Case Report

Primary thyroid hemangioma, a rare diagnosis in a patient with a painless neck mass

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A B S T R A C T

The aim of this case report is to demonstrate a case of primary thyroid hemangioma in a 62-year-old female who presented with a painless neck mass, treated with right hemithyroidectomy and diagnosed by surgical biopsy. Thyroid hemangiomas are rare, benign lesions which present a diagnostic challenge given the lack of specific imaging findings and clinical manifestations associated with them. However, accurate recognition of these lesions is important and can facilitate conservative, rather than surgical, management strategies.

In this report, we discuss a case in a patient whose laboratory assessment raised concern for a thyroid paraganglioma, leading to surgical resection of what was ultimately a benign thyroid hemangioma. We also review the pathophysiology, clinical manifestations, differential diagnostic considerations, and imaging characteristics of thyroid hemangiomas across multiple modalities and discuss strategies for accurately diagnosing these lesions.

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Introduction

As of 2020, only 31 cases of thyroid hemangioma have been reported in the literature [1]. Thyroid hemangiomas are benign vascular neoplasms that are known to occur following major or minor trauma to the neck, such as after fine needle aspiration, or as developmental anomalies [2]. Diagnosis of thyroid hemangioma proves to be difficult by thyroid ultrasound or contrast-enhanced CT imaging, as there are no reliable, specific imaging findings [2,3]. However, there are efforts beginning to explore improved pre-operative diagnosis of thyroid hemangioma, with one study reporting the successful use of contrast-enhanced ultrasound [1].

In the majority of cases reported in the literature, thyroid hemangiomas are discovered in patients who present with neck swelling, without other symptoms. Symptoms of thyroid hemangioma may also include dysphagia, voice changes, and dyspnea in the case of larger lesions which compress the airway or esophagus. In this case report, we present a rare case of a primary thyroid hemangioma in a patient without prior history of trauma.

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Case report/observation

A 62-year-old female with no significant past medical history presented to Otolaryngology Clinic for evaluation of a painless right neck mass. The mass was first noted 4 years prior, but the patient was lost to follow-up at that time. Initial clinical examination revealed a difficult to palpate, soft mass at the superior aspect of the right thyroid gland. No additional thyroid nodules or enlarged cervical lymph nodes were appreciated. Biological assessment showed euthyroidism with TSH of 1.6 IU/mL (reference: 0.4-4.7 IU/mL), free T4 of 0.95 ng/dL (reference: 0.7-1.48 ng/dL), and normal parathyroid assessment with PTH of 62.5 pg/mL (reference: 12-80 pg/mL) and calcium of 9.5 mg/dL (reference: 8.5-10.5 mg/dL). Due to clinical concern for paraganglioma, 24-hour urine 5-HIAA,
Fig. 4 – (A) Histopathologic features of thyroid hemangioma. Hematoxylin and eosin (H&E) staining (2x) of the lesion reveals normal thyroid parenchyma (arrow) with numerous intermingled thick and thin-walled blood vessels (arrowheads). (B) Histopathologic features of thyroid hemangioma. Hematoxylin and eosin (H&E) staining (4x) of the lesion reveals thick and thin walled blood vessels (arrows), in a vague lobular pattern with surrounding lymphoid aggregates (arrowheads).

VMA and metanephrines and plasma metanephrines were assessed; urine 5-HIAA was elevated at 15.2 mg/24 h (reference: < 8.3 mg/24 h), VMA was elevated at 12.2 mg/24 h (reference: < 8 mg/24 h), and total metanephrines were elevated at 1389 mcg/24 h (reference: < 1300 mcg/24 h). Plasma metanephrines were normal at < 0.2 nmol/L (reference: < 0.5 nmol/L).

A thyroid ultrasound and fine needle aspiration were performed and were non-diagnostic. Contrast-enhanced CT of
neck demonstrated a hypodense $1.5 \times 1.1 \times 3.1$ cm highly vascular mass in the superior right thyroid with a central vein draining directly into the right internal jugular vein (Fig. 1). Due to the abnormal urine studies detailed above and non-diagnostic fine-needle aspiration (FNA) (Fig. 2), a whole-body Gallium-68 Dotatate PET/CT was obtained, which was without scintigraphic evidence of a somatostatin receptor-rich neoplasm (Fig. 3).

The patient underwent surgical excision of the mass, with a simple post-operative course. The anatompathological study demonstrated a hemangioma with patchy surrounding lymphoid aggregates and otherwise normal thyroid tissue (Fig. 4). At 1-week post-operative follow-up, the patient was recovering well.

**Discussion**

Hemangiomas are common, typically benign vascular tumors that most often arise congenitally from abnormal proliferation of capillaries. While hemangiomas are common in the liver, gastrointestinal tract, subcutaneous soft tissues, skeletal muscle, bone, and in the head and neck, they are extremely rare in the thyroid [2,7]. As of 2020, only 31 cases of thyroid hemangioma have been reported in the literature [1]. Patients with thyroid hemangiomas most often present with painless neck swelling and no other symptoms. In spite of the benign nature of these lesions, they present a diagnostic challenge and lesions which enlarge or hemorrhage can cause compressive symptoms resulting in voice changes, dysphagia, and dyspnea.

FNA is a relatively common procedure and is reported as being the major iatrogenic cause of thyroid hemangioma. One of the most common complications of FNA is local hematoma, which can induce fibroblastic and vascular changes on resolution that result in the formation of cavernous hemangiomas [6]. In the case of congenital primary hemangiomas, including those that form in the thyroid gland, pathogenesis is thought to be related to a developmental anomaly of the angioelastic mesenchyma and failure to form complete vascular canals [3,6]. Although these tumors are typically benign, they should be differentiated from thyroid malignancy, goiter, and undifferentiated vascular lesions such as hemangiosarcoma.

Multiple imaging modalities to diagnose thyroid hemangioma have been explored, including ultrasound, contrast-enhanced ultrasound, CT, MRI, and I-123 and Tc-99m erythrocyte-labeled nuclear medicine scans [2,6]. Ultrasound typically shows well-marginated heterogeneous hypoechoic tumors with internal dilated vessels and increased blood flow [1]. Some may contain hyperechoic foci from phleboliths. Pickleman et al. reported the first case of a primary thyroid hemangioma in 1975 using Tc-99m-labeled erythrocyte angiography [4,5]. There is a relative paucity of literature describing the CT and MRI findings of thyroid hemangiomas, but in our case CT demonstrated a well-circumscribed, highly vascular mass hypoattenuating relative to the surrounding thyroid parenchyma. Due to the lack of distinctive and specific physical exam, laboratory and imaging findings, however, definitive diagnosis most often relies on histopathological examination [3]. One more recent study has reported the successful use of contrast-enhanced ultrasound in diagnosing thyroid hemangiomas which demonstrate progressive contrast enhancement, similar to hemangiomas in other organs [1]. In the future, this may be a reliable and cost-effective means of diagnosis, although follow-up imaging would remain indicated to exclude enlarging or dedifferentiated lesions.

Definitive management of symptomatic or diagnostically challenging lesions typically consists of surgical excision, which carries a good prognosis. In cases where compressive symptoms are present, total thyroidectomy may be indicated. In patients with smaller lesions, hemithyroidectomy or local excision may be possible, as was the case in our patient [1,2].

**Conclusion**

Due to their rarity and non-specific imaging findings, thyroid hemangiomas are diagnostically challenging lesions which are often treated by surgical excision and diagnosed histopathologically. Here, we report a case of primary thyroid hemangioma treated with hemithyroidectomy. Contrast-enhanced ultrasound may be a cost-effective and reliable means of diagnosing these lesions and keeping patients with stable lesions out of the operating room, although the rarity of these lesions, the high index of suspicion required to make this diagnosis, and the possibility of encountering symptomatic or dedifferentiated lesions makes conservative management of these lesions challenging.

**Patient consent**

Informed consent was obtained from the patient by standard procedure prior to article submission and is available for review upon request.

**References**

[1] Yang DB, Lan HF, Shi PD, Wang YC, Lu M. Evaluation of thyroid hemangioma by conventional ultrasound combined with contrast-enhanced ultrasound: a case report and review of the literature. J Int Med Res 2020;48(9):5–6. doi:10.1177/0300060520954718.

[2] Masuom SFH, Amirian-Far A, Rezaei R. Primary thyroid hemangioma: a case report and literature review. Kardiohir Torakochirurgia Pol 2021;18(3):186–9. doi:10.5114/ktp.2021.109385.

[3] Miao J, Chen S, Li Y, Fu L, Li H. A primary cavernous hemangioma of the thyroid gland: a case report and literature review. Medicine (Baltimore) 2017;96(49):e8651. doi:10.1097/MD.0000000000008651.

[4] Gutzeit A, Stuckmann G, Tosoni I, Erdin D, Binkert CA. A cavernous hemangioma of the thyroid gland: first documentation by ultrasound of a rare pathology. J Clin Ultrasound 2011;39(3):172–4. doi:10.1002/jcu.20738.

[5] Pickleman JR, Lee JF, Straus FH 2nd, Paloyan E. Thyroid hemangioma. Am J Surg 1975;129(3):331–3. doi:10.1016/0002-9610(75)90252-4.
[6] Kumar R, Gupta R, Khullar S, Dasan B, Malhotra A. Thyroid hemangioma: a case report with a review of the literature. Clin Nucl Med 2000;25(10):769–71. doi: 10.1097/00003072-200010000-00003.

[7] Dasgupta A, Teerthanath S, Jayakumar M, Hs K, Raju M. Primary cavernous haemangioma of the thyroid—a case report. J Clin Diagn Res 2014;8(2):151–2. doi: 10.7860/JCDR/2014/6854.4038.

[8] Han S, Suh CH, Woo S, Kim YJ, Lee JJ. Performance of 68Ga-DOTA-conjugated Somatostatin receptor targeting peptide pet in detection of pheochromocytoma and paraganglioma: a systematic review and meta-analysis. J Nucl Med 2018;60(3):369–76. doi: 10.2967/jnumed.118.211706.