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Original Research Article

Histopathological Study of Thyroid Lesions and Correlation with Ultrasonography and Thyroid Profile at KMCH, Katihar, Bihar

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Abstract

Background: To assess the various thyroid lesion patterns found in surgically removed specimens and biopsies received at the department of pathology and to link the various histo-morphological aspects with regard to clinical findings, USG results, and thyroid profile findings.

Methods: A total of 100 thyroidectomy cases—either partial or complete—were examined. Prior to surgery, a thorough clinical examination that included a USG scan and a thyroid function test assessment was completed.

Results: The age range of 21 to 40 years had the largest incidences (51%) of thyroid enlargements, with females predominating (77%), and the ratio was 3.34:1. Out of a total of 100 instances, 28 were cancerous and 72 were not. All 100 cases underwent thyroid function testing, and 81 of them were found to be euthyroid. The neck swelling that was evident in all thyroid lesion patients was their most prevalent clinical complaint. In 55% of cases, multinodular goitre was the most frequent radiological result. One MNG case out of 55 instances was found to be malignant after histological analysis. Ten instances were identified by the USG as being malignant, however a histological study revealed that one case was benign.

Conclusions: The association between USG and histology findings revealed 90% sensitivity, 98.8% specificity, and 90% positive predictive value when using the histopathology report as the gold standard.

Keywords: Thyroid swelling, Multinodular goiter, Histopathology, Ultrasonography, Thyroid profile

Introduction

In clinical practice, thyroid lesions are frequently seen and are relatively prevalent throughout the world [1]. Developmental, inflammatory, hyperplastic, and neoplastic thyroid abnormalities are possible. Thyroid gland disorders are widespread and include a variety of conditions that can lead to either a localised anomaly in the thyroid gland, such as a goitre or a tumour mass, or a systemic disease (Grave's disease).

Thyroid cancer shares many morphological traits, quantifiable physiological markers like serum T3/T4 levels, and ultrasonic features with its benign counterpart. Therefore, the only way to distinguish between the more common benign and much less common malignant nodules is by the surgical excision

of the nodule and its histological testing. A palpable single thyroid nodule that has been clinically identified is referred to as a solitary thyroid nodule. It raises additional concerns due to the high likelihood of cancer, which can occur in 5–35% of all solitary thyroid nodules [2].

The disorders hyperplasia and thyroiditis, which affect the entire gland, are examples of diffuse thyroid lesions. Nodular lesions are diseases that result in a clinical nodule and include benign and malignant tumours as well as non-neoplastic hyperplasia [3]

Thyroid neoplasms are a very rare condition. Only 0.7% of all malignancies in women and 0.2% in men are caused by them. To effectively assess and diagnose thyroid nodules, a variety of diagnostic methods are used. These include a clinical examination, a thyroid function test, a scantiscan, an ultrasound, a fine-needle aspiration cytology test, and a histological analysis. Clinical evaluation, TFT, and USG, however, have not been reliable methods for evaluating thyroid nodules. Final diagnosis necessitates histology or FNAC examination, which is required for the morphological assessment of lesions. An accepted method for examining thyroid lesions is FNAC. Despite having many benefits, FNAC has certain drawbacks, such as specimen adequacy and cytological interpretation due to varied and occasionally unrepresentative sampling. Thus, a specific diagnosis can only be arrived at after a histological examination [4].

Material and Methods

From January 2018 to March 2019, a prospective study on 100 thyroid cases was carried out at Department of Pathology, Katihar Medical College, Katihar, Bihar. The specimens included subtotal, near-total, and complete thyroidectomies as well as lobectomies and hemithyroidectomies. Prior to surgery, a thorough clinical examination that included a USG scan and a thyroid function test assessment was completed. 10% formalin was used to preserve the specimen. Gross characteristics of the specimen that was received were noted. After processing, representative tissue was obtained, and the blocks were created by embedding the tissue in paraffin wax. Hematoxylin and eosin (H&E) staining was routinely done following microtome sectioning. This study includes samples from all thyroidectomy procedures, including lobectomy, hemithyroidectomy, subtotal and near complete thyroidectomy, as well as thyroid biopsy. Autolyzed specimen and Inadequate biopsy were excluded.

Results

Table 1: Sex distribution of thyroid lesion

Sex	No. of cases	Percent of cases
Male	23	23.0
Female	77	77.0
Total	100	100.0

In present study, out of total 100 cases, 77 were females while remaining 23 cases were males. Female: Male was 3.34:1.

Table 2: Age wise distribution of thyroid lesion

Age (in years)	No of cases	Percent of cases
0-20	12	12.0%
21-40	51	51.0%
41-60	31	31.0%
>60	6	6.0%

Most common age group in present study was 21-40 years (51%) (Table 2).

Table 3: Clinical symptoms in cases withthyroid lesions

Clinical symptoms	No. of cases	Percent of cases
Neck swelling	100	100%
Lymphadenopathy	3	3%
Dysphagia	1	1%
Dyspnoea	1	1%
Hoarsness of vioce	1	1%

Table 3 shows in present study most common symptom was neck swelling which was present in all cases (100%).

Table 4: Site of thyroid gland involvementin 100 cases

Site	No. of cases	Percent of cases
Right side swelling	49	49%
Left side swelling	35	35%
Bilateral /diffuse swelling	16	16%

According to Table 4 right side (49%) of thyroid gland was more commonly involved.

Table 5: Neoplastic and non-neoplastic distributionof thyroid lesion

Thyroid lesion		No. of cases	Percent of cases
Non neoplastic	Multinodular goitre	6	6.0%
	Adenomatous goitre	52	52.0%
	Colloid goitre	7	7.0%
	Autoimmune thyroiditis	1	1.0%
	Hashimoto's thyroiditis	6	6.0%
	Follicular adenoma	15	15.0%
Neoplastic	Hyalinising Trabecular Adenoma	3	3.0%
	Papillary Carcinoma	8	8.0%
	Poorly diff. carcinoma	1	1.0%
	Anaplastic carcinoma	1	1.0%

Out of total 100 cases, 28 were neoplastic and 72 were non-neoplastic (Table 5).

Table 6: Distribution of histological diagnosis of cases according to sex

	Sex				Total	
	No.	%	No.	%	No.	%
Histological diagnosis	1	4.3%	5	6.5%	6	6%
Multinodular goitre	11	47.8%	41	53.2%	52	52%
Adenomatous goitre	2	8.7%	5	6.5%	7	7%
Colloid goitre	0	0.0%	1	1.3%	1	1%
Autoimmune thyroiditis	0	0.0%	6	7.8%	6	6%
Hashimoto's thyroiditis	4	17.4%	11	14.3%	15	15%
Follicular adenoma	1	4.3%	2	2.6%	3	3%
Hyalinising Trabecular Adenoma	2	8.7%	6	7.8%	8	8%
Papillary carcinoma	1	4.3%	0	0.0%	1	1%
Poorly diff. carcinoma	1	4.3%	0	0.0%	1	1%
Anaplastic carcinoma	23	23%	77	77%	100	100%

Table 7: Ultrasonography diagnosis of thyroid lesion

Ultrasonographic diagnosis	No. of cases	Percent of cases
Benign Thyroid lesion	5	5.0%
Colloid goitre	5	5.0%
Multinodular goitre	55	55.0%
MNG with colloid degeneration	10	10.0%
Solitary thyroid nodule	19	19.0%
Thyroiditis	6	6.0%

Table 8: Thyroid function test in 100 cases

Thyroid function test	No. of cases	Percent of cases
Euthyroid	81	81.0%
Hyperthyroid	11	11.0%
Hypothyroid	8	8.0%

All 100 cases underwent USG thyroid examinations. The table demonstrates that, out of 100 cases, the most thyroid cases analysed by USG—55 percent of cases—were MNG diagnoses (Table 7).

All 100 cases had a thyroid function test; 81 of them were euthyroid (Table 8).

Overall, 98 out of 100 patients showed a connection between the USG and histopathological diagnoses. Below is a list of the USG diagnostic and Histopathology association (Table 9).

1. MNG- 54 out of 55 cases (98.1%)
2. STN-19 out of 19 cases (100%)
3. Colloid goitre-5 out of 5 cases (100%)
4. Thyroiditis-6 out of 6 cases (100%)
5. Benign thyroid lesion - 5 out of 5 case (100%)
6. Thyroid malignancy-9 out of 10 cases (90%).

Table 9: Correlation of USG diagnosis withhistological diagnosis

USG diagnosis	No. of cases	Histological diagnosis	
		Benign	Malignant
Multinodular goiter	55	54	1
Solitary thyroid nodule	19	19	0
Colloid goiter	5	5	0
Thyroiditis	6	6	0
Benign thyroid lesion	5	5	0
Multinodular goiter with colloid degeneration	10	1	9

Table 10: Diagnostic parameters on the basis ofultrasonography and histopathology study in 100 cases

USG	Histopathology			Total
		Benign	Malignant	USG
	Benign	89 TN	1 FN	90
	Malignant	1 FP	9 TP	10
Total histopathology		90	10	100

Discussion

This study was carried out in Department of Pathology, Katihar Medical College, Katihar, Bihar. A thorough history, clinical examination, thyroid hormone assay, ultrasonogram, and histological exams were all performed on 100 cases as part of this study. The average age of the thyroid nodule patients in our study was 37.49 years, and the age range with the largest frequency (51%) was between 21 and 40 years old.

In contrast, the mean age of the 108 cases in the Singh P *et al*. 2000 research was 47 years old [5]. According to Islam *et al*. 2009, the majority of the patients were between the ages of 21 and 40 [6]. Age range for the 585 cases evaluated by Rangaswamy M. *et al*. was 11 to 70 years, with a mean age of 40.57 years [7]. A boy aged 14 and a man aged 85 were the study's youngest and oldest patients, both suffering from adenomatous goitre. Out of 100 patients in this series, there were 77 more female patients than male patients, a ratio of 1:3.4. This gender disparity is also present in all other investigations. Male:female ratio in Singh P *et al*. 2000 was 4.7:1.5. Female:male ratios were 4.21:1 in Sangall *et al*. (2006) and 5:1 in Mandal *et al*. (2006), respectively. In nonendemic areas, Kilopatric *et al*. discovered a female to male ratio of 4:1[8-10]. Due to the presence of oestrogen receptors in the thyroid tissue, thyroid disorders are more common in women [11]. Solitary nodules do not always belong to the same clinical category. Therefore, it is quite challenging to make a judgement about the nature of a solitary nodule solely on the basis of clinical evidence. However, a single thyroid nodule that has hoarseness of voice, a hard, irregular nodule, a palpable cervical lymph node, extreme age, or male sex is always suspect of malignancy [12]. Regarding the patients' initial complaints, we discovered that they were all suffering from neck swelling of varying durations. Other symptoms that some patients had were cervical lymphadenopathy in three (3%) cases, dysphagia in one (1%), dyspnea in one (1%), hoarseness in one (1%), and bone metastases in none. In the study of Prakash A, *et al* thyroid swelling was in 95.55% cases, Sachdeva HS, *et al* thyroid swelling was in 90%, dysphagia in 33.33%, dyspnoea in 26.66% cases, Godinho-Matos L, *et al* thyroid swelling was in 100%, dysphagia in 4%, dyspnoea in 3%, pain in 8% and hoarseness of voice in 3% cases [13-15].

Large swelling and a nodular goitre may be linked to breathing problems or, less frequently, problems with deglutition because to pressure on the oesophagus or trachea [16]. In the current study, we discovered 16 nodules in both lobes and 35 nodules in the left lobe. Numerous authors found the same things [17,18].

In our study, cases were all given a thyroid hormone profile, which revealed that 81% of them were euthyroid, 11% were hyperthyroid, and 8% were hypothyroid. There were 144 instances in the study by Godlnho-Matos L, *et al*., of which 88 cases had euthyroidism, 9 cases had hyperthyroidism, and 3 cases had hypothyroidism. 15 In our investigation, the histopathology report records served as the basis for the final diagnosis. Out of 100 instances, 72 (72%) were determined to be non-neoplastic, 28 (28%) to be neoplastic, and of the neoplastic lesions, 18 (follicular adenoma, hyalinizing trabecular adenoma) were benign and 10 were malignant. One poorly differentiated carcinoma, one anaplastic carcinoma, and eight papillary carcinomas out of ten malignant cases, respectively.

The physical properties of a nodule, such as its size, echo-structure (solid or cystic), form, number of nodules, and additional nodular thyroid tissue, can be determined by ultrasound. In our ultrasonography research, we discovered that 90 (90%) of the nodules were benign and 10 (10%) were malignant.

The following diagnostic metrics were obtained using USG: 90% sensitivity, 98.8% specificity, and 90% positive predictive value (PPV).

While in the study by Jones AJ, *et al*., sensitivity was 75% and specificity was 61%, in the studies by Watters DA, *et al*., Cai XJ, *et al*., sensitivity was 80.5% and specificity was 97.8%, and in the study by Bhushan M. Warpe, sensitivity was found to be 70% and specificity was found to be 91.3% [19-22]. Most of the benign and malignant nodules in our investigation were primarily solid and displayed cystic degeneration. Ultrasonography was used in the current investigation to diagnose multinodular goitre in 55 instances. One case's histology revealed that it was a papillary thyroid carcinoma with a follicular variation. A solid thyroid nodule is more likely to be cancerous than a cystic nodule, according to Cathy Crenshaw Doheny, who also made this observation in a digital journal [23].

Conclusion

Despite being more common in females, solitary thyroid nodules are more concerning in males due to the higher prevalence of cancer. Although FNAC is a very helpful method for pre-operative evaluation of a single thyroid nodule, postoperative histological testing can still reveal cancer as a surprise.

Based on the history, clinical examination, ultrasound findings, and FNAC, a combined conclusion should be formed regarding the nature of a thyroid nodule. While Bethesda system of reporting and ultrasound guided FNAC have improved clarity, the single thyroid nodule still remains a mystery, and the only way to make a 100 percent certain diagnosis is through removal and postoperative histological evaluation of the nodule.

The surgical results and the USG diagnosis were perfectly linked, making them the gold standard tests. Clinical palpation was unable to find nodules that were smaller than 2 cm in size, proving that nodules smaller than 3 cm are usually overlooked by clinical palpations. The majority of the nodules were cystic, and clinical palpations were virtually always accurate. The upper pole, followed by the middle and lower poles, had the most nodules. The difficulty in recognising the nodule by clinical palpations did not change significantly from the nodule's site. A suspicion of malignancy was expressed by the USG in 10 patients, of which 9 (90%) had their carcinomatous status verified by histological analysis.

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