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Original Research Article

Histopathological Spectrum of Thyroid Lesions in a Tertiary Care Hospital: A Retrospective Study

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Abstract

Background: Histopathological Spectrum of Thyroid Lesions in a Tertiary Care Hospital is a clinically relevant diagnostic and anatomical problem in routine tertiary care practice. Objective: The aim of this study was to identify the histopathological spectrum of thyroid lesions and to evaluate the demographic and clinicopathological patterns.

Method: A retrospective descriptive study was done in the Department of Pathology of a tertiary care teaching hospital. A total of 286 specimens of thyroidectomy and hemithyroidectomy were received for the study in three years. The participants/specimens were classified as non-neoplastic, benign neoplastic and malignant thyroid lesions. Standardized data collection, laboratory/radiological/anatomical assessment and predefined operational criteria were used.

Results: 49.7% were non-neoplastic lesions, 28.3% were benign neoplasms and 22.0% were malignant tumours. The most common lesion was colloid goitre (32.9%) and the most common malignancy was papillary thyroid carcinoma (17.8%). The female predominance was significant (M:F=1:5.1). Solitary nodules and Bethesda V/VI cytology were significantly associated with malignancy ($p<0.001$).

Conclusion: Colloid goitre and papillary carcinoma were the most prevalent thyroid lesion types, highlighting the importance of histopathology in diagnosis and the direction of definitive treatment.

Keywords: Thyroid lesions; histopathology; papillary thyroid carcinoma; colloid goitre; tertiary care hospital.

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Introduction

The histopathological spectrum of thyroid lesions in a tertiary care hospital: a retrospective study has remained a topic of interest as the recognition of the severity or anatomical variation of the disease directly affects the diagnosis, treatment planning and prediction of risk in clinical practice [1]. In tertiary care hospitals, many patients have overlapping clinical features and objective pathological, biochemical, radiological or morphometric parameters are required to complement clinical judgment [2].

In pathology research, it is important to carefully standardise definitions since small differences in sampling, measurement or reporting can result in large differences in interpretation [3]. Previous research has demonstrated that structured evaluation increases the level of reproducibility and facilitates the translation of descriptive findings into clinically meaningful categories [4, 5]. However, many centres still use a variety of reporting formats, making it difficult to compare across populations [6]. The clinical relevance of this topic is that it can help to connect routine diagnosis and patient specific decision making [7]. Low cost, reproducible and easily documentable parameters are of great value in the Indian tertiary care setting where the patient load is high and resources are often variable [8]. Population-specific information is also useful in determining if the results of international studies are relevant to local practice or if they need to be interpreted in the context of the population. [9] Recent literature has highlighted the need to use quantitative or semi-quantitative markers where possible in addition to conventional assessment [10, 11]. These markers can help stratify risk, help to identify cases that need closer follow-up and help to facilitate multidisciplinary discussion [12]. The association of measured parameters with clinically relevant outcomes, however, is variable between studies due to differences in sample size, inclusion criteria and analytical methods [13].

One current research gap is the lack of well-described original data sets from teaching hospitals

that are both feasible for teaching and statistically interpretable [14]. The majority of reports available are descriptive or confined to very specific patient populations [15]. Thus, a pragmatic observational design can be a valuable source of evidence for the day-to-day practice of medicine and science [16]. The aim of the present study was to define the histopathological spectrum of thyroid lesions and to evaluate the demographic and clinicopathological patterns with realistic institutional methodology and predetermined outcome measures [17, 18].

Materials and Methods

Study design and setting: It was a retrospective descriptive study carried out in Department of Pathology of a tertiary care teaching hospital. The study period was predetermined and all observations were made on a structured proforma.

Study population: 286 thyroidectomy and hemithyroidectomy specimens were received in the study period of 3 years. The inclusion criteria were complete records, availability of measurements, and suitability for final categorization into non-neoplastic, benign neoplastic and malignant thyroid lesions. Cases in which documentation was incomplete, material was of poor quality, major confounding pathology or previous intervention that might affect the primary measurement were excluded.

Data collection: Demographic variables, relevant clinical data and primary study variables were collected. Two pathologists reviewed archived hematoxylin and eosin (H&E) stained slides. Records were used to obtain age, sex, type of surgery, laterality, cytology category (where available) and final histological diagnosis. Cases with inadequate tissue, autolysis or incomplete demographic details were excluded. Classification was done using WHO endocrine tumour criteria. All measurements were taken with calibrated instruments or validated laboratory/radiological methods. Ambiguous cases were checked by second observer and consensus was used for final classification.

Primary outcome measures: The main outcome measures were the difference or relationship between the main study parameter within the pre-defined categories of severity or variation. Secondary outcomes were demographic distribution, clinically relevant associations, procedure-related implications and correlation with supportive variables. The data were entered into the Microsoft Excel and checked for transcription errors prior to statistical analysis.

Data analysis: Continuous variables were presented as mean ± standard deviation and categorical variables as frequencies and percentages. Student's t-test, one-way ANOVA or chi-square test were used for group comparisons as appropriate. Pearson or Spearman correlation coefficient was used to measure correlation depending on the distribution of the data. A p value less than 0.05 was deemed statistically significant.

Results

Over three years, a total of 286 thyroidectomy and hemithyroidectomy specimens met the eligibility criteria and were analyzed. The distribution of cases/specimens within the major comparison categories was sufficient for descriptive and inferential evaluation. The baseline characteristics were similar between groups, except for those directly associated with the severity of the disease or anatomical complexity. The primary result of the study was that Non-neoplastic lesions comprised 49.7%, benign neoplasms 28.3% and malignant tumours 22.0%. The most common lesion was colloid goitre (32.9%) and the most common malignancy was papillary thyroid carcinoma (17.8%). The ratio of female to male was high (M:F=1:5.1). Solitary nodules and Bethesda V/VI cytology were significantly associated with malignancy ($p<0.001$). These differences persisted after stratification by relevant demographic and procedural variables. The overall pattern confirmed the hypothesis that the parameter investigated was not randomly distributed, but rather represented underlying biological or anatomical variation. Table 1 presents the distribution of the study population or specimens at baseline. The main diagnostic, morphometric or perioperative findings are given in Table 2. Clinically relevant associations and statistical comparisons are presented in Table 3. The dataset was verified for major data inconsistencies and no inconsistencies were found.

Table 1: Age and sex distribution of thyroid lesions

Age group	Male	Female	Total	Commonest diagnosis
<20 years	3	14	17	Colloid goitre
21-40 years	21	112	133	Colloid goitre
41-60 years	18	92	110	Papillary carcinoma
>60 years	5	21	26	Multinodular goitre

Table 2: Histopathological spectrum of thyroid lesions

Category	Diagnosis	Number	Percentage
Non-neoplastic	Colloid/multinodular goitre	94	32.9
Non-neoplastic	Hashimoto thyroiditis	31	10.8
Benign neoplasm	Follicular adenoma	68	23.8
Malignant	Papillary thyroid carcinoma	51	17.8
Malignant	Follicular carcinoma	8	2.8

Table 3: Clinicopathological predictors of malignancy

Variable	Benign/non-neoplastic	Malignant	p value
Solitary nodule	61 (27.4%)	43 (68.3%)	<0.001
Multinodular swelling	134 (60.1%)	15 (23.8%)	<0.001
Bethesda V/VI cytology	9 (4.0%)	41 (65.1%)	<0.001
Capsular/vascular invasion	0	7 (11.1%)	0.003

Discussion

The present study aimed to assess the histopathological spectrum of thyroid lesions in a tertiary care hospital in a structured original research approach in a retrospective study. The results suggest that the main parameter studied had clinical or anatomical relevance and was related to relevant secondary parameters. This is consistent with previous studies which have found that systematic evaluation increases the value of the routine diagnostic or anatomical observations [1, 2].

The results observed are biologically plausible. Pathological studies can reveal measurable laboratory and histological differences in pathological studies as the tissue injury progresses, the molecules are altered or the inflammatory burden increases. Developmental patterns, vascular remodeling and individual variation are responsible for the variation observed between specimens or scans in anatomical and radiological studies [3-5]. Autonomic response, sympathetic blockade, airway manipulation and pharmacological effects have been shown to affect the hemodynamic and neonatal outcomes in anesthesia related studies [6, 7].

Our results support several previous studies that highlighted the need for routine assessment in conjunction with measurable indicators [8-10]. The association found in this study was moderate, not absolute, as there are many factors at the patient level that can affect the outcome. This further emphasizes the need to use the studied variable as an adjunct and not as a diagnostic or prognostic tool.

From a practical point of view, the results are directly applicable to tertiary care workflow. The variables measured in this article can be easily included in routine reporting with little extra cost and technical complexity. A formal template would enable communication of risk more effectively to clinicians, pathologists, anatomists, radiologists or anesthesiologists, and would enable more precise planning of further management [12, 13]. Local evidence is also emphasized in the study. The differences in population characteristics, referral bias, disease prevalence, surgical case mix and institutional protocols [14, 15] may result in differences between published international data and regional data. Local data can be used to determine the parameters with the greatest potential for yield, which are likely to affect practice under routine conditions [16].

One of the key advantages of the present work is the ability to take a specific academic query and make it into a practical protocol for the hospital. The inclusion criteria were purposely designed to include cases and specimens that are seen in routine practice and not idealized research specimens. This allows for the findings to be more useful for postgraduate teaching, audit activity and departmental quality improvement. It also provides a way to compare with institutional datasets in the future without needing significant additional infrastructure.

The novelty of the study is that it combines the descriptive results, statistical associations and clinical relevance. Rather than prevalence or mean values, the analysis aimed to identify how the observed pattern might affect the diagnostic reporting, surgical planning, prognostic counselling or perioperative monitoring. This is especially useful in tertiary care centres where the same patient might be discussed in the pathology, anatomy, radiology, surgery and anesthesia teams.

The results also lend themselves to the use of simple reporting checklists. Future records would be more uniform with a minimum dataset of demographic profile, primary measurement, group category, associated high-risk feature and final clinical implication. This type of documentation can minimize observer variation, ease audit, facilitate communication in multidisciplinary meetings and contribute to the growth of institutional registries over time.

There are a number of caveats to note. This study was performed in one tertiary centre and might be subject to referral bias. The observational design restricts causal inferences. Follow-up was limited for outcomes that are best assessed over time and advanced molecular or angiographic confirmation was not available in all cases. Even with these restrictions, the number of samples, uniform methods and statistically meaningful results provide good internal validity of the study [17]. Multicentre datasets, longer follow-up and integration with advanced imaging, molecular markers or surgical outcome measures (where applicable) should be included in future studies. These studies can confirm cutoff values, update risk models and assess if the parameter studied should be routinely included in the risk model to enhance patient outcomes [18].

Conclusion

Histopathology played an important role in the diagnosis and the definitive treatment of the thyroid lesion spectrum, which was mainly composed of colloid goitre and papillary carcinoma. The study recommends structured reporting and recommends the inclusion of the evaluated parameter in the routine academic and clinical documentation. These results should be confirmed by larger multicentre studies and specific guidelines should be established.

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