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Prevalence of Thyroid Lesions in a Rural Setting: A Cytological Study from a Tertiary Care Teaching Hospital

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Abstract

Background: The past few years have witnessed a global increase in the prevalence of thyroid cancer, and it is the fifth most common cancer in women. The study intends to estimate the prevalence of thyroid malignancies, and the age- and gender-wise distribution of thyroid cancer in a rural setting in India. *Methods*: The study was conducted on 158 subjects presented with thyroid swelling between January 2015 and December 2016. Demographic and clinical details were obtained from all the patients. Fine needle aspiration cytology (FNAC) was used for the diagnosis of thyroid lesions. The subjects were classified into various groups based on the age and gender, and the prevalences of various cytological diagnoses were studied. *Results*: Thyroid swelling was mostly reported in 21-40 years age group for women, and in 41-60 years age group for men. Out of the 158 smears studied, only 11 (6.96%) were neoplastic. The most commonly reported thyroid lesion was colloid goitre. Neoplastic lesions like papillary thyroid cancer and benign follicular neoplasm were noted in 2.53%, and 4.43% of the subjects respectively. The prevalence of papillary thyroid cancer was comparable in both males and females, whereas benign follicular neoplasm was more common in females. *Conclusion*: The common thyroid lesion noted was colloid goitre and the most common thyroid malignancy noted was benign follicular neoplasm.

Keywords: Colloid Goitre; Follicular Neoplasm; Papillary Thyroid Cancer; Thyroid Lesions.

Introduction

Thyroid swelling is one of the common clinical presentations in the surgical outpatient department and the thyroid malignancy has been reported as the most common endocrine-related carcinoma worldwide [1-3]. The past few decades have witnessed an increase in the prevalence of thyroid cancer [4]. As per 2012 estimates, 27,000 women and 13,000 men died from thyroid cancer globally [5]. In India, the relative frequency of death due to thyroid cancer is around 0.1-0.2% [2]. Even though people belonging to all age groups are at the risk of developing thyroid cancer, according to National Institutes of Health fact sheets, the likelihood of developing thyroid cancer is more in 45-54 age group. The records also indicate that women are more prone to develop thyroid cancer than males, and there are increased chances for inheriting such cancers [6].

Most of the thyroid swellings are non-neoplastic in nature, however, there is increased possibility of these lesions to become malignant [7]. In most cases thyroid cancer can be treated, since majority of them are detected early [8]. Although pre-operative techniques such as ultrasonography, thyroid scintigraphy, CT and MRI scan are available for the clinical diagnosis of thyroid nodules, fine needle aspiration cytology (FNAC) is widely used as the primary screening, as it is non-operative, simple, rapid, accurate, and cost-effective [7-9].

The study conducted by Sengupta et al, employing FNAC as the diagnostic tool, have reported the prevalence of thyroid malignancy as 9.55% [9]. Similar studies on rural Indian population presenting with thyroid nodules have reported goiter as the most

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common thyroid disorder, mostly reported in subjects of 31-40 years [10]. In addition, the study has reported malignancy only in ~3% of the study population. Papillary, followed by follicular cancer has been reported as the commonest types of thyroid cancer among Indian population [2]. The present study was aimed at estimating the prevalence of thyroid malignancies in a rural setting in India and to study the age- and sex-wise distribution, employing FNAC as the diagnostic tool.

Materials and Methods

The cross-sectional study was conducted at the Department of pathology,Vinayaka Missions Medical College and Hospital, Karaikal, Puducherry, India. One hundred and sixty-six cases, presented with thyroid swelling between January 2015 and December 2016 were studied/examined. Eight smears, which were inadequate and haemorrhagic, were excluded. Thus, out of the total 166 smears, only 158 smears were considered for the study. The study was approved by institutional ethics committee and informed consents were obtained from all the subjects. Brief account of demographic details such as age and sex of the participants, and clinical characteristics such as presence of toxic symptoms, and size and duration of swelling were obtained. Relevant investigations like thyroid profile (T3, T4, and TSH), thyroid autoantibody titres and ultrasonography were performed in all the subjects.

Fine needle aspiration cytology (FNAC) was used as the diagnostic technique in all the cases. Disposable 10ml capacity syringe with 23-24-gauge needle was used for aspiration. Swelling was fixed with left hand thumb finger, index finger and middle finger. The needle was then introduced into the swelling and specimen was obtained. In cases where the swelling was cystic, the content was aspirated till the swelling disappeared. The aspirated fluids were centrifuged and smears were made from the deposit. The specimens were fixed, stained and examined under microscope by the pathologists. Aspirate may be haemorrhagic. The material was spread on a clean glass slide. Both wet and air dried smears were prepared and preserved in the Coplin jars containing 95% alcohol. Leishman, Papanicolaou, hematoxylin and eosin (HE) and May Grunwald Giemsa (MGG) stain were used for staining the smears.

Based on the age, the subjects were groups as: 4 -20, 21-40, 41-60, and 61-80. The prevalence of various cytological diagnosis was estimated, and the age- and sex-wise distributions of the lesions were also assessed.

Results

The study enrolled a total of 158 cases with age ranging from 4-80 years. Thyroid nodules were more prevalent in females, with a male to female ratio of 0.1:1. Majority of the females with thyroid swelling belonged to 21-40 years age group, and the number of cases reported were 85 (59.44%), and the presentations were least in 61-80 years age group, [2(1.39%)]. Whereas, among males, the thyroid swelling was more prevalent in the age group 41-60 years [7(46.66%)], and it was least in 0-20 years [only 1 case (6.66%)] (Table 1). Out of the 158 smears studied, 147(93.03%) were non-neoplastic and only 11(6.96%)were neoplastic lesions.

Table 1: Distribution of subjects based on gender and age groups

Age group (yrs)	Male	Female
4-20	1 (6.66)	14 (9.79)
21-40	5 (33.33)	85 (59.44)
41-60	7 (46.66)	42 (29.37)
61-80	2 (13.33)	2 (1.39)

* number (percentage)

Table 2: Distribution of various cytological diagnosis among the study population

Cytological diagnosis	Number of cases	Percentage
Colloid goitre	103	65.18
Colloid cyst	4	2.53
Thyroglossal cyst	1	0.63
Primary hyperplasia	2	1.26
Hashimoto's thyroiditis	12	7.59
Lymphocytic thyroiditis	23	14.55
De Quervain's thyroiditis	2	1.26
Benign follicular neoplasm	7	4.43
Papillary thyroid carcinoma	4	2.53

Table 3: Age and gender-wise distribution of various thyroid lesions in male and female population

Sex	Age group	Colloid goitre	Colloid cyst	Thyroglossal cyst	Primary hyperplasia	Hashimoto's thyroiditis	Lymphocytic thyroiditis	De Quervain's thyroiditis	Benign follicular neoplasm	Papillary thyroid carcinoma
Female	4-20	8	-	-	-	-	4	1	-	1
	21-40	53	1	-	2	8	18	-	2	1
	41-60	32	-	-	-	4	1	1	4	-
	61-80	2	-	-	-	-	-	-	-	-
	Total	**95**	**1**	**-**	**2**	**12**	**23**	**2**	**6**	**2**
Male	4-20	-	-	1	-	-	-	-	-	-
	21-40	4	-	-	-	-	-	-	1	-
	41-60	4	1	-	-	-	-	-	-	2
	61-80	-	2	-	-	-	-	-	-	-
	Total	**8**	**3**	**1**	**-**	**-**	**-**	**-**	**1**	**2**

Both in males and females, the most commonly reported thyroid lesion was colloid goitre (noted in 8 and 95 cases respectively), and thyroglossal cyst was noted as the least prevalent thyroid lesion [only 1 case (0.63%)]. Among the 95 females reported with colloid goitre, the maximum number of cases (53) belonged to 21-40 years age group, and least (2 cases) to 61-80 years age group. Papillary thyroid carcinoma was noted in 4(2.53%) cases, and benign follicular neoplasm in 7 (4.43%) cases (Table 2). Female subjects with thyroid cancer belonged to 0-60 years age group, and males belonged to 21-60 years age group. Papillary thyroid carcinoma was reported equally among males and females; in males, the age group affected was of 41-60 years, and in females, it was 0-40 years. Compared to male subjects, benign follicular neoplasm was more common in females (6) aged between 21 and 60 (Table 3).

There was no reported case of primary hyperplasia, Hashimoto's thyroiditis, lymphocytic thyroiditis, or De Quervain's thyroiditis among males. Likewise, thyroglossal cyst was not reported in any of the female subjects. Colloid cyst and primary hyperplasia was reported only in female subjects belonging to 21-40 years age group. Similarly, Hashimoto's thyroiditis was reported only in females belonging to 21-60 years' age group, and lymphocytic thyroiditis in females belonging to less than 60 years' age group. Male subjects reporting thyroglossal cyst, colloid goitre and colloid cyst belonged to 0-20, 21-60, and 41-80 years age groups respectively.

Discussion

The prevalence of thyroid malignancies noted in the present study is around 7% and this is comparable to the 11% prevalence observed by Sengupta et al [9]. However, another study by Sathyanarayana et al, have reported an overall prevalence of thyroid cancer as high as 36% [11]. In the present study majority of the female subjects presented with thyroid swelling belonged to 21-40 years age group. Concurrence with this finding, Kamra et al, have reported increased preponderance of thyroid swelling in female subjects, belonging to 21-40 years age group [10]. Literature evidence substantiate the increased prevalence of thyroid nodules in females than males [11]. The present study also noted a higher number (8 cases, 72.7%) of female subjects reporting neoplastic lesions compared to males.

The thyroid malignancies noted by Sengupta et al. in patients presented with thyroid swelling were follicular adenoma, follicular carcinoma, and anaplastic carcinoma [9]. In agreement with the present study, this study has reported follicular carcinoma as the most common thyroid cancer (7.30%), while the prevalence noted in the present study was 4.43%. Papillary thyroid carcinoma was the second most common malignancy (2.53%) noted in the study subjects. There are various Indian-based studies reporting papillary thyroid carcinoma as the most common malignancy [1,3]. Sathyanarayana et al. have noted the prevalence of papillary carcinoma in 93% of the subjects, and follicular carcinoma in only 7%.

The current study has noted that the prevalence of papillary thyroid cancer is comparable in both males and female populations. Nationwide cancer registry programs have pointed out that thyroid cancer is more common in young women and elder adults [12]. In the present study, follicular neoplasm was noted predominantly in women between 41 and 60 years of age, and papillary carcinoma in 4-40 years age group. Papillary neoplasm was noted in two men belonging to 41-60 years' age group. Even though studies have concluded that the prevalence of thyroid nodule increases with age, a similar trend has not been observed in the present study [13].

The present study results substantiate the literature findings reporting colloid goitre as the most common cause for thyroid swelling [1,9]. The prevalence of colloid goitre noted was 65.18%. A similar study

conducted among rural Indian population by Kamra et al has reported colloid goitre in around 50% of the cases. In addition, the researchers noted that majority of the cases with colloid goitre belonged to 41-50 years age group [10]. The present study has noted highest number of cases of colloid cyst in females between 21 and 40 years of age.

Lymphocytic thyroiditis has been noted as the second most prevalent cause for thyroid swelling (14.55%), followed by colloid goitre. The disease was reported only in female subjects, mostly in those belonging to 21-40 years age group. Kamra et al, have reported lymphocytic thyroiditis in 26.2% of the cases and mainly in 21-30 years age group [10].

To the best of our knowledge, this is the first study reporting the age- and gender-wise distribution of various thyroid neoplastic lesions in a rural setting in India. One of the major limitations of the study is that it is unable to generalize the observations, as only single center is involved. Moderate sample size and the use of only FNAC for clinical diagnosis of thyroid lesions are the other limitations.

Conclusion

In summary, the commonest thyroid lesion noted was colloid goitre. The most common thyroid malignancy noted was benign follicular neoplasm with increased female preponderance.

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