



Cytological patterns of thyroid lesions at Gondar University Hospital, Northwest Ethiopia: A retrospective study

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ABSTRACT

Background: Thyroid lesion is a common disorder of the endocrine system worldwide. Characterizing varies type of the lesions in a given setup has paramount importance to design effective strategy. As a result, the purpose of this study was to find out the frequency of various cytological thyroid lesions in Gondar University Hospital. **Materials and Methods:** A retrospective data of 1010 thyroid lesions, which were registered from 2009 to 2013 on fine needle aspirate cytology log book, were included in the study. Descriptive statistics was done to determine the proportion of the thyroid lesions. **Results:** Of the total patients underwent thyroid cytological examination, 768 (76%) were females. More than half of thyroid lesions were observed in patients who were under 30 years old. Benign thyroid lesions (916 [90.7%]) were the commonest followed by malignant and neoplastic lesions that account 41 (4.1%) and 38 (3.76%) respectively. Colloid goiter (862/919 [93.8%]), follicular neoplasm (30/38 [78.9%]) and papillary carcinoma (25/41 [61%]) were the major subtype of benign, neoplasm and malignant lesions respectively. Thyroid tuberculosis (TB) was also found in 3 (0.29%) cases of benign lesions. **Conclusion:** Benign lesions were the predominant thyroid lesion; of which the proportion of colloid goiter was higher compared to another subtype of benign thyroid lesions. Unusual benign lesions like thyroid TB were also observed. Malignant thyroid lesions had also contributed a significant amount. Future research with histological technique, detail socio-demographic information, and clinical feature is crucial to determine the patterns of thyroid lesions and associated factors.

KEY WORDS: Cytology, ethiopia, fine needle aspirate, lesion, thyroid

INTRODUCTION

Thyroid lesion is a common lesion of the endocrine system worldwide including Ethiopia. It affects 4-7% of the general population with higher increment in females. The percentage may be increased on ultrasonographic guided diagnosis [1]. It mostly exists due to alterations of hormone secretion

and enlargement of the thyroid gland or both [2]. It is also characterized by different cytological findings with different morphology [3]. Colloid goiter, thyroid cyst, neoplasm, malignant and thyroiditis are the most principal cytological features. Colloid nodular goiter also known as endemic goiter is extremely common throughout the world particularly in low and middle-income countries; and it affects more than 200 million

individuals [4]. It is the most predominant lesion in mountainous areas though it is also prevalent in non-mountainous areas [5].

The diagnosis and management of thyroid diseases rely on different invasive and non-invasive investigations. Fine needle aspiration cytology (FNAC) is now accepted as a cost-effective non-invasive procedure in the initial assessment and management of thyroid enlargement [6,7]. It has low complication rate and offers non-operative diagnosis for most of the thyroid lesions even if it has a major drawback on differentiating follicular carcinoma from follicular adenoma [8].

The frequency and proportion of thyroid lesions in different community are variable depending on various factors [9,10]. These lesions tend to show regional variation [11,12]. Thus, the purpose of this study was to find out the frequency and proportion of various cytological thyroid lesions among patients with thyroid enlargement who underwent FNA cytological diagnosis at Gondar University Hospital pathology laboratory.

MATERIALS AND METHODS

Data of thyroid lesion cytology from 2009 to 2013 were collected from FNAC registration book using data extraction sheet at Pathology laboratory, Gondar University Hospital, Ethiopia. Data on the cytological feature, sex and age were retrieved. A total of 1010 thyroid FNAC results were documented within the study years, and all were included in this study. The FNAC results of thyroid lesions were classified according to Royal College of Pathologist's thyroid cytology result reporting guideline as non-diagnostic, non-neoplastic (benign), neoplastic, suspicious (suspicious for follicular thyroid neoplasm, suspicious for papillary thyroid cancer (PTC), suspicious for other malignancy) and malignant [10]. The data were entered and analyzed using statistical software, SPSS version 20. Descriptive statistics was done to determine the proportion of the thyroid lesions. The results of the study were expressed in the form of tables and figure. Ethical approval was obtained from Institutional Review Board of University of Gondar. Confidentiality was kept using anonymous coding for all patient data.

RESULTS

A total of 1010 thyroid lesions were examined. Of these, 76% (768/1010) were from female patients. The median age of patients with thyroid lesions was 26 years; 24 year for males (ranges: 2-78 years) and 28 year for woman (ranges: 5-80 years). Benign lesions account 91% (919/1010) of the lesions followed by malignant 4.1% (41/1010) and neoplastic lesions 3.9% (39/1010). The non-diagnostics and suspicious cases were small which accounts 0.4% (4/1010) and 0.8% (8/1010) of the total thyroid lesions respectively. Colloid goiter, follicular neoplasm, and PTC were the major subtypes of the benign, neoplastic and malignant lesions respectively. Among benign lesions, thyroid tuberculosis (TB) and hyperplastic lesions accounted the least. On the other hand, medullary thyroid carcinoma was the least lesion of all malignant cases [Table 1]. Metastasized cancer to thyroid gland which includes squamous cell carcinoma were

also noticed in 9.8% (4/41) of malignant cases; of which two of them were originated from the oropharyngeal area and the remaining were from unknown source.

Except under the age of 10 years, all type of thyroid lesions were predominant in female with the overall male to female ratio of 1:3.17 [Figure 1]. In addition, except the non-diagnostic cases, all type of lesions was predominant in female than male. About 55 of thyroid lesions were observed in patients who were under 30 years old. Thyroiditis was only observed in the age group of 20-39 years old individuals [Table 2].

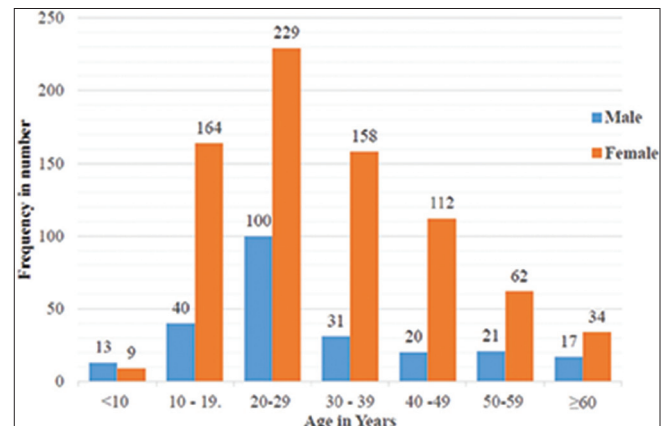


Figure 1: Age and sex frequency of patients underwent thyroid fine needle aspiration cytology from 2009 to 2013 at Gondar University Hospital Pathology

Table 1: Cytological patterns of thyroid lesions in 1010 FNAC specimens at Gondar university Hospital from 2009 to 2013

	n	% (n/N*100)	Mean age (year)	Male/ female ratio
Benign lesions (N=919 [91%])			30	1:3.34
Colloid goiter	862	93.8		
Thyroid cyst	27	2.9		
Adenomatous goiter	16	1.7		
Thyroiditis	7	0.8		
Hyperplastic lesions	3	0.3		
Thyroid TB	3	0.3		
Malignant lesions (N=41 [4.1%])			40	1:2.72
PTC	25	61.0		
ATC	5	12.2		
Secondary carcinomas	4	9.8		
PDC	2	4.9		
PTC and PDC co-existing	2	4.9		
Lymphomas	2	4.9		
Medullary thyroid carcinoma	1	2.4		
Neoplasm lesions (n=39 [3.9%])			29	1:1.93
Follicular thyroid neoplasm	30	76.9		
Hurtle cell neoplasm	9	23.1		
Suspicious lesions (n=8 [0.8%])			39.8	1:1.67
To PC	2	25		
To spindle cell carcinoma	1	12.5		
To burkitt's and hudkin's lymphoma	2	25		
To ATC and follicular neoplasm	3	37.5		
Non diagnostic (n=4 [0.4%])		23.75		3:1
Total: (N)=1010	1010	30.6030		1:3.17

PDC: Poorly differentiated thyroid carcinoma, PTC: Papillary thyroid carcinoma, ATC: Anaplastic thyroid carcinoma, FNAC: Fine needle aspirate cytology, TB: Tuberculosis

Table 2: Distribution of thyroid lesions in relation with age and sex

	Cytological patterns (n (%))					Total
	Benign	Malignant	Neoplasm	Suspicious	Non diagnostic	
Sex						
Male	213 (23.2)	11 (26.8)	12 (30.8)	3 (37.5)	3 (75)	242 (24)
Female	705 (76.8)	30 (73.2)	27 (69.2)	5 (62.5)	1 (25)	768 (76)
Age in year						
<10	19 (2.1)	1 (2.4)	1 (2.6)	-	1 (25)	22 (2.2)
10-19	194 (21.1)	3 (7.3)	5 (12.8)	1 (12.5)	1 (25)	204 (20.2)
20-29	297 (32.3)	11 (26.8)	17 (43.6)	3 (37.5)	1 (25)	329 (32.6)
30-39	177 (19.3)	6 (14.6)	5 (12.8)	1 (12.5)	-	189 (18.7)
40-49	116 (12.6)	8 (19.5)	8 (20.5)	-	-	132 (13.1)
50-59	76 (8.3)	3 (7.3)	3 (7.7)	1 (12.5)	1 (25)	83 (8.2)
>59	40 (4.4)	9 (22)	-	2 (25)	-	51 (5.0)
Total	919 (91)	41 (4.1)	39 (3.9)	8 (0.8)	4 (0.4)	1010 (100)

DISCUSSION

Identifying and characterizing lesions of the thyroid gland have pivotal role since most of the lesions require medical or surgical management. The magnitude of this problem in the general population has significant figure; it is more than 5% with higher female to male ratio [13]. High ratio of thyroid lesion in female sex was suggested to be from level of hormonal variation after puberty. Evidence from this study also supported this scientific explanation [14]. As shown in Figure 1, the female to male ratio was higher in the age group >10 year, but under the age of 10 year the female to male ratio was comparable. This comparable ratio may be due to lack of sex hormone variation between male and female under the age of 10 year.

Benign lesion was the most common lesion in this study as it was seen in 91% (919/1010) patients with thyroid enlargement. Of the benign type, colloid goiter was the predominant lesion that accounted 93.8% (862/919). Different studies convinced that a benign lesion of the thyroid is the predominant lesion over the others lesion types in developing world including Sub-Saharan African countries [15]. However, the magnitude varies across different geographical locations. The result of this study is in line with studies conducted in India (94.4%) [6], Udaipur (88%) [16] and Riyadh (77.7%) [17] showed comparable proportion of benign lesion to the current study. In contrast to this, studies conducted in Pakistan (46%) [18], Saudi Arabia (56.5%) [19] and Iran (64%) [20] showed lower proportion of benign lesion compared to the current study. This difference may be aroused because of the difference in disease prevalence and clinical criteria for the performance of FANC

The unusual benign lesions were also presented in the current study. Even if the thyroid gland was suggested to resist infection due to the presence of bactericidal colloid and iodine [21-24], thyroid TB were also seen in 0.3% (3/919) of patients. According to other studies, TB of the thyroid gland is an extremely rare lesion, and special focus should be given to diagnose this rare lesion [25-27]. All the victims of thyroid TB were female with the age of 20, 32 and 50 year in the current study. A review of Ertan, *et al.* also showed that this case is predominantly observed in female with the age group of 9-83 years old [28].

Malignant and neoplastic thyroid lesions were the second common lesions that accounted 4.1% (41/1010) and 3.9% (39/1010) respectively. Inconsistent with this, different studies reached comparable finding in which both lesions accounted around 3-10% of the lesions [17,20]. PTC, which is the commonest lesion in most studies [5,29,30], was found to be the leading sub-type of malignant thyroid lesion followed by secondary carcinoma in this study. Follicular neoplasm, hurtle cell neoplasm, and anaplastic thyroid carcinoma, which are common iodine deficiency goiter [31], were also common in the current study.

However, because of the data were retrieved in retrospective manner, the authors couldn't describe all the detail. In addition, since data were collected using non-gold standard method, FNAC technique, it may affect the result of this study. Malignant lesions were not also staged according to tumor size, lymph node involvement, and distance metastasis. This limits the information generated from this study.

CONCLUSION

Benign lesions with higher proportion of colloid goiter were the predominant thyroid lesion. Unusual benign lesions like thyroid TB were also observed. Malignant and neoplastic lesions had also contributed a significant amount. Future research with histological technique, detail socio-demographic information, and clinical feature is crucial to determine the patterns of thyroid lesions and associated factors.

AUTHORS' CONTRIBUTION

TM conceived the idea, carried out the proposal writing, participated in the data collection, data analysis and drafted the manuscript. MA, WT, and MM were participated in the designing the study, data analysis, interpretation of the findings and final write up of the paper. All authors read and approved the final paper.

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