

# A primary cavernous hemangioma of the thyroid gland

## A case report and literature review

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### Abstract

**Rationale:** Thyroid hemangioma is benign and associated with fine-needle aspiration (FNA) biopsy or trauma in most cases. Its differential diagnosis is very difficult.

**Patient concerns:** We presented the case of a 48-year-old man complained of slowly progressed swelling in the anterior neck for 20 years.

**Diagnoses:** Ultrasound and CT scan revealed a hypoechogenic and heterogeneous mass measuring 4 × 3.5 cm located in the right lobe of thyroid gland. Postoperative pathological and immunohistochemical examinations of the surgical specimen revealed a primary hemangioma of the thyroid gland.

**Interventions:** The patient received a right lobectomy of the thyroid.

**Outcomes:** The patient had been followed up for 10 months after surgery without complications and remained asymptomatic.

**Lessons:** Primary thyroid hemangioma should be considered when there is a well-circumscribed capsule mass on medical imaging without history of FNA or any other cervical procedures or trauma.

**Abbreviations:** CT = computed tomography, DSA = digital subtraction angiography, FNA = fine-needle aspiration, MRI = magnetic resonance imaging, RBC = red blood cell, SPECT = single photon emission computed tomography, US = ultrasound.

**Keywords:** fine-needle aspiration, hemangioma, thyroid gland

## 1. Introduction

Hemangioma, mostly originated from skin, oral cavity, and liver, is a common benign tumor characterized by capillary proliferation.<sup>[1,2]</sup> The primary hemangioma in thyroid gland is extremely rare, and only a few cases have been previously reported.<sup>[3–5]</sup> Primary thyroid hemangiomas are considered as a developmental

anomaly that is associated with an inability of angioblastic mesenchyma.<sup>[6]</sup> Generally, no prominent clinical manifestations but a cervical mass can be found in the patient with thyroid hemangioma. In addition, the preoperative diagnosis is difficult to be made because no distinctive signs observed by ultrasonography or computed tomography (CT) scans. Here, we present a male case with primary cavernous hemangioma of thyroid gland, and the differential diagnosis, treatment modality, and the follow-ups were also discussed.

## 2. Case presentation

A 48-year-old man complained of slowly progressed swelling in the anterior neck for 20 years. The patient had mild tracheal compressive symptoms and no dyspnea and dysphagia. He suffered no pain or voice change caused by the swelling. He denied a history of fine-needle aspiration (FNA) and trauma, and any cervical procedures or thyroid diseases among the family members were also excluded. This case report was in accordance with the ethical standards of Xingtai People's Hospital. Written consent was given by the patient for his information to be stored in the hospital database and used for research.

A solid and well-circumscribed mass with a smooth surface (4.5 × 4 cm) was identified on physical and clinical examinations in the thyroid region. Routine blood test and thyroid function results showed no abnormalities. Ultrasound (US) scan revealed a hypoechogenic mass located in the right lobe of thyroid gland. CT scan showed a mass of 4 × 3.5 cm in the right lobe of thyroid gland with heterogeneous enhancement, which compressed the trachea toward the left side slightly. Consequently, the mass was preoperatively diagnosed as nodular thyroid goiter or thyroid adenoma. FNA examination was rejected and the patient

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This patient signed informed consent for participation of this study. A statement on consent for publication for this case presentation from the patient was obtained. This study had ethics approval and consent by the Ethic Committee of Xingtai People's Hospital, Hebei Medical University Affiliated Hospital, Xingtai, China.

The authors report no conflicts of interest.

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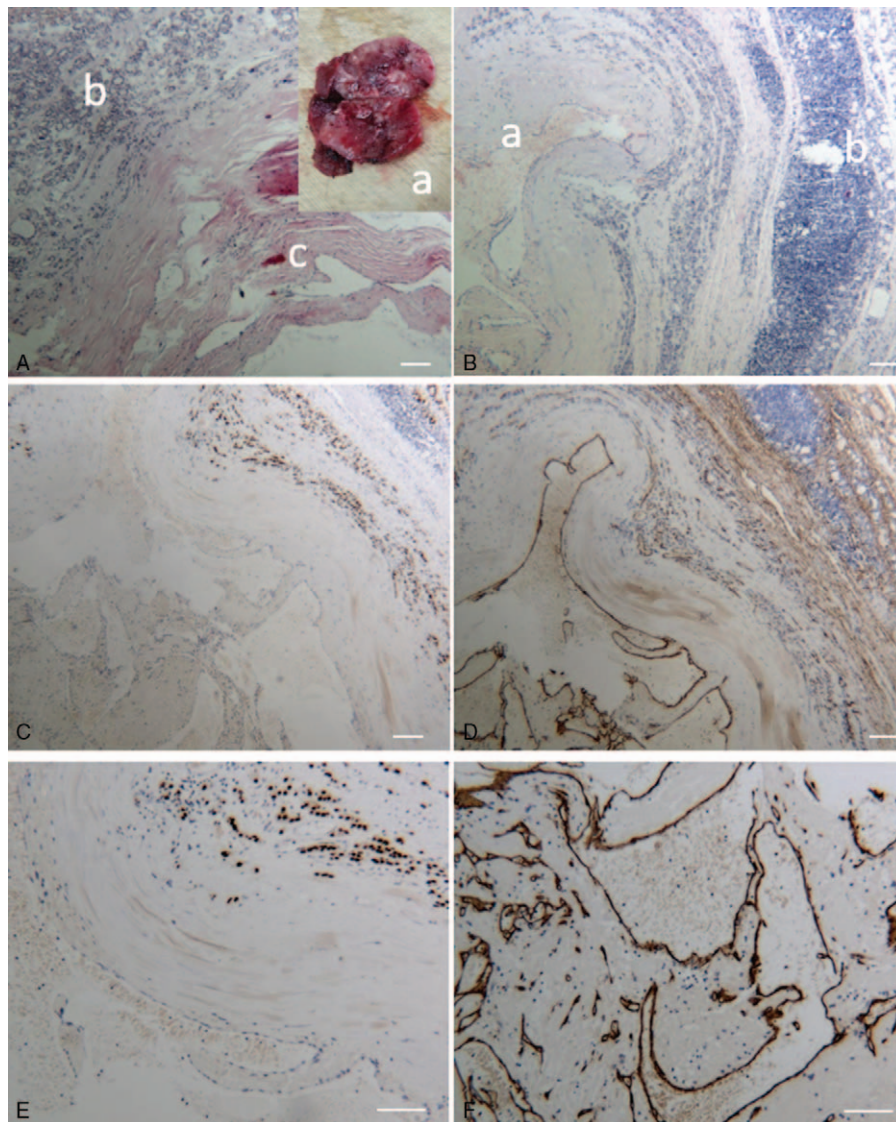
received a right lobectomy of the thyroid. The intraoperative frozen section examination was performed.

Gross morphology showed a nodular lesion with clear margin and surrounding fibrous tissues. The cut surface showed many reddish-brown, sponge-like, minute cystic spaces. The bloody discharge was drained out of the nodule through the surgical incision. On histopathology, the lesion consisted of multiple irregular, dilated vessel lumens filled with red blood cells and hemorrhagic zone, resulting in the atrophy of the adjacent thyroid tissue (Fig. 1A, B). A benign lesion was diagnosed according to the frozen section. On paraffin section, microscopic examination revealed abundant proliferated vessels with irregular shape in the lesion. A monolayer of endothelial cells, without dysplasia, were located in the inner wall of the lumen, and the fibrous tissues found in the outer wall. Some red blood cells were also observed in the lumen. This thyroid lesion was characterized by positive endothelial markers (CD31, CD34, and FVIII), and negative epithelial markers (cytokeratin, thyroglobulin, and

thyroid transcription factor-1) (Fig. 1C–F). On the basis of the above results, the diagnosis for this patient was primary intrathyroid cavernous hemangioma. The patient had been followed up for 10 months after surgery without complications and remained asymptomatic.

### 3. Discussion

Hemangioma is a common benign tumor of soft tissue, which usually occurs on skin, liver, and other organs. We could not discern whether it is malformation or hamartoma, real tumor, or reactive lesion in nature, wherever it occurs. In most cases, thyroid hemangioma is associated with FNA biopsy or trauma, which may be regarded as abnormal vascular proliferation following hematoma organization, or as a secondary lesion that resulted from the vascular changes during the development of nodular goiter.<sup>[7]</sup> Kumar et al<sup>[6]</sup> suggested that primary thyroid



**Figure 1.** Microscopic view of the thyroid hemangioma. (A, B) On histopathology, the lesion consisted of multiple irregular, dilated vessel lumens filled with red blood cells and hemorrhagic zone, resulting in the atrophy of the adjacent thyroid tissue. (A) a. Image of the excised tumor. b. Thyroid tissues. c. Vessel lumens. (B) a. Hemorrhagic areas. b. Thyroid tissues. (C, E) Immunohistochemical staining showed strongly immunoreactive for thyroid transcription factor-1 in the thyroid tissue. (D, F) Immunohistochemical staining showed that the hemangioma was strongly positive for CD34. Bar: 50  $\mu$ m.

**Table 1**  
**Reported cases of thyroid hemangioma.**

Patient	Sex	Age	Location	Size, cm	First author, year	Histology
1	F	57	Right	3.5 × 2 × 1.5	Okiyama 1966	Cavernous
2	M	56	Left	7.5 × 3 × 2	Pickleman et al <sup>[10]</sup>	Cavernous
3	F	48	Left	9 × 6 × 5	Komatsubara 1976	Cavernous
4	M	30	Right		Shamin 1978	Cavernous
5	F	29	Right	6.5 × 4 × 2.5	Queiroz 1978	Cavernous
6	M	33	Right	9 × 7 × 5.5	Queiroz 1978	Cavernous
7	M	54	Right	9	Queiroz 1978	Cavernous
8	F	55	Right	2	Hernandez 1979	Capillary
9	M	55	Right	10 × 6 × 5	Ismailov 1981	Cavernous
10	M	7	Diffuse		Okuno 1981	Capillary
11	M	59	Left	11 × 8 × 5	Kamimura 1982	Cavernous
12	M	46	Right	14 × 10 × 9.5	Ishida 1982	Cavernous
13	M	4	Isthmus	1.8 × 0.9 × 0.3	Ishida 1982	Cavernous
14	F	57	Right	8 × 6.5 × 3	Ishida 1982	Cavernous
15	F	64	Right	7.2 × 6 × 4	Yokota 1991	Cavernous
16	M	67	Right	4.5 × 3.5	Kato 1993	Venous
17	M	21	Right	5.5 × 3 × 2	Kitamura 1993	Cavernous
18	M	17	Right	4 × 3	Karamatsu 1995	Venous
19	M	53	Right	4 × 3	Pendse 1998	Cavernous
20	F	63	Left	5 × 3	Rios 2000	Cavernous
21	F	48	Left	5 × 4	Rios 2000	Cavernous
22	M	53	Right	4 × 4	Kumar et al <sup>[6]</sup>	
23	F	50	Left		Niimi 2000	
24	M	24	Right	6 × 5	Senthilvel, 2005 <sup>[5]</sup>	
25	F	56	Right	7 × 6	Kumamoto 2005	Cavernous
26	M	21	Right	5.5 × 3 × 2	Kano et al <sup>[8]</sup>	Cavernous
27	M	66	Left	17 × 16.5	Lee, 2007	Cavernous
28	M	25	Left	4.9 × 4 × .4	Datta, 2008	Cavernous
29	M	78	Right	4 × 4	Michalopoulos et al <sup>[10]</sup>	Cavernous
30	F	80	Left	22 × 21 × 17	Maciel et al <sup>[11]</sup>	Cavernous
31	M	48	Right	4 × 3.5	Our case	Cavernous

hemangioma originated from the incapability of the canal formation in the angioblastic mesenchyma.<sup>[6]</sup>

Hemangioma is histologically classified as synovial, cavernous, capillary, venous, racemose, arteriovenous, and so on.<sup>[8]</sup> Hemangioma rarely occurs in the thyroid gland, and only 23 cases have been reported until 2005<sup>[9]</sup> (Table 1). In 1975, Pickleman et al<sup>[10]</sup> were the first to report a case with thyroid hemangioma in the left lobe of thyroid gland (size 7.5 × 3.0 × 2.0 cm). Maciel et al<sup>[11]</sup> described a case with large thyroid hemangioma (size 22 × 21 × 17 cm, weight 2800 g), which was the largest one up to date. Above cases indicated a male tendency with various age (from 4 to 80 years) and the largest diameter was from 2 to 22 cm.

The patients with thyroid hemangioma often present with a growing mass, but no specific clinical characteristics, which is the cause of misdiagnosis. An asymptomatic cervical mass is the most common symptom in primary thyroid hemangioma, and the intralesional hemorrhage could result in its fast growth and corresponding compression manifestations.<sup>[9]</sup> Occasionally, a hard mass with calcification may be indicative of malignancy, and papillary thyroid carcinoma is an example.<sup>[3]</sup> Phleboliths within the lesion can also contribute to the hard texture. Even for an experienced surgical specialist, it is quite difficult to diagnose thyroid cavernous hemangioma preoperatively due to lack of clinical characteristics and pathological findings on FNA, US, or CT scans. Shpitzer et al<sup>[12]</sup> and Kumar et al<sup>[6]</sup> used signal intensity of heterogeneity and winding patterns on magnetic resonance imaging (MRI), red blood cell (RBC) scans, digital subtraction

angiography (DSA), and single photon emission computed tomography (SPECT) to reinforce the diagnosis. The appearance of Tc-99m erythrocyte blood-pool may be an indication of hemangioma.<sup>[6]</sup> There is mild or no enhanced activity soon after the label injection, and cavernous hemangiomas is characterized by this bad perfusion and delayed filling.<sup>[13]</sup> Although unusual, it may be a reliable manifestation for occasional diagnosis of thyroid hemangioma. However, high costs and nonavailability limit such investigation. FNA test always show much blood rather than epidermic cellular components.

Almost all the patients' ultimate diagnosis relies on the histopathological examination. It can be easily diagnosed on the basis of the signs of typically discrete multi-lobulated lesions with hemorrhage during its evolution stages. There are few elastic fibers and smooth muscle. The multilobulated lesions are surrounded by monolayer endothelium and different amount of fibrous stroma. In this respect, they resemble capillary telangiectasia.<sup>[14]</sup> The patients fail to conservative treatment and radical surgical excision is recommended, as the tumor frequently infiltrates into skeletal muscles, and the prognosis is fairly well.<sup>[15]</sup> A lesion with larger size and the hemorrhage during the operation should not be overlooked by the surgeon, and over 2 L of blood loss had been reported in surgery.<sup>[10]</sup> Thus, sufficient preoperative preparation is very crucial to have a good prognosis.

The tumor should be mainly differentiated from benign diseases such as endothelial reactive hyperplasia in goiter and malignancies, including undifferentiated sarcomatoid carcinoma,



hemangiosarcoma, or angiosarcoma. Benign reactive endothelial hyperplasia, which looks like malignancy, may develop in nodular goiter, due to spontaneous bleeding, granulation tissue formation, and fibrous organization. It may be secondary to the FNA biopsy.<sup>[16]</sup>

As the vascular disease is a controversial problem in terms of thyroid pathology, it has been debated for many years.<sup>[16,17]</sup> Recently, increasing literature supports that the hemangiosarcoma of the thyroid gland is a true existent entity rather than a variant of undifferentiated carcinoma, although they have overlapped images.<sup>[18–21]</sup> Thyroid hemangiosarcoma is the primary malignancy of thyroid gland, which is rare and aggressive. It was first reported among the patients in Alpine region by the Swiss researchers 90 years ago.<sup>[22]</sup> The incidence of this disease ranges from 2% to 10% of all thyroid neoplastic lesions in the above region and in Austria (endemic mountainous regions).<sup>[23]</sup> Its incidence is estimated to be 0.15 to 0.25 per 100,000 individuals per year in Western Austria.<sup>[24]</sup> Most patients complained of a rapidly growing cervical mass correlated with compressive manifestations. It is very difficult to differentiate benign vascular diseases from malignant vascular diseases in cytological material from FNA biopsies. It should be more cautious when a cytopathology report is issued, especially for the cases with few cells and massive hemorrhage: Atypical endothelial cells do not always indicate malignancy, which may also appear in reactive endothelial hyperplasia in infarcted thyroid nodules.<sup>[16]</sup> Histologically, it showed the same classical appearance of hemangiosarcoma occurring in the skin and soft tissue. It is characterized by poorly differentiated malignant polymorphous epithelioid cells containing much eosinophilic cytoplasm with occasional intracytoplasmic lumina, prominent nucleoli, and eccentrically placed vesicular nuclei. High mitotic activity can be observed. The tumor cells have vascular-like space, and other cells have intracytoplasmic lumens, which contain erythrocytes or are arranged in solid sheets.

This tumor is diagnosed mainly based on histopathological characteristics of a vascular malignancy, which is supported by immunopositivity for vascular endothelial markers such as Ulex europaeus I lectin, factor VIII related antigen, CD34, and CD31, while immunonegativity for epithelial markers (cytokeratin, thyroglobulin, and epithelial membrane antigen). Sometimes Weibel–Palade bodies can also be found in electron microscopic observation.

Some undifferentiated carcinomas of the thyroid may also show the pseudo-hemangiosarcomatous sign, especially in some variants of medullary carcinoma.<sup>[25]</sup> The histochemical staining of these carcinomas is positive for cytokeratin and other epithelial markers. Both of the malignant neoplasms yield nearly the same unfavorable clinical prognosis due to the destructive and aggressive behavior with a high recurrent and metastatic rate.<sup>[26]</sup> Most of the patients died within 5 to 7 months after radical surgery and/or radiotherapy.

In conclusion, primary thyroid hemangioma should be considered when there is a well-circumscribed capsule mass on medical imaging without history of FNA or any other cervical procedures or trauma. The definite diagnosis relies on histopathologic findings. Although it is difficult to be diagnosed before operation, its prognosis is fairly well after treatment.

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