

Original Research Article

Incidence of malignancy among thyroid swellings

Muhammad Kamrul Hasan^{1*}, Mohammad Harun-or-Rashid¹, Mohammad Nazrul Islam²,
Rizvan Forhad³, Rifat Anwar Shishir⁴, Shihab Uddin⁵

¹Department of ENT, Jamalpur Medical College, Jamalpur, Bangladesh

²Department of ENT, 250 Bedded General Hospital, Tangail, Bangladesh

³Department of Otolaryngology- Head Neck Surgery, Kumudini Women's Medical College and Hospital, Tangail, Bangladesh

⁴Department of Otolaryngology, Bangladesh Medical University, Dhaka, Bangladesh

⁵Department of ENT & Head-Neck Surgery, Mymensingh Medical College Hospital, Mymensingh, Bangladesh

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*Correspondence:

Dr. Muhammad Kamrul Hasan,

E-mail: khasanent@gmail.com

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ABSTRACT

Background: Thyroid swellings are common in clinical practice, with most being benign, although a small but significant proportion may harbor malignancy. Therefore, this study was conducted to determine the incidence of malignancy among thyroid swellings in a tertiary care hospital setting.

Methods: This observational cross-sectional study was conducted at the Department of ENT and Head-Neck Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh, from June to December 2014. Fifty patients with clinically and sonographically diagnosed thyroid swellings undergoing thyroidectomy were included to determine the incidence of malignancy. All patients were evaluated clinically and investigated with FNAC, thyroid function tests and ultrasonography, with histopathology confirming the final diagnosis.

Results: Among 50 patients, most were aged 31–40 years (40.0%), with females 84.0% (F:M=5.25:1) and middle class 70.0%. Neck swelling was present in 100%, with dysphagia 8.0%, pain 6.0%, dyspnoea 2.0% and lymphadenopathy 2.0%. Most presented within 6 months–2 years (48.0%). Solid nodules were 70.0% and multinodular goitre 68.0%. FNAC showed colloid goitre 76.0%, with malignancy 14.0% (7 cases). Papillary carcinoma accounted for 85.7%, with metastasis 14.3%. Hemithyroidectomy was most common (60.0%), followed by total thyroidectomy (22.0%).

Conclusions: Thyroid swellings show a 14.0% incidence of malignancy, higher in males and extreme age groups, with papillary carcinoma being the most common type.

Keywords: Malignancy incidence, Thyroid Cancer, Thyroid swelling

INTRODUCTION

Any increase in the size of the thyroid gland is referred to as goitre.¹ Thyroid swelling is a global health issue encountered across different populations.² Thyroid nodules are defined as distinct lesions within the thyroid gland that are radiologically separate from the surrounding thyroid parenchyma.³ These nodules are quite common, with prevalence ranging from approximately 4% when detected by palpation to as high

as 67% when identified using ultrasonography. Although most solitary thyroid nodules are benign in nature, thyroid carcinoma occurs relatively infrequently. Thyroid cancer represents the most common malignancy of the endocrine system.⁴ It accounts for roughly 1% of all cancers.⁵ Despite this, its overall incidence in the general population remains low, at about 1%. Among individuals with thyroid nodules, approximately 5% are found to be malignant, regardless of nodule size. However, recent trends indicate that the incidence of thyroid malignancy

has been rising over time.⁶⁻⁸ A major clinical concern is differentiating benign nodules from malignant ones. Fine needle aspiration cytology is widely accepted as the primary tool for initial evaluation of thyroid nodules, typically used alongside ultrasonography and assessment of thyroid function. Measurement of TSH levels, ultrasonography of the neck and FNAC are routinely performed in the assessment of thyroid swelling.⁹ Definitive diagnosis, however, relies on histopathological examination.¹⁰ Despite its usefulness, FNAC has certain limitations, including issues related to inadequate sampling, technical factors and the difficulty in distinguishing between benign and malignant follicular lesions due to overlapping cytological features.¹¹

The incidence of malignancy in goitrous thyroid is estimated to be around 10%.¹² Similarly, about 5% of all thyroid nodules are malignant. In Bangladesh, studies have shown a comparatively higher incidence of malignancy in solitary thyroid nodules, reported to be around 18.65%, which is consistent with findings from other regions.¹³ Additionally, carcinoma is observed to occur approximately twice as frequently in solitary thyroid nodules compared to multinodular goitre. The precise incidence of thyroid cancer in Bangladesh remains uncertain.¹⁴ This is largely due to the absence of comprehensive cancer registries and a lack of large-scale population-based studies, making it difficult to accurately determine the true burden of thyroid malignancy in the country.¹⁵

Despite the high prevalence of thyroid swellings, the proportion of cases harboring malignancy remains variable and often uncertain, particularly in resource-limited settings. Accurate identification of malignant lesions is crucial for appropriate surgical decision-making and to avoid both unnecessary procedures and delayed treatment of cancer. In Bangladesh, the lack of comprehensive population-based data and cancer registries further limits the understanding of the true burden of thyroid malignancy, especially among hospitalized patients undergoing thyroidectomy. Therefore, this study was undertaken to determine the incidence of malignancy among thyroid swellings in a tertiary care hospital setting.

Objective

To determine the incidence of malignancy among patients presenting with thyroid swellings.

METHODS

This observational cross-sectional study was conducted at the Department of ENT and Head-Neck Surgery, Rajshahi Medical College Hospital, Rajshahi, Bangladesh, from June 2014 to December 2014. A total of 50 patients admitted with clinically and sonographically diagnosed thyroid swellings who subsequently underwent thyroidectomy were included in

the study based on predefined inclusion criteria for the evaluation of the incidence of malignancy among thyroid swellings.

Inclusion criteria

Clinically diagnosed goitre patients irrespective of age, sex and race. Patients who voluntarily provided consent to participate in the study

Exclusion criteria

Patients who did not provide voluntary consent to be included in the study.

Variables of the study

The main variables of the study included age and sex of the patients, clinical diagnosis of thyroid swelling, thyroid function status, fine needle aspiration cytology (FNAC) findings, per-operative findings and final histopathological diagnosis.

Data collection procedure

Clinical history was obtained from all patients using a structured checklist, including age, sex, residence, duration of thyroid swelling, presenting complaints, drug history, dietary history, history of previous irradiation and family history of thyroid malignancy. A detailed physical examination was performed to assess the size, location, consistency, mobility, tracheal position, carotid pulsation and regional lymph nodes. Examination of the hands, eyes, cardiovascular system and indirect laryngoscopy was also performed in all cases.

All patients underwent investigations including fine needle aspiration cytology (FNAC), thyroid function tests and ultrasonography of the thyroid gland. Additional investigations such as X-ray of the neck (both views), CT scan and Doppler study of neck vessels were performed when indicated. Routine preoperative investigations including complete blood count, chest X-ray, blood sugar, blood urea, serum creatinine and urine routine microscopic examination (RME) were done to assess fitness for general anaesthesia. Each patient underwent appropriate thyroid surgery based on preoperative clinical and FNAC findings. Surgical specimens were sent for histopathological examination, which confirmed the final diagnosis. All data were recorded in a structured proforma, compiled, analysed and presented in appropriate tables.

Ethical consideration

Written informed consent was obtained from all patients in Bengali with full explanation of the study. Participants were informed that participation was voluntary and that they had the right to withdraw at any stage without affecting their treatment. All collected data were used

solely for research purposes and confidentiality was strictly maintained. Ethical clearance was obtained from the relevant institutional ethics committee prior to the commencement of the study.

RESULTS

The majority of patients were in the 31–40 years age group (20 patients, 40.0%), followed by 21–30 years (15 patients, 30.0%), 41–50 years (10 patients, 20.0%), 11–20 years (3 patients, 6.0%) and 51–60 years (2 patients, 4.0%). Female patients predominated (42 patients, 84.0%) with a female to male ratio of 5.25:1. Most patients belonged to the middle socioeconomic class (35 patients, 70.0%), followed by poor class (12 patients, 24.0%) and upper class (3 patients, 6.0%). All patients (100%) presented with neck swelling. Associated symptoms included dysphagia (4 patients, 8.0%), pain (3 patients, 6.0%), dyspnoea (1 patient, 2.0%) and cervical lymphadenopathy (1 patient, 2.0%), while voice change was not observed in any case.

The highest number of patients presented within 6 months to 2 years (24 patients, 48.0%), followed by 2–4 years (16 patients, 32.0%), 4–6 years (6 patients, 12.0%), 6–8 years (2 patients, 4.0%) and 8–10 years (2 patients, 4.0%). Malignant cases were more frequently observed in shorter duration of symptoms. On ultrasonographic examination, 35 patients (70.0%) had solid nodules and 15 patients (30.0%) had cystic nodules. Multinodular goitre was the most common presentation (34 patients, 68.0%), followed by solitary nodular goitre (15 patients, 30.0%) and diffuse goitre (1 patient, 2.0%). FNAC revealed colloid goitre in 38 cases (76.0%), follicular neoplasm in 6 cases (12.0%) and papillary carcinoma in 6 cases (12.0%). No cases of medullary or anaplastic

carcinoma were identified. Overall, 43 cases (86.0%) were benign and 7 cases (14.0%) were malignant. Malignancy was highest in the 11–20 years (33.3%) and 51–60 years (50.0%) age groups, while the lowest incidence was in the 31–40 years group (10.0%). Males showed a higher malignancy rate (25.0%) compared to females (11.9%).

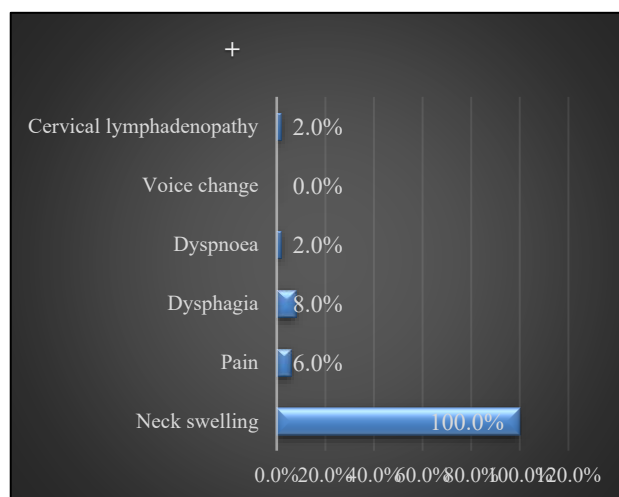


Figure 1: Clinical presentation of patients with thyroid swelling (n=50).

Papillary carcinoma was the most common histological type (6 cases, 85.7%), followed by follicular carcinoma (1 case, 14.3%). Cervical lymph node metastasis was present in 1 case (14.3%) and absent in 6 cases (85.7%). Hemithyroidectomy was performed in 30 cases (60.0%), subtotal thyroidectomy in 8 cases (16.0%), total thyroidectomy in 11 cases (22.0%) and total thyroidectomy with neck dissection in 1 case (2.0%).

Table 1: Demographic profile of patients with thyroid swelling (n=50).

Variable		Number of cases (N)	(%)
Age (in years)	11–20	3	6.0
	21–30	15	30.0
	31–40	20	40.0
	41–50	10	20.0
	51–60	2	4.0
Sex	Female	42	84.0
	Male	8	16.0
Socioeconomic status	Poor class	12	24.0
	Middle class	35	70.0
	Upper class	3	6.0

Table 2: Duration of symptoms in benign and malignant thyroid swellings (n=50).

Duration of symptoms (in years)	Benign cases (n)	Malignant cases (N)	Total (N)	(%)
6 months–2 years	20	4	24	48.0
2–4 years	14	2	16	32.0
4–6 years	5	1	6	12.0
6–8 years	2	0	2	4.0
8–10 years	2	0	2	4.0

Table 3: Ultrasonographic findings in thyroid swellings (n=50).

USG findings	Number of cases (N)	(%)
Solid	35	70.0
Cystic	15	30.0

Table 4: Types of thyroid swelling (n=50).

Type of thyroid swelling	Number (N)	(%)
Multinodular goitre	34	68.0
Solitary nodular	15	30.0
Diffuse goitre	1	2.0

Table 5: FNAC findings and overall diagnostic outcome (n=50).

Diagnosis/outcome		Number (N)	(%)
FNAC findings	Colloid goitre (non-neoplastic)	38	76.0
	Follicular neoplasm	6	12.0
	Papillary carcinoma	6	12.0
	Medullary carcinoma	0	0.0
	Anaplastic carcinoma	0	0.0
Histopathology (malignant cases, n=7)	Papillary carcinoma	6	85.7
	Follicular carcinoma	1	14.3
	Medullary carcinoma	0	0.0
	Anaplastic carcinoma	0	0.0
Overall outcome	Benign lesions	43	86.0
	Malignant lesions	7	14.0

Table 6: Malignancy distribution according to age and sex (n=50).

Variable		Total patients (N)	Malignant cases (N)	(%)
Age (in years)	11–20	3	1	33.3
	21–30	15	3	20.0
	31–40	20	2	10.0
	41–50	10	0	0.0
	51–60	2	1	50.0
Sex	Male	8	2	25.0
	Female	42	5	11.9

Table 7: Histopathological pattern and lymph node status of malignant thyroid lesions (n=7).

Variable		Number (N)	(%)
Histological type	Papillary carcinoma	6	85.7
	Follicular carcinoma	1	14.3
	Medullary carcinoma	0	0.0
	Anaplastic carcinoma	0	0.0
Lymph node metastasis	Present	1	14.3
	Absent	6	85.7

Table 8: Type of surgical management in thyroid swellings (n=50).

Type of surgery	Benign cases (N)	Malignant cases (N)	Total (N)	(%)
Hemithyroidectomy	30	0	30	60.0
Subtotal thyroidectomy	8	0	8	16.0
Total thyroidectomy	5	6	11	22.0
Total thyroidectomy with neck dissection	0	1	1	2.0

DISCUSSION

Thyroid malignancy is one of the more common endocrine malignancies, accounting for approximately 1% of all malignancies. The incidence of malignancy in goitrous thyroid is about 10%. It is postulated that goitrous thyroid may act as a precursor lesion for the development of malignant disease. The aim of this study was to determine the incidence of malignancy among thyroid swellings in hospitalized patients. A total of 50 cases of thyroid swelling were studied who underwent thyroidectomy at Rajshahi Medical College Hospital from June 2014 to December 2014. This was a cross-sectional observational study. All patients were evaluated through detailed history, clinical examination, thyroid hormone assay, FNAC and histopathological examination.

In this study, the age of the patients ranged from 11 to 59 years. The highest number of patients (40%) belonged to the 31–40 years age group, followed by 30% in the 21–30 years age group. The age distribution of this series is more or less in agreement with similar reports in the literature.^{16,17} In the study of Islam et al, the majority of patients were also within the 21–40 years age group.¹⁸ The youngest patient in this series was an 11 years old girl diagnosed with papillary carcinoma, while the oldest patient was a 59 years old male diagnosed with follicular carcinoma.

The extremes of age show a higher likelihood of malignancy and a lower likelihood of benign thyroid disease.¹⁹ In this study, both the youngest and the oldest patients had malignant thyroid disease, which corresponds with this observation.

In this study, out of 50 cases, 42 (84%) were female and 8 (16%) were male, giving a female-to-male ratio of 5.25:1. Most patients came from non-endemic areas. The higher female predominance in this series may be explained by the fact that thyroid disorders are generally more common in females than in males. Similar findings have been reported by Moon et al who observed that thyroid nodules were significantly more common in women (41.7%) than in men (27.0%), highlighting a clear female predominance and by Malakzai et al who found that out of 686 patients with thyroid nodules, 566 were female and 120 were male, further supporting the higher occurrence in females.^{20,21}

Socioeconomic status showed that 35 cases were from middle-class families, 12 from lower socioeconomic class and 3 from upper class. This reflects that patients from lower socioeconomic groups are more likely to attend tertiary care hospitals, whereas upper-class patients are less likely to seek treatment in government hospitals. Regarding clinical presentation, all patients presented with neck swelling, with variable associated symptoms. The duration of swelling varied and Table VII shows that medium and long durations (2–8 years) were more

commonly associated with benign thyroid disease. In contrast, short duration of swelling (less than 2 years) was more frequently associated with malignant conditions. This finding is supported by Chaudhary et al, who reported that most patients with thyroid swellings of longer duration were ultimately found to have benign pathology, whereas malignant lesions were more commonly associated with relatively shorter duration of symptoms, reflecting a more rapid clinical course of cancerous lesions.²²

In this study, one case presented with cervical lymphadenopathy along with goitre and was diagnosed as malignant. This indicates that thyroid swelling with cervical lymphadenopathy may be associated with malignancy. In addition, 4 cases presented with dysphagia and 1 case with dyspnoea, all of which were diagnosed as multinodular goitre. Multinodular goitre with large swellings may cause respiratory or swallowing difficulties due to tracheal or oesophageal compression. This is supported by Alfonso et al, who observed tracheal or oesophageal compression in 33% of patients with benign goitre, frequently associated with dysphagia and respiratory symptoms, indicating that enlarged goitres commonly produce compressive effects on adjacent neck structures.²³

Some patients in both benign and malignant groups presented with pain, dysphagia and dyspnoea along with thyroid swelling, which are common clinical features of thyroid disease. In this study, 7 cases were malignant, including 6 cases of papillary carcinoma and 1 case of follicular carcinoma. Among papillary carcinoma cases, one patient (16.7%) presented with lymph node metastasis. In this series, nodules were found more frequently in the right lobe than in the left lobe; however, no established anatomical predilection has been reported in literature.

In this study, solitary thyroid nodules accounted for 30%, multinodular goitre for 68% and diffuse goitre for 2%. Solitary thyroid nodules do not represent a single clinical entity, as they may encompass a spectrum of pathological conditions ranging from benign adenoma to malignancy. This pattern is in agreement with Siddappa et al who reported that in patients with nodular thyroid disease, multinodular goitre was the predominant presentation, accounting for the majority of cases, while solitary nodules and diffuse goitre were comparatively less frequent.²⁴

On ultrasonography, solid nodules were more common (70%) than cystic nodules (30%). Similar findings were reported by Mu et al who observed that solid thyroid nodules constituted the predominant ultrasound pattern, accounting for approximately 68% of cases, followed by mixed and cystic types, thereby supporting the higher frequency of solid lesions in thyroid swellings.²⁵ Investigations are essential to establish the preoperative physical, functional and cytopathological status of

thyroid swellings. Thyroid hormone profiles were within normal limits in all patients, with only one patient having a history of hyperthyroidism but remaining euthyroid at the time of the study due to medical treatment. Ultrasonography was used to assess the size, shape, echotexture, number of nodules and any extrathyroidal extension. In this series, 40 nodules were solid and 10 were cystic. Among solid nodules, 34 (85%) were benign and 6 (15%) were malignant, whereas among cystic nodules, 9 (90%) were benign and only 1 (10%) was malignant. Lee et al reported that purely solid nodules had a significantly higher risk of malignancy (29.5%) compared to minimally cystic (8.8%) and partially cystic nodules (6.2%), indicating that solid composition is an important predictor of malignancy.²⁶

FNAC is a highly important, specific and minimally invasive preoperative diagnostic tool. According to Chandanwale et al FNAC is the gold standard for preoperative evaluation of thyroid swelling.²⁷ In this study, 76% cases were colloid goitre, 12% were papillary carcinoma and 12% were follicular neoplasm. The majority of thyroid swellings were benign. FNAC cannot distinguish follicular carcinoma from follicular adenoma, as this requires histological evidence of capsular and vascular invasion. FNAC has some false-positive and false-negative rates and it is less reliable in cystic than solid nodules. Chandanwale et al reported a sensitivity of 90% and specificity of 100%, while Basharat et al, reported sensitivity of 80% and specificity of 97.7%.^{27,28} Therefore, FNAC remains an essential preoperative diagnostic tool and its findings in this study were supported by postoperative histopathology.

All patients underwent surgical management based on site, nature of lesion and cervical lymph node status. Most solitary thyroid nodules were treated by hemithyroidectomy. In this study, 30 patients (60%) underwent hemithyroidectomy. Total thyroidectomy was performed in most malignant cases, consistent with standard management principles. The type and extent of surgery had a significant impact on complications. Hypocalcaemia was more common in near-total or total thyroidectomy and total thyroidectomy with neck dissection. Recurrent laryngeal nerve injury occurred in one case following total thyroidectomy with neck dissection. One case each of reactionary hemorrhage and postoperative infection was observed following hemithyroidectomy and subtotal thyroidectomy.

Final diagnosis was confirmed by histopathological examination. Out of 50 cases, 37 (74%) were colloid nodular goitre. Neoplastic lesions were found in 13 cases (26%), of which 6 (12%) were benign follicular adenoma and 7 (14%) were malignant. Among malignant cases, papillary carcinoma was most common (85.7%), followed by follicular carcinoma (14.3%). The overall incidence of malignancy in this study is comparable with findings reported by Hussain et al, Khairy et al and Islam et al.^{18,29,30}

Limitations

Limitations of this study were as this study was conducted in a single tertiary-level hospital only. The sample size was small and the study duration was short.

Due to these limitations, the study may not accurately reflect the true incidence of thyroid malignancy in the country.

CONCLUSION

In this study, the incidence of thyroid malignancy among thyroid swellings in hospitalized patients was 14.0%. The incidence was higher in males (25.0%) compared to females (11.9%) and was also greater in the extreme age groups (below 20 years and above 50 years). Papillary carcinoma was the most common histological pattern. It can be concluded that a significant proportion of thyroid swellings (14.0% in this study) may be malignant. The risk of malignancy is higher in patients at extreme ages and in males with goitre; therefore, such cases require careful evaluation and prompt medical attention. Larger demographic studies are recommended to determine the true incidence more accurately.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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