Incidence of Thyroid Cancer among Surgically Treated Thyroid Diseases

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Abstract

Background : Thyroid disease is the commonest surgical endocrine disease, and carcinoma of thyroid is the most common endocrine malignancy, it occurs more often in people who live in areas with iodine deficiency like our country. There is a great controversy about the incidence of thyroid cancer.

Objectives: To document the incidence of thyroid cancer.

Methode: Over a 7 year period, from Sept 1997 to Aug 2004, a prospective study of 142 patients with thyroid disease underwent thyroid surgery in Hammad Shihab military hospital and Al-Kindy teaching hospital was carried out.

Results: The overall incidence of thyroid carcinoma was 8.45 %, and the incidence of malignancy in clinically solitary thyroid nodule (S.T.N.) was 12.5 %, while in cold nodule 14.95 %. Papillary carcinoma was the commonest type of carcinoma of thyroid, which represents 75 %. Incidence of cancer was higer in female than male, with male to female ratio(M : F) 1 : 1.4. The most commonly affected age group was between 3rd and 4th decades of life.

Conclusion: This study shows high incidence of malignancy in S.T.N., therefore patients with S.T.N. must be of great concern to the doctors.

الملخص

تمهيد : مرض الغدة الدرقية من أكثر أمراض الغدد الصماء التي تعالج جراحيا، و يعد سرطان الغدة الدرقية أكثر سرطانات الغدد الصماء شيوعا ، و غالبا ما يصيب سكان ألمناطق ألموصوفة بنقص اليود كما هو ألحال في بلادنا. هناك خلاف كبير حول نسبة ألاصابة بسرطان الغدة الدرقية.

ألاهداف : توثيق نسبة ألاصابة بسرطان الغدة الدرقية.

ألطرق : تمت ألدراسة بين أيلول 1997 و أب 2004 و شملت 142 مريض خضعوا لعمليات الغدة الدرقية في مستشفى حماد شهاب العسكري و مستشفى الكندي التعليمي

ألنتائج : نسبة الاصابة بسرطان الغدة الدرقية هي 8.45 % ، وان نسبتها في العقدة الاحادية البارزة هي 12.5% ، بينما كانت نسبتها في العقدة الباردة14.95% و وجد ان السرطان الاكثر شيوعا هو السرطان

الحليمي و كانت نسبته 75 %. وان نسبة الاصابة في الاناث تفوق نسبتها في الذكور (نسبة الذكور الى الاناث 1.4:1) ، وان الفئة العمرية بين العقد الثالث و الرابع هي الاكثر عرضة للاصابة بهذا المرض.

ألاستنتاجات : أظهرت هذه ألدراسة ان نسبة ألاصابة بسرطان الغدة الدرقية في ألعقد ألاحادية ألبارزة عالية و هذا يدعو لاهتمام ألاطباء ألبالغ في هذه ألحالات.

Introduction

Thyroid disease is the commonest surgical endocrine disease. Goitre is the most common condition presenting to the endocrine surgeon. It is a descriptive term rather than an actual condition, it refers to the enlargement of the thyroid, it can also be a localised lump or nodule, caused by a single thyroid nodule or cancer. The term multinodular goiter (M.N.G.) is used when many lumps have spread throught the gland. Most patients are euthyroid. (1) Iodine deficiency is the key cause of goitre. (2)

Most of the patients with goitre are a symptomatic and require no treatment. The incidence of functional lesions in thyroid is less than 2 %. (3) Thyroid surgery is performed for a variety of reasons: to treat hyperthyroidism, to remove a goiter that is unsightly or impinges on vital structures, or to treat thyroid cancer.

Thyroid nodules are common, with a reported prevalence of about 4-7%. (4) The prevalence is much higher in area of iodine deficiency like our country. The differential diagnosis of thyroid nodule includes benign lesions colloid or haemorrhagic cysts, Hashimotos' thyroiditis, adenoma, and malignant lesions. (5)

Iraq is an endemic goitre area (3 , 4) It is mentioned that thyroid carcinoma occurs more often in people who live in geographic areas with iodine deficiency.(6) The relative risk to develop malignancy in endemic area was 1.3 if the residence < 20 years and 1.6 in > 20 years especially with follicular and anaplastic carcinoma. Chronic T S H stimulation is held to predispose to neoplastic change. (7)

A nodule is more likely to be cancerous if it falls into certain risk factors:

1- Large nodules - over 4 cm are more likely to be cancerous than nodules less than 4cm.

2- Mens'nodules are more likely to be cancerous than womens'nodules.

3- Nodules in a person younger than 20 or older than 70.

4-History of external neck radiation during childhood.

5- Cold characterization**:** nodule does not absorb iodine or make thyroid hormone. (2)

Rapid tumour growth, or a family history of thyroid cancer increases the risk.(8) It is not always easy to exclude a carcinoma in a solitary thyroid nodule and multinodular goiter.(5) Ther is no screening test available to detect thyroid cancer, however, the most appropriate method of screening thyroid nodules for malignancy is fine needle aspiration cytology (F.N.A.C.).(9)

Carcinoma of thyroid is the most common endocrine malignancy.(10, 11) It occurs in both sexes, in any age group, but it most commonly affect women. There are four different types of thyroid cancer. The most common and slow growing type is papillary type, follicular carcinoma, medullary carcinoma (which tends to run in families), and anaplastic carcinoma which is less common but is faster growing, more aggressive and more malignant. (5) Other rare groups include: lymphoma and secondary metastases.

Surgery is the main treatment for thyroid cancer and the extent of surgery depends on the extent and type of the disease. (12, 13) Often the nearby lymph nodes in the neck are also removed.

Patients and Methods

142 patients with thyroid diseases admitted to the surgical department of two hospitals in Baghdad Hammad Shihab military hospital and AL-Kindy teaching hospital and underwent surgery, in the period between Sept 1997 and Aug 2004.

The clinical diagnosis is shown in table -1

Table -1 Clinical diagnosis

	No.	%
S.T.N.	80	56.3
M.N.G.	32	22.5
Diffuse goitre	21	14.78
Toxic goitre	9	6.33
Total	142	100%

Table-2 shows the single chief complaint of patients

Table – 2 The single chief complaint of patients

single chief complaint	No.	%
Swelling in the neck	79	55.6
Pressure symptoms	32	22.5
Pain	22	15.5
Tachycardia	5	3.5
Loss of weight	3	2.11
Cervical lymphadenopathy	1	0.7
Total	142	100%

Full history was taken especially history of exposure to radiation and family history of goitre and malignant diseases. Proper clinical examination especially of the neck had been performed.

Investigations were done, included: thyroid function tests (T3, T4, TSH) for all the patients, chest X-ray and X-ray of the neck for some patients (to evaluate trachea, chest and exclude retrosternal goitre). Thyroid scan and ultrasound of the neck were performed for patients who had S.T.N. indirect laryngoscopy was asked for some patients to asses vocal cord mobility. The definite diagnosis based on the histopathological results. F.N.A.C was done for 45 patients only.

The operations performed are shown in table-3

Table -3 Types of operations

Type	No.	%
Lobectomy	13	9.16
Lobectomy+isthmectomy	20	14.08
Subtotal thyroidectomy	89	62.68
Total,near total thyroidectomy	20	14.08

Total	142	100 %

Results

142 patients uderwent thyroidectomy, the vast majority of them from Baghdad city. No history of exposure to radiation and no family history of goitre or malignant diseases .Their ages range from 17 to 62 years, with a mean age (32.16) years. (Table- 4)

Table - 4 Distribution of types of goiter according to the age

Type.	17-20 yr	21-30 yr	31-40 yr	41-50 yr	51-60 yr	Over 60yr
S.T.N.	3	10	38	17	10	2
M.N.G	0	6	12	7	6	1
Diffuse goitre	2	3	11	3	2	0
Toxic goitre	o	2	3	3	1	0
Total	5 (3.52%)	21 (14.7%)	64 (45%)	30 (21.12%)	19 (13.38%)	3 (2.11%)

Females constitute (66.2 %) and males (33.8 %), M : F 1 : 1.95 , (table -5)

Table -5 Distribution of Types of goiter according to sex

Type	No.	Female	Male
S.T.N.	80	51 (63.7%)	29 (36.3%)
M.N.G.	32	22 (68.75%)	10 (31.25%)
Diffuse goitre	21	15 (71.42%)	6 (28.57%)
Toxic goitre	9	6 (66.6%)	3 (33.3%)

Total	142	94 (66.2 %)	48(33.8 %.)

12 patients proved to have thyroid cancer by histopathological examination, 10 of them presented with S.T.N., 1 patient presented with diffuse goitre, and 1 patient with M.N.G.

On thyroid scanning of patients with S.T.N. 67 (83.75 %) patients had cold nodule, 12 (15 %) patients had warm nodule, and 1 (0.7 %) patient had hot nodule.

10 (14.92%) patients (out of 67 patients with cold nodule) proved to have thyroid carcinoma by histopathological examination.

On thyroid ultrasonography of patients with S.T.N. 51(63.75 %) patients had solid nodule, 8 (15.6 %) of them proved malignant. And 29 (36.25 %) patients had cystic nodule, 2 (6.89 %) of them proved malignant.

7 (58.3 %) of malignant cases were female , and 5 (41.7%) were male with M : F

1 : 1.4

The histopathological types of carcinoma of thyroid are shown in table-6

Table-6 Histopathological types of carcinoma of thyroid

Type	No.	%
Papillary carcinoma	9	75
Follicular carcinoma	2	16.66
Anaplastic carcinoma	1	8.33

Out of 9 patients with papillary carcinoma 2 (22.22 %) patients had ipsilateral cervical lymphadenopathy, while 1 (50 %) patient with follicular carcinoma had bone metastases.

F.N.A.C. was performed on 45 patients with S.T.N. results are shown in table-7

Table-7 F.N.A.C. results

	No.	%
Benign	24	53.33
Malignant	2	4.45
Suspicious	19	42.22
Total	45	100%

Histopathological results showed, 1 from those labled benign proved malignant, and 2 from those labled suspicious were malignant

Discussion

Although thyroid cancer is the most frequent endocrine malignancy, (5) compared with carcinoma elsewhere in the body , is rare.(14)

It was reported that the overall incidence of surgery for thyroid disease in the female was almost 5 times that in male (14), our study showed that the incidence was lower (M : F was 1 : 1. 95), because most of our patients from Baghdad city, where the iodine content of Tigris river is low,(15) – Iraq is an endemic goiter area - (16, 17) and M : F reaches near unity in goitrous districts, (18) in addition to that most of the patients which consult military hospitals are male. Nevertheless our study showed female predominance, because goitrous women present due to cosmetic disfigurement more than goitrous men. It has been reported different figures for incidence of thyroid carcinoma.

In the present study the incidence of thyroid carcinoma was 8.45 %, which is less than that reported by AL-Saleem T, and AL- Ashbal in 1973 as 10 % of cases collected in Iraq ,(16) but higher than that reported by AL – Saleem T, AL – Hadithy in 1986 as 5.7 % of thyroid specimens which they studied(19), Barnouti HN 4.6 % (20) , and Knowlson in analysis of 771 of thyroidectomy specimen, reported the incidence of 4.2 % and Menon 5.3 %.(14) It is assumed that the geographical difference in the incidence of thyroid malignancy is more likely to be caused by environmental or dietary factors than by race or heredity.(21) From cancer registry reports, it seems to be that there is evidence of increased incidence in thyroid malignancy. (18)

The occurance of malignancy in clinically S.T.N. varies from different series, it may exist in 5 % (5) to as

many as 30 % (22). Our finding (12.5 %) is similar to that of Taylor S 12.6 % (14) and approximates that of Menon 11.5 % (14), but higher than that reported by Barnouti HN 7 % (20) as shown in table-8.

Table-8 Incidence of malignancy in clinically S.T.N.

	%
Taylor S	12.6
Menon	11.5
Barnouti HN	7
Our study	12.5

Regarding the incidence of malignancy in M.N.G. it is mentioned as (1%) (21), our study showed an incidence of 3 % which is higher than that mentioned above and higher than the lower limit mentioned by Silverberg and Vidone 1-22.9 % (14)

It is reported that 80 % of S.T.N. are cold on thyroid scaning (23), but Knudsen N et al and Ashcraft MW, Van Herle AJ found 85 % of S.T.N. are cold on thyroid scaning.(24, 25) Our result 83.75% represents nearly midway between these results. The reported incidence of cancer in cold nodules is highly variable, it is mentioned in Loy TJ et al study ranges from 8 % to 25 % (26). Our finding 14.95 % lies within this range and represents the upper limit mentioned by Mackenzie EJ et al 5 -15 % (12), but higher than the percentage reported by Werk EE Jr et al 10 % (27) and Wong CK et al, less than 8 % (4) (Table-9).

Table- 9 Incidence of malignancy in cold nodule

	%
Loy TJ et al	8-25
Mackenzie EJ et al	5-15
Werk EE Jr et al	10
Wong CK et al	less than 8
Our study	14.95

Since most nodules are cold and generally benign and some (5 %) functioning or "warm" swellings will be malignant, many centres have abandoned radionuclide scanning.(28) It is mentioned that over 30 % of clinically isolated swellings are cystic or partly cystic, (23) we found 36.25 % had cystic nodule on thyroid ultrasonography, which is nearly similar to that mentioned above, and 63.75 % had solid nodule. In this study 8 (15.6 %) patients with solid nodule proved malignant, and 2 (6.89 %) patients with cystic nodule were malignant, these results are in disagreement with the recent studies which suggest that the risk of carcinoma is similar in both solid and cystic nodules, or higher in cystic nodules.(29)

In the present study the incidence of papillary carcinoma was 75 %, which is similar to that obtained by Mazaferri (30) but less than that mentioned by Barnouti HN 80 % (20), and higher than that reported by AL- Hamdani AK et al 62.54% (19). The second most common was follicular carcinoma 16.66 % , which is nearly similar to that mentioned by AL- Hamdani AK et al 17.42% (19) but higher than that mentioned by Mazaferri 10 % (30) Then anaplastic carcinoma 8.33 % which is less than that reported by AL-Hamdani AK et al 11.96% , (19) and higher than the results of Mazaferri and Mackenzie as 5 % (30,12). (Table-10)

Table-10 Different incidences of of different histopathological types of carcinoma of thyroid

	Papillary	Follicular	Anaplastic
Mazaferri	75 %	10 %	5 %
AL- Hamdani	62.54%	17.42%	11.96%
Barnouti HN	80%		
Mackenzie EJ			5 %
Our study	75 %	16.66 %	8.33 %

With regard to metastases, it is mentioned that nodal metastases in papillary carcinoma is 34% and distant metastases in follicular carcinoma is 75 %. (23). Mackenzie E J, Mortimer R.H found nodal metastases in papillary carcinoma as 5 – 20 % , (12) Although our findings differ from the above mentioned results, 22.22% nodal metastases in papillary

carcinoma and 50% distant metastases in follicular carcinoma, they are in agreement that spread in papillary carcinoma mainly to cervical lymph nodes and in follicular carcinoma mainly extranodal.

Regarding the sex ratio in thyroid carcinoma, it is mentioned that the sex ratio is 3 females to I male.(19 , 23), we found M **:** F was 1 **:** 1**.**4 which is in disagreement with that mentioned above. Hegedüs L et al found thyroid carcinoma is nearly equal in men and women(31) which differs from our finding. The difference in sex incidence had been thought to be due to the specific binding sites for estrogen that are detectable in all thyroid tissue and neoplasm arising from thyroid tissue. (32)(Table-11)

Table -11 Distribution of different histopathological types of thyroid carcinoma according to the sex of patients.

Type	No.	%	Female	Male
Papillary	9	75	5 (55**.**5%)	4 (44**.**5%)
Follicular	2	16.66	1 (50%)	1 (50%)
Anaplastic	1	9.33	1 (100 %)	0
Total	12	100%	7 (58**.**3)	5(41**.**7)

Regarding the age, our study showed the preponderance of malignant patients (41.66%) were between 3rd and 4th decades of life, which is in disagreement with AL – Hamdani et al study which mentioned that most commonly affected age group was 21 – 40 years.(19) as shown in table -12

Table-12 Distribution of different histopathological types of thyroid carcinoma according to the age of the patients

Type	21 – 30 yr	31 – 40 yr	41 – 50 yr	51 – 60 yr	Total
Papillary	3	5	1	0	9(75%)
Follicular	0	0	1	1	2(16.66%)
Anaplastic	0	0	0	1	1(8.33%)
Total	3(25 %)	5(41.66%)	2(16.66%)	2(16.66%)	12(100%)

In our study F.N.A.C. results were deficient, they involved small numbers, they can not be extrapolated with confidence to other results, it needs further studies.

Conclusion

1 - This study shows high incidence of malignancy in S.T.N., therefore it is of

the utmost importance that a patient with S.T.N. should be investigated accurately to elicit the true nature of it.

2- History taking, physical examination, measurement of the serum TSH level, and FNAC. are essential for the diagnostic evaluation of S.T.N.

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