

Thyroid Cancers amongst Goiter population in a Nigerian tertiary hospital: Surgical and Radiographic perspective

□¹ Rahman G A, *² Abdulkadir A Y, Braimoh K T, ² Inikori ARK .

¹Department of Surgery, ²Department of Radiology, University of Ilorin Teaching Hospital, Ilorin, Kwara State, Nigeria □¹ Currently at College of Medicine King Khalid University/ Asir Central Hospital, Abha, Kingdom of Saudi Arabia, ² Currently at Department of Radiology, Federal Medical Centre Gusau, Zamfara state, Nigeria

Abstract

Background: Goiters are commonly benign, but cases of malignancy can develop. Thyroid cancer is known to be commoner in whites than in blacks and in females than in males. Bone metastasis is a common occurrence and may be the initial manifestation in a small subset. We hope to determine the incidence and the cervical radiographic patterns of thyroid cancer amongst goiter population in Nigeria.

Method: Surgical, histological and radiographic findings in patients with goiter who had thyroidectomy in our hospital from 1999 to 2006 were reviewed. Those with proven cancer were analyzed for sex, age and radiographic changes using SPSS 11.0 for windows.

Results Thirteen (8.2%) cases out of the 160 goiters were malignant and distant metastases were present in 1.3% at presentation. The histological sub-types of malignant goiters were follicular (5.0%), papillary (1.9%) and poorly differentiated or anaplastic thyroid carcinoma (1.3%). As much as 30% of thyroid cancers demonstrated calcification on plain neck radiograph, which were commonly scattered or diffused.

Conclusions: Carcinomatous goiters occurred in 9.3% of the goiter population studied with predominance of follicular variant. Surgery remains the main stay but was inappropriate in about 1.2 % of population with goitre. Aside evidence of bony destruction, TC should be suspected in goiters with mixed (diffused or scattered) calcifications.

Key words: Neck radiograph, Goiter, Thyroid carcinoma, Thyroidectomy

Date Accepted for Publication: 10th January 2010

NigerJMed 2010: 432 - 435

Copyright©2010 Nigerian Journal of Medicine

Introduction

Approximately 5% of the population worldwide have goiters¹ and about 7 to 17% of cases are reported to be malignant^{2, 3}. Thyroid cancer (TC) is about the most

frequent carcinoma of the endocrine glands and it represents about 1% of human neoplasias with an estimated annual worldwide incidence of 0.5 to 10 per 100,000 populations¹⁻³. TC accounts for approximately 1% of new cancer diagnoses each year and such incidence is increased if cases of occult carcinoma are taken into consideration². Yearly, about 23,500 new cases of TC are diagnosed in the United States and about 900 new cases in England and Wales⁴. In Britain the annual incidence is 2.3 women and 0.9 men per 100,000 populations^{2,4}. In Nigeria tertiary Hospitals where TC have been reported to constitute 1-2% of malignant tumours⁵, the incidence of TC in thyroidectomy specimen is about 5- 12.5%⁶ unlike the 4-5%⁷ reported in the western world.

TC arises from the two cell types present in the thyroid gland. The endodermally derived follicular cell gives rise to papillary, follicular and probably anaplastic carcinomas. The neuroendocrine-derived calcitonin-producing C cell gives rise to medullary TC. Thyroid lymphomas arise from intrathyroid lymphoid tissue whereas sarcomas likely arise from connective tissue in the thyroid gland^{4,7}.

The most frequent presentation of TC is that of thyroid mass. Majority is otherwise symptomless. Sometimes patient may present with symptoms of distant metastasis. The diagnosis of TC is more commonly made at histology following excision surgery⁸⁻¹⁰.

This study is to determine the incidence and the cervical radiographic patterns of TC amongst goiter population in Nigeria.

Materials and Method

Thyroid cancers amongst goiter population in our Teaching Hospital from 1999 to 2006 were evaluated. Only thyroidectomy patients who had histological reports of the removed specimens and pre-surgery plain radiographs that include frontal neck, lateral neck,

thoracic inlet and frontal chest examinations in our centre were included in the study. Patients not operated because of distant metastases and local invasion were noted in our analyses. Evaluation was with respect to preoperative diagnosis, findings on roentgenography, operative procedure done and histological diagnosis. Data was analysed using SPSS 11.0 software.

Results

One hundred and sixty patients with goiter (81.5% female and 18.5% males) had surgical operation and histological diagnoses. Majority of who were in their 4th and 5th decade at presentation (Fig 1). Preoperative diagnoses were simple multinodular goiter, toxic goiter and malignant goitre in 74%, 20% and 6% respectively. Post-operative histology confirmed 8.1% (13/160) as TC. Consideration for the two patients with local invasion and distant metastasis at presentation who were inoperable but had histological confirmation gave an overall occurrence of malignancy of 9.3% (15/162). Both patients had skull metastasis (Fig. 2). Majority of our patients with TC presented between 5th and 6th decades of life. The histological sub-types of TC and its relations to sex and age is as shown in table I. There was no significant difference between genders within groups with respect to occurrence of malignancy (2/24, 8.3% in males; 11/136, 8.1% in females) as shown in table II.

Neck and thoracic inlet radiographic findings in patients with TC were soft tissue swelling in all, retrosternal extension of mass in 46%, normal cervical lordosis in 46%, cervical spine straightening in 54% and calcifications with predominance of mixed (diffused or scattered) and cloudy variants in 30% (Fig. 3). No patient with malignancy had kyphosis or scoliosis.

Ten patients with preoperative diagnosis of malignant goitre had total thyroidectomy and one had 'near' total thyroidectomy. Two patients diagnosed as simple multinodular goitre preoperatively were histologically confirmed to be malignant. One of these patients had subtotal thyroidectomy while the other patient had total lobectomy on one side and partial lobectomy of the other side (Table III). All patients who had total thyroidectomy had postoperative l-thyroxine replacement therapy while patients who had subtotal thyroidectomy were given l-thyroxine to suppress TSH production.

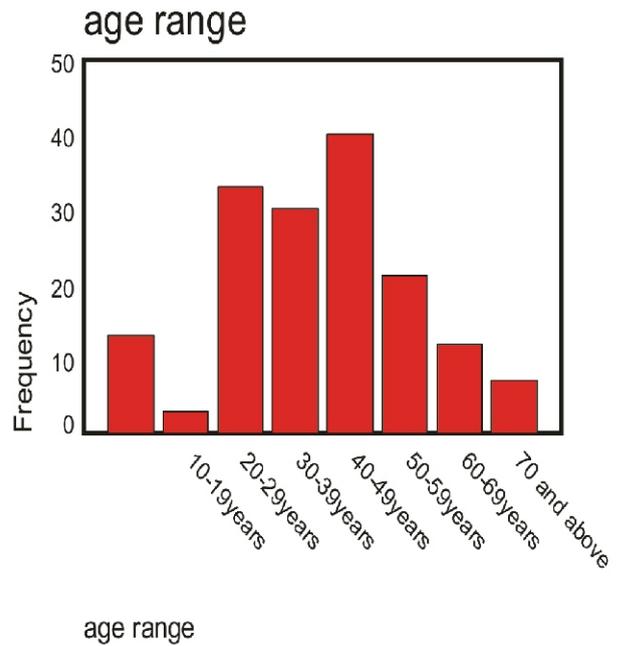


Fig 1: Age distribution of patients with Goiters

Table I: Histological Subtype of Goiters Related to Sex and Age

Histological Variance	Sex			Age Groups								Total
	Male	Female	Total	10-19 years	20-29 years	30-39 years	40-49 years	50-59 years	60 years Above	Unsure of Age		
Colloid Goitre	22	125	147	2	32	30	35	19	18	11	147	
Follicular Carcinoma	1	7	8	1	-	1	3	1	-	2	8	
Papillary Carcinoma	1	2	3	-	1	-	1	-	1	-	3	
Poorly Differentiated	-	2	2	-	-	-	1	1	-	-	2	
Total	24	136	160	3	33	31	40	21	19	13	160	

Table II: Gender Specific Incidences of patients Thyroid Malignancy

Gender	Malignancy	
	Frequency	Percentage
Male	2 [n=24]	8.3
Female	11 [n=136]	8.1
Total	13 [n=160]	8.1

Table III: Surgical operation for patients with Thyroid Cancer (n=13)

Operation	Follicular	Papillary	Poorly diff.	Total
Total Thyroidectomy	7	1	2	10
Near Total Thyroidectomy	-	1	-	1
Subtotal Thyroidectomy	1	-	-	1
Others	-	1	-	1
Total	8	3	2	13



Fig 2: Thyroid Malignancy with Skull Metastasis. Note the involvement of the paranasal sinuses (frontal, sphenoidal maxillary and mastoid).



Fig. 3: Thyroid Calcification in one of the patients with Thyroid Malignancy

Discussion

The commoner occurrence of TC in the 5th and 6th decade with predominance of the follicular type and 9.3% incidence of TC we recorded in this study were similar to the findings of Olurin et al⁶ and Adeniji et al¹¹. However, in contrast to their reports, we did not find significant statistical sex difference in the incidence of TC.

It has been postulated that populations with low dietary iodine intake have higher proportion of follicular and anaplastic carcinomas¹⁻⁷; this may explain our findings of predominantly follicular TC in this our study from goiters endemic zone.

Since the presentation of TC can be non-specific or symptomless, the affected individual may not suspect it leading to delayed diagnosis or diagnosis made at the time of distant metastases especially in the follicular TC type⁴⁻¹⁰. Two of our patients (1.3%) had distant bone metastases at presentation.

Thyroid calcification can occur in both benign and malignant goiters and is more common in multinodular than solitary thyroid nodules^{12,13}. Although calcifications in goiter do not necessarily suggest benignity or malignancy of the thyroid mass, the incidence was as high as 30% amongst patients with TC in this study. Thyroid calcification rate is reported to rise steadily with duration of thyroid swelling varying from 4% under one

year to 100% in patients with goitre with duration exceeding 15 years¹³. According to Komolafe report¹³, the longer the duration of goiter, the higher the chances of occurrence of haemorrhage, tissue necrosis or epithelial degeneration predisposing to dystrophic calcifications. Although Komolafe¹³ study did not relate calcification in goiters to TC our study showed most calcifications TC to be of mixed and cloudy types. Where calcifications were discrete in TC, they were commonly diffused or scattered.

Majority of patients with goitre in Nigeria as in this study have thyroidectomy performed for simple multinodular goitre mainly for cosmetic reasons. Some however, present with compression symptoms or hyperthyroidism.

The main stay treatment for TC is thyroidectomy^{5, 6, 14, 15} and was offered to all our patients except two due to local and regional metastases. Oncologists agree that surgery for thyroid carcinoma has no alternative^{14,15}. It is only the extent of surgery that is controversial. The extent of primary surgery should be dictated by stage of disease and prognostic factors. The aim of surgery in thyroid carcinoma is to eradicate all tumour foci, cure the most number of patients, reduce recurrence and mortality rate, and provide good quality of life¹¹. The advantages of total and 'near' total thyroidectomy offered to nearly all patients in this study are: lower recurrence rate, better survival, increased sensitivity of thyroglobulin as tumor marker, decreased indications for radio-iodine ablation, low complications rate when performed by experienced surgeon. 'Near' total thyroidectomy removes the affected lobe, isthmus and almost the entire opposite lobe except small amount of thyroid tissue. While in total thyroidectomy the whole thyroid gland, including pyramid lobe, is removed. L-thyroxin suppression is indicated in all patients with differentiated thyroid cancer even if less radical surgery is performed. After thyroidectomy all the patients had L-thyroxine either as replacement therapy or TSH suppression therapy.

Conclusion

Carcinomatous goiters are not uncommon in Nigeria with an occurrence of 9.3% in goiter population and predominance of follicular variant. Aside evidence of bony destruction, TC should be suspected in goiters with diffused or scattered calcifications. Surgery remains the main stay of treatment but late presentation can be a challenge in the management of these patients.

References

1. Do MY, Rhee Y, Kim DJ, Kim CS, Nam KH, Ahn CW, Cha BS, Kim KR, Lee HC, Park CS, Lim SK. Clinical features of bone metastases resulting from thyroid cancer: a review of 28 patients over a 20-year period. *Endocr J.* 2005; 52:701-7.
2. Gandolfi PP, Frioia A, Raffa M, Flavia R, Rocchetti O, Ruggeri C, Tombolini A. The incidence of Thyroid carcinoma in Multinodular Goitre: retrospective analysis. *Acta Bio Medica Ateneo Parmense* 2004; 75: 114-117.
3. GA Rahman, AY Abdulkadir, SA. Olatoke, IF Yusuf, KT Braimoh. Unusual Cutaneous Metastatic Follicular Thyroid Carcinoma. 2010; 2: 35-38. DOI: 10.4103/2006-8808.63724
4. Pramod K Sharma, Michael M John. Thyroid cancer. eMedicine www.emedicine.com/ent/topic646.htm
5. Thompson NW, Nisiyama RH, Harness JK. Thyroid Carcinoma, Current controversies. *Curr Surg Probl* 1978; 15: 11-20
6. Mandong BM, Madaki KJ, Mannaseh AN. Malignant diseases in Jos: A follow-up. *Annals of African Medicine* 2003; 2: 49-53
7. Olurin EO, Timeyin ED, Adenuga MO. Thyroid gland diseases in Ibadan A review. *West African Journal of Medicine* 1986; 5: 147-155.
8. Werk EEJ, Vernon BM, Gonzalez JJ, et al. Cancer in thyroid nodules, a community hospital survey. *Arch Intern Med* 1984; 144:474.
9. Belfiore A, Giuffreda D, La Rosa GL, et al. High frequency of cancer in cold thyroid nodules occurring at young age. *Acta Endocrinol* 1989; 121:197.
10. McCall A, Jarosz H, Lawrence AM, et al. The incidence of thyroid carcinoma in solitary cold nodule and in multinodular goiter. *Surgery* 1986; 100:1128.
11. Adeniji KA, Anjorin AS, Ogunsulire IA. Histological Pattern of Thyroid Diseases In A Nigerian Population. *Nig. Qt J Hospi Med* 1998; 8: 241-244.
12. Rahman GA, Abdulkadir AY, Braimoh KT. Thyroid calcification: radiographic patterns and histological significance. *Acta Med Acad.* 2008; 37:99-105.
13. Komolafe F. Radiological Pattern and Significance of Thyroid Calcification. *Clinical Radiology* 1981; 32: 571-575.
14. Dzodic R, Markovic I, Inic M, Milovanovic Z, Jovanovic N. Principles of surgery for thyroid carcinoma. *Archive of Oncology* 2003; 11: 175-7.
15. Zettinig G, Fueger BJ, Passler C, Kasserer K, Pirich C, Dudezak R, Niederle B (2002) Long-term follow-up of patients with bone metastases from differentiated thyroid carcinoma surgery or conventional therapy? *Clin Endocrinol* 56: 377-382.