Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Assessment of correlation of fine needle aspiration cytology with histopathological examination of thyroid swellings

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ABSTRACT:

Background: The prevalence of thyroid swelling ranges from 4% to 10% in general adult population and from 0.2% to 1.2% in children. The present study was conducted to correlate fine needle aspiration cytology with histopathological examination of thyroid swellings. **Materials & Methods:** 65 patients of thyroid swellings of both genders were enrolled. Data such as name, age, gender etc. was recorded. All patients with were clinically evaluated.Thyroid function test and an ultrasound was performed using a 7.5 MHZ high frequency linear array transducer. FNAC was performed. Sensitivity, specificity, positive predictive value, negative predictive value and accuracy of FNAC smear was recorded. **Results:** 58 lesions were cytologically benign and 7 were malignant. Lesions were colloid goitre in 25, multinodular goitre in 20, follicular neoplasm in 3, hashimotos thyroiditis in 2, papillary carcinoma in 10, follicular adenoma in 4 and lymphocytic thyroiditis in 1 case. The difference was significant ($P< 0.05$). Histopathological diagnosis was thyroiditis in 2, multinodular goitre in 23, colloid goitre in 12, follicular adenoma in 8 and malignancy in 10 cases. The difference was significant ($P< 0.05$). FNAC had Sensitivity of 70%, Specificity of 100%, PPV of 100% and NNV of 94.8%. **Conclusion:** FNAC is a reliable, and accurate method in evaluating thyroid swelling before the surgery.

Key words: Thyroid, FNAC, Swelling

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This article may be cited as: Bisaria D. Assessment of correlation of fine needle aspiration cytology with histopathological examination of thyroid swellings. J Adv Med Dent Scie Res 2018;6(4):174-177.

INTRODUCTION

Diseases of the thyroid gland is a common clinical presentation in general population where the incidence being higher in endemic areas, which is higher in females as compared to males.[1] The prevalence of thyroid swelling ranges from 4% to 10% in general adult population and from 0.2% to 1.2% in children. The disorders of thyroid gland can be due to inflammatory and neoplastic causes.[2]

Among multitude of diagnostic tests like ultrasound of neck, fine needle aspiration cytology (FNAC) and many more are available to evaluate a case of goiter. Final diagnosis always requires morphological examination of lesions for which FNAC and histopathological examination (HPE) becomes mandatory tests.[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%.[4] 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, skillfull cytological interpretation and a rational analysis based upon a synthesis of cytological and clinical information in the context of an individual patient.[5] The present study was conducted to correlate fine needle aspiration cytology with histopathological examination of thyroid swellings.

MATERIALS & METHODS

The present study comprised of 65 patients of thyroid swellings of both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. All patients with were clinically evaluated. Parameters such as 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 were determined. Thyroid function test and an ultrasound was performed using a 7.5 MHZ high frequency linear array transducer. FNAC was performed Alcohol fixed smears was treated with Haematoxylin and Eosin and examined under the microscope. Findings of fine needle aspiration cytology were classified as malignant, indeterminate or suspicious, follicular, benign and nondiagnostic. Sensitivity, specificity, positive predictive value, negative predictive value of FNAC smear was recorded.

Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 65		
Gender	**Males**	**Females**
Number	25	40

Table I shows that out of 65 patients, males were 25 and females were 40.

Table II Results of fine needle aspiration cytology

Cytology	Histology		Total cytology
	Benign	Malignant	
Benign	55	3	58
Malignant	0	7	7
Total histology	55	10	65

Table II shows that 58 lesions were cytologically benign and 7 were malignant.

Table III Type of lesions

Lesions	Number	P value
Colloid goitre	25	0.01
Multinodular goitre	20	
Follicular neoplasm	3	
Hashimotos thyroiditis	2	
Papillary carcinoma	10	
Follicular adenoma	4	
Lymphocytic thyroiditis	1	

Table III, graph I shows that lesions were colloid goitre in 25, multinodular goitre in 20, follicular neoplasm in 3, hashimotos thyroiditis in 2, papillary carcinoma in 10, follicular adenoma in 4 and lymphocytic thyroiditis in 1 case. The difference was significant (P< 0.05).

Graph I Type of lesions

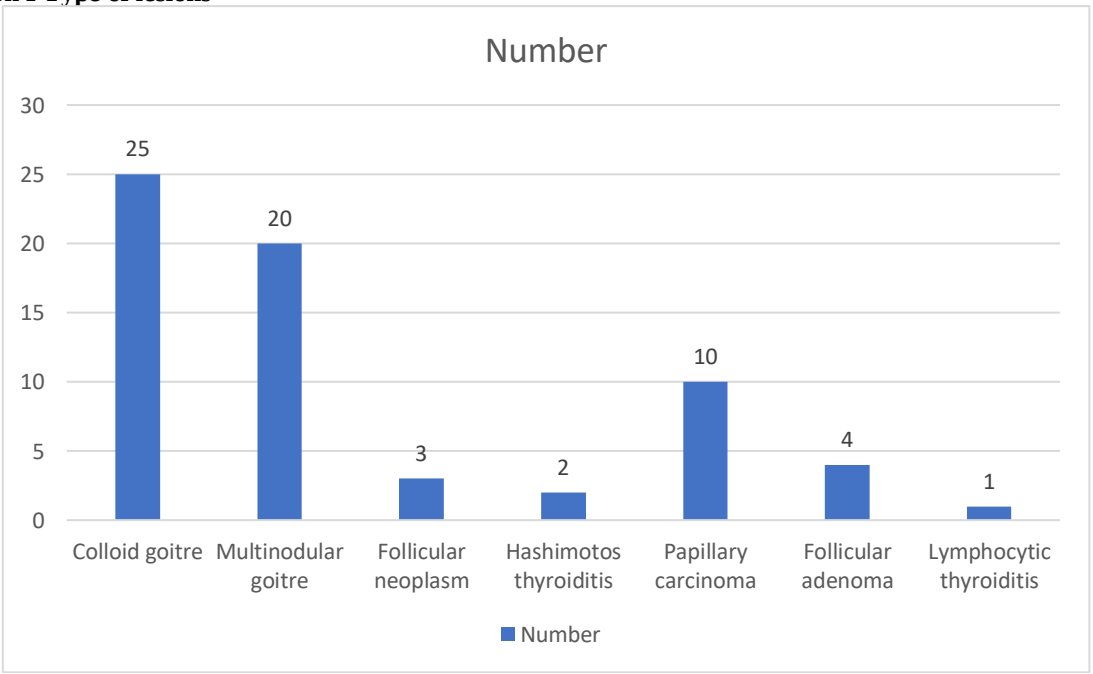

Table IV Histopathological diagnosis

Histopathological diagnosis	Number	P value
Thyroiditis	2	0.01
Multinodular goitre	23	
Colloid goitre	12	
Follicular adenoma	8	
Malignancy	10	

Table IV shows that histopathological diagnosis was thyroiditis in 2, multinodular goitre in 23, colloid goitre in 12, follicular adenoma in 8 and malignancy in 10 cases. The difference was significant (P< 0.05).

Table V Efficacy of FNAC

Efficacy	Value
Sensitivity	70%
Specificity	100%
PPV	100%
NNV	94.8%

Table V shows that FNAC had Sensitivity of 70%, Specificity of 100%, PPV of 100% and NNV of 94.8%.

DISCUSSION

Fine needle aspiration cytology is considered the gold standard in the evaluation of thyroid swelling. It is a simple, cost-effective, readily repeated, and quick to perform procedure in the outpatient department, with excellent patient compliance.[6] Important factor for satisfactory test includes representative specimen from the goiter and an experienced cytologist to interpret the findings.[7] Fine needle aspiration cytology, however, is not without limitations related to specimen adequacy, sampling techniques, skill of performing the aspiration, interpretation of the aspirate, and overlapping cytological features between benign and malignant follicular neoplasm and also in the detection of some papillary carcinomas because of associated thyroid pathology including multinodular goiter (MNG), thyrotoxicosis, and marked cystic changes.[8] The present study was conducted to correlate fine needle aspiration cytology with histopathological examination of thyroid swellings.

We found that 58 lesions were cytologically benign and 7 were malignant. Bodepudi et al[9] in their study a total number of 93 cases were included in the study of which majority were females with frequency of 84.94%, most of the incidence of thyroid swellings occur in the age group of 40 to 50 years. Overall mismatch between histopathological examination and FNAC was 43 out of 93 and of which 7 were major and 36 were minor mismatch. Sensitivity of patients having malignancy with positive FNAC is 82.35% from the study and specificity of patients with nonmalignant thyroid disease and positive cytology is 95.18%.

We observed that lesions were colloid goitre in 25, multinodular goitre in 20, follicular neoplasm in 3, hashimotos thyroiditis in 2, papillary carcinoma in 10, follicular adenoma in 4 and lymphocytic thyroiditis in 1 case. Singh et al[10] in their study found that a total of seventy patients were included. The diagnosis on FNAC was correlated with histopathology. Statistical analysis showed FNAC had a sensitivity of 83.3%, specificity of 100%, positive predictive value of 100%, negative predictive value of 96.7%. However, the overall accuracy in this study was determined to be 95.71%. Results were found to be statistically significant. The diagnostic role of FNAC in thyroid lesions is of utmost importance in making preoperative diagnosis. FNAC was found to be highly sensitive and specific for diagnosing thyroid lesions but the final HPE is considered as a gold standard.

We found that histopathological diagnosis was thyroiditis in 2, multinodular goitre in 23, colloid goitre in 12, follicular adenoma in 8 and malignancy in 10 cases. Kini et al[11] found that FNA was diagnostic in 86.6, 98, and 100% in grade 0, 1, and 2 goiters, respectively. 52.3% (n = 90), 19.8% (n = 34), 16.9% (n = 29) of cases were diagnosed as Hashimoto's thyroiditis (HT), colloid goiter (CG), and lymphocytic thyroiditis (LT). Sixteen had a combination of LT and CG (n = 6), HT and CG (n = 6), papillary carcinoma (n = 2), and diffuse hyperplasia (n = 2). No statistically significant difference (P = 0.4586) was noted between the groups of patients with grade 0 and grade 1-2 goiter, who underwent FNAC. 38.95% of patients (n = 67) with TSH values greater than 10 microIU/ml and considered hypothyroid showed features of HT/LT at FNA. 23.83% (n = 41) having TSH values between 5 and 10 microIU/ml (subclinical hypothyroidism) also showed features of HT/LT at FNA. Both groups were treated with thyroxine. 35.46% (n = 61) of cases with TSH values within normal range (0.5-5.1 microIU/ml) and considered euthyroid showed a spectrum of lesions at cytology other than HT and LT. They are being followed up to detect them at an early stage of subclinical hypothyroidism. Only 13 cases (7.5%) who were serologically euthyroid showed HT/LT and are being followed-up.

We observed that FNAC had Sensitivity of 70%, Specificity of 100%, PPV of 100% and NNV of 94.8%.Bajaj et al[12]evaluated the predictive value of pre-operative fine needle aspiration cytology (FNAC)

in surgical decision making, by comparing the final pathological diagnosis with the initial FNAC result. All patients who underwent thyroidectomy between 1999 and 2003 were analysed. One hundred and sixty patients who underwent pre-operative FNAC were included in this study. Fine needle aspiration was accurate in 119 (74.3 per cent) patients. Fine needle aspiration cytology and histology did not correlate in 32 (20 per cent) patients and FNAC was inadequate in nine (5.6 per cent) cases. Failures were mainly noted in cases of follicular neoplasm.

CONCLUSION

Authors found that FNAC is a reliable, and accurate method in evaluating thyroid swelling before the surgery.

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