Undifferentiated pleomorphic sarcoma of the thyroid: A case report and literature review

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Abstract
This report describes a patient who presented with a large thyroid nodule and compressive symptoms. Immunohistochemical staining showed diffuse marked reactivity for vimentin and focal reactivity for CD68 and Ki-67 that is compatible with primary undifferentiated pleomorphic sarcoma of the thyroid. This report emphasizes and discusses extremely rare thyroid cancer type.

KEYWORDS
malignant fibrous histiocytoma, sarcoma, thyroid gland, undifferentiated pleomorphic sarcoma

INTRODUCTION
Sarcomas are a rare and heterogeneous group of malignant tumors of mesenchymal origin that comprise less than one percent of all adult malignancies and 12 percent of cancers in children.1,3 Approximately 80 percent of new cases of sarcoma develop from soft tissue.3 Histologically, the diagnosis of a soft tissue sarcoma is made on the basis of morphologic patterns. Immunohistochemical staining often aids in the identification of the probable tissue of origin.

Malignant fibrous histiocytoma (MFH), completely re-named “undifferentiated pleomorphic sarcoma” (UPS) in the

FIGURE 1 A 79-y-old woman visited our hospital because of a fast-growing neck mass
2013 World Health Organization classification of soft tissue sarcoma, is the most uncommon subtype of soft tissue sarcoma. Primary UPS of the thyroid is a subtype of primary thyroid sarcoma (reported frequency ranges from 0.01% to 1.5%), which extremely rarely occurs in the thyroid gland. To the best of our knowledge, there are only a few well-documented primary UPS of the thyroid in the literature and this is the first report in Vietnam. In this report, we describe a 79-year-old woman with primary UPS of the thyroid gland and review the literature.

2 | CASE PRESENTATION

A 79-year-old woman presented with a fast-growing, painless thyroid nodule and symptoms of dysphagia and dysphonia for six months. She reported a history of hypertension, no history of radiation to the neck, and no family history of any malignancy. She was admitted to hospital for a tentative thyroid radiofrequency ablation (RFA).

On physical examination, a very large, solid, and irregular thyroid nodule was detected (Figure 1). No lymph node was found in the lateral neck. Thyroid function tests (FT4, thyrotropin) and other tests (CBC, liver, and renal function tests) were normal with serum FT4 1.18 ng/dL (normal range [NR] 0.93-2.22); thyrotropin 0.59 microU/mL (NR 0.27-4.2). Her chest X-ray showed no abnormal findings. The thyroid ultrasonography showed a 45 × 32 mm mixed echogenicity mass which occupied nearly the entire thyroid gland, with no calcification, no vascularity, and no lymph node involvement. Fine Needle Aspiration (FNA) of the thyroid mass yielded hemorrhagic aspirate (Figure 2A,B) with diagnosis of a large benign thyroid nodule. The patient refused a core needle biopsy. A total thyroidectomy instead of RFA was performed because of compressive symptoms and high risk of malignancy (Figure 3).

Histopathologic examination (HE stain) revealed the tumor cells were spindle-shaped, round, or ovoid, and arranged in a whirlpool fashion with invasive growth, with high mitotic activity and areas of necrosis. It is consistent with a moderately differentiated thyroid sarcoma (Figure 4A,B). Immunohistochemical staining showed diffuse marked reactivity for vimentin and focal reactivity for CD68 and Ki-67 (positive 20%). No reactivity for AE1/3, thyroglobulin, S100, or smooth muscle actin was detected (Figure 5A-H). Histopathologic and immunohistochemical staining features were suggestive of UPS of the thyroid. No postoperative chemo- or radiotherapy was given because her daughter refused. The whole-body scan detected no metastasis to distant organs and lymph nodes. After 6 months of follow-up, local recurrence was detected and no further treatment was undertaken because of her poor performance status.

3 | DISCUSSION AND CONCLUSIONS

There are four major types of thyroid cancer. The most common types are papillary thyroid cancer—85% and follicular thyroid cancer—10%. Less frequent types are thyroid Hurthle cell carcinoma and medullary carcinoma. Anaplastic type is quite rare, only 1%-2%. Primary thyroid
lymphoma (PTL) make up from 0.5% to 5.0% of all thyroid malignancies. Primary thyroid sarcoma (PTS) is very rare with a reported incidence ranging from 0.01% to 1.5%. UPS of the thyroid is a subtype of thyroid sarcoma which is extremely rare with 20 cases reported in the English language literature, and only three cases reported in the past ten years.

Definitive diagnosis is crucial in determining prognosis treatment strategy. UPS, PTL, and anaplastic thyroid cancer are present as rapidly growing thyroid tumors in elderly patients. Unfortunately, ultrasonographic features and FNA cytology may not help to differentiate these entities. When diagnostic surgery is not available, core needle biopsy will help to exclude PTL from UPS and anaplastic thyroid cancer which characterized by diffuse infiltration of lymphoid cells. To distinguish thyroid UPS from anaplastic thyroid carcinoma, histopathologic features and immunohistochemical stains are critical. Both of them show the characteristic spindle cell, pleomorphism, and storiform pattern which distinguish them from nonmesenchymal thyroid cancers. Immunohistochemically, both of them are positive for vimentin but only thyroid UPS is positive for α1-antitrypsin and CD68, which enable definite diagnosis (Table 1).

In Table 2, we reviewed 20 cases of thyroid UPS published in the literature (using Endnote X9 with keywords in PubMed: “malignant fibrous histiocytoma”, “undifferentiated pleomorphic sarcoma”, “the thyroid”). More than 80% of cases were female with a peak of age over 60 years. The thyroid mass in previously reported cases and in our patient exceeded 4 cm in size (75%). The incidence of thyroid cancer within a nodule of greater than 4 cm is 22%; consequently, we could not exclude malignancy even although ultrason features are benign.

Complete excision of the primary lesion and involved adjacent tissue is recommended in patients with thyroid UPS in order to achieve negative surgical margins. Radio- or chemotherapy is usually indicated as part of cancer treatment. Because surgery alone has poor results, adjuvant radio- and/or chemotherapy is generally considered in soft tissue sarcoma treatment, despite of being no proven benefit. Adjuvant or neo-adjuvant radiotherapy in the head and neck has been
used to improve disease control for thyroid UPS. However, in eleven out of twenty-one (11/21) cases in which adjuvant radio- and/or chemotherapy was used, no proven benefit was found. Rapid local recurrence or distant metastasis usually leads to death.

Ultrasound-guided RFA for benign thyroid nodules is a minimally invasive treatment modality that may be an alternative to surgery. In our elderly patient, although all of our available tests (a core needle biopsy was denied) initially showed a benign thyroid nodule, we decided to perform total thyroidectomy.
instead of RFA because of the high risk of malignancy clinically (rapid growth in elderly patient, exceeded 4 cm in size, lacking core needle biopsy). If symptomatic local recurrence after six months coupled with a poor health condition for surgery again, RFA should be an option of choice.

In conclusion, in clinical practice, primary thyroid UPS presents as a rapidly growing neck tumor in the elderly patient that causes compressive symptoms similar to anaplastic thyroid cancer and thyroid lymphoma. Histopathologic features combined with immunohistochemical stains are required for diagnosis. The treatment of choice for primary thyroid UPS is complete excision with or without postoperative adjuvant radio- and/or chemotherapy. Although the benefits of this remain unproven.

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CONFLICT OF INTEREST
None declared.

AUTHOR CONTRIBUTIONS
VBN: designed this study and wrote the preliminary draft of the manuscript. CVL and VVHN: supervised this project. TDC and JHB: performed pathology evaluation. BTT and JHB: revised the manuscript critically. Conflict of interest relevant to this article was not reported.

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