Case Report

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Concurrent Medullary Carcinoma and Hashimoto's Thyroiditis: A Case Report with an Emphasis on US Features

하시모토 갑상선염과 동반된 갑상선 수질암의 증례 보고: 초음파 소견을 중심으로

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Medullary thyroid carcinoma (MTC) is a rare malignancy that originates from the parafollicular cells of the thyroid gland. Hashimoto's thyroiditis (HT) is an autoimmune thyroid disease and is the most common cause of hypothyroidism. Previous studies have frequently discussed the association among HT, papillary thyroid carcinoma, and thyroid lymphoma. However, there have been few reports on the ultrasonographic findings of concomitant HT and MTC. In the present case, a heterogeneous hypoechoic background parenchymal echogenicity, with intraglandular echogenic strands, and increased vascularity were observed. A concurrent, ill-defined, parallel-oriented, heterogeneous hypoechoic mass with central microcalcifications was located at the left thyroid gland, consistent with reported US findings of medullary thyroid carcinoma except for an ill-defined margin in our case.

Index terms Medullary Thyroid Carcinoma; Hashimoto's Thyroiditis; Ultrasonography

INTRODUCTION

The associations among Hashimoto's thyroiditis (HT), papillary thyroid carcinoma (PTC), and thyroid lymphoma have been extensively discussed (1). However, there is insufficient evidence regarding an association between HT and medullary thyroid carcinoma (MTC) (1). Herein, we report a rare case of concurrent MTC and HT encountered at our hospital, with

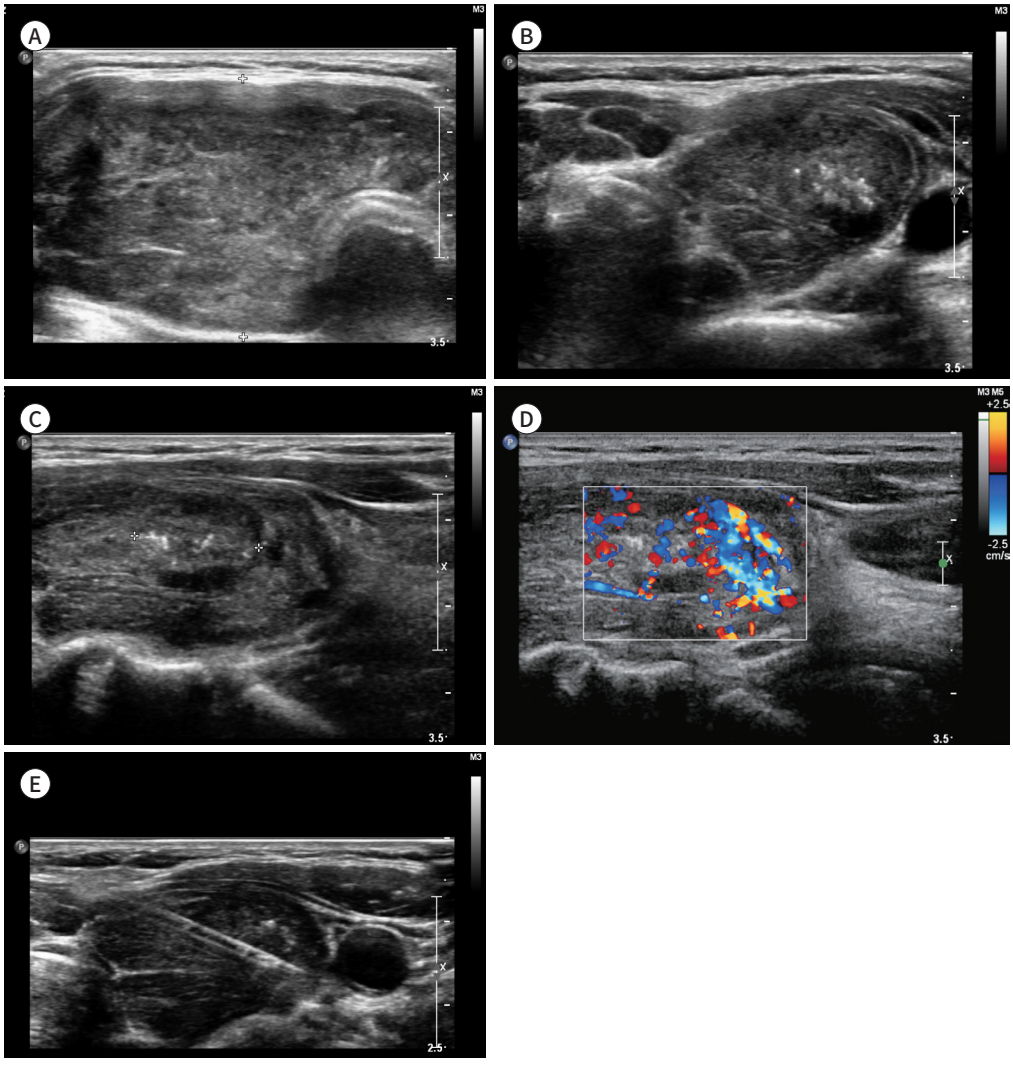
an emphasis on the ultrasonographic findings.

CASE REPORT

A 63-year-old female with diffuse thyroid gland enlargement visited our hospital's endocrinology department. Blood tests were performed to evaluate thyroid function. She had a high thyroid stimulating hormone level of 5.46 μIU/mL and free T4 of 0.75 ng/dL, which indicated hypothyroidism.

Neck ultrasonography revealed diffuse enlargement of the thyroid gland with heterogeneous hypoechoic parenchymal echogenicity and intraglandular echogenic strands (Fig. 1A).

Fig. 1. A 63-year-old female with concurrent medullary thyroid carcinoma and Hashimoto's thyroiditis.
A-E. US of thyroid gland and thyroid nodule shows (A) diffuse enlargement of the thyroid gland with heterogeneous, hypoechoic, parenchymal echogenicity and intraglandular echogenic strand, with (B, C) an ill-defined mass, isoechoic to the abnormal background of the thyroid gland. The mass has central, multiple, calcifications (transverse plane in B and longitudinal plain in C), and shows increased intratumoral vascularity on color Doppler study (D). Core needle biopsy (E) was performed at the left thyroid nodule.



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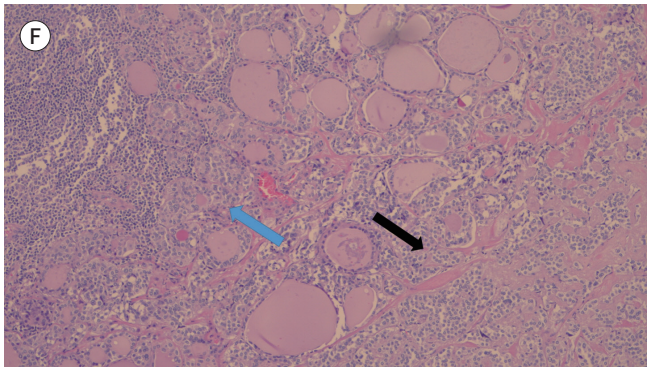

Fig. 1. A 63-year-old female with concurrent medullary thyroid carcinoma and Hashimoto's thyroiditis.
F. Histopathology of the resected thyroid gland shows Hashimoto's thyroiditis (blue arrow) and medullary carcinoma (black arrow) without sharp demarcation or capsule (hematoxylin and eosin stain, × 100).

An ill-defined mass isoechoic to the abnormal background of the thyroid gland with multiple central microcalcifications was observed in the mid to lower pole of the left thyroid gland (Fig. 1B, C). The mass exhibited increased intratumoral vascularity on color Doppler study (CDS) (Fig. 1D). Several enlarged lymph nodes were detected at levels IV and VI in the left neck. Initial fine-needle aspiration of the mass in the left thyroid gland revealed cellular atypia. Therefore, a biopsy was recommended.

A core needle biopsy was performed one month later for the left thyroid glandular mass, and the results were suggestive of MTC (Fig. 1E). Blood tests revealed high serum calcitonin levels (567 pg/mL). PET-CT was performed to evaluate the presence of metastasis; distant metastasis was not observed. The patient underwent total thyroidectomy with central compartment neck dissection and frozen biopsy of the four enlarged lymph nodes in the left level IV neck area. Frozen sections of biopsied lymph nodes tested negative. Histopathological evaluation confirmed the diagnosis of bilateral multifocal medullary carcinoma with a metastatic lymph node in the left level IV neck area on permanent sections, and concurrent HT (Fig. 1F). After three months, the postsurgical serum calcitonin level decreased to < 2 pg/mL.

This case report was approved by the local Institutional Review Board, which waived the requirement for written informed consent (IRB No. 2022-07-016).

DISCUSSION

The association between HT and PTC was first reported by Dailey et al. (1955). Subsequently, several studies have suggested a relationship between HT and thyroid carcinomas (1). There have been conflicting results regarding the relationship between HT and PTC; only a few studies have systematically reviewed the relationship between HT and thyroid carcinomas, excluding PTC (1). A recent study by Christina et al. discussed the association between HT and PTC as well as HT and thyroid lymphoma. However, the relationship between HT and other types of thyroid cancers, including medullary, follicular, and anaplastic thyroid cancers, has not yet been established (1).

Ultrasonographic findings of MTC have been described in many studies (2-4). According to Saller et al. (2), hypoechogenicity, intranodular calcifications, and no "halo sign" are suggestive of MTC. A combination of these findings has been observed in 89% (17/19) of patients with MTC and only 6% (8/139) of patients with benign thyroid nodules. Liu et al. (3) studied

the US characteristics of MTC and compared them with those of PTC. Compared to benign nodules, both MTC and PTC have ill-defined margins, irregular shapes, hypoechogenicity, solid nodules, and calcifications. Compared with PTC, in MTC, the lesions are significantly larger in size, nonparallel orientation is less frequently observed, mixed echotexture is more commonly detected, and intranodular blood flow is significantly increased (3). Lee et al. (4) suggested that larger size, oval shape, presence of cystic change, and circumscribed margins are the differentiating sonographic features of MTC compared with PTC.

Studies have investigated the effects of HT on the ultrasonographic characteristics of thyroid carcinomas (5-7). Gul et al. (5) suggested that the presence of HT does not affect the US characteristics of malignant nodules in patients with PTC. Ohmori et al. (6) reported fewer psammoma body calcifications and denser calcifications in the PTC with HT group than in the PTC without HT group. In cases of primary thyroid lymphoma with HT, differentiating lymphoma from HT may be difficult (7). Typical US findings of primary thyroid lymphoma include marked hypoechogenicity, posterior acoustic enhancement and hypervascularity (7). Heterogeneously decreased parenchymal echogenicity and increased vascularity in US findings of HT may mask the malignant nodules of primary thyroid lymphoma, which could lead to a challenging diagnosis (7). There are few case reports on the synchronous occurrence of HT and MTC (8-10). To the best of our knowledge, there have been no reports focusing on the ultrasonographic findings of concurrent HT with MTC. Several studies of concurrent HT and MTC have reported various ultrasonographic findings (8-10). Mousa et al. (8) reported a well-defined hypoechoic nodule in a confirmed case of MTC with concurrent HT. Turiano (9) reported a markedly hypoechoic, non-parallel-oriented nodule of MTC with HT. Choi et al. (10) reported an ill-defined hypoechoic MTC nodule with HT and Kikuchi disease. These diverse and inconsistent ultrasonographic findings in MTC with HT are thought to be due to the various ultrasonographic features of HT. In the present case, an ill-defined nodule was observed in the mid to lower pole of the left thyroid gland. It was characterized by hypoechogenicity, intranodular calcifications, a wider shape (aspect ratio > 1), and increased vascularity, suggestive of MTC. In addition to US findings, serum calcitonin levels also aid in the diagnosis of MTC (2). Our patient in the present case had a high serum calcitonin level (567 pg/mL), supporting the diagnosis of MTC.

Differentiating between benign and malignant nodules is difficult in cases of thyroid nodules with coexisting HT because of the varied ultrasonographic findings of HT. Therefore, most thyroid nodules that coexist with HT should be diagnosed by fine needle aspiration and/or core needle biopsy. As medullary carcinoma is rare, further studies are needed to confirm the effect of HT on the ultrasound findings of medullary carcinoma.

In conclusion, the present case of concurrent MTC and HT showed a heterogeneous hypoechoic background parenchymal echogenicity and an ill-defined, parallel-oriented, heterogeneous hypoechoic mass with central microcalcifications located at the mid to lower pole of the left thyroid gland.

Author Contributions

Conceptualization, P.N.H.; supervision, P.N.H.; visualization, K.H.Y.; writing—original draft, K.H.Y.; and writing—review & editing, K.H.Y.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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하시모토 갑상선염과 동반된 갑상선 수질암의 증례 보고: 초음파 소견을 중심으로

김형엽 · 박노혁*

갑상선 수질암은 갑상선의 소포곁세포에서 기원하는 드문 악성 종양이다. 하시모토 갑상선염은 자가면역성 갑상선 질환의 일종으로, 갑상선 기능 저하증의 가장 흔한 원인이다. 하시모토 갑상선염과 갑상선 유두암 및 갑상선 림프종 사이의 연관성은 이전 연구에서 자주 논의되었다. 하지만 하시모토 갑상선염과 동반된 갑상선 수질암의 초음파 소견에 대한 보고는 거의 없었다. 증례에서 갑상선 실질은 미만성의 비균질 저에코 소견 및 내부에 에코발생 가닥이 관찰되었으며, 색 도플러 영상에서 증가된 혈관분포를 보였다. 이와 동시에 불분명한 경계의 평행한 방향성의 저에코성 종괴가 좌측 갑상선의 중간에서 하부 극에 관찰되었으며, 내부에는 중심 미세석회화를 보였고, 이는 불분명한 경계를 보인다는것을 제외하면 이전의 보고된 갑상선 수질암의 초음파 소견과 같았다.

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