



SPECTRUM OF THYROID DISEASES REQUIRING SURGERY IN A TERTIARY CARE CENTER-A HISTOPATHOLOGICAL RETROSPECTIVE STUDY.

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ABSTRACT

Background- Thyroid gland is an endocrine gland situated in front of the neck. Enlarged Thyroid (Goiter) can be endemic and sporadic. The present study is carried out to study the Spectrum of Thyroid diseases in our surgical unit by analyzing the histopathological data of Thyroid specimens in our institute.

Material and methods- This retrospective study is carried out in Department of General Surgery, Osmania Medical College, Hyderabad, Telangana, India. The study period is from October 2017 to March 2018. The Data collected during this study period is from August 2015 to July 2017.

Results- Histopathological data of 171 Thyroid specimens belonging to 167 patients were studied. Out of 167, 145 (87%) are Females and 22 (13%) are Males giving F: M ratio of 6.6: 1. The age range is 11 years to 80 years with mean age of 39.46 years and the relative peak age of incidence is seen in 21-40 years age group. Nonneoplastic lesions constitute 71.85% (n=120) and Neoplastic lesions constitute 28.15% (n=47).

Conclusion- Thyroid diseases requiring surgery are common in young females. Females predominate in both Nonneoplastic and Neoplastic Thyroid diseases. The Incidence of malignant Thyroid disease is more in males compared to females. The commonest Thyroid condition for which patient gets operated is Nodular Hyperplasia (pathological diagnosis) or Nodular Goiter (Clinical diagnosis) and the commonest Neoplastic condition of Thyroid indicating surgery is Papillary carcinoma.

KEYWORDS : Thyroid; Goiter; Nodular Hyperplasia; Papillary carcinoma; Histopathology.

1. INTRODUCTION

The Thyroid gland is an endocrine gland situated in front of the neck. It is subjected to both functional and structural changes. Functional changes produce Hypo or HyperThyroidism, whereas structural change produces Goiter. Any enlargement of the Thyroid gland is called Goiter[1]. Goiter can be endemic and sporadic. Endemic Goiter is related to iodine deficiency whereas sporadic Goiter is independent of iodine status. The surgically treated Goiters include both of these types, hence iodine deficiency status of a particular region may not totally reflect the surgical spectrum of Thyroid diseases in that region. Endemic Goiter initially can be treated conservatively with iodine and thyroxine supplementation, surgery is indicated when the Goiter is large and cosmetically unacceptable. Whereas sporadic Goiters need surgical intervention. Gaitan E et al.,[2] in his study states that 25% of people with Goiters live in more developed countries where Goiter continues to occur in certain areas despite iodine prophylaxis. Iodine-sufficient Goiters are associated with autoimmune Thyroiditis, hypoThyroidism, hyperThyroidism, and Thyroid carcinoma. Goiter is of considerable surgical significance in iodine-sufficient endemic areas and, to a lesser degree, in non-endemic areas where it is called "sporadic" Goiter[2]. Iodine global network stated that India has an adequate intake of iodine in the general population[3]. The total surgical load of Thyroid diseases can be assessed by the total number of Thyroid surgeries done in a surgical unit or by the total number of Thyroid specimens received in the Department of Pathology of that institute. The data of Thyroid surgeries done in a surgical unit can only give the clinical diagnosis whereas the histopathological data of Thyroid specimens can give us the final diagnosis. In India, 0.8-3.6% of the total surgeries requiring biopsy per year in an institute are Thyroid surgeries[4-10]. The present study is carried out to study the spectrum of Thyroid diseases which require surgery, by analyzing the Histopathological data of Thyroid specimens in our institute.

2. MATERIALS AND METHODS.

This retrospective study is carried out in Department of General Surgery & Department of Pathology, Osmania Medical College, Hyderabad, Telangana, India. Hyderabad is approximately 300 km

away from the nearest seashore and is at a height of approximately 550 meters above the sea level. The study period is from October 2017 to March 2018. The Data collected during the study period is from August 2015 to July 2017 i.e., for a period of 2 years.

2.1.Inclusion & Exclusion criteria

2.1.1-Inclusion Criteria

a) Excision biopsy reports of all specimens related to Thyroid.

2.1.2-Exclusion Criteria

a) FNAC reports of the Thyroid.

b) Core Needle Biopsy reports of the Thyroid.

2.2.Data Collection

All the Thyroid specimens which were sent from the Department of General Surgery to the Department of pathology will be processed and the Final pathological impression will be given by Senior pathologists of our institute. We collected the histopathological data during the study period from the records available in the Department of Pathology.

2.3.Data Interpretation & Analysis

The Age, Sex, and the final Pathological diagnosis were noted from the records. When two Thyroid surgeries are performed on a single patient with an interval (as seen in patients who underwent completion Thyroidectomies when the 1st surgical specimens histopathological impression came to be as a Neoplastic lesion), the histopathological impressions of the two reports are combined and considered as a single impression.

When there were reports with more than one diagnosis, for example - Papillary carcinoma in a background of Nodular Hyperplasia then for analysis the severe disease is taken into consideration, here it is Papillary carcinoma.

The data thus collected is tabulated and analyzed using calculating electronic devices.

3. RESULTS

A total of 8794 surgical specimens were received in the Department of Pathology in a period of 2 years, out of which 171 are Thyroid specimens. Out of these 171 Surgical specimens, 4 specimens are of patients who had 2nd Thyroid surgery (completion Thyroidectomy) when the 1st Thyroid surgery histopathological impression came to be as a Neoplastic lesion. Hence these 171 Thyroid specimens belong to 167 patients which constitute 1.9% of all surgical specimens. The results of our study are for these 167 patients histopathological data.

3.1. Age & Sex

Out of 167, 145 (87%) are Females and 22 (13%) are Males giving F: M ratio of 6.6: 1. The age range is 11 years to 80 years with mean age of 39.46 years and the relative peak age of incidence is seen in 21-40 years age group (n=91,54.48%). The younger age Group <20 years and older age group >60 years constituted 5.41% and 7.78% respectively.(Table & Figure-1)

Table-1 Showing the age distribution and F: M ratio.

AGE GROUP	GENDER		TOTAL	F: M
	MALE	FEMALE		
<20years	2(9.1%)	7(4.82%)	9(5.41%)	3.5:1
21-30	2(9.1%)	47(32.42%)	49(29.32%)	23.5:1
31-40	6(27.3%)	36(24.82%)	42(25.16%)	6:1
41-50	6(27.3%)	26(17.93%)	32(19.16%)	4.33:1
51-60	2(9.1%)	20(13.8%)	22(13.17%)	10:1
>60years	4(18.1%)	9(6.21%)	13(7.78%)	2.25:1
TOTAL	22(100%)	145(100%)	167(100)	6.6:1

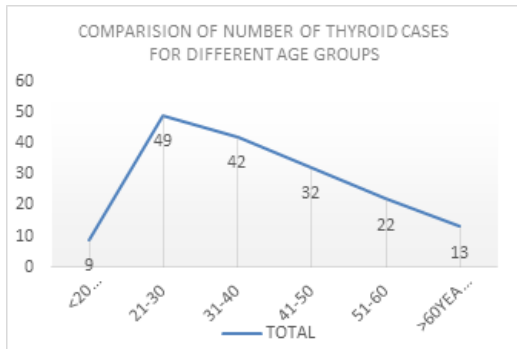


Figure-1 showing the the peak age of distribution at 21-30 years.

In our study, age of Female patients ranged from 12-80 years and most of them belong to 21-40 years age group (57.24%) with mean age of 38.75 years, whereas Male patients age ranged from 11 – 73 years and most of them belong to 31-50 age group (54.6%) with a mean age of 44.13 years. Males and Females in younger age group (<20years), have 9.1% and 4.82% incidence respectively whereas in older age group (>60years), Males have a higher incidence (18.1%) than Females (6.21%).

3.2. Disease Spectrum.

73.8% of Females (n=107) are diagnosed with Nonneoplastic lesions, whereas 59.1% of Males (n=13) are diagnosed with Nonneoplastic lesions. The Nonneoplastic to Neoplastic lesions ratio is 2.8: 1 in Females and 1.45: 1 in Males.

In our study, out of 167 specimens, 120 are Nonneoplastic (71.85%) and 47 are Neoplastic (28.15%). Among all the Nonneoplastic lesions, Nodular Hyperplasia is the commonest condition 46.7% (n=78) followed by Adenomatoid hyperplasia 10.77% (n=18), Hashimoto's Thyroiditis 7.78% (n=13), Thyroglossal cyst 4.2% (n=7), colloid cyst 2.4% (n=4). Among Neoplastic lesions 13.17% (n=22) of

total Thyroid lesions are Benign and 14.98% (n=25) of total Thyroid lesions are Malignant. Follicular adenoma constitute 10.77% (n=18), Hurthle cell adenoma constitute 1.8% (n=3), and Hyalinizing trabecular adenoma constitute 0.6% (n=1) of total Thyroid lesions. Among Malignant lesions Papillary carcinoma constitute 13.18% (n=22), Anaplastic carcinoma constitute 1.2% (n=2), and Medullary Thyroid carcinoma constitute 0.6% (n=1) of total Thyroid lesions. There is no single case of Follicular carcinoma diagnosed in our study.(Table-2)

Table-2 Showing the incidence of individual Thyroid lesions in our study along with F: M ratio

DIAGNOSIS	n (%)	F:M RATIO
NONNEOPLASTIC -	120(71.85%)	8.23:1
NODULAR HYPERPLASIA	78(46.7%)	8.75:1
ADENOMATOID HYPERPLASIA	18(10.77%)	ALL FEMALES
COLLOID CYST	4(2.4%)	3:1
HASHIMOTOS THYROIDITIS	13(7.78%)	ALL FEMALES
THYROGLOSSAL CYST	7(4.2%)	1:1.33
NEOPLASTIC -	47(28.15%)	4.22:1
BENIGN	22(13.17%)	6.33:1
FOLLICULAR ADENOMA	18(10.77%)	17:1
HURTHLE CELL ADENOMA	3(1.8%)	2:1
HYALINIZING TRABECULAR ADENOMA	1(0.6%)	MALE
MALIGNANT	25(14.98%)	3.16:1
FOLLICULAR CARCINOMA	-	-
PAPILLARY CARCINOMA	22(13.18%)	3.4:1
MEDULLARY CARCINOMA	1(0.6%)	MALE
ANAPLASTIC CARCINOMA	2(1.2%)	ALL FEMALES
TOTAL	167(100%)	6.6:1

4. DISCUSSION

The spectrum of surgically operated Thyroid diseases can predict the endemicity of both endemic and sporadic Goiter. This is because in Goiter endemic states like Kerala[11] the incidence of surgically treated Thyroid diseases are high i.e., 3.2% in Geoth J et al., [9] study and 3.6% in Priya P.V et al., [10] study. In our study which is done in Hyderabad, Telangana state the incidence is 1.9% which is almost half of the incidence seen in Kerala.

Our incidence is comparable with the incidence of two studies done in Pondicherry by Bharatidasan et al.,[7] and Pradeep Kumar et al.,[8], which are 1.82% and 2.08% respectively.

Studies done in Karnataka by Rajesh et al.,[4] and in Kashmir by Lateef et al.,[5] show lower incidence than our study 0.8% & 1.1% respectively.

In studies done in Nigeria by Solomon et al.,[12] and Ijomone et al.,[13] the incidence is slightly low compared to our study i.e., 1.5% & 1.6% respectively.

In studies done in Ethiopia by Abebe et al.,[14] and Tsegaye et al.,[15] the incidence is double the incidence seen in our study i.e., 3.8% & 3.6% respectively.

In our study for every 100 surgeries requiring biopsy, 2 surgeries (1.9 is taken as 2) are of Thyroid, whereas in few studies [9, 10, 14, 15], 4 out of 100 surgeries requiring a biopsy (3.2-3.8 is taken as 4) are related to Thyroid.(Figure-2)

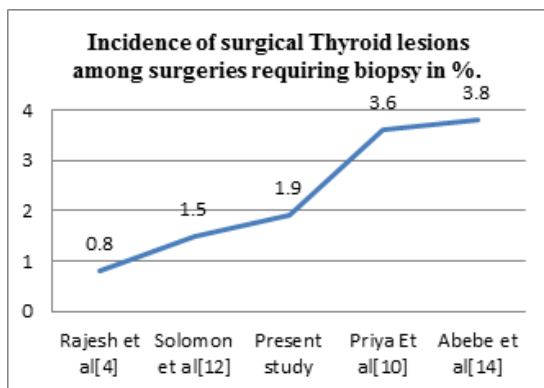


Figure-2 comparing the Thyroid surgeries incidence among surgeries requiring biopsy.

4.1. F: M ratio

Thyroid diseases are common in Females. Studies from India [9,10,16], Pakistan [17-19], Nigeria [12, 20, 21], Saudi Arabia [22], Malaysia [23], & Trinidad [24], show F: M ratio ranging from 6-7: 1. Our studies F: M ratio is within this range.

In studies from India [5, 25, 26], Pakistan [27, 28], Saudi Arabia [29, 30], and Ethiopia [14], F: M ratio is <4:1. Our studies F: M ratio is more than these studies.

F: M ratio >9:1 is seen in studies from India [8], Nigeria [13], which is more than our study.

In our study, as the F: M ratio is 6.6: 1, for every 7(6.6 is taken as 7) Females operated for Thyroid disease, 1 Male patient will be operated for the same.

In our study, F: M ratio is highest (23.5: 1) in 21-30 years age group and lowest (2.25: 1) in >60years age group(Table-1). For calculation purposes 23.5 is taken as 24 and 2.25 is taken as 2.4. For 24 & 2.4 the common multiple is 240.Hence, for every 240 (24x10) Females getting operated for a Thyroid problem in the age group of 21-30 years, 10 Males are getting operated for the same. In contrast, for every 240 Females (2.4x100) getting operated for a Thyroid problem in the age group of >60 years, 100 Males are getting operated for the same. From the above calculations, it can be inferred that the number of Males in >60years age group are 10 times the number of Males in 21-30 years age group when the number of Females in both the age groups are equal.

4.2. Age Range

In our study youngest patient is a Male of 11 years and the oldest patient is a Female of 80 years. The studies done in India [6, 4], Pakistan [18,19,27,28],Nigeria [20, 21], Saudi Arabia [22] and Trinidad [24] show age range similar to our study.

In a study done in Nigeria, by Solomon et al., [12], the youngest patient is 5 months of age. The oldest patient is 90 years of age, in a study done by Priya P.V et al.,[10] in Kerala, India. In our study, the youngest patient is 11 years of age. Infants & children from 1-10 years age were not seen in our study due to the presence of a Pediatric Tertiary care center in our region, where most of the Pediatric Thyroid cases are dealt with.

4.3. Commonest age group.

In our study, the common age group is 21 – 40 years (54.48%). Few Studies done in India has similar observations[8,16,25].

In our study, 44.32% belong to 31-50years age group and 32.33% belong to 41-60 years age group.

In our study, no study taken for reference has common age group <20years.

4.4. Mean age

In our study, the mean age of patients is 39.46 years. Studies done in India[5], Pakistan [17, 28], Nigeria [12] & Saudi Arabia [29] have a mean age in the range of 35-40 years. Our studies mean age is within this range but is at the upper limit.

Mean age of <35 years is not common in India but is seen in few studies done in Pakistan [27] & Ethiopia [14].

Studies done in Nigeria [20, 21], Saudi Arabia [22] & Malaysia [23] show Mean age >40 years which is more than the mean age seen in our study.

4.5. Nonneoplastic Vs Neoplastic conditions.

In our study, Nonneoplastic lesions (71.85%) are more compared to Neoplastic (28.15%) lesions, the ratio being 2.55:1. The Nonneoplastic to Neoplastic lesions ratio is 2.8: 1 in Females and 1.45: 1 in Males. This shows that in females, for every 3 (2.8 is taken as 3) patients getting operated for a Nonneoplastic lesion, 1 will get operated for a Neoplastic lesion. In contrast, for every 3 (1.45 is taken as 1.5) males getting operated for a Nonneoplastic lesion, 2 will get operated for a Neoplastic lesion.

. Studies done in India [7,16, 25], Pakistan [19], Nigeria [12, 13], Saudi Arabia [29] & Malaysia [23] show Nonneoplastic lesions ranging from 65%-75% of total Thyroid lesions. Our studies Nonneoplastic lesions proportion is within this range.

But most of the studies from India [6, 10, 26], Pakistan [17,27, 28], Nigeria [20, 21], Ethiopia [14, 15] & Trinidad [24] show Nonneoplastic lesions proportion > 75% of the total Thyroid lesions which is more than our study.

In our study the F: M ratio for the different group of Thyroid lesions are as below (from Table-2). For calculation purpose, the decimal numbers are rounded of to the nearest natural number (in brackets).

DISEASE	F:M	F: M(rounded of to nearest natural no.)
Total Thyroid lesions-	6.6:1=	(7:1)
Nonneoplastic lesions-	8.23:1=	(8:1)
Neoplastic lesions -	4.22:1=	(4:1)
Benign	- 6.33:1=	(6:1)
Malignant	- 3.16:1=	(3:1)

From the above values it is inferred that for every 1 male getting operated for Thyroid disease, 7 females are getting operated for the same (7:1). The number of females are high in Nonneoplastic lesions (8:1).

In order to compare the number of Males in different Thyroid lesions, we need to equalize the number of Females in those different Thyroid lesions.

If we take the common multiple of the above natural numbers(7,8,4,6,3) we get 336, which means 336 is divisible by 7,8,4,6,&3. The Following are the F: M ratios after the calculation.

Total Thyroid lesions -	336:48 =	(7:1)
Nonneoplastic lesions -	336:42 =	(8:1)
Neoplastic lesions -	336:84 =	(4:1)
Benign	- 336:56 =	(6:1)
Malignant	- 336:112=	(3:1)

From the above values, it is inferred that for every 336 females getting operated for Thyroid disease, 48 males are getting operated for the same (336:48 = 7:1). The number of males are high in Malignant Thyroid lesions (336: 112 = 3:1).(Figure-3)

The commonest lesion overall and among Nonneoplastic lesion in our study is Nodular Hyperplasia/Nodular Goiter (46.7%) and the second most common lesion overall is Papillary carcinoma (13.18%) and is the most common malignant lesion in our study. The above statement holds good for studies carried out in India and abroad [10,16-19,23].

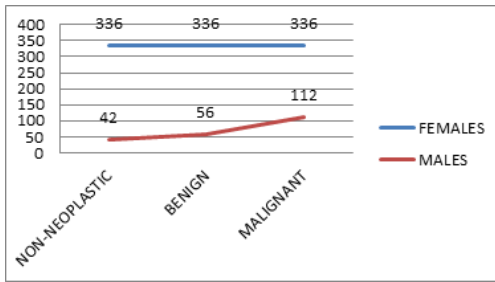


Figure-3 showing the number of Males for equal number of Females in various Thyroid lesions in our study.

5. CONCLUSION

Thyroid diseases requiring surgery are common in young females. Females predominate in both Nonneoplastic and Neoplastic Thyroid diseases. The Incidence of malignant Thyroid disease is more in males compared to females. The commonest Thyroid condition for which patient gets operated is Nodular Hyperplasia (pathological diagnosis) or Nodular Goiter (Clinical diagnosis) and the commonest Neoplastic condition of Thyroid requiring surgery is Papillary carcinoma.

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