Case Report

Columnar Cell Variant of Papillary Carcinoma of the Thyroid Gland in a 22-Year-Old African Female

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Abstract

Columnar cell variant of papillary carcinoma of the thyroid gland is a rare and aggressive thyroid malignancy with the clinical course predicated on the clinical stage, with the presence or absence of extrathyroid invasion. The tumors tend to occur in the elderly. We herein report a case of columnar cell variant of papillary carcinoma of the thyroid gland with lymph node metastasis in a 22-year-old African female who presented with 2 years' history of anterior neck swelling. The clinical examination, imaging, and cytological examination were suggestive of a benign neoplasm. An initial subtotal thyroidectomy was histologically diagnosed to be a columnar variant of papillary carcinoma. She subsequently had a completion thyroidectomy with resection of residual malignant thyroid tissue and lymph node, which showed metastasis. The patient is on follow-up.

Keywords: Papillary thyroid carcinoma, thyroid cancer, thyroidectomy

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Introduction

Among endocrine cancers, thyroid cancer remains the most common, and its incidence has continuously increased worldwide,[1] except in Africa where the trend has not been substantiated as detection has been insufficient.[2] Papillary thyroid carcinoma (PTC) is the most common histological type among the thyroid cancers globally and accounts for 80%–85% of all thyroid cancers.[1,3] Figures for Nigeria are variable and mostly lower than these but, in many cases, at least Papillary carcinoma is predominant.[4-6] PTC is commonly seen in countries having iodine sufficient or iodine excess diets, but the most important etiological factor is said to be its association with radiation, especially occurring early in young age.[7] PTC can occur at any age, but most tumors are diagnosed in patients in the third to fifth decades of life. Women are more frequently affected than men in a ratio ranging between 2:1 and 4:1.[8,9]

Several variants of PTC have been documented, and each histopathologic variant of PTC has a varied clinical course different from the classical PTC.[10] The columnar cell variant of PTC (CCPTC) is a rare variant that was first described by Evans in 1986, and it accounts for 0.15-0.2% of all PTCs.[11,12]

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Recently, the revised American Thyroid Association guidelines categorized variants of PTC according to their biological behavior and classified the CCPTC as an aggressive type with widespread dissemination and a fatal outcome.[12]

Case Report

A 22-year-old woman presented with an anterior neck swelling of 2 years' duration. There was neither associated pain nor difficulty with breathing, but the swelling progressively increased more to the left side of the neck. There was no complaint of obstructive symptoms, no weight loss, and no hypothyroid or hyperthyroid symptoms. There was also no known history of exposure to radiation. Examination revealed a palpable mobile mass more to the left with the left lateral margin about 7.0 cm from the midline. The mass was about 6.0

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cm long and moved with swallowing but not with protrusion of the tongue. The lower margin could not be palpated, and the overlying skin appeared normal. There was no palpable cervical lymph node.

Thyroid function test was normal, while an ultrasound scan of the neck revealed a left thyroid mass with cystic degeneration. Fine-needle aspiration cytology was suggestive of a benign mass. Thoracic inlet and neck radiographs of the neck showed a goiter with retrosternal extension. At surgery, the left lobe of the gland was mostly involved, and a subtotal thyroidectomy was done. Gross examination of the tumor showed a bilobular thyroid gland with an isthmus. The first lobe measured 4.0 cm × 2.5 cm × 1.0 cm, while the second lobe measured 5.5 cm × 3.5 cm × 2.5 cm. The whole specimen weighed 42 g. Cut sections from the smaller lobe showed a brownish appearance while the cut surface of the larger lobe revealed a gray-tan-colored appearance with areas of hemorrhage. Microscopically, the isthmus and the smaller lobe showed proliferating epithelial follicles with variable amounts of colloid and nothing to suggest malignancy. However, sections from the larger, second, lobe showed proliferating epithelial cells forming papillae with sometimes prominent vascular core. The cells lining the papillary core are predominantly tall columnar with vesicular nuclei arranged in a pseudostratified pattern [Figure 1]. Focally, there was invasion of the capsule [Figure 2].

Based on the initial hematoxylin and eosin sections, the diagnosis of invasive PTC (columnar cell variant) was made with a comment to exclude metastasis from the lower gastrointestinal tract.

She subsequently had a completion thyroidectomy surgery. The thyroid tissue showed residual tumor with lymph node tumor metastasis [Figure 3]. The patient is alive and clinically stable with no recurrences or metastasis as at the time of reporting, which is only 12 months since diagnosis.

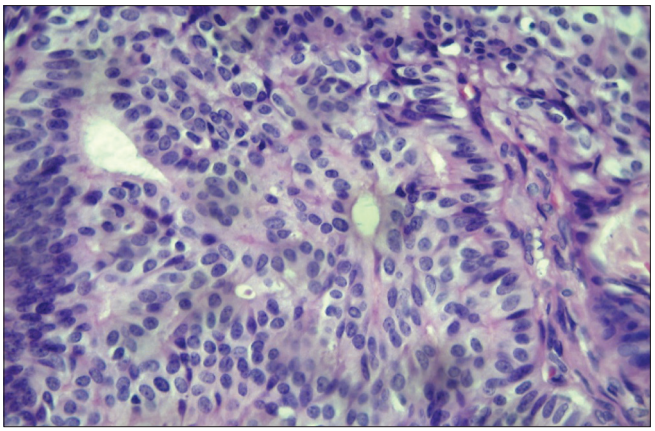

Figure 1: Columnar cell variant of papillary carcinoma (H and E, ×400) Histologic sections show cells lining are predominantly tall columnar with vesicular nuclei arranged in a pseudostratified pattern

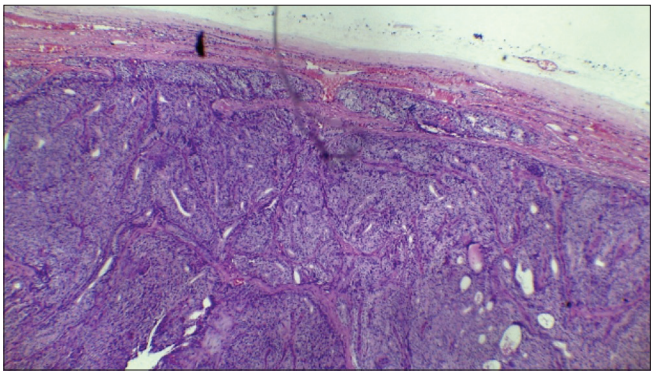

Figure 2: Capsular invasion (H and E, ×100)

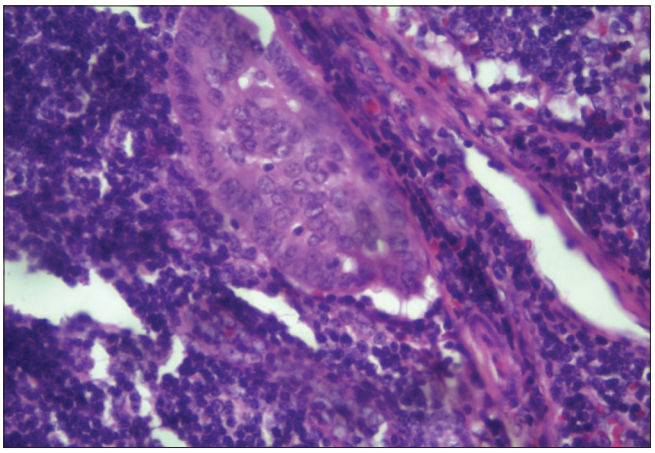

Figure 3: Lymph node tumor metastasis (H and E, ×100)

Discussion

PTC was considered an indolent tumor with excellent prognosis.[13] It however represents a heterogeneous group of tumors that exhibit marked variability in macroscopic and histologic appearance. The CCPTC is a rare subset of PTC, which was initially considered to be aggressive by its having tall columnar cells, but this opinion has since been reinforced more by the nature of its biological behavior, almost always extending beyond the thyroid capsule into extrathyroid tissues by the time of its diagnosis, a rapid growth rate, and a high rate of recurrence.[14,15] It often presents as an asymptomatic or enlarging neck mass, which can be encapsulated. It may also present as an infiltrating mass.

The macroscopic appearance of the PTC is quite variable, with lesional tumor appearing anywhere within the gland. Typically, PTC is often small in size with averages of 2–3 cm but may occasionally be large. The lesions are typically firm with a tan or white appearance, with infiltrating borders and often gritty cut surface. Cystic changes are relatively common especially within lymph node metastasis and calcification is a common feature.[14,16]

The microscopic appearance of PTC is also based on constellation of architectural and cytologic features. The architectural patterns include papillary, trabecular, micro and macrofollicular, solid, diffuse sclerosing, oncotic, and

tall or columnar cell variant.[14,16] Cystic spaces lined by one or occasionally several layers of cells with crowded oval nuclei (the neoplastic epithelial cells with characteristic enlarged optically clear, empty "Orphan Annie" nuclei, nuclear grooves, cytoplasmic pseudoinclusions, and overlapping nuclei) are commonly present. Psammoma bodies can be seen in up to 50% of cases. Lymphatic invasion is common and is often associated with a cystic growth pattern in the lymph node. The stroma is often abundant and fibrous.[14,16]

CCPTC tumors however, often extend beyond the thyroid capsule and are usually larger (>6.0 cm) than the conventional PTC. These tumors tend to occur more in older persons, with mean age of 44 years.[8] The majority of cases present with lymph node metastasis and even distant metastasis.

Microscopically, the histopathologic features used to define CCPTC include the presence of columnar appearing cells with nuclear stratification, scant cytoplasm, and absent minimal features of PTC.[16,17] In the current, we found a morphologic spectrum including papillary and micropapillary patterns.

In this case report, the distinguishing features of the aggressive nature of the CCPTC is yet to be established. With follow-up and more extensive ancillary examination, the exact biological behavior in the case can be concluded.

Despite this emphasis that CCPTC is highly aggressive and fatal, some studies have reported more favorable outcomes in certain patients who have the encapsulated form of CCPTC.[18,19] In addition, it has also been suggested that tumors confined to the thyroid gland are associated with an excellent prognosis.[20,21] In our own case, the columnar cell carcinoma shows capsular invasion and lymph node metastasis, which suggest guarded prognosis as no distant metastasis observed was demonstrated. It is necessary to emphasize that further ancillary investigations such as nuclear and PET scans were not carried out to exclude distant spread at the time of surgery and histological diagnosis. The patient however is still alive 12 months after the initial diagnosis was made.

In well-differentiated PTC, genetic alterations such as V600E missense mutation have been documented. In this mutation, valine is substituted by glutamic acid in the gene encoding the serine threonine kinase, b-raf ($BRAF^{V600E}$) resulting in activation of the receptor tyrosine kinase signaling cascade. The BRAF driver mutation has been described as an indicator of the progression and aggressiveness of PTC.[22,23]

Some studies show a 33% detection of BRAF in CCPTC, which is comparable to findings in its overall prevalence in well-differentiated PTC.[21,24] The presence of BRAF mutation may therefore suggest progression and aggressiveness of the tumor.[24] BRAF has not been studied in this case because we do not have the facility to do so. However, some other studies do not agree that BRAF does show a correlation with the known prognostic variable.[25]

Surgical resection is the main form of treatment. Encapsulated tumors are managed conservatively while, metastases, recurrences, and unencapsulated tumors that invade beyond the capsule are managed aggressively.[26,27]

Conclusion

The biological behavior of this tumor is predicated on the clinical stage, with the presence or absence of extrathyroidal invasion being the singular most important parameter that treatment is based apart from the morphologic appearance and the clinical stage as well. Our patient has a tumor with capsular invasion and lymph node metastasis. With clinical follow-up, the disease-free period, recurrence or distant metastasis will be observed to further emphasize the nature of the tumor.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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