Section: General Surgery

Original Research Article

CLINICAL PRESENTATION AND FINE NEEDLE ASPIRATION CYTOLOGY FINDINGS IN ADULTS PRESENTING WITH THYROID SWELLING: AN OBSERVATIONAL STUDY

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Received *: 21/12/2024*
Received in revised form *: 16/02/2025*
Accepted *: 03/03/2025*

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DOI: 10.70034/ijmedph.2025.1.307

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (1); 1639-1644

ABSTRACT

Background: Thyroid swelling is a common clinical finding in surgical practice. The causes of such swellings range from benign conditions like multinodular goiter to malignant lesions such as papillary carcinoma. Thyroid swellings are more commonly seen in females due to hormonal influences. It is important to differentiate between benign and malignant thyroid lesions because of obvious implications in terms of management. High-resolution ultrasonography and FNAC are essential diagnostic tools for evaluation of thyroid swellings. Cytology and histopathology provides definitive diagnosis. This study aims to analyze clinical presentation and cytological diagnosis of thyroid swelling in adults.

Materials and Methods: This prospective observational study was conducted at Government Stanley Medical College, Chennai. The purpose of the study was to analyze clinical presentation and FNAC findings in patients presenting with thyroid swelling. 50 Adults aged 18 years and above presenting with thyroid swelling and willing to provide informed consent were included in this study. Pregnant women, patients with prior thyroid malignancy or surgery, those with uncontrolled chronic diseases or on medications affecting thyroid function were excluded. Demographic details, clinical findings, thyroid function tests, high-resolution ultrasound and FNAC was done in all cases. Data was analyzed using SPSS (version 23.0). P value <0.05 was considered statistically significant.

Results: Thyroid swellings were more common in females (72%) with a male-to-female ratio of 1:2.57. The mean age of male and female patients was 39.6 +/- 13.2 and 41.4 +/- 14.3 years respectively. The most common clinical presentation was swelling only (42%), followed by swelling with pain (28%). Majority of cases were euthyroid (70%). Ultrasound findings revealed colloid goitre as the most common condition (20%) followed by multinodular goitre (16%). Histopathological analysis confirmed colloid goitre (20%) as the most frequent diagnosis followed by multinodular goitre (16%) and follicular adenoma (14%).

Conclusion: Thyroid swellings were more common in females. Majority of the cases were found to have benign pathology with colloid goitre being the most prevalent diagnosis. Most patients were euthyroid and swelling without other symptoms was the most common presentation. FNAC was effective in distinguishing benign from malignant lesions underscoring its diagnostic value.

Keywords: Thyroid swelling, Colloid goitre, Fine needle aspiration cytology, Ultrasonography.

INTRODUCTION

Thyroid swelling is one of the most common clinical presentations encountered in surgery practice. It affects a significant proportion of the adult population worldwide. It encompasses a broad spectrum of thyroid gland disorders ranging from benign conditions like multinodular goiter and thyroiditis to malignant lesions such as papillary and follicular carcinomas.[1] The prevalence of thyroid nodules detected clinically is estimated to be 4-10% in the general adult population, but with the advent of high-resolution ultrasonography, this figure rises to 14-50%. Thyroid swellings are more frequently observed in females. This female preponderance is reported to be due to hormonal influences related to reproductive function, puberty, pregnancy and menopause. The peak incidence of thyroid enlargement occurs between the third and fifth decades of life although it can be observed across all age groups.[2]

Various pathological conditions can present with thyroid swelling. Benign conditions presenting with thyroid swelling may include conditions such as multinodular goiter, colloid goiter, cystic degeneration, and thyroiditis (e.g., Hashimoto's thyroiditis). On the other hand, thyroid malignancies are clinically significant due to their potential for local invasion and distant metastasis. Papillary carcinoma is the most common thyroid carcinoma followed by follicular carcinoma, medullary carcinoma and the aggressive anaplastic carcinoma. In differential diagnosis of thyroid swelling secondary metastases to the thyroid gland should also be considered. Accurate differentiation between benign and malignant thyroid lesions is crucial for appropriate management of patients presenting with thyroid swelling.[3]

In addition to thyroid enlargement patients may also present with a variety of other symptoms depending on the underlying pathology. In cases of hyperthyroidism, symptoms such as palpitations, weight loss, heat intolerance, and anxiety may be present. Conversely, hypothyroidism may manifest as fatigue, constipation, weight gain, cold intolerance, and subtle psychiatric symptoms. Mechanical symptoms due to compressive effects of an enlarged thyroid, such as dysphagia, dyspnea, hoarseness and stridor may also be present. These mechanical symptoms are more commonly seen in cases of large goiters or thyroid malignancies with local invasion. Enlarged cervical lymph nodes may be an indication of malignant thyroid disease.[4]

In every case presenting with thyroid swelling a detailed clinical examination, relevant laboratory investigations (including thyroid function tests) and imaging techniques needs to be undertaken to accurately diagnose the underlying pathology.[5] High-resolution ultrasonography remains the first-line imaging modality for assessment of thyroid nodules. USG can characterise the thyroid swellings in terms of size, echogenicity, vascularity and risk of malignancy using the TIRADS (Thyroid Imaging Reporting and Data System) classification.[6] Fine Needle Aspiration Cytology (FNAC) is recommended for nodules >10 mm or even smaller nodules with suspicious ultrasound features. FNAC findings are usually categorized according to the Bethesda system.[7] Additional imaging modalities such as thyroid scintigraphy, computed tomography and magnetic resonance imaging may be indicated in selected cases. in patients with suspected malignant thyroid lesions Indirect laryngoscopy is commonly done to evaluate vocal cord mobility.[8]

Histopathological examination is the gold standard for the definitive diagnosis of thyroid lesions. It provides essential information on the type and extent of thyroid pathology.[9] Histopathological examination can enable accurate differentiation between benign and malignant lesions thereby helping in taking appropriate therapeutic decisions. Histopathology also facilitates the classification of thyroid malignancies thereby aiding in prognostication and staging. Though histopathological evaluation of surgically excised thyroid tissue remains important in confirming the diagnosis in cases where suspicion of malignancy is low FNAC can be used as an alternative to histopathology.[10]

Despite the extensive research on thyroid swellings, there remains a knowledge gap concerning the variability of clinical presentations and the correlation between clinical findings, imaging features, and histopathological diagnosis, particularly in the adult population. This observational study, therefor, aims to analyse the clinical presentation and cytological diagnosis of adults presenting with thyroid swelling.

MATERIALS AND METHODS

This prospective observational study was conducted in the Department of Surgery of Government Stanley Medical College Chennai to analyze the clinical presentation and histopathological diagnosis of adults presenting with thyroid swelling. The duration of study was 1 year. All patients presenting with thyroid swelling during this period were evaluated and included as per the inclusion and exclusion criteria. Written and informed consent was taken from all participants. Sample size was calculated on the basis of pilot studies done on the topic of evaluation of thyroid swellings . Keeping power (1-Beta error) at 80% and confidence interval (1-alpha error) at 95%, the minimum sample size required in each group was 50 patients therefore we included 50 patients in each group

Demographic details including age, gender, residence, occupation, duration of thyroid swelling, and presenting symptoms were recorded for all patients. A structured proforma was used to document clinical findings. A general examination

was performed to assess the overall health status and rule out systemic illnesses. In addition, a local examination of thyroid swelling was conducted to note the site, size, shape, consistency, mobility, tenderness, and surface characteristics of the swelling. Mobility during swallowing was assessed to differentiate thyroid from other cervical swellings. A thorough systemic examination was carried out to identify any cardiovascular, respiratory, or neurological involvement.

Serum T3, T4, and TSH levels were measured to evaluate thyroid function status and categorize patients as euthyroid, hypothyroid, or hyperthyroid. High-resolution ultrasound was performed to evaluate the size, echogenicity, vascularity, and nodular characteristics of the thyroid swelling. FNAC was performed under ultrasound guidance in all cases. FNAC findings were correlated with clinical presentation and ultrasound findings.

Data were recorded in Microsoft Excel and analyzed using SPSS software (version 23.0). Quantitative variables, such as thyroid hormone levels, were expressed as mean ± standard deviation (SD). Qualitative variables, including clinical presentation, ultrasound findings and FNAC results were expressed as frequency and percentages. Chi-square test was used to analyze categorical variables, and Independent t-test was applied for continuous variables. A p-value <0.05 was considered statistically significant.

Inclusion Criteria

- Adults (≥18 years) presenting with thyroid swelling.
- Patients undergoing clinical examination, thyroid function tests, ultrasonography and FNAC.
- Patients willing to provide informed written consent.

Exclusion Criteria

- Pregnant females.
- Patient in whom FNAC was not done.
- Patients with a known history of thyroid malignancy or prior thyroid surgery.
- Patients with uncontrolled chronic diseases (e.g., severe COPD, uncontrolled hypertension).
- Patients on medications known to affect thyroid function (e.g., amiodarone, lithium).
- Patients who did not provide informed consent

RESULTS

Out of 50 studied cases there were 36 (72%) females and 14 (28%) males. There was an overall female preponderance with a M:F ratio of 1:2.57. [Figure 1]

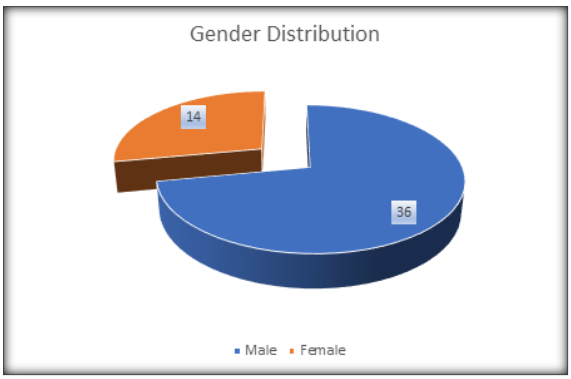

Figure 1: Gender Distribution of studied cases

The analysis of the age distribution of the studied cases showed that the most common age group was 26-35 years (28%), followed by the 36-45 years (22%). Females were more prevalent across all age groups compared to males. In the 26-35 age group there were 10 females (20%) compared to 4 males (8%), and in the 36-45 age group there were 8 females (16%) and 3 males (6%). The mean age was slightly higher for females (41.4 ± 14.3 years) compared to males (39.6 ± 13.2 years) however there was no statistically significant difference in the mean ages of male and female patients. [Table 1]

Table 1: Comparison of gender wise age distribution in studied cases

Age (years)	Female	Male
18-25	5	2
26-35	10	4
36-45	8	3
46-55	7	3
56-65	4	1
66-75	2	1
Total	36	14
Mean Age	41.4 +/- 14.3	39.6 +/- 13.2
P= 0.6524 (Not Significant)		

The most common sign was swelling only (42%), with females accounting for 15 cases (30%) and males for 6 cases (12%). This was followed by swelling with pain (28%) which was seen in 10 females (20%) and 4 males (8%). Swelling with dysphagia was seen in 7 cases (14%), predominantly in females (5 cases, 10%) compared to males (2 cases, 4%). Swelling with pain and dysphagia occurred in 4 cases (8%), while swelling with stridor was the least common presentation (6%). Overall, females were more frequently affected across all clinical presentations. [Figure 2]

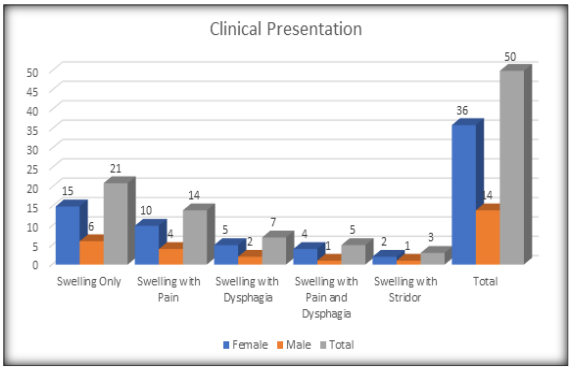

Figure 2: Clinical Presentation of studied cases.

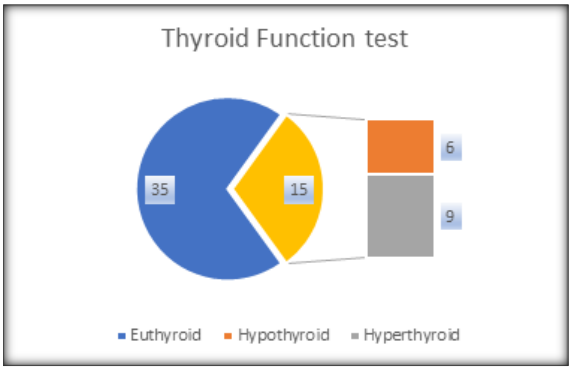

Figure 3: Thyroid Function status in studied cases.

The analysis of the thyroid function test results showed that the majority of the cases were euthyroid, with 35 individuals (70%), indicating normal thyroid function. This was followed by 15 cases (30%) with thyroid dysfunction, of which 9 were hyperthyroid (18%) and 6 were hypothyroid (12%). [Figure 3]

The analysis of the ultrasound findings showed that the most common condition was colloid goitre, observed in 10 cases (20%), followed by multinodular goitre in 8 cases (16%) and thyroid nodule in 7 cases (14%). Diffuse nodular goitre and microcalcifications were each noted in 6 cases (12%). Hypoechoic nodules were found in 5 cases (10%), while thyroid cysts and lesions with irregular margins were the least common findings, each occurring in 4 cases (8%). [Table 2]

Table 2: Ultrasound findings in studied cases

Ultrasound Findings	Count	Percentage (%)
Colloid Goitre	10	20.0
Diffuse Nodular Goitre	6	12.0
Multinodular Goitre	8	16.0
Thyroid Nodule	7	14.0
Thyroid Cyst	4	8.0
Hypoechoic Nodule	5	10.0
Microcalcifications	6	12.0
Lesions with Irregular Margins	4	8.0
Total	50	100

FNAC was done in all cases. The analysis of the histopathological diagnosis revealed that the most common condition was colloid goitre, found in 10 cases (20%), followed by multinodular goitre in 8 cases (16%) and follicular adenoma in 7 cases (14%). Nodular hyperplasia and papillary carcinoma were each observed in 6 cases (12%). Follicular neoplasia was identified in 5 cases (10%), while thyroid cysts and medullary carcinoma were the least common, each occurring in 4 cases (8%). [Table 3]

Table 3: Fine needle aspiration cytology of studied cases

Histopathological Diagnosis	Count	Percentage (%)
Colloid Goitre	10	20.0
Nodular Hyperplasia	6	12.0
Multinodular Goitre	8	16.0
Follicular Adenoma	7	14.0
Thyroid Cyst	4	8.0
Follicular Neoplasia	5	10.0
Papillary Carcinoma	6	12.0
Medullary Carcinoma	4	8.0
Total	50	100

DISCUSSIONS

Thyroid swellings are a common clinical problem encountered worldwide, with a broad differential diagnosis ranging from benign hyperplasia to malignant neoplasms.[11] They are more prevalent in females and can present with various symptoms, including neck swelling, pain, dysphagia, and, less commonly, stridor. Accurate evaluation of thyroid swellings is crucial, as the clinical presentation alone is often insufficient to distinguish between benign and malignant conditions. High-resolution ultrasound and fine needle aspiration cytology (FNAC) are essential tools in the diagnostic workup, aiding in risk stratification and guiding the need for surgical intervention.[12]

In our study there were 36 (72%) females and 14 (28%) males. There was an overall female

preponderance with a M:F ratio of 1:2.57. The mean age of females (41.4 ± 14.3 years) was found to be comparable to males (39.6 ± 13.2 years) with no statistically significant difference (P= 0.6524). Chaudhary M et al conducted a prospective study to find out the relative occurrence of various pathological conditions presenting as thyroid swellings and to evaluate their clinicopathological and radiological features.[13] A comprehensive clinical, radiological, cytological, and histopathological examination was conducted, and complete clinical data were gathered from medical records.The study found that the highest incidence of thyroid swelling was in the age group of 31–40 years (34%), with a marked female predominance (female to male ratio of 7.3:1). Most patients were from rural backgrounds (84%). Left-sided neck swelling was the most common presentation (36%). Ultrasound revealed non-neoplastic lesions in 88% of patients and neoplastic lesions in 12%. FNAC showed non-neoplastic lesions in 76% and neoplastic lesions in 24% of patients. Histopathological examination confirmed non-neoplastic lesions in 72% and neoplastic lesions in 28% of patients. Colloid goiter was the most common non-neoplastic lesion (58%), while papillary carcinoma was the most common malignant disease (8%). On the basis of these findings, the authors concluded that thyroid swelling was most commonly seen during the 3rd and 4th decades of life, predominantly affecting females. The mean age and gender distribution of cases in this study was found to be comparable to our study. Similar mean age and gender distribution of cases with thyroid swelling was also reported by the authors such as Rout K et al,[14] and Amjad KM et al.[15]

The most common symptom was swelling only (42%), followed by swelling with pain (28%). Swelling with dysphagia was observed in 14% of cases, while swelling with pain and dysphagia occurred in 8% of cases. The least common presentation was swelling with stridor (6%). Overall, swelling was the predominant symptom in all clinical presentations. Swelling and pain were also reported to be the most common clinical presentation in cases of thyroid swelling in studies done by the authors such as Takashima S et al,[16] and Hong Y et al.[17]

The analysis of imaging and FNAC findings showed that the most common condition was colloid goitre (20%), followed by multinodular goitre (16%) and thyroid nodule (14%). Diffuse nodular goitre and microcalcifications were each seen in 12% of cases, while hypoechoic nodules were found in 10%. Thyroid cysts and irregular margins were the least common findings (8% each). Histopathological analysis also showed colloid goitre as the most common condition (20%), followed by multinodular goitre (16%) and follicular adenoma (14%). Nodular hyperplasia and papillary carcinoma were observed in 12% of cases each, while follicular neoplasia was noted in 10%. Thyroid cysts and medullary carcinoma were the least common histopathological diagnoses (8% each). Overall, benign conditions, particularly colloid goitre and multinodular goitre, were more prevalent than malignant thyroid pathologies. Shukla S et al conducted a study to analyse FNAC diagnosis of cases presenting with thyroid swelling ad reported that nodular goitre was most common, occurring in 16 cases (26.7%), followed by colloid goitre with cystic degeneration in 12 cases (20%).[18] Hashimoto thyroiditis was observed in 7 cases (11.7%), while adenomatous goitre was noted in 5 cases (8.3%). Follicular neoplasia also appeared in 5 cases (8.3%). Less frequently observed conditions included thyroiditis and colloid goitre, each in 3 cases (5%), cystic changes in 3 cases (5%), papillary neoplasia in 2 cases (3.3%), and adenoma and malignant lesions in 1 case each (1.7%). Autoimmune thyroiditis and anaplastic neoplasm were the least common, each occurring in 1 case (1.7%). Similar FNAC findings in cases of thyroid swellings were also reported by the authors such as Patel KA et al,[19] and Bhise SV et al.[20]

CONCLUSION

This study found that the thyroid swellings were more commonly seen in females as compared to males. majority of cases were benign. Colloid goitre was the most prevalent diagnosis followed by multinodular goitre and follicular adenoma. Most patients were euthyroid and swelling without ANY other sign or symptoms was the most common clinical presentation. Fine needle aspiration cytology proved effective in differentiating between benign and malignant lesions highlighting its importance in the diagnostic approach for thyroid swellings.

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