



A PROSPECTIVE STUDY ON CLINICOPATHOLOGICAL CORRELATION OF SOLITARY THYROID NODULE

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ABSTRACT **Background:** A solitary thyroid nodule (STN) is a thyroid swelling that, on clinical examination, appears to be a single discrete nodule within one lobe without a palpable abnormality elsewhere in the gland. Its clinical importance lies in distinguishing benign disease from malignancy. This prospective study assessed malignancy among patients presenting with an STN and evaluated the clinicopathological profile and diagnostic work-up. **Methods:** Fifty patients with clinically solitary thyroid nodules admitted to the Department of Surgery, Bowring and Lady Curzon Hospital, were prospectively studied. Patients were selected by random sampling and evaluated using a structured proforma. Routine investigations and specific investigations including FNAC, thyroid profile, indirect laryngoscopy, plain X-ray neck, and ultrasonography of the neck were performed. Radioisotope scanning was not performed because the facility was unavailable. All patients underwent surgical management, and final diagnosis was established by histopathological examination. Clinical, demographic, functional, cytological, and pathological findings were summarized descriptively. **Results:** Fifty patients were studied. Mean age was 38.5 years, with 72% reported to be in the 3rd–5th decades. Forty-six patients were female and four male (female:male 11.5:1). Twenty-six nodules were in the right lobe and 24 in the left. Nodule size ranged from 2–12 cm. Forty-seven patients were euthyroid, two thyrotoxic, and one hypothyroid. Swelling alone was reported in 42 patients; pain in three, discomfort in three, and dysphagia in two. Seven patients had carcinoma on histopathology: five papillary and two follicular carcinomas, giving an overall malignancy rate of 14%. **Conclusions:** STN was predominantly observed in females and in adults aged 20–50 years. Most patients were euthyroid and presented with a neck swelling. FNAC is a key investigation in the evaluation of STN, while histopathology provides definitive diagnosis in surgically treated patients. Papillary carcinoma was the most common malignancy in this series.

KEYWORDS : solitary thyroid nodule; thyroid swelling; FNAC; thyroid malignancy; papillary carcinoma; follicular carcinoma; histopathology

1. INTRODUCTION

Thyroid nodules are common clinical findings, and most are benign. A clinically solitary thyroid nodule nevertheless requires systematic evaluation because a dominant nodule may represent benign hyperplasia, adenoma, cystic disease, thyroiditis, or malignancy. The purpose of assessment is to identify lesions requiring definitive treatment while minimizing unnecessary intervention.

A solitary thyroid nodule is conventionally defined as a discrete palpable nodule in one thyroid lobe without another palpable abnormality in the gland. Physical examination alone can underestimate multifocal disease; ultrasonography may reveal additional nodules and structural features that are not clinically apparent.

The diagnostic evaluation generally incorporates clinical assessment, thyroid function testing, ultrasonography, and FNAC when indicated. In patients who undergo surgery, histopathological examination establishes the final tissue diagnosis.

This prospective study was undertaken to evaluate the clinicopathological profile of patients presenting with STN at Bowring and Lady Curzon Hospital, determine the frequency and histological pattern of malignancy, and assess the relationship between clinical findings, investigations, and final histopathology.

2. AIMS AND OBJECTIVES

1. To assess the presence and proportion of malignancy in patients presenting with a solitary thyroid nodule.
2. To evaluate age, sex, symptoms, duration, nodule site, size, and thyroid functional status.
3. To evaluate the role of FNAC and other available investigations in the work-up of STN.
4. To correlate preoperative findings with definitive histopathology.
5. To describe the histological spectrum of benign and malignant lesions and the management outcome in the study cohort.

3. MATERIALS AND METHODS

Study design and setting: Prospective observational study conducted in the Department of Surgery, Bowring and Lady Curzon Hospital.

Study population: Fifty patients presenting with a clinically solitary

thyroid nodule during the specified study period were included. Patients were selected by random sampling.

Clinical assessment: A structured proforma recorded age, sex, symptoms, duration, site, maximum nodule dimension, and thyroid functional status. Symptoms such as pain, discomfort, and dysphagia were specifically documented.

Investigations: Routine investigations and FNAC, thyroid profile, indirect laryngoscopy, plain X-ray neck, and ultrasonography of the neck were performed. Radioisotope scanning was not undertaken because the facility was unavailable.

Treatment and reference standard: All patients underwent surgery. Resected specimens were examined histopathologically, and histopathology was treated as the definitive diagnostic reference.

Statistical analysis: Aggregate data supplied in the study summary were analyzed descriptively using frequencies, percentages, mean, and range where available. Overall malignancy proportion was calculated as $7/50 = 14\%$. Patient-level FNAC categories, FNAC–histopathology cross-tabulations, individual age data, ultrasound descriptors, and exact study dates were not supplied; therefore sensitivity, specificity, predictive values, confidence intervals, and inferential testing were not fabricated.

4. RESULTS

A total of 50 patients were included. Mean age was 38.5 years. The supplied study summary reports that 72% belonged to the 3rd–5th decades. The cohort was strongly female predominant, with 46 females (92%) and four males (8%), giving a female-to-male ratio of 11.5:1.

Twenty-six patients (52%) had a right-lobe nodule and 24 (48%) a left-lobe nodule. The maximum nodule dimension ranged from 2 to 12 cm.

Forty-two patients (84%) presented with swelling alone; three (6%) had pain, three (6%) had discomfort, and two (4%) had dysphagia. Duration of symptoms ranged from 15 days to 8 years.

Forty-seven patients (94%) were euthyroid, two (4%) had thyrotoxicosis, and one (2%) had hypothyroidism.

Histopathology demonstrated carcinoma in seven patients (14%). Five were papillary carcinomas and two follicular carcinomas. Thus, papillary carcinoma represented 71.4% of all malignant lesions and 10% of the complete cohort, while follicular carcinoma represented 28.6% of malignant lesions and 4% of the complete cohort.

Table 1. Sex distribution

Variable	Cases	Percentage
Female	46	92.0%
Male	4	8.0%

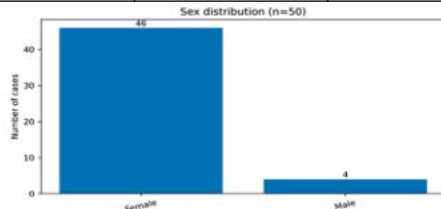


Figure 1. Sex distribution (n=50).

Table 2. Presenting symptoms

Variable	Cases	Percentage
Swelling only	42	84.0%
Pain	3	6.0%
Discomfort	3	6.0%
Dysphagia	2	4.0%

Table 3. Lobe involved

Variable	Cases	Percentage
Right lobe	26	52.0%
Left lobe	24	48.0%

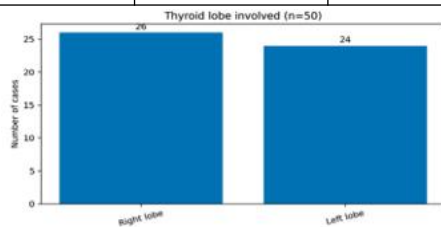


Figure 2. Thyroid lobe involved (n=50).

Table 4. Thyroid functional status

Variable	Cases	Percentage
Euthyroid	47	94.0%
Thyrotoxicosis	2	4.0%
Hypothyroidism	1	2.0%

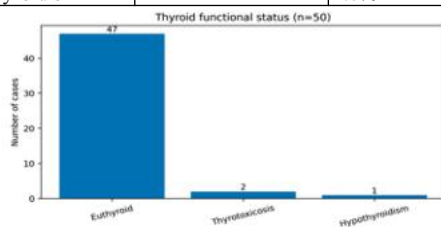


Figure 3. Thyroid functional status (n=50).

Table 5. Histopathological outcome

Variable	Cases	Percentage
Benign/non-malignant	43	86.0%
Papillary carcinoma	5	10.0%
Follicular carcinoma	2	4.0%

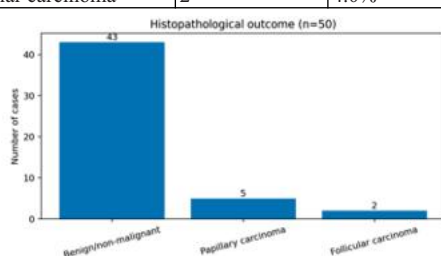


Figure 4. Histopathological outcome (n=50).

5. DISCUSSION

The present prospective study demonstrates a marked female predominance among patients with clinically solitary thyroid nodules, with women comprising 92% of the cohort. This agrees with the established epidemiology of thyroid nodules, which are more frequently detected in women. The mean age of 38.5 years and the reported concentration of cases in the 3rd–5th decades indicate that the condition commonly presents during young and middle adulthood.

Most patients presented with a neck swelling without the additional symptoms specifically recorded in the study. Pain, discomfort, and dysphagia were uncommon. The wide symptom duration of 15 days to 8 years indicates substantial variation in clinical course and healthcare-seeking behavior. Dysphagia, when present, may reflect local compressive effects and warrants careful clinical and imaging assessment.

Right- and left-lobe involvement was nearly equal, at 52% and 48%, respectively. Nodule size varied from 2 to 12 cm. Size is clinically important for documentation and management planning, but size alone cannot establish benignity or malignancy.

The overwhelming majority of patients were euthyroid (94%). This finding is clinically important because a normal thyroid functional state does not exclude malignancy. Structural assessment and cytological risk stratification therefore remain important even when biochemical thyroid function is normal.

Malignancy was identified in 7 of 50 patients, yielding a rate of 14%. Papillary carcinoma accounted for five of the seven cancers and follicular carcinoma for two. Papillary carcinoma was therefore the most frequent malignant subtype. This pattern is consistent with the recognized predominance of papillary carcinoma among differentiated thyroid cancers.

FNAC was included in the diagnostic protocol for all patients. FNAC is central to thyroid nodule evaluation because it can stratify cytological risk and guide surgical decision-making. However, the supplied study summary does not provide individual FNAC categories or a cross-tabulation against final histopathology. It would be methodologically inappropriate to invent those values; consequently, diagnostic sensitivity, specificity, predictive values, and accuracy are not reported.

Ultrasonography was also performed in all cases. Modern ultrasound assessment is important for evaluating composition, echogenicity, margins, calcifications, shape, lymph nodes, and additional non-palpable nodules. Because detailed sonographic descriptors were not included in the supplied dataset, this study cannot quantify the relationship between specific ultrasound risk features and malignancy.

Strengths include prospective data collection, a defined clinical evaluation, use of multiple investigations, surgical management, and histopathological confirmation. Limitations include the small single-center sample, potential selection bias from including only surgically treated patients, unavailability of radioisotope scanning, lack of patient-level FNAC and ultrasound data, and inability to perform robust inferential or diagnostic-accuracy analyses from aggregate data alone.

6. Clinicopathological Correlation

The central clinicopathological observation was that a clinically solitary nodule could harbor carcinoma despite predominantly euthyroid presentation. The seven malignant cases represented 14% of the cohort. The available aggregate data establish the overall malignancy rate and histological distribution, but do not permit valid patient-level correlations such as whether malignancy was significantly associated with age, sex, nodule size, lobe, symptoms, thyroid functional status, or a particular FNAC category.

For publication, the strongest version of the clinicopathological correlation would include a patient-level table cross-classifying FNAC findings against histopathology, together with age, sex, size, ultrasound features, thyroid function, and symptoms. If those raw data are available, they should be incorporated before submission and analyzed using appropriate statistical tests.

7. Comparison with Existing Literature

The major findings are broadly compatible with the established

literature: thyroid nodules are more common in women, most are benign, and papillary carcinoma is the dominant thyroid malignancy. Differences in malignancy rates between published series can result from differences in referral patterns, definitions of solitary nodules, ultrasound use, surgical selection, and the denominator used for calculation. The 14% malignancy rate in this cohort should therefore be interpreted as a finding specific to this surgically managed institutional series rather than as a population prevalence estimate.

8. Clinical Implications

1. A solitary thyroid nodule warrants structured evaluation even in a euthyroid patient.
2. Clinical examination should be supplemented by ultrasonography and FNAC according to accepted risk-based indications.
3. Nodule size and compressive symptoms should be documented carefully but should not be used alone to diagnose malignancy.
4. Histopathology remains definitive in surgically treated patients.
5. The 14% malignancy rate observed in this cohort supports careful evaluation rather than assuming that a solitary nodule is benign.
6. Papillary carcinoma was the most common malignant histological subtype in this study.

9. STRENGTHS AND LIMITATIONS

Strengths:

prospective design; structured assessment; multiple investigations; surgical treatment with histopathological confirmation; and description of demographic, clinical, functional, and pathological variables.

Limitations:

small sample size; single-center setting; possible selection bias because all patients underwent surgery; lack of radioisotope scanning; absence of individual FNAC categories and FNAC – histopathology cross-tabulation; incomplete ultrasound descriptors; and insufficient raw data for inferential statistics or diagnostic accuracy calculations. The exact study period, inclusion/exclusion criteria, ethics approval number, and follow-up duration were not included in the supplied material and should be added before journal submission.

10. CONCLUSION

In this prospective series of 50 patients with solitary thyroid nodules, the condition was predominantly observed in females and in adults aged 20–50 years. Most patients presented with a neck swelling and were euthyroid. The two thyroid lobes were involved with nearly equal frequency, and nodule size ranged from 2 to 12 cm. Histopathology identified malignancy in 7 patients (14%), comprising five papillary and two follicular carcinomas. Papillary carcinoma was the most common malignant subtype.

The findings emphasize the need for systematic evaluation of clinically solitary thyroid nodules. FNAC is a key component of preoperative assessment, supported by thyroid function testing and ultrasonography, while histopathology establishes the definitive diagnosis in surgically treated patients. Larger multicenter prospective studies with standardized ultrasound classification, detailed FNAC categories, patient-level clinicopathological correlation, and long-term follow-up would provide stronger evidence for predictors of malignancy and management outcomes.

11. REFERENCES

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