

Pattern of Thyroid Diseases - A Histopathological Study

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Objective: The aim of this study is to describe the clinicopathological findings of thyroidectomy specimens.

Setting: Bahrain Defence Force Royal Medical Services Hospital – Bahrain.

Design: Retrospective Study.

Method: This is a study of all cases of thyroidectomy specimens diagnosed from January 2000 to December 2004; all histology reports, clinical information and stained slides were reviewed. Thyroid diseases were grouped into different categories according to gender and age distribution.

Result: One hundred and ten cases of thyroidectomy specimens were found, 84 females and 26 males with female: male ratio 3.2:1. Fifty cases (45.5%) of Nodular goiter were seen, it was the most common thyroid disease followed by malignancy 26 (24%), follicular adenoma 17 (15.5%), primary thyrotoxicosis 9 (8%) and Hashimoto's thyroiditis 8 (7%). Age range for colloid goiter was 19-67, malignancy 21-82, follicular adenoma 20-69, primary thyrotoxicosis 20-42 and Hashimoto's thyroiditis 20-56. Colloid goiter had a peak at age group 31-40 years. Papillary carcinoma was the commonest malignant thyroid tumour (25 cases). All cases of Hashimoto's thyroiditis were females (100%). Primary thyrotoxicosis was the only thyroid disease with male: female ratio 2:1.

Conclusion: In this study, Thyroid malignancy accounted for 24% of patients with thyroid swelling who underwent surgery. Identification of thyroid malignancy requires proper diagnostic tools including ultrasonography, reliable FNAC technique and proper pathological examination.

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Thyroid nodules are common in clinical practice and they occur in 4-7% of the population, but this percentage may increase on ultrasonography¹. Thyroid nodules are four times more in females than in males and can be caused by a variety of thyroid disorders^{1,2}.

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Most of the nodules are benign, and only 5% are considered to be malignant^{2,3}. Nodular goiter is the most common cause of thyroid swelling and can occur as a result of an endemic goiter due to iodine deficiency in the soil, water or food. Sporadic nodules may be caused by a variety of conditions, most of them are benign in nature, but still can simulate malignancy clinically or radiologically. Utilization of fine needle aspiration cytology (FNAC) in euthyroid patients with a suspicious nodule is believed to be an effective technique for distinguishing benign from malignant thyroid nodules. The sensitivity and specificity of FNAC approaches 75% and 100% respectively, depending on the experience of the physician performing the aspiration and the skills of the cytopathologist interpreting the smears^{2,4,5}. The main indications of surgical removal of thyroid nodules are malignancy, family history of thyroid cancer or suspicious clinical findings, such as, solitary nodule in a male patient.

The aim of this study is to describe the clinicopathological findings of thyroidectomy specimens removed during 2000-2004.

METHOD

Between January 2000 and December 2004, 110 patients underwent thyroidectomy in the hospital. The decision to operate on such patients was based on clinical, radiologic and laboratory tests. Many patients but not all had a blind or ultrasound guided fine needle aspiration cytology and ultrasonographic scan examinations before their surgery. Thyroidectomies have been indicated to relieve compression symptoms, cosmetic reason, suspicious solitary nodule, or following failure of medical treatment in thyrotoxicosis. The operative procedure for simple goiter and thyrotoxicosis was subtotal thyroidectomy, lobectomy for solitary nodule, and total thyroidectomy with excision of enlarged lymph node for carcinoma.

All thyroidectomy specimens were re-examined by two pathologists to confirm the original diagnosis. All specimens' sections were stained with hematoxylin and eosin. Additional special stains were used when needed. The histopathology findings were classified into six groups: Nodular goiter, thyroiditis, benign tumours (follicular adenomas), malignant tumours, Primary thyrotoxicosis, and others.

Strict morphologic diagnostic criteria were used for the above grouping; Nodular goiter was considered as thyroid tissue with colloid or multinodular growth pattern and with absence of malignancy. The thyroiditis group included Hashimoto's disease, subacute granulomatous (De Quervain's) and Riedel's thyroiditis. True Follicular adenoma was considered only for a solitary, encapsulated lesion that was well demarcated from the surrounding thyroid parenchyma, producing compression effect on the adjacent thyroid parenchyma, and lack evidence of capsular and/or vascular invasion.

Thyroid carcinoma was classified into four main types; papillary, follicular, medullary and anaplastic. Papillary carcinoma has characteristic nuclear histologic features, which was considered essential for the diagnosis. The clinical history is very important in diagnosing primary thyrotoxicosis, along with microscopic examination.

RESULT

One hundred and ten thyroidectomy specimens were reviewed. The age and sex distribution of patients is shown in tables 1 and 2. Eighty-four cases were females and 26 cases were males, the ratio was 3.2:1. Table 1 shows the different thyroid diseases, nodular goiter is the commonest, 50 cases (45.5%), followed by malignant tumours 26 cases (24%), follicular adenoma 17 cases (15.5%), primary thyrotoxicosis 9 cases (8%) and Hashimoto's thyroiditis 8 cases (7%). Papillary carcinoma was the commonest malignant tumour in this study (26 cases), 19 cases were females and 7 were males. Most follicular adenomas were in females (14 cases), female: male ratio is 4.6:1. Eight cases of Hashimoto's thyroiditis were found in females (100%), the age ranged between 20-56 years and the mean age was 42. In primary thyrotoxicosis, there were 6 males and 3 females, male: female ratio is 2:1. Table 2 shows the age range and gender distribution of different types of thyroid diseases diagnosed during this study. The age ranged between 19-82 years in females and 21-69 years in males. The mean age of nodular goiter was 38 years in females and 48 years in males. Thyroid cancer was found in ages 21-82 years; females presented 10 years younger than males. Follicular adenoma presented at an earlier age in females than males, the mean age was 36 years in female and 52 years in males. In primary thyrotoxicosis, the mean age was 26 years in females and 32 years in males. Table 3 shows the frequency of presentation of colloid goiter in different age groups, 35 cases were found in 21-50. This study did not reveal other findings as described in category group 7.

Table 1: Shows the range and mean age of each type of the thyroid disease with regard to the gender.

Type of Thyroid disease	Range of the age	Mean age
Nodular goiter	F 19- 67	38
	M 35- 55	48
Thyroid malignancy	F 21- 82	44
	M 31- 69	47
Follicular adenoma	F 20- 49	36
	M 32- 69	52
Primary thyrotoxicosis	F 20- 33	26
	M 21- 42	32
Hashimoto's thyroiditis	F 20- 56	42
	M 0	0

Table 2: Shows the total number of different types of thyroid diseases diagnosed during 2000-2004 with sex distribution of each type.

Thyroid disease	Number of Patients	female	Male
Nodular goiter	50 (45.5%)	40	10
Malignancy	26 (24%)	18	8
Follicular adenoma	17 (15.5%)	14	3
Primary thyrotoxicosis	9 (8%)	3	6
Hashimoto's thyroiditis	8 (7%)	8	0
TOTAL	110 (100%)	84	26

Table 3: Note that most of the cases of colloid goiter in females were between 21-50 year old with the peak at 31-40.

Age group (years)	Number of colloid goiter cases
< 20	1
21 – 30	10
31 – 40	15
41 – 50	10
51 – 60	2
61 - 70	3
TOTAL	41

DISCUSSION

Diseases of the thyroid are of great importance because most are amenable to medical or surgical management. It is known that approximately 1-10 % of adults in the USA are reported to have solitary nodules¹. This incidence is even significantly higher in endemic goitrous regions. Single nodules are about four times more common in women than in men and this incidence increases throughout life. In fact, benign neoplasms outnumber thyroid carcinomas by a ratio of nearly 10:1^{1,6}. Overall, the incidence of thyroid malignancy is low, forming 0.5-1.0% of all cancers and 3.3-17% of all thyroid diseases¹. Carcinomas of the thyroid are thus uncommon, accounting for less than 1% of solitary thyroid nodules and representing about 15,000 new cancer cases in North America each year¹⁻³. Moreover, most thyroid cancers are indolent, permitting 90% survival at 20 years.

Thyroidectomy specimens in this study formed approximately 2% of all surgical pathology load received at the department of pathology during the study period. Therefore it is not uncommon and much concordant with most pathology practice in North America and Europe^{2,3,6}.

In this study, nodular goiter accounted for 45.5% (50 cases) forming the most common pathologic presentation, despite the fact that Bahrain population has a good constant access to dietary iodine mainly from seafood products and consumption of iodide salt. The lower frequency in this study compared to other studies might be explained by the reliable pre-operation FNAC and ultrasonographic aid that save many patients from the surgeon's scalpel. There are no available data in Bahrain to date about the incidence of nodular goiter. Endemicity of goiter is defined when 10% of the population are affected^{7,8}. Sporadic nodular goiter is the most common type seen in this country; its pathogenesis remains unknown, and combination of mild dietary deficiency of iodine, slight impairment of hormone synthesis, increased iodide clearance by the kidneys, presence of thyroid-stimulating immunoglobulins, and increased production of insulin-like growth factor I; all are considered likely underlying risk factors.

In 2002 and according to the age standardized incidence rate per 100,000, thyroid cancer in males formed 0.0, 1.5 and 3.4 in Bahrain, Saudia, and Kuwait and for females was 6.4 and 4.6 and 7.4 respectively. At that time, thyroid cancer was the

fourth most common cancer in Bahraini females forming 6.2% (10 cases) of all registered malignant diseases⁹.

Thyroid malignancy is represented exclusively in this study by papillary carcinoma only. Despite this observation, it still ranks the second most common presentation as a solitary nodule, forming 24% (26 cases); females were affected twice compared to males. The overall frequency of carcinoma in this study was 24%, which is almost 10 times higher than the 4.25% in Birmingham series and similar data from other general hospitals^{6,9-11}. No other types of thyroid cancer were diagnosed during this study reflecting the rare reported incidence of other thyroid cancer which in general forms less than 1% of all thyroid diseases. The alarming fact is the higher frequency of papillary carcinoma in Bahrain that needs further investigation. Dietary factors may play a role, however, exposure to low doses of diagnostic irradiation or following exposure to radioactive substances still needs to be ruled out. As in most reported cases of papillary carcinoma, this study has shown a similar sex distribution where females are affected more than males; likewise, the wide age distribution was almost identical to other studies. It is known that papillary carcinoma is the predominant type in areas without iodine deficiency, and its frequency is said to increase in regions with high iodine uptake, unlike most series that have shown a statistical correlation between iodine deficiency and an increased incidence of thyroid carcinoma of both follicular and undifferentiated types. Whether the introduction of iodized salt actually results in a decrease in the incidence of thyroid cancer in these areas remains controversial.

In this study, several cases were diagnosed in patients over 60 years where the prognosis was less favorable. No case of Follicular Carcinoma was seen in this study. The incidence of follicular carcinoma is increased in areas of dietary iodine deficiency, suggesting that in some cases, nodular goiter may predispose to the development of the neoplasm.

Benign adenomas (using strict diagnostic criteria) form 15.5% (17 cases). This disease has shown similar worldwide clinical presentation of middle age patients and female predominance. Several morphologic growth patterns were found; however, it is well known that they do not have significant clinical implications.

Primary thyrotoxicosis accounted for 8% (9 cases) in this study with a male to female ratio of 2:1. Increased frequency of Grave's disease occurs among family members of affected patients, but this cannot explain the high occurrence in males in this study.

All autoimmune thyroiditis patients 8 cases (7%) were young or middle-aged females. Most reported cases of localized 'nodular' (clinically suspicious) autoimmune thyroiditis showed similar findings to our data with female predominance of 10:1 or 20:1¹². The low percentage in this study is still considered high when compared to other resected specimens from many other reported studies that show an average of 2.9%.

CONCLUSION

In this study, thyroid malignancy accounted for 24% of all patients presenting with thyroid swelling who underwent surgery. A high frequency of papillary carcinoma was found including several cases, which were diagnosed in patients over 60 years of age where the prognosis is less favorable.

Identification of thyroid malignancy requires proper diagnostic tools, including ultrasonography, reliable FNAC technique and proper pathological examination. In experienced hand, pre-operative FNAC diagnosis plays a crucial role in the diagnosis of thyroid nodules and enables the number of surgical operations to be reduced.

Combined multicentric studies are needed to investigate the national patterns of thyroid diseases in Bahrain.

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