Sonographic Detection of Intrathyroidal Branchial Cleft Cyst: A Case Report

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We report here on an extremely rare case of an intrathyroidal branchial cleft cyst. Intrathyroidal branchial cleft cyst is rare disease entity and it has nonspecific findings on sonography, so the diagnosis of the lesion is very difficult. However, during aspiration, if pus-like materials are aspirated from a thyroid cyst, we should consider the possibility of intrathyroidal branchial cleft cyst in the differential diagnosis.

Index terms:
Thyroid cyst, Branchial cleft cyst, Branchial cleft anomaly, Neck mass, Ultrasound

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Branchial cleft cysts are a well-described entity and branchial anomalies are derived from the branchial cleft apparatus that persists after fetal development (1). A branchial cleft cyst is usually located in the lateral areas of the head and neck, and an intrathyroidal branchial cleft cyst is extremely rare (2).

We report here on a case of intrathyroidal branchical cleft cyst presenting as a benign thyroid cystic lesion and its sonographic finding.

CASE REPORT

A 32-year-old female visited our hospital due to her nonspecific neck discomfort for several years. Sonography was performed on an Acuson unit with a 15-MHz linear transducer (Acuson, Mountain View, CA), and a 0.5 cm sized hypoechoic nodule with ill-defined margins and a taller shape was found in the right portion of the thyroid gland. It was suspected of malignant nodule. Another 1.8 cm sized anechoic cystic lesion with oval shape and well-defined margin was also noted at the posterior aspect of the mid-portion of the thyroid, and it was superior to the suspicious malignant nodule (Figs. 1A, B).

To rule out thyroid cancer, the patient underwent sonography-guided fine needle aspiration of the suspicious malignant nodule. At the same time, we also aspirated the cystic lesion in right portion of the thyroid gland. The aspirated fluid was measured as 1 cc and showed as a thick yellowish pus-like fluid material. The cystic lesion was thought of parathyroid cyst or other complicated cyst, so aspirated fluid was sent for cytology cultures for bacteria and a check of the parathyroid hormone (PTH) level. After aspiration, the cystic lesion collapsed. The cytology results of the suspicious malignant nodule were consistent with a papillary cancer; there were no follicular cells and a few squamous cells in the cytology results of the cystic lesion. The PTH level of cystic fluid showed to be normal and there were no bacteria on culture. The patient underwent right total thyroidectomy for removal of the cancer. Histopathologic examination about the suspicious malignant nodule on US revealed micropapillary carcinoma, the same as the preoperative cytology report. The 1.8 cm sized cystic

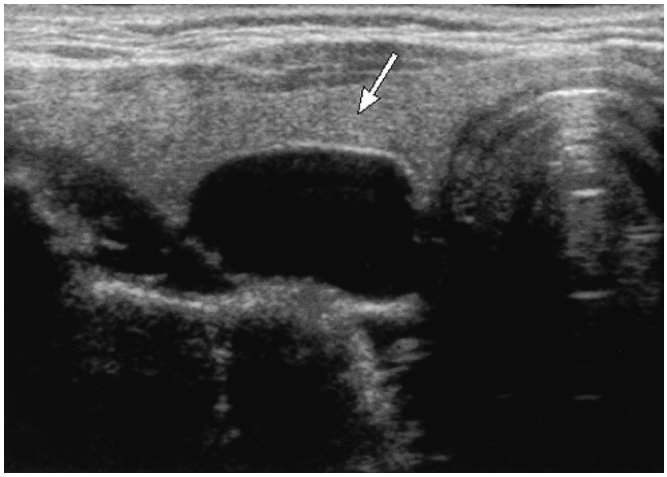
lesion superior to the cancer was lined by ciliated pseudostratified columnar epithelial cells, and its diagnosis was a branchial cleft cyst (Fig. 1C).

DISCUSSION

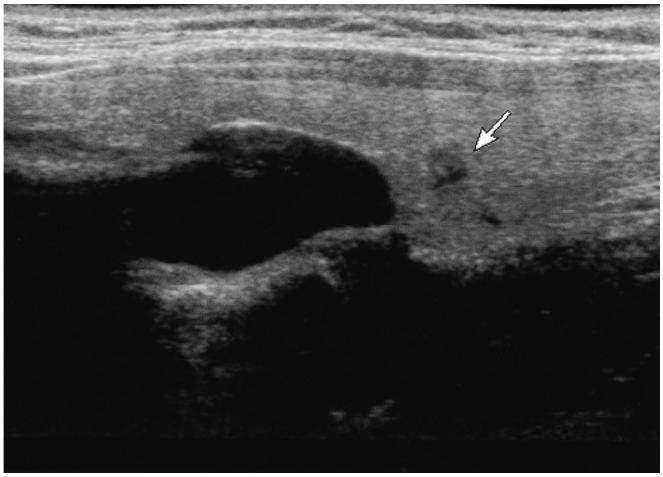
Branchial anomalies may result from the abnormal persistence of branchial apparatus remnants, and they present around each of the developed brachial derivates. Such anomalies have been traditionally classified as cysts, sinuses, or fistulas. A branchial cleft cyst is an epithelial-lined structure without an external opening, and it is usually located in the lateral areas of the head and neck (1, 2). First branchial cleft cysts are intimately associated with the external auditory canal and the parotid gland (1). Second branchial cleft cysts are found along the anterior border of the sternocleidomastoid muscle and most commonly present just lateral to the internal jugular vein at the level of the carotid bifurcation (3). Anomalies of the third and fourth branchial clefts are relatively uncommon and the distinction between third and fourth branhcial anomalies remains controversial, primarily because both lesions similarly present around the piriform sinus (1).

A intrathyroidal branchial cleft cyst is extremely rare. The exact histogenesis of a intrathyroidal branchial cleft cyst is unclear, but probably the failure of the third or fourth branchial pouches to atrophy and dissipate in utero results in the cysts or the sinus tracts that lie in close proximity to, or inside, the thyroid gland (2, 5).

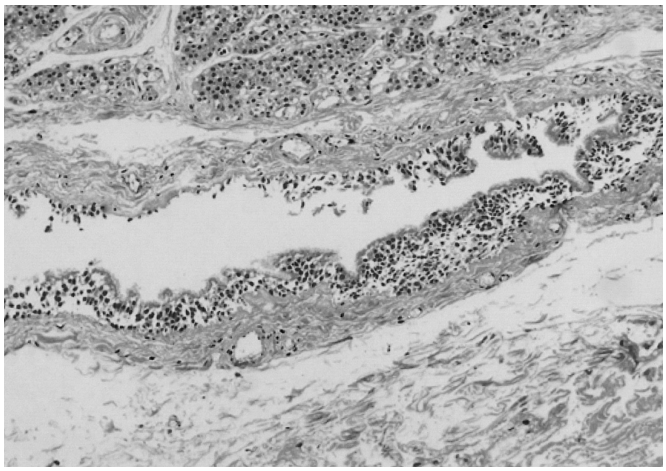
Whatever their origin, histologic analysis reveals that they are generally well-circumscribed cysts lined by straight squamous or pseudostratified columnar epithelium, and they have abundant lymphoid tissue and follicles beneath the epithelium. The cystic contents may be clear, watery to mucinous fluid, or the cyst may contain desquamated, granular cellular debris and if this becomes infected, it may be yellowish pus-like fluid (3, 4). Generally, the diagnosis of branchial cleft cysts is relatively easy when it is located in its classical position, and sonographically the cyst appears as an anechoic mass or a



A



B



C

Fig. 1. A, B. Transverse (**A**) sonography of thyroid glnad shows a well-defined, oval shaped, anechoic mass (white arrow) at the posterior aspect of mid portion of the right thyroid gland. During sonography-guided fine-needle aspiration biopsy for the cystic lesion, thick yellowish pus like fluid was aspirated. In longitudinal sonography (**B**), a small 0.5 cm sized hypoechoic lesion (white arrow) inferior to the cystic lesion was confirmed as papillary carcinoma.
C. A cystic lesion is located on the thyroid surface, measuring about 1 ×0.8 cm. The inner linings are ciliated pseudostratified columnar epithelium without smooth muscle or a cartilagenous component (H & E stain, ×100).

predominantly hypoechoic, cystic mass with faint internal debris and posterior enhancement. Occasionally, it is hyperechoic and shows a pseudosolid appearance. However, on real-time images, after the application of transducer pressure on the cyst, the entire contents may shift, suggesting their true cystic nature (4).

Preoperatively, how can we arrive at the the diagnosis of intrathyroidal branchial cleft cyst? Although some prior reports have suggested that intrathyroidal branchial cleft cysts should be considered in the differential diagnosis of thyroid cystic lesions, and especially in the patients with Hashimoto's thyroiditis, yet in view of the rarity of the lesion, the diagnosis can be suggested only by histopathologic confirmation, as was the case in all the previous case reports (2, 6). Generally, in clinical practice, when thyroid cysts are detected by sonography, we first suggest that it is a colloid cyst or a true epithelial thyroid cyst. If cysts are presented in the posterior portion of the superior or inferior pole of the thyroid, we also should consider the possibility of parathyroid cysts (7). But, fine-needle aspiration of yellowish, green viscous fluid or the sonographic appearances of a pseudosolid, cystic nodule in the thyroid should alert the sonographer to the possibility of a congenital developmental cyst (6). Thyroglossal duct cysts, the one of congenital developmental cysts, also have been reported to present as thyroid masses. The distinguishing features between a thyroglossal duct cyst versus a branchial cleft cyst include presentation of the mass, with thyroglossal duct cysts more likely to be midline neck masses while branchial cleft cysts are typically lateral neck masses, and frequency of infection, branchial cleft cyst are more likely to be infected (8). Histology of the cellular components of the cyst wall and surrounding tissue is the most valuable method of differentiating the two (8). But, preexisting inflammation may cause metaplasia of the lining of a thyroglossal duct cyst, while may make histologic differentiation from a branchial cleft cyst difficult (8).

When we reviewed the previous case reports for intrathyroidal branchial cleft cysts, there was no specific finding on the sonography studies. But in a few cases, there was creamy green or turbid yellowish fluid aspirated during fine needle aspiration cytology for intrathyroidal branchial cleft cyst, as like our case (4, 8).

In conclusion, the differential diagnosis for a cystic lesion that lies in close proximity to, or inside, the thyroid gland on sonography includes colloid cyst, true epithelial thyroid cyst and parathyroid cyst. The definite diagnosis of thyroidal branchial cleft cyst will be made postoperatively; yet if on fine-needle aspiration of the cyst a yellowish, pus-like viscous fluid is aspirated, branchial cleft cyst should be considered in the differential diagnosis of the thyroid cystic lesion.

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