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Study of spectrum of thyroid lesions on FNAC at tertiary care centre

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Abstract
Background: Thyroid diseases are among the commonly encountered disordered in any hospital. Majority of thyroid lesions are non-neoplastic and 5%-10% are malignant. Fine needle aspiration cytology (FNAC) is now a well-established, first line, simple and quick screening test as well as the diagnostic tool for surgical and non-surgical goitres. It is a very useful modality to decide on the patients requiring surgery from those who need not be operated.
Objective: To identify the cytomorphological spectrum of thyroid lesions and correlate with the clinical findings at the tertiary care centre.
Material and Methods: A total of 90 cases undergoing FNAC were enrolled. Thyroid swellings were aspirated using 23 gauge disposable needles fitted with 10 ml disposable syringes. The aspirated material was smeared into glass slides with preparation of both air dry smears for May-Grunewald Giemsa stain and 95% alcohol fixed smears for Haematoxylin and Eosin stain. Cytological evaluation was performed and cytological results were correlated with clinical features, thyroid function tests and histopathological examination.
Results: The most common age groups affected were 21 to 30 years (28.89%). Female outnumbered the males with female-male ratio of 6.5:1. Out of 90 cases benign lesions were observed in 80 cases (88.89%) followed by malignant 6 cases (6.67%) than atypia of unknown significant was present in 4 cases (4.44%). Out of 80 benign lesion cases, Benign Follicular Nodule Lesion were most common 62.23% while out of 6 malignant lesions, Papilary Carcinoma was most common found in 4 cases
Conclusion: Fine needle aspiration cytology is a cost effective procedure that provides specific diagnosis rapidly with minimum complications. It helps to differentiate cysts from solid tumors and serves as a therapeutic procedure when a cyst is encountered.

Keywords: benign, fine needle aspiration cytology, malignant, thyroid lesions

1. Introduction

Thyroid diseases are among the commonly encountered disordered in any hospital. They include a vast array of developmental, inflammatory, hyperplastic and neoplastic lesions. Goiter is a major health concern in many parts of the world [1]. Thyroid gland enlargement is a common presentation in the general population but all thyroid enlargements do not require surgery [2]. Thyroid nodules are common but thyroid cancer is uncommon [3].

The prevalence of thyroid nodules is about 3%-8% in the general population and is greater than 50% after age 65 years [4, 5]. It ranges from 0.2% to 1.2% in children[4]. Clinical surveys have shown that 5-10% of the general population have thyroid pathologies including nodular lesions in 2.5-3% of cases [6]. Thyroid enlargements may be diffuse or nodular, at times causing obvious physiological changes. Nodular lesions comprise those disorders that produce a clinical nodule and consist of non-neoplastic hyperplasia as well as benign and malignant tumors. Majority of thyroid lesions are non-neoplastic and 5%-10% are malignant. Clinical features alone cannot distinguish between benign and malignant nodules [7]. The incidence of thyroid malignancy is quite low, 1 in 20 clinically identified nodules turn out to be malignant, thus thyroid Fine needle aspiration cytology (FNAC) helps in reducing the rate of surgery for benign thyroid diseases [8, 9].

Fine needle aspiration cytology (FNAC) is now a well-established, first line, simple and quick screening test as well as the diagnostic tool for surgical and non-surgical goiters. It is a very useful modality to decide on the patients requiring surgery from those who need not be operated [10]. Introduction of FNAC in the field of thyroid diagnostic tests has reduced thyroid surgeries considerably [11]. The main requirement for thyroid FNAC is to differentiate neoplastic from non-neoplastic lesions and get a definite diagnosis of the enlargement [12]. FNAC is usually the first line of investigation followed by ultrasound examination, thyroid function tests and antibody levels [13].

Now a day's rapid assessment and accurate diagnosis of needle aspiration smears has become increasingly popular due to the global trend in reducing health care costs[14]. This study is undertaken to identify the cytomorphological spectrum of thyroid lesions and correlate with the clinical findings at the tertiary care centre SMS Medical College and attached hospital Jaipur.

2. Material and Methods

This study was laboratory based Cross sectional descriptive type of observational study carried out in Department of Pathology, Sawai Man Singh Medical College, Jaipur, Rajasthan. A total of 90 cases undergoing FNAC were enrolled for present study.

Thyroid swellings were aspirated using 23 gauge disposable needles fitted with 10 ml disposable syringes using standard procedures. Aspiration was done after detailed clinical history, physical examination and thyroid function test. FNAC results were compared with final histopathological diagnosis wherever possible. The aspirated material was

smeared into glass slides with preparation of both air dry smears for May-Grunwald Giemsa stain and 95% alcohol fixed smears for Haematoxylin and Eosin stain. Cytological evaluation was performed and cytological diagnosis from each case was based on cytomorphological and clinical findings. The cytological results were correlated with clinical features, thyroid function tests and histopathological examination.

3. Statistical analysis

Descriptive and Inferential statistical analysis has been carried out in the present study using computer software (SPSS Trial version 23 and primer). The qualitative data were expressed in proportion and percentages, and the quantitative data expressed as mean and standard deviations. The difference in proportion was analyzed by using chi square test and the difference in means among the groups was analyzed using the ANOVA test for parametric data. Significance levels for tests were determined as 95% (P <0.05).

4. Results

A total of 90 cases undergoing FNAC were enrolled for present study. Among that the most common age groups were affected 21 to 30 years of age (28.89%) followed by 31 to 40 years (23.33%). The mean ± SD of the study population age was 36.57±15.01years.

Out of 90 patients, female (78) outnumbered the males (12) with female- male ratio of 6.5:1.i.e female preponderance was observed in the study.

Out of 90 cases benign lesions were observed in 80 cases (88.89%) followed by malignant 6 cases (6.67%) than Atypia of unknown significant was present in 4 cases (4.44%).

Out of 80 benign lesion cases, Benign Follicular Nodule Lesion were observed in 62.23% followed by Autoimmune Thyroiditis (22.22%) Grave's Disease (2.22%) and each cases of Subacute Thyroiditis, Hurthle cell adenoma (1.11%) were found while out of 6 malignant lesions, Papilary Carcinoma cases were present in 4 cases followed by one cases of Anaplastic Carcinoma and one case of Follicular Neoplasm were found.

Among females, most common diagnosis observed was Benign Follicular Nodule, present in 58.97% cases followed by Auto Immune Thyroiditis which were present in (25.64%) while among males, most common diagnosis observed was Benign Follicular Nodule, present in 83.33% cases followed by Papillary Carcinoma which were present in (8.33%) No significant association was observed gender with diagnosis.

5. Discussion

Fine needle aspiration cytology (FNAC) is regarded as a gold standard in the initial diagnosis of thyroid nodules. It is simple, reliable, time saving, minimally invasive and cost effective [16, 17]. However there are some limitations of FNAC which a pathologist must be aware of [17]. The main information one wants from FNAC is to distinguish a malignant lesion from a benign one. The reporting systems for thyroid cytology vary among institutions and include 4 category system [18], 5 category system [19], or 6 category systems [20]. The most widely used ones are the Bethesda system [20] (6 category) and the Royal College of Pathologist [19]. (5 category) system.

In this study we found that maximum patients with thyroid lesions, irrespective of sex were in the age group of 21-30 years (28.99%) followed by 31-40 years of age (23.33%) and the least (7.78) was > 60 years of age. The peak age of incidence was observed in second and third decade of life. Our results are consistent with various authors Rangaswamy *et al.* [21]. and Gupta *et al.* [22]. Which concluded that maximum number of thyroid lesions are seen in age group of 31-40 yrs of age group. However, Yassa *et al.* [22]. Observed maximum number of cases between age group 41 and 50 years.

In this study we found that out of 90 patients, female (78) outnumbered the males with female- male ratio of 6.5:1 our results are in accordance with Dharmakanta Kumbhakar *et al.* [23]. Who reported female:male was 6.6:1 However Singh P *et al.* [24]. Reported female: male was 4.7:1.5, Sangalli G *et al.* 17 female: male was 4.21:1, Mandal S *et al.* [25]. Female: male was 5:1. It is due to fact that thyroid disorder is female prone owing to the presence of estrogen receptors in the thyroid tissue [26].

In this study, maximum number of cases belonged to the benign category 80 cases (88.89%), 06 cases (6.67%) belonged to malignant while 4 (4.44%) cases belong to Atypia of unknown significant. Our results are concordant with the study done by Handa *et al.* [9] which reported out of total 434 pts, 381 cases (87.7%) were reported to be benign & 31 cases (7.14%) were reported to be malignant. Another study done by Swamy *et al.* [27]. Also reported that same incidence i.e. out of 120 cases of thyroid lesion 100 cases (83.66%) were benign & 20 cases (16.66%) were reported to be malignant. However in the study done by Singh *et al.* [28]. A maximum number of cases belonged to malignant, i.e., 70 cases (57.3%) which were discordant with our study, the reason behind this may be the study was conducted on solitary nodules only.

Thyroid nodules are a source of concern for the patients and a diagnostic dilemma for physicians [29]. The prevalence of patients with thyroid nodules ranges from 4-25% [30]. The vast majority of nodules are non-neoplastic or benign neoplasms [31]. whereas 5-10% are estimated to be malignant nodules [30]. FNAC of the thyroid gland is now a well-established [2], most important modality [32]. And first line [2] preoperative and pathological [33]. Diagnostic test, for the evaluation of diffuse thyroid lesions as well as of thyroid nodules[2] as it is a rapid, inexpensive investigation.

In this study we found that out of 80 benign lesion 56 (62.23%) comprises Benign Follicular Nodule Lesion followed by Autoimmune Thyroiditis 20 (22.22%), Grave's Disease 2 (2.22%) and both Hurtle cell adenoma and Subacute Thyroiditis 1 (1.11%) cases. Out of 06 malignant lesion 4 (4.44%) comprises papillary carcinoma while both anaplastic carcinoma and follicular neoplasm comprises 1 (1.11%) cases each. We also found 4 (4.44) cases of Atypia of undetermined significance in our study. Our results are in agreement with various authors Khusbu Jain *et al.* [34], Ranjan Agarwal *et al.* [35] and Mani Krishna *et al.* [36] whose results are concordance with us.

In this study we found that out of 56 benign follicular nodules; 46 were females while only 10 males were affected from benign follicular nodules. Similarly 3 cases were diagnosed as papillary carcinoma among that 3 were female and only 1 were male. Autoimmune Thyroiditis was found only in female patients. Our results are concordant with Shrish *et al.* [37] and Ranjan Agarwal *et al.* [35].

The incidence of thyroid lesion is increasing significantly nowadays. Many a time's differentiation between physiological, inflammatory, autoimmune, hyper functioning and hypo functioning of thyroid gland, benign and malignant tumor poses diagnostic difficulty. Fine needle aspiration cytology with clinical correlation along with thyroid function tests are done in relevant cases. Final diagnosis requires morphological examination of the lesions. Fine needle aspiration cytology is widely accepted and has become the cornerstone in evaluation of the thyroid lesion and unnecessary surgery can be avoided.

Therefore, fine needle aspiration cytology should be adopted as an initial investigation of thyroid lesion in all Tertiary Hospitals [38].

6. Conclusion

Fine needle aspiration cytology is a cost effective procedure that provides specific diagnosis rapidly with minimum complications. Based on the cytology findings, patients can be followed in cases of benign diagnosis and subjected to surgery in cases of malignant diagnosis thereby decreasing the rate of unnecessary surgery. It helps to differentiate cysts from solid tumors and serves as a therapeutic procedure when a cyst is encountered and also provides psychological relief of anxiety to the patients with benign thyroid lesions.

7. References

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