A Cervical Schwannoma Masquerading as a Thyroid Nodule

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What Is Known about This Topic?

- Cervical schwannomas can mimic thyroid nodules and are historically difficult to diagnosis preoperatively due to the low diagnostic yield of fine needle aspiration and their appearance as hypoechoic lesions on ultrasound.

What Does This Case Report Add?

- The preoperative diagnosis of a cervical schwannoma was suspected by the use of magnetic resonance imaging (MRI) which led to additional specialized cytologic stains. We review the radiographic characteristics of nerve sheath tumors on MRI as well as the diagnostic cytologic stains which can enhance the possibility of a correct preoperative diagnosis.

Keywords

Thyroid nodule · Schwannoma · Magnetic resonance imaging · S-100

Abstract

Background: We present a case of a cervical schwannoma, likely originating from the pharyngeal plexus of the vagal nerve. The lesion masqueraded as a thyroid nodule and magnetic resonance imaging (MRI) assisted in preoperative diagnosis. We review the radiographic characteristics of nerve sheath tumors on MRI as well as the diagnostic cytologic stains which can enhance the possibility of a correct

preoperative diagnosis. **Case:** We describe a 60-year-old female with dysphagia and a neck mass consistent with a nodular goiter. The patient's history, diagnostic images, cytology, pathology, and surgical management are presented and analyzed. The preoperative diagnosis of a cervical schwannoma was suspected by the use of MRI which led to additional specialized cytologic stains. **Conclusion:** Pharyngeal wall schwannomas are important to consider in the differential diagnosis of thyroid nodules when fine needle aspiration cytology indicates cells of neural origin. Imaging by MRI can assist in identifying lesions of neural origin masquerading as thyroid nodules.

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Introduction

Schwannomas, also known as neurilemmomas, are benign, slow-growing tumors that are comprised entirely of neoplastic Schwann cells. These peripheral nerve growth tumors occur in the extremities as well as the head and neck [1]. Head and neck schwannomas can mimic thyroid nodules whether they present as cervical or (rarely) intrathyroidal lesions [2–4]. Presurgical diagnosis can be challenging as these lesions are often mistaken for thyroid nodules [1, 4]. Here we present a case in which magnetic resonance imaging (MRI) and the unique characteristics of schwannomas on MRI facilitated the correct presurgical diagnosis.

Case Report

A 60-year-old female with a 13-year history of a goiter presented to our department with a 1-year history of dysphagia and a significant increase in goiter size over 3 years. She had no prior imag-

Fig. 1. Transverse ultrasound image. Hypoechoic mass with smooth borders, which appears intrinsic to the thyroid.

Fig. 2. Imaging: contrast-enhanced computed tomography (**a, b**) and magnetic resonance imaging (**c, d**). **a** Axial image demonstrates diffusely enlarged thyroid. **a, b** Heterogeneous appearance of right and left lobes characteristic of multinodular goiter. **b** Coronal image demonstrates lesion extension to the anterior mediastinum. **c** Axial T2-weighted image demonstrates hyperintense left thyroid bed lesion. **d** Enhanced axial T1-weighted image demonstrates plane of separation between schwannoma and thyroid goiter (thin arrow).

Fig. 3. Histology: spindle cells on FNA. **a** Spindle cells on low power. **b** Spindle cells on high power. **c** Spindle cells positive for S-100 (brown, color in online version only).

Fig. 4. Pathology. **a** Schwannoma, thyroid and parathyroid tissue. **b** Hypercellular Antoni A pattern of schwannoma. **c** S-100 stain positive (brown, color in online version only). **d** Low proliferation index (Ki67).

ing, no history of head and neck irradiation, and no family history of thyroid disorders. The patient denied any symptoms of hypo- or hyperthyroidism. Her physical exam was notable for an enlarged nodular thyroid with retrosternal extension. Labs showed a TSH of 0.31 mIU/dL (n: 0.34–5.6) and TT₄ of 10.4 µg/dL (n: 6.1–12.2). On imaging, neck ultrasound revealed a solid hypoechoic mass without calcifications, inseparable from the thyroid (Fig. 1). Contrast-enhanced computed tomography of the neck revealed a diffusely enlarged and heterogeneous thyroid with the left lobe extending to the retropharyngeal space and anterior mediastinum (Fig. 2a, b).

Sonographic guided fine needle aspiration (FNA) of a 4-cm hypoechoic left lobe lesion (Fig. 1) yielded cohesive spindle cells with a lymphocytic background. The differential diagnosis based on FNA cytology results included schwannoma, melanoma, and medullary and anaplastic thyroid cancer. Immunohistochemistry was positive for S-100, suggesting a neural crest origin of the mass (Fig. 3c) consistent with a schwannoma. Negative staining for calcitonin, CEA, thyroglobulin, TTF1, melan-A, and HMB45 excluded melanoma, medullary thyroid cancer, and well-differentiated thyroid cancer. While on contrast-enhanced computed tomography the lesion had appeared intrinsic to the thyroid, MRI showed a hyperintense lesion on T2-weighted images (Fig. 2c). The hyperintense T2 pattern of the lesion on MRI delineated the mass as distinct from the less hyperintense thyroid and the enhanced T1-weighted images demonstrated a plane of separation between the lesion and the thyroid gland (Fig. 2c, d).

Intraoperatively the mass was found to be adherent to the pharynx and esophagus, but resectable. Based on operative findings, the most likely origin of the schwannoma was the pharyngeal nerve plexus of the vagal nerve. After surgical resection, histopathology displayed spindle cells in whorls with a predominantly Antoni A pattern (Fig. 4b), positive S100 staining (Fig. 4c), and a low Ki67 proliferation index (Fig. 4d). The resected thyroid gland was diagnosed as a benign multinodular goiter.

Discussion

Primary nonepithelial thyroid tumors are rare, comprising approximately 1% of all thyroid tumors [5]. The differential diagnosis of benign nonepithelial tumors of the thyroid gland includes vascular, smooth muscle, and nerve tumors. Schwannomas, which are neural derived tumors, are histologically classified into 3 subtypes: Antoni type A, Antoni type B, or a mixture of the 2 subtypes. The Antoni type A pattern consists of highly cellular regions which may have ordered and dense cell arrangements with unique palisading nuclei. In contrast, the Antoni type B pattern consists of less ordered and fewer cellular regions which may contain microcysts [6].

The first case report of a primary schwannoma of the thyroid gland was published in 1964 by Delaney and Fry [7]. Intrathyroidal schwannomas have been reported globally and most occur in the 40- to 60-year-old age group [1].

Unlike most reported cases of thyroid schwannomas whose FNA findings were often inconclusive [1, 3, 4, 8], our preoperative FNA yielded spindle-shaped cells. The differential diagnosis of spindle cell lesions includes neural derived tumors, mesenchymal lesions (leiomyoma, solitary fibrous tumor, hemangiopericytoma), epithelial tumors (anaplastic thyroid cancer – particularly if the tumor cells undergo degeneration), medullary thyroid cancer, thymoma, spindle epithelial tumor with thymus-like differentiation (SETTLE), and hyalinizing trabecular adenoma. S-100 positivity on immunocytochemistry was crucial in preoperatively suggesting the diagnosis of schwannoma.

MRI was invaluable in identifying the mass as an extensive extrathyroidal lesion, prompting further cytologic investigation which suggested the diagnosis of a cervical schwannoma preoperatively. On noncontrast computed tomography, schwannomas often appear hypodense compared to muscle. On computed tomography with contrast enhancement, schwannomas with a predominantly Antoni A pattern commonly appear as solid, highly enhancing, nonhomogeneous, and hypodense lesions. Schwannomas with a predominantly Antoni B pattern are often pseudocystic in appearance without significant contrast enhancement. On MRI these lesions are hypointense to isointense on T1-weighted and hyperintense on T2-weighted images, depending on cellularity. Contrast-enhanced T1-weighted images show moderate to intense enhancement. The lesions typically appear homogeneous when smaller and heterogeneous with increasing lesion size. In this case, imaging characteristics on MRI were essential in driving the specialized cytologic staining and facilitating the correct preoperative diagnosis.

Conclusion

In the evaluation of an enlarging nodular thyroid, pathology arising from other structures in the neck, such as nerve structures, should be considered in the differential diagnosis. Multimodal imaging often yields helpful clues. Imaging by MRI can assist in identifying lesions which are not thyroidal in origin and should be utilized when there is suspicion of nonthyroidal tumors. Schwannomas are important to consider in the differential diagnosis of thyroid nodules when FNA cytology yields spindle cells, potentially of neural origin.

Disclosure Statement

The authors have no disclosures.

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