Original Research Article

Correlation of Preoperative Fine Needle Aspiration Cytology with Histopathological Examination Of Thyroid Swellings

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Abstract

Background: Swelling of thyroid are frequently encountered in surgical practice. Clinical evaluation is of utmost importance and hepls in early diagnosis but it is difficult to differentiate between early malignant lesions and the most prevalent benign goiters. **Objective:** To correlating the cytological diagnosis (FNAC) with the histopathological diagnosis to calculate the sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC smears.**Methods:** A proforma was drafted for the studies2 of all patients presenting with history of palpable thyroid swelling and undergo surgery in our hospital. Clinical presentations, FNAC and histopathology of all cases were documented. **Results:** 50 cases who presented with thyroid swellings were studied and their histopathological diagnosis was compared with the FNAC. Out of the 50 cases, 42 were females and 08 were males, being 5.65 : 1. Of the 42 cases which were seen benign by FNAC, 39 were confirmed by histopathology. Of the 11 cases which were proved to be malignant by histopathology 08 were only seen as malignant by FNAC. The sensitivity of FNAC in the diagnosis of benign lesions was found to be 72.72%, specificity was 100%, positive predictive value 100% and accuracy is 94%. **Conclusion:** The majority of cases were benign of which multinodular goiter was the most dominant pathology (34 %). Among the malignancies, papillary carcinoma (72.72 %) was common .The sensitivity, specificity and predictive value of positive smears being 72.72%, 100 %, and 100% respectively. FNAC is simpler, safer, quicker and more informative, when compared with other well known methods in the diagnosis of thyroid lesions.

Keywords: Fine Needle Aspiration Cytology, Histopathological Examination, Thyroid Swellings, sensitivity, specificity, predictive value.

Introduction

Thyroid gland swelling is a common manifestation in most part of the world, particularly in countries like India which is endemic for iodine deficiency disorders. Studies had shown that the prevalence of goitre in India is as high as 40%. The goitre development is a concern for both the patient and the clinician, as many of the thyroid swelling may turn malignant. Though many of the goitre swellings are benign but still the reports had shown that the prevalence of malignancy among the solitary nodule goitre was about 10%. As such thyroid cancer is relatively a rare malignancy but it is the commonest endocrine cancer accounting for more than 90% of all the endocrine cancers. [1]

Among the various types of cancers in thyroid gland, papillary carcinoma is the most common which is followed by follicular, medullary, anaplastic and lymphoma.

Fine needle aspiration cytology (FNAC) is now being accepted as the most cost-effective, minimal invasive technique with very low incidence of complications in the diagnosis of most of the thyroid lesions .advantage of segregating the patients of solitary thyroid nodule(STN) into operative and non-operative groups. [2]

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A thyroid nodule which is usually considered for FNAC should be of firm, palpable and ultrasonographic features; dominant or atypical nodules in multinodulargoiter complex or recurrent cystic nodules; or any nodule associated with palpable or ultrasonographically abnormal cervical lymph nodes. [3] FNAC is considered to be the "gold standard" in the selection of patients for surgery. It is usually performed without local anaesthesia and any previous preparations on the patients. Studies have quoted that medical professionals with longstanding experience, the diagnostic (adequate) biopsies obtained from solid nodules had ranged between 90–97%.During the procedure, ultrasound guidance instead of palpation had enhanced the value of the FNAC diagnostic accuracy. However, the success of FNAC depends on several factors such as aspirator experience, skill ful cytological interpretation and a rational analysis based upon a synthesis of cytological and clinical information in the context of an individual patient. Still the histopathological examination of the thyroid gland was considered superior to FNAC in diagnosing the thyroid pathologies due to certain pitfalls in FNAC such as scanty sample, vascularity of thyroid swelling, variation in sampling technique and skill of the performing expert and as well as the experience of pathologist interpreting the aspirate. So the current study was undertaken in view of comparing and correlating the FNAC findings with that of histopathology readings among the patients with palpable thyroid swelling

Material and Methods

The prospective study includes those patients admitted in the surgical wards of K.R Hospital Mysore from January 2018 to July 2019 for treatment of thyroid diseases.

Source of data

Patients with thyroid swelling having clinical and sonological indication for FNAC and subsequent thyroid surgery admitted in the wards of Department of Surgery, K.R Hospital, mysore during the study period.Sample size and method: A total of 50 patients with thyroid swelling were studied.

Inclusion criteria

1. Patients with thyroid swellings undergoing thyroidectomy
2. Patients of all age groups, sex and demographic distribution.

Exclusion criteria

The study excludes those patients with-Bleeding disorders, Pregnant ladies and children below 10years, Not willing for surgery, Patient unfit for surgery.

Patients with goiter were evaluated clinically. Relevant aspects of patien's history included age, sex, rapidity of growth, recent onset of hoarseness, dysphagia, dyspnoea, symptoms of hypo or hyperthyrodism, history of head and neck irradiation, family history of endocrine diseases was included**.**Physical examination to determine whether the gland was diffusely enlarged, solitary, nodular or multinodular with symmetric or asymmetric enlargement was done. In nodular swelling, the size, shape, consistency, location and mobility was assessed. The patient was also be examined for the presence of cervical lymphadenopathy.A thyroid function test and an ultrasound was performed using a 7.5 MHZ high frequency linear array transducer. An informed consent after explaining the procedure and its complications namely pain and haemorrhage was obtained. The procedure was carried out in the Department of Pathology, K.R.Hospital , Mysore.

Materials used

1. Syringe: 10ml disposable plasticsyringe
2. Needle: 23G disposableneedle
3. Microslides: 7.5 x 2.5 cm insize
4. Fixative: 95% isopropylalcohol
5. Spiritswab: To sterilize theskin
6. Stain: Hematoxylin andeosin

Procedure

The patient was placed supine with neck extended and instructed not to swallow or talk. The skin cleansed with a simple alcohol preparation. Proper site for aspiration decided, avoiding, superficial neck vein. Under visual guidance a 23 gauge needle was introduced into the nodule with a series of rapid advance - withdraw motions. Patients were subjected to 2-5 passes when sample are adequate or 5-8 passes when assessed inadequate initially. Pressure is applied over the biopsy site to minimise bruising and decrease the chance of haematoma. The sample is expelled on to a clean, dry, microscopy slide using air in a syringe taking care to avoid splashing. Smears are quickly dried and placed in Coplin jars with isopropyl alcohol. Alcohol fixed smears was then treated with Haematoxylin and Eosin and examined under the microscope.

Results of fine needle aspiration cytology can be classified as : 1. Malignant 2. Indeterminate or suspicious 3. Follicular 4. Benign 5. Nondiagnostic

Results

The study consisted of a total of 50 patients among whom, 42 were females and 08 were males The study group of 50 patients included cases ranging from 19 yrs to 70 yrs. Majority of thyroid cases (60%) were in the 2nd and 3rd and decades of life (21-40)yrs. Of the 50 cases of thyroid selected for study, 42 were cytologically benign and 08 were malignant. Among the benign thyroid swellings 13 were multinodular goitres, 17 colloid goitres, 2 Hashimotos thyroiditis, 3 Lymphocytic thyroiditis, 4 follicular neoplasm. Of the 08 malignant thyroid lesions, 08 were papillary carcinoma. Of the 100 excised specimens, 39 were confirmed to be benign and 11 were malignant. Among the benign ones, 17 were multinodular goitres, 06 were thyroiditis, 07 were follicular adenoma, 09 were colloid goitre.

Among the malignancies, 08 were papillary carcinoma thyroid, 03 follicular carcinoma. Of the 11 malignancies diagnosed histologically as malignant, 08 were diagnosed correctly from cytology too. But 03 were found to be benign in cytological study.Of the 08 male patients studied, 07 had benign lesions, and 01 had malignant lesions. Among the benign ones, 03 had multinodular goitre, 01 Lymphocytic thyroiditis, 03 colloid goitre, and of the malignancies, 01 were papillary carcinomas. The accuracy of FNAC in the diagnosis of malignant disease of thyroid was evaluated by using the predictive value theory. The sensitivity, specificity, positive and negative predictive values and accuracy were determined.

Table 1: Predictive Value of FNAC of Thyroid Swellings

Cytology	Histology		Total Cytology
	Benign	Malignant	
Benign (no malignant cells)	39	3	42
Malignant (malignant cells)	0	8	8
Total histology	39	11	50

Sensitivity: Positive in disease =72.72%
Specificity: Negative in disease=100%
Positive predictive value= 100%
Negative predictive value=92.85%
Accuracy =94%

Table 2: Fine Needle Aspiration Cytology Diagnosis

FNAC Diagnosis	Number	Percentage
Multinodular goitre	13	26
Colloid goitre	17	34
Hashimotos thyroiditis	02	04
Follicular neoplasm	04	08
Lymphocytic thyroiditis	03	06
Follicular adenoma	03	06
Papillary carcinoma	08	16

Table 3: **Histopathological Diagnosis**

Histopathological Diagnosis	Number	Percentage
Multinodular goitre	17	34
Thyroiditis	6	12
Follicular adenoma	7	14
Colloid goitre	9	18
Malignancy	11	22

Table 4: Malignancy in Histopathology

Malignancy	Number	Percentage
Papillary carcinoma	8	72.72
Follicular carcinoma	3	27.27
Medullary carcinoma	0	0
Anaplastic carcinoma	0	0
Total	11	100

Discussion

The age of the patients in the present study varied from 19 to 70 yrs. The age of the patients studied by Klemi PJ et al [4] (1990) studied ranged from 21 to 86 yrs. In this study patients of 2nd and 3rd decade was found to be 56%. The majority of patients in the study conducted by Scalbas GM et al [5] (2003) were between 30 and 50 yrs. The sex ratio in the present series was 5.25:1 with 42 women and 08 men. In the series of Gershengom et al [6] (1977) female to male ratio was 28:5, the male proportion in Colacchio series was 16% . [7]

Incidence of malignancy

11 out of 50 patients (22%) studied were malignant. The other series shows Chu et al [8] (1979) 26%, Silver et al [9] (1981) 22%, Sclabas G M et al [5] (2003) 32%. Among the malignant lesions, papillary carcinoma comprised 72.72%, follicular comprised of 27.27%. The frequency of carcinomas studied in the series of Braun and Silver (1984) [9] 38:25% and 37:29% respectively for papillary and follicular carcinomas respectively. The incidence of papillary carcinomas ws high in the strudy Ramaciottio et al [10] (1984) was 76% and Klemi et al [4] was 59%. In the study of Sclabas GM [5] papillary carcinoma was 82% and follicular carcinoma accounted to be 15 %, and the study of Rajpurohit showed papillary and follicular was 77 and 7.7% respectively.

Table 5: FNAC of thyroid swellings: Incidence of malignancy in different series

Sl. No.	Name of the Author	Year	Incidence of malignancy
1	Chu et al[8]	1979	26%
2	Lowhagen et al [12]	1979	20%
3	Silver et al [9]	1981	22%
4	Ramaciotti et al [10]	1984	20%
	Present series	2019	22%

Table 6: Incidence of malignant histological types from different series

Sl. No.	Name of the Author	Year	Papillary Carcinoma	Follicular Carcinoma
1	Braun and Silver et al[9]	1984	37%	29%
2	Klemi PJ et al[4]	1990	59%	13%
3	Sclabas et al[5]	2003	82%	12%
4	Babu SBK et al	2016	48%	28%
5	PRESENT SERIES	2019	73%	27%

Conclusion

FNAC was of greater help in the diagnosis of thyroid swellings. multinodular goitres and colloid goitres were diagnosed easily with FNAC, but confusion prevailed in cases of follicular adenoma. Majority of our cases were rural folks, who cannot be followed up regularly and for long time, hence clinical suspicion of malignancy should be one of the indications of surgery, Inspite of negative FNAC reports. FNAC is simpler, safer, quicker and more informative, compared to other sofisticated investigations in diagnosis of thyroid diseases. It should be exploited to its maximum benefit on all thyroids wellings.

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