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Original Research Article

Clinicopathological study of thyroid swelling and its management

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ABSTRACT

Background: There is high prevalence of thyroid lesions in India. In this study, an attempt is made to find out the clinical spectrum of thyroid swellings in central India, diagnostic accuracy of fine needle aspiration cytology (FNAC), appropriate surgical management and to compare it with postoperative histopathological diagnosis so as to determine its role in surgical management.
Methods: In this prospective study, 100 subjects presenting to ENT OPD of GMC, Nagpur during the period from September 2017 to August 2019 with thyroid swelling who were fit to undergo surgery and willing to participate in the study were selected. After detailed evaluation and routine investigations, thyroid function test (TFT), FNAC, ultrasonography (USG) neck, all the subjects underwent required thyroidectomy. The postoperative histopathological examination (HPE) report was correlated with cytological report.
Results: In 100 subjects, majority of subjects were from 4th decade (32%) with female: male ratio=6.14:1. FNAC findings were colloid goiter (61%), nodular goiter (19%), follicular neoplasm (10%), and papillary carcinoma (9%). On HPE, colloid goitre (57%) was most common non-neoplastic lesion and papillary carcinoma (65.21 %) was most common malignant lesion. Hemithyroidectomy (70%) was most common procedure done. Transient hypocalcemia (5%), recurrent laryngeal nerve (RLN) paresis (2%) were the postoperative complications encountered. Sensitivity, specificity, accuracy, positive and negative predictive values of FNAC to diagnose malignancy were 55.6%, 100%, 91%, 100% and 90% respectively.
Conclusions: FNAC is an easy, rapid, reliable, cost-effective, minimally invasive and readily repeatable technique for diagnosis of thyroid swellings. The common false negative diagnosis is seen in follicular pattern cases, cystic papillary thyroid carcinoma (PTC) and papillary microcarcinoma.

Keywords: Thyroid swelling, Thyroidectomy, Papillary carcinoma, FNAC, Thyroid HPE

INTRODUCTION

The Thyroid gland is unique among endocrine glands in that it is the first endocrine gland to appear in the fetus.[1] It is the largest of all endocrine glands and the only one which is amenable to direct physical examination because of its superficial location. Thyroid lesions are fairly common worldwide and are commonly encountered in clinical practice. From a clinical standpoint, the possibility of neoplastic diseases is of major concern. The primary concern is the biologic behavior of benignancy versus malignancy in a swelling so that the operative approach can be aptly modified. The main stay of diagnosis of nodular. Thyroid swelling is by means of clinical, fine needle aspiration cytology, sonological, and histopathological examination. Fine needle aspiration cytology (FNAC) is considered as the important investigation in diagnosis of thyroid swellings, however it has some limitations related to some aspects, mainly overlapping cytological features between benign and malignant follicular neoplasm, in detection of some

papillary carcinomas because of associated thyroid pathology owing to low yield of cells and loss of histological architecture.[3,4] Here arises the need for histopathological examination, as it is considered as the final diagnostic test. This also raises the question of how much corroborative is FNAC and histopathological examination (HPE). In this study, a modest attempt is made to find out the clinical spectrum of thyroid swellings in this particular geographical area, as there is high drainage from all over central part of India. Diagnostic accuracy of FNAC with respect to disease, appropriate surgical management according to preoperative sonological and cytological diagnosis and to compare with postoperative histopathological report so as to determine its role in surgical management of thyroid disease.

METHODS

This is a prospective hospital-based study carried out on 100 cases of thyroid swelling attending the department of ENT in government medical college, Nagpur having adequate diagnostic and treatment facilities during the period of September 2017 to August 2019 after approval from institutional ethics committee.

Inclusion criteria

Patients with thyroid swelling, who are fit to undergo thyroid surgery, and willing to give consent to participate in the study.

Exclusion criteria

Patients with thyroiditis on FNAC, patients with pubertal thyroid enlargement, hypothyroid or hyperthyroid patients, and patients unfit for surgery due to medical reasons.

The principle investigator thoroughly examined all cases at the ENT department by taking a detailed history, general examination along with a system based otorhinolaryngological assessment. After clinical assessment, thyroid status was determined by estimation of T3, T4, TSH. FNAC, USG NECK was done. Complete hematological investigations were done. 100 patients of thyroid swelling were evaluated and the main outcome measures were the clinicopathology and sonological correlates. All the subjects were explained about the purpose of the study and were ensured that the information collected from them would be kept confidential and would be used only for academic purpose. Then written informed consent was taken from each subject. Other non-invasive procedure like X-ray chest PA view and soft tissue X-ray neck lateral view was taken to see any calcification or deviation of trachea and retrosternal extension. Preoperative indirect laryngoscopy or 70-degree endoscopy was done in all cases. During operation all operative findings were recorded meticulously and carefully, including macroscopic finding, visualization and isolation of parathyroid glands and recurrent laryngeal nerve, status of draining lymph nodes. All specimens were sent for histopathological study for a confirmed diagnosis. In the postoperative period all the patients were examined for any postoperative complications of immediate and delayed in nature and routinely before discharge, indirect laryngoscopy was done to see the vocal cord movement and their position. The patients were followed up on OPD basis for histopathological report. Kappa statistics was used to find Significant agreement between FNAC and postop HPE to determine benign and malignant lesions $k<0.05$ was considered as statistically significant. Stastistical software, STATA version 14.0 was used for data analysis.

RESULTS

In this study of 100 subjects, maximum patients were in the age group of 31 to 40 years (32%), followed by 41 to 50 years (26%). The youngest patient in our study was 10 years while oldest was 71 years (Table 1). Mean age of presentation was 40.82 years. 86 (86%) subjects were females while 14 (14%) subjects were male. Thus, the thyroid lesions showed female predominance with the female to male ratio of approximately 6.14:1.

Table 1: Age distribution.

Age distribution (years)	No. of subjects	%
10-20	02	02
21-30	23	23
31-40	32	32
41-50	26	26
51-60	09	09
61-70	07	07
>71	01	01
Total	100	100

All cases presented with swelling in front of neck (100%). Associated complaints were 05 (05%) subjects of bulky thyroid swelling complained of difficulty in swallowing, 03 (03%) subjects complained pain in neck, 01 (01%) subject presented with cervical lymphadenopathy and 01 (01%) subject with hoarseness of voice. Most of the thyroid swellings were firm in consistency 45 (45%) followed by nodular 20 (20%), cystic consistency in 12 (12%) cases and soft consistency in 09 (09%) cases. Hard swellings accounted for 14 (14%) cases, most of which turned out to be malignant. On USG, Colloid nodule was found in 31 (31%) cases, followed by Multinodular goitre which was 27 (27%) cases, neoplastic etiology found in 23 (23%) cases, solitary thyroid nodule found in 12 (12%) cases and colloid cyst in 07 (7%) cases. FNAC findings were colloid goitre (61%), nodular goitre (19%), follicular neoplasm (10%), papillary carcinoma (9%) and medullary carcinoma (01%) (Table 2). Out of 10 cases of follicular neoplasia, five cases of follicular neoplasm

were diagnosed as follicular carcinoma on HPE. Since differentiation of follicular adenoma from follicular carcinoma requires histopathological evidence of vascular and capsular invasion, this was considered to be a positive correlation. Thus, the FNAC was correct in 50% subjects when it was indeterminate. On histopathological reports out of the 100 subjects studied maximum subjects were of colloid goiter comprising of 44 (44%) subjects. This was followed by papillary carcinoma in 15 (15%) subjects, multinodular goitre in 13 (13%) subjects, adenomatous goitre in 08 (08%) subjects, thyroiditis in 8 (08%) subjects, follicular carcinoma in 7 (07%) subjects, follicular adenoma in 4 (4%) subjects and medullary carcinoma was seen in 1 (1%) case. In this present study 23 (23%) cases out of 100 cases turned out to be malignant on histopathological examination, out of which 15 (65.21%) cases were papillary carcinoma, 07 (30.43%) cases were follicular carcinoma and 01 (04.34%) case was medullary carcinoma. The sensitivity, specificity, positive predictive value, and negative predictive value of FNAC for diagnosis of thyroid swellings were 55.56%, 100%, 100% and 90%, respectively. Hemithyroidectomy was done in 70 (70%) cases out of which further 6 (08.57%) cases underwent completion thyroidectomy in view of postoperative histopathological report of malignancy. In 30 (30%) cases total thyroidectomy was done. Postoperative complications were seen in 08 (08%) of cases. Transient hypoparathyroidism was seen in 05 (05%) cases which manifested with signs of hypocalcemia. All the 5 subjects recovered within weeks when started on calcium supplementation. Change in voice in postoperative period was seen 2 (02%) cases of recurrent laryngeal nerve (RLN) paresis recovered in a month when started on steroids. Postoperative wound infection was seen in 01 (01%) case.

Table 2: Cytodiagnosis and its correlation with histopathological diagnosis of various thyroid lesions.

FNAC	No. of cases	Histopathological diagnosis		Statistical remarks
Nonneoplastic lesion				
Colloid goitre and with cystic changes	61	Colloid goitre	44	TN
		Nodular goitre	06	TN
		Thyroiditis	07	TN
		Follicular carcinoma	01	FN
		Papillary carcinoma	03	FN
Nodular goitre	19	Nodular goitre	14	TN
		Thyroiditis	01	TN
		Follicular carcinoma	01	FN
		Papillary carcinoma	03	FN
Total	80			
Neoplastic lesion				
Follicular neoplasm	10	Follicular carcinoma	05	
		Follicular adenoma	04	
		Nodular goitre	01	
Positive for malignant cells	10	Papillary carcinoma	09	TP
		Medullary carcinoma	01	TP
Total	20			

DISCUSSION

In present study, the age of subjects ranged from 10-71 years with mean age of presentation was 40.82 years. There was a female preponderance with 6.18:1 ratio. Rios et al showed that 89% were females, while Godara et al, showed that 90% were females.[7,8] All 100 cases, in present study presented with swelling in anterior aspect of neck. In the study by Khan et al, chief complaints of all the subjects was swelling in front of the neck.[9] Ananthakrishan found swelling as the commonest presenting symptoms in 94% cases; pain in 10% cases, change in voice in 9.2% cases and pressure symptoms in 13.9% cases.[10] In present study, 45 (45%) cases had a swelling with firm consistency, while 20 (20%) cases showed nodular consistency, cystic consistency was seen in 12 (12%) cases, soft in 9 (09%) cases and hard in 14 (14%) cases which turned out to be malignant on histopathological examination. In 503 thyroid cases of Ananthakrishan et al 75% firm, 5.3% cystic, 14.4% soft and 5.3% were hard in consistency.[10] In present study, FNAC showed 80% non-neoplastic and 20% neoplastic lesions which was almost similar to Shafiqul et al study which showed 78% neoplastic lesions.[5]

In present study, 23 cases out of 100 cases (23%) were found to be malignant on histopathology, (15 papillary carcinoma, 7 follicular carcinoma, 1 medullary

carcinoma), while the benign group comprised 77 (77%) cases (Table 3).

Papillary carcinoma was the most common malignant thyroid lesion in most of the studies. This was in cordance with the present study. Studies have shown that papillary carcinoma can occur at any age and rarely has been diagnosed as a congenital tumour. It is to be stressed that in most of the cases of papillary carcinoma diagnosed by FNAC were papillary carcinoma on histopathological examination also.[2,4]

In the present study, the cyto-histological concordance rate was achieved in 82 (91.11%) cases and the discordant cases of cyto-histology, false negative were present in 8 (8.8%) cases. False negative rates in our series accords with the reports that suggests a range in literature from 1 to 11%. The false negative FNAC results may occur due to error in sampling or misinterpretation of cytology. FNAC is a valuable diagnostic tool for distinguishing between benign and malignant thyroid lesions. In present study the sensitivity, specificity, positive predictive value, and negative predictive value of FNAC for diagnosis of thyroid swellings were 55.56%, 100%, 100%, and 90%, respectively, whereas, in a study by Cusick et al, it was 76%, 58%, 72%, and 64% respectively (Table 4).[12]

Table 3: Comparision of benign versus malignant thyroid lesions on histopathological examination.

Lesions	Benign (%)	Malignant (%)
Nagori et al[14]	79	11
krishnan et al[13]	84.7	15.3
Khadilkar et al[15]	79	21
Tsegaye and Ergete[16]	79	21
Present study	77	23

Table 4: Comparision of results with previous studies.

Study	No. of subjects	Sensitivity (%)	Specificity (%)	Accuracy (%)	Negative predictive value (%)	Positive predictive value (%)
Cusick et al[12]	283	76	58	69	64	72
Kessler et al[6]	170	79	98.5	87	76.6	98.7
Gupta et al[11]	75	80	86.6	84	80	86.6
Present study	100	55.56	100	91.11	90	100

CONCLUSION

The present study was undertaken to evaluate the usefulness of clinical examination, histo-cytology, and USG of thyroid in the management of thyroid swelling. Females have greater preponderance for thyroid disease. USG can diagnose multi nodularity and intra thyroid lesion in better way than any other radiological modality. FNAC is simple, safe and cost-effective modality in pre-operative investigation of thyroid swellings with good sensitivity, high specificity and diagnostic accuracy to differentiate between benign and malignant lesion. Malignant cases diagnosed on FNAC underwent total thyroidectomy at primary surgery, thereby obviating the need of revision surgery. Misdiagnosis was more with follicular neoplasms compared to other lesions. The scope and limitations of FNAC should be fully realized, especially in the interpretation of follicular neoplasms.

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