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SENSITIVITY AND SPECIFICITY OF FINE NEEDLE ASPIRATION CYTOLOGY [FNAC] IN A THYROID SWELLING

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Abstract: The current study was observational study undertaken to study sensitivity and specificity of FNAC in a thyroid swelling. It was observed that majority of patients with goiter were in age group 31-40 years. The majority of patients with goiter were females 50 (89.29%) as compared to males 14 (73.68%). The carcinomas were also more prevalent in females as compared to males. The results of thyroid cytology must be assessed in conjunction with the clinical findings and other investigations like TFT and USG findings, in view of the possibility of false negative or false positive cytological diagnosis. The viability and applicability of cell pattern analysis in applying pattern analysis to the understanding of thyroid cytology is also seen in this study.

Keywords: Thyroid Swelling, Specificity, Sensitivity, Fine Needle Aspiration Cytology

1. INTRODUCTION

Thyroid gland disorders are widespread and involve a variety of organisms that cause systemic disease (Grave 's disease) or a localised thyroid gland abnormality such as nodular enlargement (goitre) or mass of the tumour. The thyroid gland is the most prominent organ to cause endocrine disorders after diabetes mellitus [1]. The most common endocrine diseases are thyroid disorders, especially in countries where dietary iodine intake is low. A solitary thyroid nodule is classified as a unambiguous single, clinically detected nodule in the thyroid. They cause some anxiety due to significant chance of malignancy in them, which can range from 5-35 percent of all solitary thyroid nodules [2]. Diffuse thyroid lesions are those that are associated with diseases such as hyperplasia and thyroiditis that affect the whole gland. Nodular lesion consists of conditions that create a chronic nodule and include non-neoplastic hyperplasia as well as benign and malignant tumours [3]. Thyroid neoplasms are very unusual disorders. They represent just 0.7% of all cancers in women and 0.2% in males. However, the occurrence of thyroid neoplasm has risen in India and abroad [4]. Striking advances in multiple areas in medication and science as applied to the analysis in thyroid

lesions have contributed to a deeper understanding and control of multiple thyroid disorders [5]. Thyroid gland Fine Needle Aspiration Cytology (FNAC) is a well-established first-line diagnostic examination for the assessment of diffuse thyroid lesions and thyroid nodules with the primary goal of verifying benign lesions and thereby eliminating needless surgery. The thyroid gland's superficial location facilitates excellent visualisation and assessment of its natural anatomy and pathological state by real-time grey scale sonography with high resolution [6,7].

2. AIM AND OBJECTIVES

AIM:
To study sensitivity and specificity of FNAC in a thyroid swelling.
OBJECTIVES:
To study role of FNAC in diagnosis of thyroid swelling.

3. REVIEW OF LITERATURE

108 million people in India suffer from endocrine and metabolic diseases. Many of these ailment are due to environmental causes. They are preventable and can be easily handled at an acceptable rate. A peculiar characteristic of endocrine disorders is that early and accurate diagnosis can only be made by sensitive and precise hormone measures. Endocrine disorders often present with symptoms early in their diagnosis. Full-blown syndrome progresses late, and some structural complications may have occurred as a result of injury to vital organs [8]. Thyroid disorders are the most prevalent of all endocrine diseases in India. The thyroid gland is a very important part of the human body that controls many functions including the growth and metabolism of the body. Thyroid disorder develops because the thyroid gland does not provide the proper amount of hormones produced by the body. Thyroid disorders often go undiagnosed [9]. Thyroid is an endrocrine gland which is derived from the Greek word “thyreoeides”, meaning shield shaped, situated at the root of the neck on either side of the trachea. The thyroid gland is shaped like a butterfly and consists of two cone-like lobes or wings, which are connected in the middle by an isthmus. Normally the weight of thyroid is about 20 to 40 g in adults but it is subjected to variations under physiological conditions. It is brownish red in colour. It starts functioning even before birth [10]. Cytopathology is the study of cells that have been exfoliated freely from the tissue surface or that have been collected by brushings, scraping, washing or by needle aspiration.

Earlier authors such as Soderstrom N [11] in 1966 developed and reported the first well defined method of needle aspiration and cytopathologic evaluation. Several of his protégés, including Lundquist A [12] (1970), continued this work and reported extensively on the clinical application of these techniques. It was in the 70‟s that the clinicians started utilization of newer imaging modalities like ultrasound [13] and later on computerized tomography [14] for the purpose of aspiration biopsy. It was found that these newer methods not only demonstrated the disease process far more accurately than before but also allowed more precise localization of aspiration biopsy needle even in previously inaccessible lesions. [15]

Singh P et al [16] (2000) performed FNAC on 108 thyroid lesions and correlated with histopathology study during the period between July 1988 and June 1996. Although some limitations were observed in diagnosis of follicular neoplasm; FNAC has been found by them to be a rapid, simple, economical and fairly accurate diagnostic modality, and valuable tool in surgical selection in majority of patients with thyroid lesions, thereby reducing the cost of management of thyroid disease.

Aravinthan T et al [17] (2007) evaluated the usefulness of fine needle aspiration cytology

on thyroid lumps. The thyroid nodules of 110 patients between January 2004 to December 2005 were subjected to FNAC and later after surgery, their cyto-histological correlation done. They concluded in their study that thyroid FNAC should be undertaken under USG guidance with the presence of pathologist to assess sample adequacy and in STN cases, repeat FNAC should be done to rule our high false negative rate.

Mondal HP et al [18] (2011) studied 33 thyroid cases prospectively from2007 to 2009 and concluded that firm to hard nodules, male sex, 3-4 cms size dnodules were mainly susceptible for thyroid carcinoma. They opined that there is an obvious trend towards cancer risk with higher TSH values in thyroid nodules. Owingly, they concluded that TSH levels may be used as a supportive screening test to predict malignancy in patients with thyroid nodule; which still needs further study on similar course taking relatively large number of patients into consideration.

4. MATERIALS AND METHODS

The present study was observational study undertaken to study sensitivity and specificity of FNAC in a thyroid swelling. The present study period was carried out during December 2015 to June 2017 at Department of Surgery in Krishna Hospital, Karad. All the patients presenting to the Department of Surgery with neck swelling were included as study population. A total sample size of 75 patients with thyroid swelling referred to Department of surgery was included in the study.

5. OBSERVATIONS AND RESULTS

Table 1: Age Distribution

Age group (years)	No. of cases	Percentage
0-10	01	01.33
11-20	03	04.00
21-30	19	25.33
31-40	25	33.33
41-50	12	16.00
51-60	07	09.33
61-70	05	06.67
>70	03	04.00
Total	75	100

The above table no. 1 shows distribution of patients according to age. It was observed that majority of patients were in age group 31-40 years (33.33%) followed by 21-30 years (25.33%).

Table 2: Sex Distribution

Sex	No. of cases	Percentage
Female	56	74.67
Male	19	25.33
Total	75	100

The above table no. 2 shows distribution of patients according to sex. It was observed that majority of patients were in female (74.67%) and males were 25.33%.

Table 3: Clinical Complaints

Complaints	Number Of Patients	Percentage
Swelling	75	100.00
Pain	19	25.33
Pressure Effects	13	17.33
Hoarseness	08	10.67
Dysphagia	06	8.00
Fever	06	8.00

The above table no. 3 shows distribution of patients according to clinical complaints. It was observed that majority of patients were having swelling (100%) followed by pain (25.33%).

6. DISCUSSION

The present study was observational study undertaken to study sensitivity and specificity of

FNAC in a thyroid swelling. The present study period was carried out during December 2015 to June 2017 at Department of Surgery in Krishna Hospital, Karad. All the patients presenting to the Department of Surgery with neck swelling were included as study population. A total sample size of 75 patients with thyroid swelling referred to Department of surgery was included in the study. Patients in end stage renal failure and all previously diagnosed cases of neck lesion, histopathological proven cases and post operated cases were excluded from study. After written consent, a detailed history was taken with emphasis on duration of presence of lump, pain, dysphagia, hoarseness, fever etc A complete general physical and systemic was done. Local examination of the swelling was done and size, shape, number, location, consistency, compressibility, translucency, fixity to underlying structures, movement with deglutition, protrusion of tongue and any associated lymphadenopathy was noted.

7. CONCLUSION

Thyroid FNAC proves to be a reliable, simple and cost-effective first line diagnostic procedure with high patient acceptance and without complications. The results of thyroid cytology must be assessed in conjunction with the clinical findings and other investigations like TFT and USG findings, in view of the possibility of false negative or false positive cytological diagnosis. The procedure has acceptable sensitivity and specificity in wide range group of patients in experienced hands and hence can be followed as a pre-operative diagnostic modality in the management of patients with thyroid lesions, thus reducing the number of surgeries. Our study also demonstrates the feasibility and applicability of cell pattern analysis in applying pattern analysis in interpretation of thyroid cytology. Application of systematic pattern analysis study has allowed reliable accuracy and easy reproducibility. However the sensitivity and specificity to diagnose malignancy by routine cytological reporting was slightly higher than that of cell pattern approach of STN lesions due to the lower sample size of USG detected STN cases in our study. We conclude that pattern analysis is better suited for beginners‟ in cytopathology. Studies to evaluate various diagnostic parameters are necessary in all cytology centers to improve upon technical as well as interpretative errors.

8. REFERENCES

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