



RESEARCH ARTICLE

A CLINICO-CYTOHISTOPATHOLOGICAL EVALUATION OF THYROID SWELLINGS:
A PROSPECTIVE STUDY

*¹Sumeet Angral, ¹Manish Sharma, ²Mohit Goel and ³Deepakshi Angral

¹Department of ENT, Government Medical College, Jammu

²Department of ENT, Maharishi Markendeshwar Medical College & Hospital, Solan

³Intern BDS Govt Dental College Jammu

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ABSTRACT

Introduction: Enlargement of thyroid gland (goiter) is a commonly encountered endocrine problem in clinical practice and accurate preoperative evaluation of thyroid disorder becomes important for proper management of the patient. Epidemiological studies suggest an annual incidence of 0.1% to 1.5% of nodular disease.

Aims and objectives: This study designs to determine the clinical parameters, probable clinical diagnosis and comparative results of fine needle aspiration cytology (FNAC) and definitive histopathology (performed postoperatively) of thyroid swellings.

Material and methods: This study was carried out at Government medical college, Jammu for a period of 1 year i.e. from May 2015 to May 2016. This prospective study comprises total 30 cases with thyroid lesions referred to cytology after proper clinical examination and routine investigations. Definitive histopathological examination of specimen after surgery was done.

Results: 16 (53%) cases were between 31-40years of age. While 77% of the patients were female, only 23% were males. Right thyroid lobe was the site of affection in 15 (50%) cases. Based on clinical signs, symptoms and FNAC report four cases (13%) were found suspicious of malignancy and staged according to TNM classification. Out of 30 cases, 24(80%) cases had colloid goiter on FNAC, while 4 (14%) cases had follicular neoplasia, 1(3%) case each was diagnosed as having Hurthle cell neoplasia and thyroid cyst. Out of 30 cases, 25 (84%) cases had post-operative HPR of colloid goitre. This included one case with thyroid cyst, whose histological nature was not suggested previously by FNAC report. Four (13%) cases had HPR of follicular adenoma and only one (3%) cases had benign Hurthle cell neoplasm. Out of 30 cases, 22(73%) cases underwent lobectomy, while 5 (17%) cases were subjected to subtotal thyroidectomy. Two cases (7%) underwent near total thyroidectomy and only 1 (3%) case was subjected to isthmusectomy. Overall specificity of FNAC was 80% and sensitivity 97%. FNAC had false-negative rate of 3% and accuracy of 80%. FNAC was 96% specific in cases of colloid goiter and in only 4% of cases of colloid goiter was non-diagnostic as it could not predict the nature of swelling in thyroid cyst. FNAC could not predict the malignant or benign nature of follicular neoplasia as well as Hurthle cell neoplasia in none of the concerned cases. All the five cases of follicular and Hurthle cell neoplasia were confirmed to be of benign nature only by definitive histopathology.

Conclusion: The serum TSH should be initial screening test to assess thyroid function, as it is a sensitive and reliable index of thyroid function. FNAC should be obtained as the initial diagnostic test to exclude malignancy in prominent palpable or suspicious nodules. FNAC does not help in differentiating benign and malignant counterparts of follicular neoplasia and hurthle cell neoplasia and definitive pathology is established only on histopathology performed post-operatively.

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INTRODUCTION

Enlargement of thyroid gland (goiter) is a commonly encountered endocrine problem in clinical practice. Goiter may be classified as diffuse or nodular and may be either toxic or nontoxic. Nodular goiter may comprise multiple nodules (MNG) or a single nodule. Recent data suggests that 50% of patients with a single thyroid nodule have other nodules demonstrated by careful ultrasonography (Tan et al., 1995).

Epidemiological studies suggest an annual incidence of 0.1% to 1.5% of nodular disease, with a prevalence of approximately 4% (6.4% in women, 1.5% in males) (Vander et al., 1968). Worldwide iodine deficiency is the most common cause of goiter (endemic goiter) (Williams et al., 1983). Approximately, 80% of patients with multinodular goiter (MNG) are biochemically euthyroid at initial presentation. Clinical assessment includes detail history to evaluate the differential diagnosis of thyroid enlargement. Questions regarding rate of thyroid growth and recent increase in size, hoarseness, neck pain, odynophagia, dysphagia, previous radiation exposure and history of cancer are important in the assessment of thyroid

*Corresponding author: Sumeet Angral,
Department of ENT, Government Medical College, Jammu

cancer risk. Symptoms of dysphagia, hoarseness, dyspnoea, stridor and cough may signify the presence of a retrosternal or intrathoracic MNG, but further diagnostic evaluation is needed to exclude malignancy (Geerdsen and Frolund, 1984). Fortunately, the likelihood that a single thyroid nodule is malignant is only 5% (Belfiore *et al.*, 1992; Mazzaferri, 1993; Rojeski and Gharib, 1985). In addition, the patient with a nodule who has a family history of medullary thyroid carcinoma also has a greater chance of harbouring a thyroid malignancy (Lairmore and Wells, 1991). A history of sudden onset of neck pain suggests a benign process, usually haemorrhage into a benign cyst or a degeneration adenoma or subacute viral (granulomatous) thyroiditis (Singer, 1991). Another factor to be considered in the evaluation is that a thyroid nodule in a child is more likely to be malignant (Gorlin and Sallan, 1988; Mc Henry *et al.*, 1988) as is a nodule in elderly individuals, elderly if there is a rapid growth. The presence of thyroid nodule in a male, especially after age 60, is much more likely to be carcinoma than in a female (Mazzaferri, 1993). In view of these facts the present study was undertaken to determine the clinical parameters of thyroid swelling and evaluate the correlation between pre operative FNAC/ cytology and the postoperative definitive histopathology.

MATERIALS AND METHODS

Patients with thyroid swelling who attended ENT outpatient's department of SMGS hospital from 1 -5 -2014 to 30- 4 -2015 were taken up for the study. Complete clinical workup of all the patients was done (Complete history, complete physical and local examination). Routine investigations including thyroid profile was done followed by FNAC of the lesion. Surgery was performed according to the diagnosis and the extent of the disease and definitive histopathological examination of specimen after surgery was done.

RESULTS

Thirty cases with thyroid swellings were admitted to ENT inpatient department of SMGS Hospital.

Age distribution

As regard with age distribution, third and fourth decade of life were found to be the most frequently involved groups. Age distribution of the cases under study is shown in Table -1.

Table 1. Age distribution of cases involved in the study (n=30)

Age group (years)	No. of patients	Percentage
21-30	8	27
31-40	16	53
41-50	4	13
51-60	2	7

As is evident from the table, 16 (53%) cases were between 31-40years of age, the next common age group found involved was between 21-30 years (27%). The youngest case in series was of 22 years while the oldest case was 60 years old.

Sex distribution

Thyroid swellings were found to be predominantly occurring in females as shown in Table 2 While 77% of the patients were female, only 23% were males. The females: male ratio being

3:1 with maximum cases (87%) belonging to rural areas and few (13%) belonging to urban areas.

Table 2. Sex distribution of case under study (n=30)

Sex	No. of cases	Percentage
Female	23	77
Male	7	23

Symptomology

All the cases presenting with asymptomatic thyroid swellings, were noted by the patients on self-examination. The duration of swelling ranges from minimum of 2 months to a maximum of 13 years as shown in Table-3.

Table 3. Duration of swelling in patients under study

Duration (months/years)	No. of cases	Percentage
Less than 6 months	12	40
6 months-1 year	7	23
1-2 years	3	10
2-4 years	3	10
More than 4 years	5	17

About 12(40%) cases had swelling for duration of 6 months or less, while 7 cases (23%) had swelling for 1 year or less. Three cases (10%) less than 4 years. Five cases had swelling for 7,10,12,13 and 25 years duration. None of the cases had history of pressure effects or thyrotoxicosis and only 1 (3%) cases out of 30 had a positive family history for thyroid swelling.

Examination findings

Site: About half of thyroid swellings were found to involve right thyroid lobe, followed by left thyroid lobe and whole thyroid gland which each were site of affection in about 1/5th of cases.

Table 4. Distribution of thyroid swelling according to site

Site	No. of cases	Percentage
Whole thyroid gland	7	23
Right thyroid gland	15	50
Left thyroid gland	7	23
Thyroid isthmus	1	4

Right thyroid lobe was the site of affection in 15 (50%) cases. While left thyroid lobe and whole thyroid gland each were sites of affection in 7(23%) cases. One case had involvement of isthmus only. Size: Approximately 4/5th of swellings had greatest dimension between 5- 10 (cms), while approximately 1/4th had greatest dimension less than 5 (cms).

Table 5. Distribution of size of thyroid swelling of cases under study

Greatest dimension (cms)	No. of cases	Percentage
<5	3	10
5-10	26	87
>10	1	3

Twenty-six (87%) cases were found to have thyroid swelling with greatest dimension in the range of 5 – 10 (cms), while 3 (10%) of cases had greatest dimension of swelling measuring less than 5 cms, only one case had greatest dimension of swelling more than 10 cms.

Consistency

Almost all of the cases (29) had swelling of soft to firm consistency, while only 1 case had cystic swelling. Number of nodules per swelling: Almost 3/4th of the cases (22) had single thyroid nodule, while approx. 1/4th (8) had multi-nodular swellings. Out of 8 cases of multi – nodular swelling one of the case had two separate thyroid nodules affecting the left lobe and the isthmus. None of the cases were found to have fixation of thyroid to underlying structures, nor had they any pressure effects. Only one case (3%) demonstrated toxic manifestation of viz-a-viz tremor of hands. None of these cases had impaired mobility of cords and only one case (3%) showed cervical lymph node enlargement at level 11. Based on clinical signs, symptoms and FNAC report four cases (13%) were found suspicious of malignancy and staged according to TNM classification. The stage distribution of four cases found suspicious for malignancy is represented in Table 6.

Table 6. Distribution of cases according to benignity or suspicious for malignancy

Nature of swelling	No of cases	Percentage
Benign	26	87
Suspicious of malignancy	4	13
Stage 1	2	50
Stage 2	2	50
Stage 3	-	-
Stage 4	-	-

Investigations

Thyroid profile: Out of 30 cases, only 1 (3%) case had thyroid function tests suggestive of hyperthyroidism and rest 29 cases were hypothyroid. FNAC: About 3/4th of the cases showed features suggestive of colloid goiter on FNAC, while as follicular neoplasia was second most common finding.

Table 7. Distribution of cases according to FNAC report

FNAC report	No. of cases	Percentage
Collid goiter	24	80
Follicular neoplasia	4	14
Hurthle cell neoplasia	1	3
Thyroid cyst with hemorrhage	1	3

Out of 30 cases, 24(80%) cases had colloid goiter on FNAC, while 4 (14%) cases had follicular neoplasia, 1(3%) case each was diagnosed as having Hurthle cell neoplasia and thyroid cyst. Histopathology report (HPR): Approximately 4/5th of cases had HPR of colloid goiter while approximately 1/10th had HPR of follicular adenoma.

Table 8. Distribution of cases according to histopathology report

Histopathology	No. of cases	Percentage
Colloid goiter	25	84
Follicular adenoma	4	13
Benighn hurthle cell neoplasm	1	3

Out of 30 cases, 25 (84%) cases had post-operative HPR of colloid goitre. This included one case with thyroid cyst, whose histological nature was not suggested previously by FNAC report. Four (13%) cases had HPR of follicular adenoma and only one (3%) cases had benign Hurthle cell neoplasm.

Nature of surgery

About 3/4 of the cases were subjected to thyroid lobectomy, while 1/5th of the cases were subjected to subtotal thyroidectomy. One-tenth of the cases underwent near total thyroidectomy.

Table 9. Distribution of cases according to nature of surgery

Nature of surgery	No. of cases	Percentage
Lobectomy	22	73
Subtotal thyroidectomy	5	17
Near total thyroidectomy	2	7
Isthmusectomy	1	3

Out of 30 cases, 22(73%) cases underwent lobectomy, while 5 (17%) cases were subjected to subtotal thyroidectomy. Two cases (7%) underwent near total thyroidectomy and only 1 (3%) case was subjected to isthmusectomy. As shown above, FNAC was negative (for malignancy) in 24 (80%) cases and reported 5 cases (17%) as suspicious for malignancy. FNAC was non-diagnostic in 1 (3%) case which was labelled as thyroid cyst. Overall specificity of FNAC was 80%and sensitivity 97% FNAC had false-negative rate of 3% and accuracy of 80%. FNAC was 96% specific in cases of colloid goiter and in only 4% of cases of colloid goiter was non-diagnostic as it could not predict the nature of swelling in thyroid cyst. FNAC could not predict the malignant or benign nature of follicular neoplasia as well as Hurthle cell neoplasia in none of the concerned cases. All the five cases of follicular and Hurthle cell neoplasia were confirmed to be of benign nature only by definitive histopathology. None of the cases under study required revision surgery.

DISCUSSION

Thyroid nodules are commonly found in clinical practice and their detection by either the physician or the patient always raises the concern of cancer. Infact, fewer than 5% of detected nodules are malignant which implies a management strategy is appropriate that reliably and regularly identifies the more common benign nodules, avoiding unnecessary surgical treatment. To this end, the application of fine – needle aspiration (FNAC) cytology, the introduction of new highly sensitive thyrotropin (TSH) assays have modified thyroid nodule management. Our study considers how these advances enter into the treatment of patients with nodular thyroid disease. It includes a brief description of clinical importance of thyroid nodules; of the usefulness, limitations and impact of FNAC on nodule management and discussion of approach to different thyroid nodules.

Age and sex distribution: Nodular thyroid disease increases linearly with age and in all groups thyroid nodules are more frequently in women than in men (Gharib, 1994; Raab, 1994). In our study also, women were more frequently affected with female to male ratio being 3:1. However, in our study majority (53%) of cases affected with nodular thyroid disease were between 31 to 40 years. This may probably be related to number of cases in our study, predominantly benign pathology of our cases and more awareness on part of middle aged population to present for cure of their largely asymptomatic ailment. Symptomatology: Most patients present with an asymptomatic thyroid mass discovered by either a clinician on

routine neck palpation or by the patient during self-examination. Exposure to ionizing radiation is a known risk factor for development of benign and malignant thyroid nodules (Rojeski, 1985; Ashcraft *et al.*, 1981; Ross, 1992; Scneider, 1986). Physical findings: In our study majority of cases (97%) had thyroid swelling with either soft or firm consistency and only 1 case (3%) had swelling of cystic consistency. None of the cases had fixation to adjacent tissue, pressure effects or vocal cord paralysis and only 1 case (3%) had cervical level 1 lymphadenopathy, which was confirmed on definitive histopathology to be of reactive nature. These findings are in agreement with results of above mentioned studies, since none of our cases was documented to have malignancy (Al – Saleh, 1994; Bearchs *et al.*, 1951; Bondeson, 1981; Koh, 1992; Mathai, 1994). FNAC and histopathology: Most cystic lesions are degenerative, benign adenomas or cystic colloid nodules, although malignancy may be present (Rojeski and Gharib, 1985; los Santos, 1990). The cytologic examination usually shows abundant colloid, normal epithelial cells and often foam cells indicating degeneration. The suspicious category (5% to 23%) consists of specimens with features suggestive of but not definitive for malignancy which, practical, is an inconclusive finding. This group includes follicular neoplasms, Hurthle cell neoplasms and specimen with cellular atypia. The most common type is follicular neoplasia which is attended with the problem that cytologically benign follicular neoplasms cannot be separated from malignant ones. These lesions produce hypercellular aspirates with the cells arranged in microfollicular patterns, decreased or absent colloid and mild nuclear atypia.

Colloid nodules: These nodules are the most common thyroid nodules and constitute about 40% to 64% of all thyroid nodules. Our study reported a value of 80%. Cytological studies usually reveal abundant colloid and benign follicular cells but hemorrhagic nodules or highly cellular aspirates may be difficult to differentiate from follicular tumours.

Follicular adenomas: They are most common in middle aged females, are not premalignant and rarely become toxics, but may function and become autonomous. In our study, 75% of the follicular adenomas occurred in middle aged persons with males and females being affected equally. They lacked vascular or capsular invasion on histological examination.

Hurthle cell neoplasia: A Hurthle cell neoplasm is defined as an encapsulated group of follicular cells with at least 75% Hurthle cell component. Hurthle cell neoplasms collectively represent about 5% of all thyroid neoplasms. In our study, 1 case of Hurthle cell neoplasm was diagnosed as adenoma on histology by ruling out vascular or capsular invasion. The adenoma was located unilaterally and in the left thyroid lobe. Hurthle cell neoplasms occur more commonly in female population. In our study, the only affected case was a 40 year old male.

Surgery: In our study, 7 cases had multinodular colloid goiter which were managed with either subtotal thyroidectomy on FNAC and 71% had colloid goiter on FNAC. Twenty-nine percent follicular neoplasia cases were managed with subtotal thyroidectomy and 71% colloid goiter cases were managed with subtotal thyroidectomy 60% and near-total thyroidectomy 40%. None of these cases required revisions surgery following definitive histopathology.

Conclusion

Nodular enlargement of thyroid gland (nodular goiter) may comprise multiple nodules (MNG) or a single nodule. Nodular goitres are common in women than in men (ratio 3:1) middle aged persons are the most commonly affected age group. These goitres may be asymptomatic with normal TSH levels [(non-toxic) (97% cases)] or may be associated with systemic thyrotoxic symptoms. Diagnostic evaluation of patients with nodular goitres consists of clinical evaluation, biochemical testing, FNAC and imaging studies. History, physical examination and diagnostic evaluation should be thorough to detect any potential clues for thyroid hormone dysfunction, compression from large goitres and nodules suspicious for malignancy. The serum TSH should be initial screening test to assess thyroid function, as it is a sensitive and reliable index of thyroid function. FNAC should be obtained as the initial diagnostic test to exclude malignancy in prominent palpable or suspicious nodules. FNAC does not help in differentiating benign and malignant counterparts of follicular neoplasia and Hurthle cell neoplasia and definitive pathology is established only on histopathology performed post-operatively. FNAC has false-negative rate of 3%, sensitivity 97%, specificity 80% and accuracy of 80%.

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