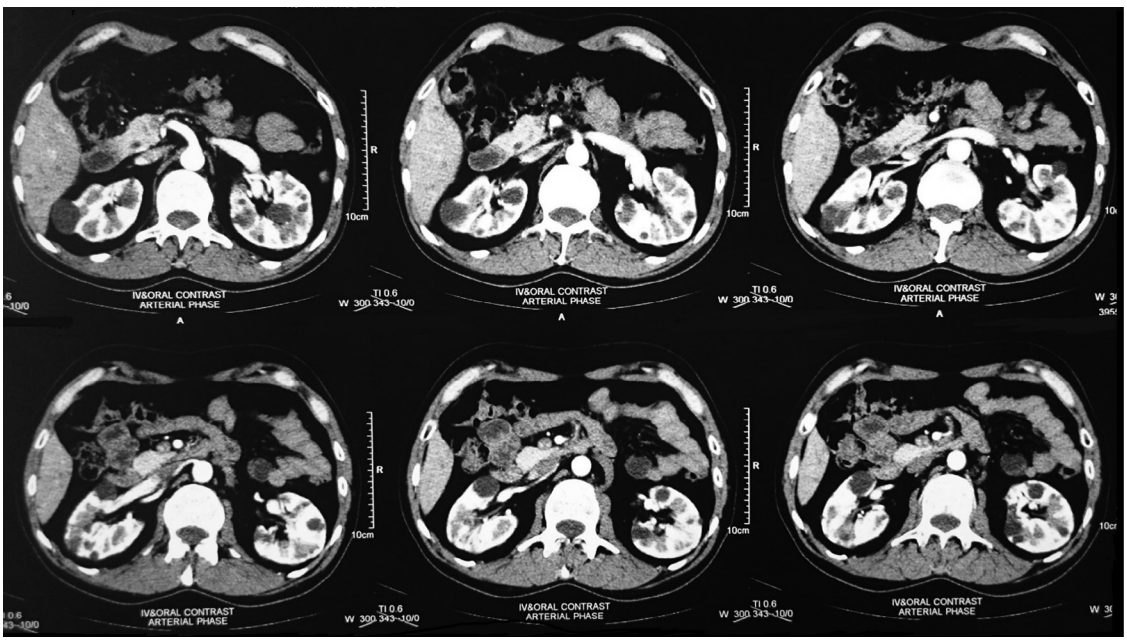

Fig. 3 – Abdominal computed tomography scan shows multiple cortical cysts in both kidneys in favor of autosomal dominant polycystic kidney disease.

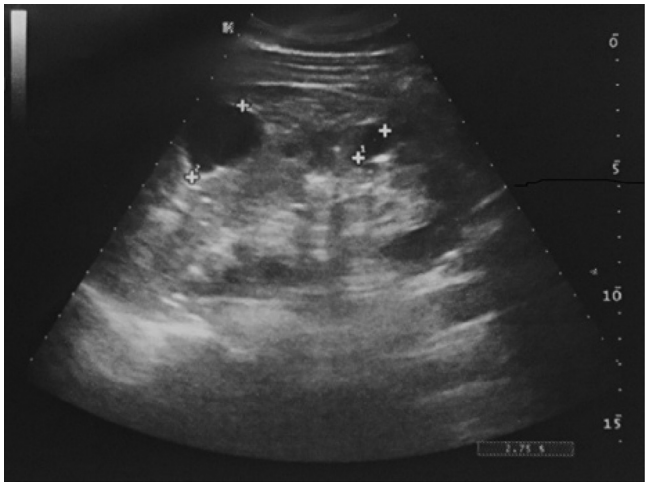

Fig. 4 – Ultrasonographic image reveals multiple cysts in both kidneys.

uptake in nonthyroid tissues. One cause is NIS (Na/I symporter) expression in many tissues, including skin, eye, and the gastrointestinal system. [5]. Retention of radioiodine can be due to structural or functional changes in any part of the body [5]. The mechanism of radioiodine retention in any cyst can be a result of slow exchange of water between the cyst and its environment despite the entrance of radioiodine into it [5]. Other pathologic uptakes that have been reported include neoplastic lesions, pulmonary inflammation, and others that have been mentioned before. In these cases, low levels of Tg can help differentiate between the uptake in tumoral thyroid tissue and false-positive cases. Many potential errors in radionuclide scintigraphy could occur and reporting should be done with caution [3,4]. Because of the harmful effects of radioiodine [8,9], recognition of potential false-positive ^{131}I scintigraphy is critical to avoid renewal therapeutic doses of radioactive iodine.

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