Abstract We describe the case of a patient who had a diffuse sclerosing variant of papillary carcinoma of the thyroid with characteristic features on ultrasonography. Most papillary thyroid carcinomas can be easily recognized and diagnosed by ultrasonography. The thyroid carcinoma in this patient, however, showed diffuse enlargement of the thyroid without formation of any masses, and it had hypoechoic and heterogeneous internal echoes, which contained fine and multiple high-echo spots. Multiple lymph nodes were found to be swollen in the bilateral jugular chains on B-mode ultrasonography. It is very important that this type of papillary carcinoma with characteristic clinical features be detected by careful examination.

Keywords thyroid · papillary carcinoma · diffuse sclerosing variant · ultrasonography

Introduction

Most patients with papillary carcinoma of the thyroid are correctly diagnosed by ultrasonography and cytological examination preoperatively because of the ultrasonographic and cytological features of the malignancy. The preoperative diagnosis is important for determining appropriate treatment for these patients.

The Japan Society of Ultrasonics in Medicine published their “Diagnostic Criteria for Thyroid Nodules” in the Japanese Journal of Medical Ultrasonics in 1999.1 These criteria are very useful for diagnosing papillary carcinoma of the thyroid, and they have practical utility for clinicians.

In recent years, an appreciation of the distinct subtypes or variants of papillary carcinoma has revealed distinct biological behaviors that provide significant prognostic information. A diffuse sclerosing variant of papillary carcinoma of the thyroid was recognized in the 2004 World Health Organization classification.2 Because of the rarity of this type of disease, its ultrasonographic characteristics are ill defined.

Here we describe a patient with a diffuse sclerosing variant of papillary carcinoma of the thyroid that presented characteristic features different from conventional papillary carcinoma on ultrasonography.

Case report

A 29-year-old woman noticed a firm induration in the anterior neck 2 years before presenting at our hospital. At that time she was diagnosed with Hashimoto’s thyroiditis and was given 50µg thyroxine per day. Two years later she visited our hospital complaining of neck induration. She had not experienced dysphagia, odynophagia, difficulty in breathing, or hoarseness. Her medical history was negative for prior radiation therapy and she had no family history of thyroid disease. She had diffuse and firm enlargement of the thyroid gland, and bilateral swelling of the cervical lymph nodes. The patient’s serum concentration of thyroid-stimulating hormone was less than 0.003µIU/ml (normal: 0.3–5.0µIU/ml), her free thyroxine concentration was 1.58ng/dl (normal: 0.70–1.60ng/dl), and her thyroglobulin concentration was 22.0ng/ml (normal: <35ng/ml). Anti-thyroglobulin autoantibody was positive at 11.2U/ml (normal: <0.3U/ml).

A radiologic study of the patient’s neck revealed fine and multiple calcifications that were determined to be psammoma bodies and no tracheal deviation. Chest computed tomography revealed multiple small lesions in bilateral pulmonary fields, suggesting pulmonary metastasis. Ultrasonographic examination was performed using a Toshiba Apio 80 ultrasound system (Tokyo, Japan) with PLT-1204AX (7–14MHz) and PLT-805AT (5–12MHz) linear probes. B-mode ultrasonography revealed diffuse enlargement of the
thyroid gland without formation of any masses. Hypoechoic and heterogeneous internal echoes with fine and multiple high-echo spots were seen over the whole thyroid (Fig. 1a,b). Power Doppler sonography revealed moderate intrathyroidal vascularization (Fig. 1c). Swelling of multiple lymph nodes was also found in the bilateral jugular chains (Fig. 1d). Sonography-guided fine-needle aspiration biopsy of the bilateral lobe of the thyroid gland revealed malignancy, consistent with papillary carcinoma. Finally, we preoperatively diagnosed this patient with a diffuse sclerosing variant of papillary carcinoma of the thyroid with cervical lymph node metastases and with multiple pulmonary metastases. Total thyroidectomy and bilateral cervical lymph node dissection were performed. The outer surface and cut surface of both thyroid lobes are shown in Fig. 2a. Distinct tumors were not recognized within the specimen. An X-ray of the resected specimen revealed fine and multiple calcifications within the whole tissue (Fig. 2b). Histopathologically, the specimen presented diffuse involvement of papillary carcinoma cells in the whole thyroid gland in association with extensive squamous metaplasia, a large number of psammoma bodies, marked lymphocytic infiltration, and prominent fibrosis (Fig. 3). The tumor was pathologically diagnosed as a diffuse sclerosing variant of papillary carcinoma of the thyroid with cervical lymph node and pulmonary metastases. We are planning to perform $^{131}$I scintigraphy of the whole body and $^{131}$I radiotherapy.

**Discussion**

The diffuse sclerosing variant of papillary carcinoma of the thyroid is histopathologically characterized by the following features: (1) diffuse involvement of carcinoma cells into one or both lobes, (2) numerous small papillary formations located within intrathyroidal cleft-like spaces, probably representing lymph vessels, (3) extensive squamous metaplasia, (4) a large number of psammoma bodies, (5) marked lymphocytic infiltration, and (6) prominent fibrosis. Fine-needle aspiration cytology often reveals squamous metaplasia, inflammatory cells, and psammoma bodies. Psammoma bodies are calcified, degenerated changes in the papillae of papillary carcinoma that appear as laminated, basophilic, and stromal structures. They appear in about half of papillary carcinomas, and the presence of psammoma bodies in the thyroid or a cervical lymph node