

The frequency of carcinoma in solitary thyroid nodules and in multinodular goitres

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A retrospective study of all patients with goitre seen from 1988 to 1992 inclusive at the Muhimbili Medical Centre, Dar es Salaam was made to determine the frequency of malignancy in patients with solitary non-toxic thyroid nodule (STN) and in those with multinodular goitre (MNG). There were 60 cases of STN and 178 with MNG. Nodular goitre was found to be predominantly a disease of females with sex ratios of M:F;1:7 for the STN group and of M:F;1:13 in the MNG group. The final diagnosis in all cases was made by histology which found malignancy in 10% of STN and in 5% of MNG patients, a difference which was not statistically significant.

Patients in the 20-29 years age group with STN appeared to have an increased risk of malignancy when compared with the MNG group. No cause for this was discovered. The predominant malignancy in the STN group of patients was papillary carcinoma, while that in the MNG group was follicular carcinoma.

Introduction

Iodine deficiency disorders are endemic in Tanzania and large numbers of patients requiring surgery for goitre are referred to the Muhimbili Medical Centre

(MMC), Dar es Salaam (the major referral and teaching hospital for the country). Over 70% of patients with a goitre referred to our Department of Surgery have nodular lesions and these include both solitary nodules and multinodular goitres.

In the West, the risk of carcinoma in a solitary non-toxic thyroid nodule is reported to vary from as low as 10% to as high as 50%^{1,2,3,4}. This risk has also been found to vary according to the age and to the sex of the patients^{3,5,6,7}. Solitary "cold" thyroid nodules are therefore considered to be more likely to be malignant until proven otherwise⁸.

Until recently malignant change in multinodular goitre was considered uncommon and it was stated that carcinomas were not found in colloid nodules⁴. Recent studies have reported, however, that carcinoma may be present in from 5% to 48% of MNG removed for cosmesis^{4,8}. Nmadu et al, reporting from Nigeria, recommended that multinodular goitres should be considered as "pre-malignant" conditions⁸.

Moreover, the risk of malignancy in both STN and in MNG occurring in endemic goitre areas, is reported to be higher than in a control area³. When considering surgery in patients with goitre one of the major challenges is to select those patients with a high risk of malignancy. Several investigations

have been recommended to assess thyroid nodules and these include thyroid function, ultrasonography, radionuclide scans and needle cytology. Needle cytology is considered to be a precise diagnostic screening test for malignancy. However, for a satisfactory result, a representative specimen and an experienced cytologist are mandatory. While the diagnostic accuracy is high in papillary, medullary and anaplastic carcinoma, it is more difficult to recognise malignant change in follicular lesions. In a developing country where sophisticated technology and an experienced cytologist may not be readily available, the challenge of identifying patients with malignancy in nodular goitres is even greater.

The aim of this study was to determine the frequency of carcinoma in solitary nodules and multinodular goitres in our environment, and to help toward developing a rational approach for the management of patients with these lesions.

Patients and methods

A retrospective study of all patients aged above 10 years with a diagnosis of solitary thyroid nodule (STN) or multinodular goitre (MNG) seen at MMC from 1988 through 1992 was made. Patients with clinical or biochemical evidence of thyrotoxicosis and those with a previous history of head and/or neck irradiation for any reason were excluded from the study.

Details of the patient's age, sex, diagnosis, cytology results of fine needle aspirations and biopsy results of the resected thyroid specimen were obtained from the patients' case files, operation registers, histopathology records and the Cancer Registry records. A firm diagnosis of malignancy was only made by histology.

The statistical significance among different groups was determined using Fisher's Exact Test, as the numbers in each group were small.

Results

A total of 60 patients with a solitary thyroid nodule (STN) and 178 with multinodular goitres (MNG) were studied retrospectively. There were six

malignancies in the STN group (10%) and nine in the MNG group (5%).

The rates of malignancy in various age groups (Table I) shows the highest frequency (15.4%) of STN in the 20-29 year age group followed by 11.8% in the 30-39 year age group. Malignancy was found in only these two age groups among the 60 patients with STN.

In the MNG group, those between 50 and 59 years had the highest rate of malignancy (12%) followed closely by the 40-49 year olds with a rate of 10.3%. Six of the nine patients with a malignancy were in these two age groups.

TABLE I Frequency of malignancy in various age groups with nodular thyroid disease

Age (years)	Solitary Nodule Group			Multinodular Goitre Group		
	Malign. Cases	Total Cases	Malign. %	Malign. Cases	Total Cases	Malign. %
10 - 19	0	4	0	0	0	0
20 - 29	4	26	15.4	0	40	0
30 - 39	2	17	11.8	2	47	4.3
40 - 49	0	5	0	3	29	10.3
50 - 59	0	4	0	3	25	12.0
60+	0	0	0	0	11	0
Unspecified	0	4	0	1	19	5.3

Note: 43 out of the 60 cases with solitary nodule were aged 20-39 years.

There were very few males in either group, 8 in the STN group (13%) and 13 in the MNG group (7%), while the number of females was 52 (86%) and 165 (92%) respectively (Table II). Malignancy was found in 12.5% of males and 8.5% of females in the STN group. In the MNG group, malignancy was found in 7.7% of males and 4.8% of females.

TABLE II Frequency of malignancy in relation to the sex of the patients

Sex	Solitary Nodule Group			Multinodular Goitre Group		
	Malign. Cases	Total Cases	Malign. %	Malign. Cases	Total Cases	Malign. %
Male	1	8	12.5	1	13	7.7
Female	5	52	8.5	8	165	4.8
Total	6	60	10.0	9	178	5.0

1. Nodular goitre is predominantly a disease of females.

2. Overall frequency of malignancy in:

a. Solitary Thyroid Nodule = 10% (N=60)

b. Multinodular Goitre = 5% (N=178).

Four of the six cases with malignancy in the STN group had papillary carcinoma while the remaining two were follicular carcinomas (Table III). Six of the nine cases with malignancy in the MNG group had follicular carcinoma and the remaining three cases were papillary carcinomas. No other histological type of thyroid cancer was found in this study.

Table III Histological types of the malignant lesions

Nodule Group	Multinodular Goitre Group Number of Cases	Solitary Goitre Group Number of Cases
Papillary	4	3
Follicular	2	6
Anaplastic	0	0
Others	0	0
Total	6	9

Discussion

Solitary thyroid nodule (STN) is a disease of the young with the age group 20-39 years constituting 71.6% of all patients in this study and it affects females more than males (M:F;1:7). However, multinodular goitre (MNG) affects those aged 20-59 years and again there is a predominance of females (M:F;1:13). The incidence of carcinoma in STN was 10%. Other studies report similar results^{1,4,7} although there are some that record a much higher rate of up to 50%^{2,3}.

Among the patients with MNG, the frequency of malignancy was found to be 5%, which is a similar finding to that of McCall et al⁴. However, Nmadu, working in an endemic goitre area in Nigeria reported a much higher rate of malignancy among multinodular goitre cases in his series⁸. There was no statistically significant difference in the overall frequency of carcinoma in our patients with STN compared to those with MNG (p=0.145). Overall, the number of nodules in a goitre does not seem to be an important predictor of the risk of carcinoma.

Patients between 20 and 29 years formed the only age group of those with solitary nodules, in whom the frequency of malignancy was found to be significantly higher when compared to that of the same age group with MNG (p=0.020). The

frequency of malignancy among the MNG cases of any age group was found **not** to be significantly different when compared with the frequency of malignancy in other age groups.

The frequency of malignancy in STN among males (12.5%) was comparable to that in females (8.5%); a difference which was not significant (p=0.593). The difference between the frequency of malignancy in MNG in males (7.7%) and females (4.8%) was not significant either (p=0.502). Most studies have found that females develop solitary thyroid nodules more often than males although a nodule in a male is more likely to be malignant^{3,7}. This discrepancy may be attributed to the small number of the study population in this series. There was no statistically significant difference in the frequency of malignancy among males in STN group when compared with that of males in the MNG group or among females in the STN group when compared with females in the MNG group.

The higher frequency of malignancy in males with STN or MNG was not significant. Most studies have shown, however, that although females develop STN more frequently than males, the STN is more likely to be malignant in a male^{5,7}.

While papillary carcinoma was more frequent in the STN group, follicular carcinoma was more frequent among the MNG group. This pattern of distribution may be accounted for by the fact that, in endemic goitre areas, MNG is a condition affecting an older age group, while STN cases are sporadic and affect much younger members of the population.

A rational approach to management, essentially one that would help avoid unnecessary surgery on the majority of patients with benign disease, cannot be recommended on the basis of this study. However, while the diagnostic accuracy of fine needle aspiration cytology is over 90% for a papillary, medullary and anaplastic carcinoma, in follicular carcinoma it is only approximately 40%^{4,7}. Since the services of a trained and experienced cytologist may not always be available in developing countries, a surgeon undertaking exploration of a STN has to decide whether to do a total thyroidectomy or not

on the gross findings at operation. In MNG, re-operation would be essential if the extent of surgery is considered inadequate on the basis of the histopathology result.

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