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ORIGINAL ARTICLE

Concomitant thyroid lesions in patients with primary hyperparathyroidism

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Summary *Background:* Concomitant thyroid pathologies in patients with primary hyperparathyroidism (PHPT) present a challenge in the clinical and surgical decision-making for these patients. In this study, we aimed to evaluate concomitant thyroid pathologies in patients who underwent operations for PHPT to determine the sensitivity (Sn) of neck ultrasonography (US) and Tc99m sestamibi scintigraphy in detecting parathyroid adenoma. We also aimed to determine the clinical impact of preoperative neck US in patients with PHPT.
Methods: One hundred thirty-eight patients with PHPT were included in this retrospective study. All patients underwent preoperative Tc99m sestamibi scintigraphy and/or thyroid US. Nodules of $\geq$1 cm or $<$1 cm with suspicious US features underwent fine needle aspiration biopsy (FNAB).
Results: Preoperative thyroid US revealed that 93.5% of patients with PHPT had thyroid abnormalities and 66.7% of patients had at least one thyroid nodule. Postoperative histopathology results showed that 79.2% of patients had benign thyroid disease and 20.8% of patients had malignant thyroid disease. In the detection of parathyroid adenoma, US had 89.1% Sn and Tc99m sestamibi scintigraphy had 82.6% Sn.

Conflicts of interest: The authors have no conflicts of interest to declare.

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Conclusion: We recommend the routine use of US in combination with Tc99m sestamibi scintigraphy, especially in endemic goiter regions, to detect any concomitant thyroid disease and thus determine the best surgical strategy for patients with PHPT.

1. Introduction

Primary hyperparathyroidism (PHPT) is the third most common endocrine disorder.[1,2] It is twice as common in women, and its incidence increases with age with a peak in the fifth to sixth decades of life.[1,3,4] It is caused by one or more overactive parathyroid glands, which results in elevated parathyroid hormone (PTH) and serum calcium (Ca) levels.[5]

Coexistent thyroid pathology found during neck exploration in patients with PHPT has been well described.[6] The incidence of PHPT with coexistent thyroid diseases ranges from 17% to 84% in different studies.[2,4,7–12] In addition, the incidence of synchronous thyroid cancer in patients with PHPT ranges between 2% and 24%.[2,4,7–9,11,12] It is still controversial whether the association of PHPT and nonmedullary thyroid carcinoma (NMTC) is coincidental or if pathogenetic mechanisms or risk factors such as irradiation, the goitrogenic effect of Ca or calcitonin, and genetic factors account for the coexistence of these two disorders.[13]

Surgical excision is the only curative treatment for PHPT and has been shown to be safe and effective for patients of any age.[5] Bilateral neck exploration which allows the surgeon to perform a thorough examination of the thyroid gland and examine the four parathyroid glands was traditionally performed in the surgical management of PHPT.[11,13,14] This procedure is usually helpful also for the identification and resection of tissue affected by concomitant thyroid disease.[11] Advances in imaging procedures (which provides a definitive preoperative localization of parathyroid adenomas), improved surgical techniques, and the use of intraoperative intact PTH measurement have increased the tendency toward minimally invasive approaches (MIAs) for parathyroid surgeries.[11–13] Because PHPT is caused by a solitary adenoma in 85–90% of patients[15,16], most patients can be treated with MIAs.[14] Such approaches have potential benefits, such as smaller incisions, lower morbidity, shorter length of hospitalization, and quick return to preoperative activity; however, a surgeon may miss any coexistent thyroid pathology because of the smaller surgical field.[2,5,11,13] Concomitant thyroid pathology in patients with PHPT presents a challenge in the clinical and surgical decision-making for these patients.[11] Early diagnosis and simultaneous surgical treatment, particularly for thyroid cancer, is the most important part of management.[17] A delayed diagnosis may lead to a second neck exploration, which is more difficult and associated with increased complication rates.[17] To determine the most appropriate management for PHPT, it is important to localize the pathologic parathyroid gland and diagnose concomitant thyroid disease.[18] High-resolution ultrasonography (US) and Tc99m sestamibi scintigraphy are widely accepted methods for the preoperative localization of parathyroid lesions.[5,19] Ultrasonography enables screening of the thyroid gland while simultaneously localizing the parathyroid adenoma.[17]

In this study, we aimed to evaluate concomitant thyroid pathologies in patients who underwent operations for PHPT to determine the best surgical strategy in this group of patients and to determine the clinical impact of preoperative neck US in our center.

2. Materials and methods

2.1. Patients

We retrospectively evaluated patients who underwent parathyroid surgery for PHPT between January 2010 and June 2013 in our clinic. All patients underwent preoperative parathyroid localization by Tc99m sestamibi scintigraphy and/or neck US. Patients younger than 15 years old and patients with a previous history of thyroid or parathyroid operations, percutaneous interventions, or radiotherapy of the head and neck were excluded from the study. Patients with a surgical contraindication associated with comorbid diseases (e.g., cardiovascular or respiratory system diseases) or who refused surgery were also excluded.

In our clinic, all operation indications are administered with an expert council that consists of surgeons, endocrine specialists, and nuclear medicine specialists. In this council, patients are informed about their operation indications and the operation types, and they are informed that the operation type can be changed according the situation in which the surgeon encounters. Informed consent was obtained from all patients before surgery. The study protocol followed the tenets of the 1964 Declaration of Helsinki.

2.2. Laboratory

The levels of sensitive thyroid-stimulating hormone (sTSH), free triiodothyronine (fT3), free thyroxine (fT4), thyroid autoantibodies [e.g., thyroid peroxidase antibody (anti-TPO) and thyroglobulin antibody (anti-Tg)], and thyroglobulin were measured in all patients using chemiluminescence methods (Immulite 2000; Diagnostic Products Corporation, Los Angeles, CA; and UniCel DxI 800; Beckman Coulter, Brea, CA). The normal ranges for sTSH, fT3, fT4, anti-Tg, and anti-TPO were 0.4–4 μIU/mL, 1.57–4.71 pg/mL, 0.61–1.12 ng/dL, <30 U/mL, and <10 U/mL, respectively. The serum levels of Ca, albumin,

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