Original Article

Histopathological Pattern of Thyroid Cancers in Zaria: A 10-Year Review

Nasiru Raheem, Modupeola O. A. Samaila[1], Saad A. Ahmed[1]

Department of Histopathology, Federal Medical Centre Yola, Adamawa State, [1]Department of Pathology, Ahmadu Bello University Teaching Hospital, Zaria, Kaduna State, Nigeria

Abstract

Background: Thyroid cancer is a relatively rare malignancy representing only 1.5% of all cancers worldwide. However, it is the most common endocrine cancer globally and accounts for 92% of all endocrine malignancies. The annual incidence of thyroid cancer varies worldwide from 0.5 to 10/100,000 populations. This is an analysis of thyroid cancers diagnosed at the Department of Pathology, Ahmadu Bello University Teaching Hospital (ABUTH), Zaria. **Materials and Methods:** This was a retrospective study carried out between January 2005 and December 2014. All the cases diagnosed with thyroid cancers within the period formed the study materials. Patient's biodata were retrieved from request cards. All histology slides stained with routine hematoxylin and eosin were retrieved and fresh sections made from formalin-fixed, paraffin-embedded stored tissue blocks where necessary. **Results:** Thyroid cancers constituted 4.6% of the total thyroid specimens submitted for histology during the study. The peak age of occurrence was between 21 and 30 years with a male-to-female ratio of 1:2.5. There were 14 thyroid cancer cases. Ten (71.4%) of the 14 thyroid cancer cases seen were papillary carcinoma, two cases (14.3%) were follicular carcinoma, and a case each (7.1%) of medullary and undifferentiated carcinoma. **Conclusion:** Thyroid cancer in our locality is uncommon. It is also more common in females and occurs predominantly within the third to fifth decades of life. Furthermore, the most common histologic variant in this environment is the papillary variant of the malignancy.

Keywords: Cancers, thyroid, Zaria

Introduction

Thyroid malignancy is relatively rare worldwide. It represents only 1.5% of all cancers but it is the most common endocrine cancer and accounts for 92% of all endocrine malignancies.[1,2] The annual incidence of thyroid cancer varies worldwide from 0.5 to 10/100,000 populations.[3] At the University College Hospital, Ibadan, Nigeria, carcinoma of the thyroid accounted for 1.3% of all malignant conditions and 8% of total thyroid diseases.[4] Furthermore, it constituted 15% of all thyroid diseases at the Department of Pathology, University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria.[5] A 20-year study conducted a decade ago at the Ahmadu Bello University Teaching Hospital (ABUTH), Zaria, showed that thyroid cancer formed 0.4% of all solid malignancies.[6] Thyroid carcinoma is as prevalent as multiple myeloma, twice as common as Hodgkin's disease and comparable in frequency to cancers of the esophagus, larynx, mouth, and even uterine cervix in some parts of the world.[3] Furthermore, it is a common malignancy that has a variable tendency to metastasize to other parts of the body, depending on the histological subtype.[3]

The histology of thyroid cancers in a population is dependent on the ambient iodine intake. A high proportion of aggressive follicular and anaplastic tumors are seen in iodine-deficient population while the more benign papillary type is common in iodine-rich populations. Furthermore, long-standing multinodular goiter has been suggested as a predisposing factor in some cases, and areas with iodine deficiency-related endemic goiter have a higher prevalence of follicular carcinoma. The major risk factor predisposing to thyroid cancer is exposure to ionizing radiation, particularly during the first two decades of life.[7] Up to 9% of people who

Address for correspondence: Dr. Nasiru Raheem, Department of Histopathology, Federal Medical Centre Yola, Adamawa State, Nigeria.
E-mail: raheemnasiru@yahoo.com

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received radiation therapy during childhood have subsequently developed thyroid malignancies usually several decades after exposure. The majority of thyroid lymphoma arises from the preexisting Hashimoto's thyroiditis. However, there is no conclusive evidence to suggest that thyroiditis is associated with an increased risk of thyroid epithelial carcinoma.[7]

The pattern of thyroid disorders in Africa is evolving with increasing iodine sufficiency.[8]

This study aims to analyze the current pattern of thyroid malignancies in our setting.

Materials and Methods

This study was a retrospective analysis of thyroid cancers diagnosed at the Department of Pathology, ABUTH, Zaria, over a 10-year period from January 1, 2005 to December 31, 2014.

All cases registered as thyroid diseases within the study period were extracted from the departmental records and bench books. The patient's case cards filled by the requesting physicians and case folders where necessary were retrieved for biodata. All histology slides stained with routine hematoxylin and eosin were retrieved. Fresh sections were made from formalin-fixed, paraffin-embedded stored tissue blocks where necessary. Congo red was used to demonstrate amyloid.

Results

A total of 302 thyroid specimens were submitted to the department for histopathological examination during the study. Of these, there were 14 thyroid cancer cases which represented approximately 4.6% of the total thyroid specimens submitted for histology during the study period. The peak age of occurrence was between 21 and 30 years [Table 1] with a male-to-female ratio of 1:2.5 [Table 2]. Ten (71.4%) of the 14 thyroid cancer cases were papillary carcinoma [Figure 1], two (14.3%) follicular carcinoma showing vascular invasion [Figure 2], and a case each (7.1%) medullary and undifferentiated carcinoma [Table 2]. Histologically, the undifferentiated carcinoma showed pleomorphic malignant cells arranged in sheets, having vesicular nuclei, and prominent nucleoli with foci of sarcomatoid differentiation [Figure 3] while the medullary carcinoma was composed of solid nests and trabeculae of round-to-polygonal cells with finely granular eosinophilic cytoplasm, hyalinized stroma, and amyloid deposits which was confirmed using Congo red stain [Figure 4] and polarized light.

Table 1: Age distribution of thyroid cancers

Age groups	Frequency
11-20	1
21-30	6
31-40	2
41-50	3
51-60	0
61-70	1
71-80	1
Total	14

Discussion

Thyroid cancer represented 4.6% of all thyroid diseases during the study period. This rate is, however, lower than many other studies. Lawal *et al*.[9] reported 12.9% in Ile-Ife; Nzegwu *et al*.[10] reported 14.1% in Enugu; and Ijomone *et al*.[5] also reported 15% in Port Harcourt, all in Nigeria. Abdulkareem[11] in Basrah, Iraq, reported 7.7% and 8.2% by Tsegaye and Ergete[12] in Adis Ababa, Ethiopia. The lower rate in this study may also be attributable to a reduction in iodine deficiency in the general populace due to Government policy on iodizing domestic salt in Nigeria. This trend of reduction in the incidence of the follicular cancer histologic variant, especially in Africa, has been observed in the study by Okosieme.[8] Furthermore, the smaller number of thyroid cancer cases relative to larger total thyroid specimens seen in this study might also contribute to lower rate when compared to the studies such as Ijomone and Nzegwu *et al*. Those two studies (Ijomone and Nzegwu *et al*.) had more thyroid cancer cases with less total thyroid specimens.

The incidence of thyroid cancers is increasing and more common in females with peak age distribution in the third to fifth decades of life.[13] This is similar to our finding of female predominance and peak age frequency in the third decade of life. The female prevalence observed in this study is similar to Ahmed's *et al*.'s observation a decade ago in Zaria, and studies by Ariyibi and Duduyemi[4] in Ibadan, Olatoke *et al*.[2] in Ilorin, Ijomone *et al*.[5] in Port Harcourt, and Tsegaye and Ergete[12] in Ethiopia.

The varying incidence rates have been reported for thyroid malignancy ranging from 10.8% (India), 7.8% (Iraq), 12% (Kenya), 8.3% (Bangladesh), and 8.2% (Ethiopia).[1,11-14] The documented prevalence rates of the different thyroid cancer in the African continent are variable (papillary; 6.7%–72.1%, follicular; 4.9%–68%, anaplastic; 5%–21.4%, and medullary; 2.6%–13.8%).[15] These variations in the prevalence rate were also observed in the report by Edino *et al*., Kpolugbo *et al*., Ahmed *et al*., Olatoke *et al*., and Nggada *et al*. in Nigeria.

Table 2: Histological types and sex distribution of thyroid cancers

Histological types	Gender		Frequency (%)
	Female	Male	
Papillary	7	3	10 (71.4)
Follicular	2	-	2 (14.3)
Medullary	1	-	1 (7.1)
Undifferentiated	-	1	1 (7.1)
Total	10	4	14 (100.0)

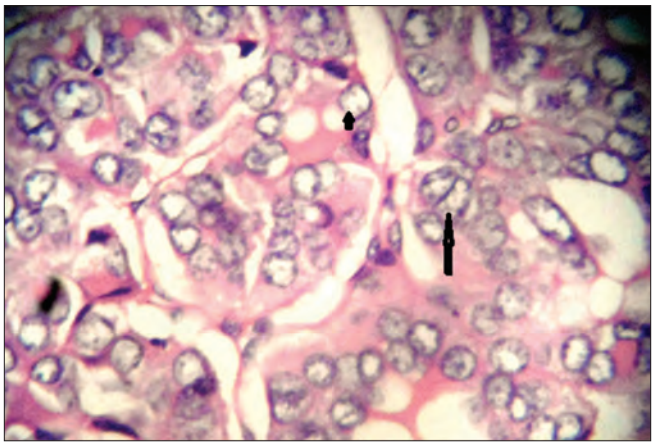

Figure 1: Photomicrograph showing papillary carcinoma with the classical nuclear features such as optically clear nuclei (short arrow) and nuclear grooving (long arrow) (H and E, ×400)

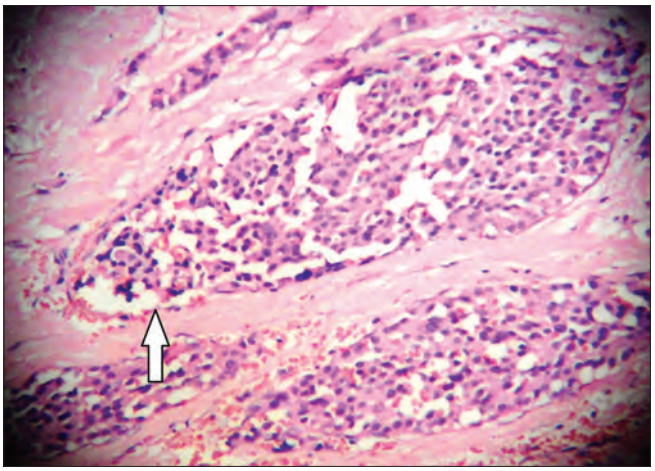

Figure 2: Photomicrograph of follicular carcinoma showing vascular invasion (arrow) (H and E, ×100)

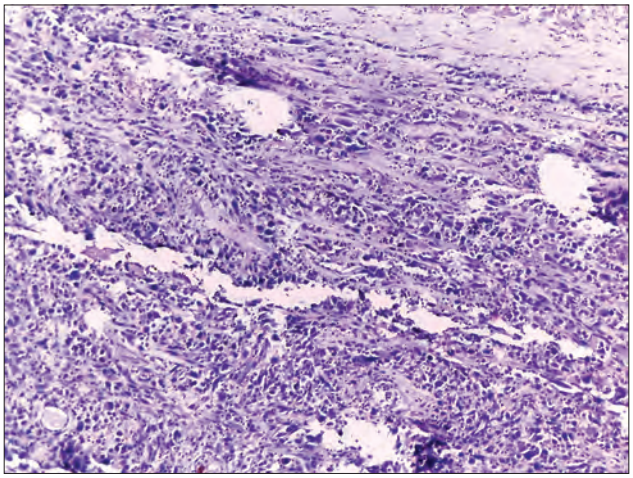

Figure 3: Photomicrograph of undifferentiated carcinoma showing plump spindle cells (H and E, ×100)

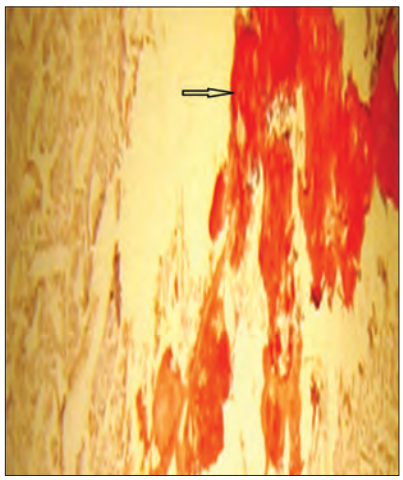

Figure 4: Photomicrograph showing amyloid (arrow) using Congo red, ×100

In 2001, data from cancer research in the United Kingdom showed 1200 new cases of thyroid cancers in England and Wales, with a reported annual incidence for the UK of 3.5/100,000 women and 1.3/100,000 men.[16]

Results from the review of trends of differentiated cancer from some West Africa tertiary centers, in the 1980s indicated a predominance of follicular cancer over papillary (35.8% vs. 27.3%) with a reversed predominance of papillary cancer over follicular type (35.7% vs. 24.8%) in the late 1990s to 2004 reflective of the changing iodine status of the continent as a result of widespread iodizing programs.[15]

Papillary carcinoma was the most common histologic variant, and the majority occurred in the third decade while the only two cases of follicular carcinoma were seen in the fifth decade with a female preponderance. The papillary carcinoma accounted for 71.4% of all the thyroid cancers. Similarly, Ariyibi and Duduyemi[4] in Ibadan also reported papillary carcinoma as the most common malignant thyroid neoplasm although with a lower rate (41.8%) followed by follicular carcinoma (32.7%). Ijomone *et al*.[5] reported 55% for papillary carcinoma and 30% for follicular carcinoma. Hussain *et al*.[17] in Karachi reported a rate of 77.9% for papillary carcinoma and 12.6% for follicular carcinoma similar to the findings in this study. Abdulkareem[11] in Basrah, Iraq, recorded (56.6% and 26%) while Bukhari and Sadiq[18] in Pakistan reported (90.2% and 2%) for papillary and follicular carcinoma, respectively. However, Edino *et al*.[19] in Kano, Lawal *et al*.[9] in Ile Ife, Olatoke *et al*.[2] in Ilorin, and Abebe and Osman[20] in Ethiopia reported follicular carcinoma as the most common thyroid cancer with rates varying from 44.4% to 92.9% and a female predominance. These contrasting findings may be attributed to the geographic influence of iodine deficiency and causal relationship with incidence of follicular carcinoma.[15] In the United States, papillary carcinoma is the most common thyroid neoplasm and accounts for 75%–85% of cases, followed by follicular carcinoma which accounts for (5%).[7] The global trend in the preponderance of papillary carcinoma over other thyroid carcinoma was demonstrated in our findings.

Solitary cases of medullary and undifferentiated carcinoma were seen in this study. Other studies from Nigeria, Ethiopia, Iraq, and Pakistan also confirmed these as uncommon tumors. The largest series were reported by Ariyibi and Duduyemi[4] and Bukhari and Sadiq[18] in Karachi, Pakistan while Nzegwu *et al*.,[10] Edino *et al*.,[19] Tsegaye and Ergete,[12] Ijomone *et al*.,[5] Lawal *et al*.,[9] Abdkareem *et al*.,[11] and Ahmed *et al*.[6] all reported 1–4 cases. The only case of medullary carcinoma seen in this study was in a 40-year-old female while that of undifferentiated carcinoma was seen in a 75-year-old male. The only case seen in Kano by Edino *et al*.[19] was exclusively in a male similar to the finding in this study.

Conclusion

Thyroid cancer in our locality is uncommon. It is also more common in females and occurs predominantly within the third to fifth decades of life. Furthermore, the most common histologic variant in this environment is the papillary variant of the malignancy.

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Conflicts of interest

There are no conflicts of interest.

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