e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2024; 16(4); 725-729

Original Research Article

A Retrospective Hospital-Based Observational Analysis of Thyroid Enlargement and its Treatment via a Clinicopathological Investigation

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Received: 10-3-2024 / Revised: 28-03-2024 / Accepted: 20-04-2024
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Conflict of interest: Nil

Abstract

Aim: A comprehensive analysis of thyroid enlargement and its treatment via a clinicopathological investigation.

Material and Methods: This is a retrospective hospital-based study was conducted in the Department of Pathology, BMIMS Pawapuri, Nalanda, Bihar, India for 6 months. 100 Patients with thyroid swelling, who are fit to undergo thyroid surgery, and willing to give consent to participate in the study. After clinical assessment, thyroid status was determined by estimation of T3, T4, TSH. FNAC, USG NECK was done. Complete haematological investigations were done. 100 patients of thyroid swelling were evaluated and the main outcome measures were the clinicopathology and sonological correlates.

Results: 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%).

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.

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

Introduction

Thyroid swelling, commonly referred to as a goitre, represents an enlargement of the thyroid gland, which is located at the front of the neck below the Adam's apple. This condition can be associated with both hypothyroidism (underactive thyroid) and hyperthyroidism (overactive thyroid), although it can also occur in euthyroid individuals (those with normal thyroid function). [1] The thyroid gland plays a crucial role in metabolism, growth, and development through the production of thyroid hormones—thyroxine (T4) and triiodothyronine (T3). The most common causes of thyroid swelling include iodine deficiency, autoimmune diseases, and nodular thyroid disease. Iodine deficiency leads to reduced production of T3 and T4, prompting the pituitary gland to release more thyroid-stimulating hormone (TSH), which stimulates thyroid growth. [2] Autoimmune diseases such as Hashimoto's thyroiditis and Graves' disease are also significant contributors. Hashimoto's thyroiditis is characterized by an immune-mediated destruction of thyroid tissue, often resulting in hypothyroidism and compensatory goitre formation. Conversely, Graves' disease leads to hyperthyroidism due to the

production of autoantibodies that stimulate thyroid growth and hormone production. [3] Nodular thyroid disease can manifest as solitary or multiple nodules, which may be benign or malignant. Multinodular goitre, a common variant, results from the irregular enlargement of the thyroid gland due to hyperplasia of the follicular cells. Patients with thyroid swelling may present with a visible enlargement of the neck, which can be associated with symptoms of hyperthyroidism or hypothyroidism, depending on the underlying cause. Symptoms of hyperthyroidism include weight loss, heat intolerance, palpitations, and anxiety, while hypothyroidism typically presents with weight gain, cold intolerance, fatigue, and depression. Physical examination and patient history are essential for initial assessment. Palpation of the thyroid gland can help determine the size, consistency, and presence of nodules. Diagnostic tests include serum TSH, T3, and T4 levels to evaluate thyroid function, and ultrasound imaging to assess the structure and presence of nodules. Fine-needle aspiration biopsy (FNAB) is recommended for nodules larger than 1 cm to rule out malignancy. The management of thyroid swelling depends on the underlying cause, the severity of symptoms, and the presence of complications such as compression of adjacent structures or suspicion of malignancy. [4,5]

Material and Methods

This is a retrospective hospital-based study was conducted in the Department of Pathology, BMIMS Pawapuri, Nalanda, Bihar, India for 6 months. 100 cases of thyroid swelling having adequate diagnostic and treatment facilities.

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 haematological 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.

Statistical software, SPSS version 22.0 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. 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 aetiology 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 goitre 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 hypocalcaemia. 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 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

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	44	TN
		Nodular goitre	06	TN
Colloid goiter and with cystic	61	Thyroiditis	07	TN
changes		Follicular carcinoma	01	FN
		Papillary carcinoma	03	FN
		Nodular goitre	14	TN
		Thyroiditis	01	TN
Nodular goiter	19	Follicular carcinoma	01	FN
		Papillary carcinoma	03	FN
Total	80			
Neoplastic lesion				
		Follicular carcinoma	05	
Follicular neoplasm	10	Follicular adenoma	04	
		Nodular goitre	01	
		Papillary carcinoma	09	TP
Positive for malignant cells	10	Medullary carcinoma	01	TP
Total	20			

Table 3: Comparison 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: Comparison 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

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] Anantha Krishan 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 Anantha Krishan 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. Papillary carcinoma was the most common malignant thyroid lesion in most of the studies. This was in co

+++rdance 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. [12]

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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