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Thyroid Lesions a Clinicopathological Study

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ABSTRACT

Over eleven months period from October 2003 until September 2004, (200) patients with surgically treated thyroid disease in Mosul city were collected. The patients were examined clinically , and the biopsies examined histologically.

There were 170 females and 30 males and the female to male ratio was 5.6:1 .The age ranged between 14 and 75 years, with a mean of 36.4 years. The peak age incidence was at 3rd and 4th decades. Seventy percent of the patients were urban and the rest were rural areas.

On clinical examination 57% had multinodular goiter ,11.5% had diffuse enlargement and 31.5% presented with single nodule. Among the single nodules, 66.6% were right sided, 31.7% left sided, and 1.5% had single nodule in the isthmus.

Ultrasound examination was performed on 50 patients and revealed 26% cystic ,66% solid , and 8% mixed echogenicity.

On histopathological examination there were 52% non toxic nodular goiter, 17.5% toxic nodular goiter, 11% thyroiditis, 8% adenoma, and 11.5% thyroid malignancy. Papillary carcinoma formed 78.2%, of all malignant lesions, follicular carcinoma formed 17.4%, and medullary carcinoma constitute 4.3% of malignant lesions.

FNAC was done for 84 patients; 69 of them were benign and 8 were malignant with 2 false positive and one false negative. The sensitivity, specificity, and accuracy was; 88.8% , 97.1% , 96.2% , respectively.

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Introduction:

The thyroid gland located below and anterior to the larynx , consist of two bulky lateral lobes connected by thin isthmus, the gland divided by thin fibrous septae in to lobules composed of about 20-40 follicles , lined by cuboidal to low columnar epithelium, and filled with thyroglobulin[1] .

Diseases of thyroid glands including conditions associated with disturbed thyroid functions ,inflammations, and mass lesions (benign and malignant).[1]

Several tests used to evaluate thyroid gland including blood tests ,imaging techniques , and cytohistological examinations .[2]

FNA of the thyroid is a first line procedure that is fully accepted in the diagnostic workup of patients in conjunction with more traditional methods. It is the most popular preoperative investigation to identify malignant thyroid nodule with a good sensitivity and specificity[3,4,5,6]. FNA is a simple, inexpensive and quick procedure which can be repeated with minimal risk of complications[3,7].

Aims of the study

The aims of the study are :

1-To identifiy thyroid lesions in relation to age ,and sex distribution.

2- To assess the reliability of FNAC in thyroid diseases.

3- To compare our results with other studies.

Subjects and Methods

Subjects:

The study was carried out on a series of 200 patients over a period of eleven months from October 2003 to September 2004 . Most of the patients presented with palpable thyroid nodules, the size and consistency of each nodule was evaluated. Ultrasound was done for 50 patients. FNAC was performed on 84 patients.

Methods:

The samples of FNAC are interpreted as :

1-Inadequate (Insufficient)

2-Benign

3-Suspicious (Indeterminate)

4-Malignant

Biopsies from 200 patients were received, weighed, gross appearances for size, nodularity and consistency were described.

The microscopical features of the biopsies were analyzed for the shape and size of follicular cells and for colloid content, any papillary configuration,Hurthle cells, vascular or capsular invasion, nuclear changes, psammoma bodies, fibrosis, calcification, ossification, cyst and lymphocytic infiltration.

Results

200 cases with thyroid gland swelling were analysed .There were 170 females (85%) and 30 males (15%). The female to male ratio was

5.6 : 1. The age ranged between 14 and 75 years with a mean of 36.4 years . The peak age incidence was at 3rd and 4th decades. The duration of complaint ranged between two months and 20 years with an avarage of 4.9 years,with a maximum between (1-5) years. 70% of the patients was from urban and the rest was from rural areas. History of previous thyroidectomy was reported in 4 cases (2%) only . The chief complaint was swelling in 57% of the patients, swelling with dyspnoea in 24.5%, swelling with dyspnoea and dysphagia in 11%, and swelling with dysphagia in 7.5% .

On clinical examination, 114 patients (57%) had multinodular goiter, 23 patients (11.5%) had diffuse enlargement of the gland and 63 patients (31.5%) had a single nodule . Among the single nodules, 42 patients (66.6%) were right sided, 20 patients (31.7%) left sided and one patient (1.5%) had a single nodule in the isthmus. The single nodules histologically classified are shown in (Table 1). The weight of the biopsies ranged between (10-210) gms with a mean of 60.6 gms.

Ultrasound examination was done for 50 patients . The results were compared with the histopathological findings. Thirteen (26%) cystic lesions were reported and proved to be simple cyst , of them there were 5 cases proved to be follicular adenoma , 6 cases were

colloid nodules with areas of cystic degeneration , one case associated with hyperplastic nodule and one case with thyroiditis. Of the 33 cases (66%) with solid nodules, there were 20 cases colloid nodules , 5 cases thyroiditis , 5 cases with toxic nodules , one case adenoma and 2 cases proved to be papillary carcinoma. Mixed echogenicity was reported in 4 cases (8%) , 2 of them were thyroiditis, one case was colloid nodule and one was toxic nodule . The results of different histopathological study in relation to age , sex distribution and frequency of 200 cases are summarized in (Table 2 and 3).

FNAC was done for 84 patients who had nodular lesions. Inadequate specimens were reported in 5 cases , 8 cases were diagnosed as malignant by FNAC and by histopathology, 2 cases were diagnosed as suspicious for malignancy by FNAC and proved to be benign by histopathology. 69 cases were diagnosed as benign by FNAC ,of these ; 68 cases were diagnosed as benign by histopathology , and one case proved to be malignant (Table 4).

Sesitivity , specificity , and accuracy rates can be calculated as follow :

Sensitivity = (TP / TP +FN) × 100 = (8 / 8+1) ×100 = 88.8%

Specificity = (TN / TN+FP) × 100 = (68 / 68+2) × 100 = 97.1%

Accuracy = (TP + TN / TP + FN + TN + FP) ×100 = (8 +68 / 8 + 1 + 68 + 2) ×100 = 96.2 %

(Table 1)

Histological classification diagnosed clinically as solitary nodule.

Histological diagnosis	Number of cases	%
MNG	30	47. 6
Cyst	6	9. 5
Thyroiditis	4	3. 6
Adenoma	10	15. 8
Toxic nodule	6	9. 5
P.C	5	7. 9
F.C	2	3.1
Total	63	100

(Table 2)

Age distribution of 200 cases of different histopathological group

	ge(Year)						
Pathological Type	**0-10**	**11-20**	**21-30**	**31-40**	**41-50**	**51-60**	**61-70**
Colloid Goiter	**0**	**3**	**35**	**30**	**26**	**8**	**2**
Toxic Goiter	**0**	**4**	**15**	**11**	**4**	**1**	**0**
Thyroiditis	**0**	**1**	**10**	**5**	**5**	**1**	**0**
Adenoma	**0**	**0**	**8**	**4**	**2**	**2**	**0**
Carcinoma	**0**	**3**	**4**	**6**	**5**	**3**	**2**

(Table 3)

Pathological types , sex and frequency of 200 cases.

Pathological type	**Female**	**Male**	**Total**	**%**	**F:M**
N.T.C.C	**95**	**9**	**104**	**52**	**10. 5:1**
Toxic	**25**	**10**	**35**	**17. 5**	**2. 5:1**
Thyroiditis					
Hashimoto Th.	**12**	**1**	**22**	**11**	**21:1**
Lymphocytic Th.	**9**	**---**			
Adenoma					
Follicular Ad	**14**	**2**	**16**	**8**	**7:1**
Carcinoma					
P.C	**12**	**6**	**23**	**11. 5**	**1. 8:1**
F.C	**2**	**2**			
M.C	**1**	**---**			

(Table 4)

Accuracy of FNAC in 84 swelling

FNAC Diagnosis	No.	Histopathological result				
		Colloid Goiter	Thyroiditis	Toxic	Adenoma	Ca.
Benign	69	43	8	9	8	1 (FN)
Suspicious	2	---	---	1	1	--- (FP)
Malignant	8	---	---	---	---	8 (TP)
Unsatisfactory	5	2	---	1	2	---
Total	84	45	8	11	11	9

Discussion

Thyroiditis:

Thyroiditis formed 11% of total patients . The age ranged between 20-54 years with a mean of 34 years. and female to male ratio of 21: 1 which is nearly the same result reported by Malsween[8] .

There were 13 cases of Hashimoto's Thyroiditis (12 females and one male) with a mean age of 33.7 years. Kumar[9] in India reported that 74.5% of patients with Hashimoto's thyroiditis were below 30 years of age.Of the total number of Hashimoto's thyroiditis there were 4 cases

(30%) presented with a single nodule, and 9 cases (70 %) presented with a diffuse enlargement. This result is comparable to the result of Kumar[9] who reported a diffuse swelling in 81% and a single nodule in 18 % of all cases of Hashimoto's thyroiditis .

Frequency of thyroiditis in different series in comparison with current study.

(Table 5)

series	frequency
Priya[10]	12.5%
Arvind[11]	8.8%
Venkates[12]	8%

Magdalene[13]	**7.1%**
Current study	**11%**

Nodular colloid goiter :

It is well known that this type of lesion is the most common thyroid lesion which is found in endemic areas. In this study it forms 52 % of the total thyroid lesions; it is comparable to the results reported in India by Bapat[14] of 57.7 % ,Rout [15] which reported 48.9 % , Magdalene[13] which reported 42% and Tadele[16] which reported 59.8% .

The age ranged between 18 – 75 years with a mean of 38 years; the female to male ratio was 10.5 : 1, Al Tameem [17] in Saudi Arabia reported a mean age of 37 years . High female to male ratio may be due to a high demand for iodine in females during puberty,pregnancy, lactation, and for cosmetic reason which brings the females to treat goiter more than male.

Solitary thyroid nodule:

There were 63 cases (31.5 %) of the total number presented with a palpable solitary thyroid nodule. Most of the patients presented with no symptoms other than swelling in the neck. Few patients presented either by a sudden increase in the size of the nodule or with a large nodule which causes neck discomfort.

Bapat[14] reported a percentage of 39.5% of his total number of 334 cases which presented as a single thyroid nodule, which is comparable with the result of the current study.

The age ranged between (18-75) years with a mean of 36.7 years, which is less than the age reported by Wadstrom et al.[18]of 47 years. This may be due to an earliest presentation of solitary nodule in our country.

The female to male ratio was 5.3: 1. Mazzaffari[19] reported that single nodules are 4 times more common in women than in men , while Hegedus [20] reported a female to male ratio of 6.6:1

On histological examination of the solitary nodules ; the following results are compared with the literature:

Colloid nodule reported in 47.6% which

is comparable to the results of Das et al. [21] in Bangladesh. And within the range reported by Mazzaffari [19] of 42-77 %.

Cystic nodule in the current study forms 9.5 % which is comparable with the result reported by Abdullah[22] which was 11% but lower than the results of Das et al.[21]who reported a percentage of 26% and also lower than the range reported by Mazzaffari [19] which was 15-25 % . Follicular adenoma in this series is 15.8 % which is within the range of Mazzaffari [19]who reported a range of 15-40 %, but lower than that reported by Das et al. [21] which was 23% , Abdullah[22] and Samir[23] who reported 26% and 22% respectively

The incidence of malignancy in solitary thyroid nodule in this study is 11.1 % which is comparable to the rate reported by Mazzaffari [19] of 8-17 %.

Toxic goiter

Thirty five cases of toxic goiter were reported in this study forming a percentage of 17.5% of total cases. There were 25 females and 10 males with a ratio of 2.5:1, Bapat [14] reported a percentage of 14.6% of the total cases who had toxic goiter.

The age of the patients was ranged between (14-51) years with a mean of 31.3 years. Al Tameem [17] reported a mean age of 31 years.

Adenoma:

Sixteen cases in this study were diagnosed as adenoma which form 8% of all thyroid lesions, which is comparable to the results of Bapat [14] who reported a percentage of 6.29 % and with Magdalene[13] who reported 7.5% , but lower than Arvind[11] who reported 12.5% and Al Mohareb[24] in Saudi Arabia ,who reported 12.2% .

The age of the patients ranged between (21-56) years, with a mean of 35.2 years, and female to male ratio of 7 : 1 which is comparable with the study of Al- Tameem [17] .

Malignant lesions:

Thyroid cancer was microscopically diagnosed in 23 cases with a frequency of 11.5 % of all thyroid lesions.

Mori et al. [25] in Japan reported an incidence of a malignant thyroid nodule

ranged from 4% -20% .Our results are comparable to Pyen et al.[26]in Denmark who reported a frequency of thyroid carcinoma of 10.7 % , and with Shete[27] who reported a frequency of 10.2% but higher than El Hamel[28] in Libya who reported a frequency of 9.7 % , Tadele[16] who reported a frequency of 7.3% and also higher than the results of Ahmmad [29] who reported a frequency of 7.5% in Mosul city. Our results are low in comparison with other studies done by Hamberger et al. [30] in Sweden and by Al Hureibi[31] in Yeman who reported a frequency of 29% and 29.8 % respectively (Table 6).

(Table 6):

Frequency of thyroid carcinoma in different series in comparison with current study.

Series	Year	Country	Frequency of ca %	Total no.
Hamberger et al [30]	1982	Sweden	29 %	147
Gharib [32]	1984	U.S.A	24 %	1970
Beecham [33]	1988	Saudi Arabia	19.4 %	93
El Hamel [28]	1988	Libya	9.7 %	618
Al Hureibi [31]	1990	Yeman	29.8 %	282
Rout and Shariff[15]	1999	U.S.A	22.8%	233
Pyen et al [26]	2002	Denmark	10.7 %	342
Current study	2004	Mosul	11.5 %	200

The female to male ratio was 1.8 :1, Which is comparable to the results of Koriech [35] in Saudi Arabia , which was 2.3 : 1 but it is lower in comparison with the result of Abdulla M.[36]in Malaysia which was

5.6 : 1. Koriech [35] reported that the female to male ratio varies between (1.5 : 1) to (4.1: 1) .

The mean age at presentation of thyroid carcinoma in this study was 38.5 for females and 45.5 for males which is comparable with the result of Abdulla M.[36]who reported the mean age in 4th and 5th decades.

Of the total 23 cases of thyroid cancer, 18 (78.2%) were papillary carcinoma , 4 (17.4 %) follicular carcinoma and one case 4.3 % was medullary carcinoma . These results are comparable with other

results reported in the literature in (Table 7).

(Table 7): *The percentage of subtype of thyroid malignancy in current study in comparison to other series .*

Series	Year	No. of patients	Country	P.C %	F.C %	M.C %
Koriech [35]	1988	113	Saudi Arabia	51	25.6	1.76
Hundahl et al [37]	1998	54000	U.S.A	78	13	3.
Abdulla M.[36]	2002	107	Malaysia	69	21.5	6.5
Lumachi et al. [38]	2003	106	Italy	75.5	17.	2.8
Tadele[16]	2014	62	Ethiopia	45.2	29	1.6
Shete[27]	2015	13	India	69.2	7.6	7.6
Magdalene[13]	2017	80	India	57.5	11.2	1.2
Current study	2004	23	Mosul	78.2	17.4	4.3

Regarding the papillary carcinoma in this study, 2/3 of cases were females and 1/3 males with a mean age of 37.1 years , which is in agreement with the results of Abdulla M. [36]who reported a mean age of 36 years for papillary carcinoma.

Clinically, all the patients with papillary carcinoma presented with neck swelling , 4 patients (17.3 %) presented with cervical lymphadenopathy in addition to the swelling .

Follicular carcinoma represents 17.4 % of malignant cases which is comparable to Lumachi et al. [38] in Italy who reported 17 % follicular carcinoma in a series of 106 malignant cases.

The mean age of the patients is 55.7 years with an equal female to male ratio. The mean age is higher than that of the patients with papillary carcinoma. Goljan [39]in United States reported that follicular carcinoma

occurs between 40-60 years.

Clinically, half of patients with follicular carcinoma presented with solitary nodule of variable duration , with no lymphadenopathy .

One case of medullary carcinoma was reported, making a percentage of 4.3% of all malignant tumors which is comparable to Handahl et al.[37]in United States who reported a percentage of 3 % medullary carcinoma in a series of 54000 cases .

Five cases (21.7 %) of all malignant cases were presented with palpable lymph nodes enlargement clinically. On Histological examination 4 of them (17.3 %) revealed papillary carcinoma and one case was diagnosed as medullary carcinoma. This result is comparable to Way [40] who stated that 20 % of adult presented with palpable lymph node had papillary carcinoma.

FNAC:

Hamberger et al.[30] proved that with the introduction of FNA, the number of patients with thyroid nodule who underwent thyroidectomy has decreased from 67 % to 43 % and that the thyroid cancer rate increased from 14 % to 29 % , therefore, the frequency of thyroid cancer found at thyroid surgery was doubled .

Although FNAC is a cost effective and useful diagnostic tool , the differentiation of hyperplastic nodule , follicular adenoma, and follicular carcinoma on FNAC may be difficult raising doubts about the accuracy of this method, since the rate of false negative results reported to vary from 2 % to as high as 37 % [15].

Five cases out of 84 who underwent FNAC, had unsatisfactory smears which forms 5.9 % of technical failure . The rate of inadequate thyroid FNA smears reported in the literature ranged from 2-21 % [14] .In different series the reported high rate of non-diagnostic smears is due to scant cellularity , poor preparation , lack of experience , location and size of the lesion . The unsatisfactory results are also obtained when the lesion is cystic or vascular yielding diluted specimen and follicular cells .[14] [41]

The false positive result in this study

was 2 out of 84 cases (2.4 %). On histological examination, one case was proved as hyperplastic nodule and the other diagnosed as follicular adenoma .Walsh [42] reported a FP rate of 0 % - 7.1 % which is comparable to the rate of FP in this study.

The false negative rate was one of 84 cases (1.2 %) which was a case of papillary carcinoma with cystic degeneration which is a common cause for FN result .This is in an agreement with the result reported by Walsh [42]which ranged from 0.5- 11.8 % .

The sensitivity was 88.8 %, specificity was 97.1 % , diagnostic accuracy was 96.2 % .These rates were compared with other studies shown in (Table 8).

(Table 8): *Sensitivity, specificity, and accuracy of FNAC of thyroid current study in comparison with other different series.*

Series	Year	Total no.	Sensitivity	Specificity	Accuracy
Safar et al.[43]	1990	115	71.7	90.6	90
Al Rawi [44]	1990	189	90	100	98.7
Hovorkova[45]	1999	2100	86	74	75
Emmrich et al.[46]	2001	533	86.4	71.4	-------
Hussien et al.[47]	2001	113	87.5	80.	--------
HM K et al.[48]	2003	207	78.4	98.2	84.4
Lumachi et al.[38]	2003	606	93.6	98.9	95.9
El Hag[41]	2003	303	85.7	97.6	94
Kolova et al.[49]	2003	254	71	96	93
Arvind[11]	2015	312	78.5	95.2	91
Sheela[50]	2015	136	90	96	94
Venkates[12]	2015	87	80	98.7	97.7
Current study	2004	84	88.8	97.1	96.2

CONCLUSIONS

It can be concluded from this study that :

1. Non toxic colloid goiter is the most common thyroid lesions in our locality, followed by toxic nodular goiter, neoplastic lesions, and finally thyroiditis ,with female predominance in all lesions.
2. Any thyroid nodule should be investigated for malignancy .
3. FNAC is an accurate, safe, quick, and economic test, in addition it can be very helpful in differentiating benign from malignant lesions and recommended as an initial test in the evaluation of the thyroid nodules.

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