

Original research article

Clinico-pathological study of multinodular swellings of thyroid by histopathology, FNAC and ultrasound correlation

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Abstract

Background: Thyroid disorders are one of the most common endocrine disorders. Benign thyroid swellings include solitary thyroid nodules and multinodular goiter. Most of the thyroid swellings are asymptomatic. USG neck and FNAC aid each other in differentiating neoplastic from non-neoplastic lesions. The present study was done to understand clinic-pathological findings of multinodular goiter.

Materials and Methods: 50 patients diagnosed with multinodular goiter were included in this prospective study, conducted in the Department of ENT, Surabhi Institute of Medical Sciences, Siddipet.

Results: Females are most commonly affected. The majority belong to 40-60 yrs of age group. Non-neoplastic lesions were more common than neoplastic lesions. All patients were euthyroid. All patients underwent surgical management. In histopathological examination, nodular goiter was most common.

Conclusion: Multinodular goiter most commonly affects females in the middle age group. Most of the patients are asymptomatic. Surgical management is the definitive mode of treatment.

Keywords: Multinodular goiter thyroid, clinico-pathological study, FNAC.

Introduction

India harbors the world's largest goiter belt which is the Himalayan range, extending from Kashmir in the north to Naga Hills in the east ^[1]. About 170 million of the Indian population people suffer from thyroid disease. Normally thyroid gland is not palpable but becomes palpable in thyroid dysfunction. Thyroid swelling causes pressure symptoms on the trachea and esophagus owing to its proximity to these structures ^[2]. Thyroid swelling can be benign or malignant. Benign disorders include diffuse goiter, and multinodular goiter and malignant disorders include thyroid adenoma, papillary carcinoma, follicular carcinoma, medullary carcinoma, etc. ^[3]

Iodine deficiency is the most common cause of thyroid swellings. Patients with thyroid swelling may be euthyroid hyperthyroid, or hypothyroid. Patients with hyperthyroidism complain of palpitations, nervousness, tremors, increased blood pressure and heat intolerance. Patients with Hypothyroidism will have weight gain, cold intolerance, constipation and lethargy.

Females are most commonly affected with female to male ratio being 6:1. The type of thyroid disease varies with advancing age. Papillary carcinoma is more common in young girls; Hashimoto's disease, follicular carcinoma and thyroid adenoma are more commonly seen in the middle. Anaplastic carcinoma occurs in later ages ^[4].

Multinodular goiter (MNG) is characterized by an increased volume of the thyroid gland with the formation of multiple nodules. The nodules can be very small, often only a few millimeters in size, or can be larger, up to several centimeters. Upon histopathological examination, the follicles are morphologically and functionally grossly altered ^[5, 6]. The etiopathogenesis of MNG is not very clear. Initially, the mass is euthyroid; however, with increasing size, elevations in T3 and T4 can occur and progress gradually into clinical hyperthyroidism.

There has been an increased incidence of thyroid disorders because of advancements in diagnostic modalities. The various diagnostic modalities for thyroid swellings include serological tests, radiological tests, surgical interventions, and microscopic examinations. Serological tests include Thyroid function tests (TFT), serum calcitonin levels, thyroid-stimulating immunoglobulins, TPO antibodies, and TRH assays.

Ultrasonography (USG) is safe, cost-effective, and the most commonly used radiological investigation for determining the extent of thyroid nodules. It can differentiate between benign and malignant nodules. It is useful in measuring tumor size, diagnosing MNG, and excluding contralateral disease.

Fine Needle Aspiration Cytology is widely accepted for the diagnosis of thyroid nodules. FNAC is the most sensitive, rapid, safe, precise, and economical procedure than sonological studies to evaluate

thyroid nodules from neoplastic and non-neoplastic lesions. The Bethesda system which is widely accepted was framed for reporting thyroid cytopathology [7]. Management of Hyperthyroidism is usually medical but surgical management is the preferred treatment. Subtotal or total thyroidectomy may be performed depending on the involvement of the thyroid gland. Radioactive iodine therapy is reserved for elderly individuals who have a poor operative risk. The complications of thyroid surgeries are hemorrhage, respiratory obstruction, vocal cord paralysis, hypoparathyroidism, thyroid insufficiency, thyrotoxic storm, and wound infection. This study aims to correlate between clinical, pathological, and radiological findings of multinodular swellings of the thyroid.

Material and Methods

This prospective observational interventional study was conducted in the Department of ENT, Surabhi Institute of Medical Sciences, Siddipet. 50 patients with clinically palpable multinodular thyroid swellings admitted in ENT wards and O.P. during 18 months (Jan 2022-June 2023) were included in this study. Patients with clinically solitary nodular goiter, multinodular goiter with palpable neck nodes, and swelling with a previous history of malignancy were excluded from the study. After obtaining informed consent, a detailed history was taken, general and local examination was done on all patients. Special investigations like plain X-ray of the neck (lateral view), video laryngoscopy, thyroid profile, ultrasound examination of the neck, FNAC of multi-nodular swelling of the thyroid, and histopathological examination were done. Routine investigations like complete blood picture, complete urine examination, RBS, renal function tests, Chest x-ray, ECG, and viral markers were done.

Results

A prospective study was conducted including 50 patients with multinodular thyroid swelling, admitted to the Department of ENT, Surabhi Institute of Medical Sciences, Siddipet over 18 months. The majority of the patients fall in the age group of 31-40 years (42%) followed by 41-50 years (24%) and 21-30 years (24%). Females (88%) are more commonly involved than males (12%). This can be explained by the demands of hormonal requirements in females in their life cycle (puberty, menstrual cycles, pregnancy, menopause), which increase the chance of thyroid nodule formation as compared to males.

Table 1: Fine Needle Aspiration Cytology

	Cytology	No. of patients	Percentage
1.	Nodular goiter	18	38%
2.	Colloid goiter	16	31%
3.	Colloid cyst	5	9%
4.	Hashimoto’s thyroiditis	4	8%
5.	Adenomatoid goiter	2	4%
6.	Follicular neoplasm	2	4%
7.	Papillary carcinoma	3	6%

The majority of lesions were non-neoplastic lesions (82%) when compared to neoplastic lesions (18%) in Fine needle aspiration cytology. Among non-neoplastic lesions, nodular goiter (38%) was most common. In neoplastic lesions, papillary carcinoma (6%) was most common.

Table 2: Ultrasonographic Findings

	Findings	No. of patients	Percentage
1.	Multinodular goiter	14	28%
2.	Micro calcifications	1	2%
3.	Solitary thyroid nodule	31	62%
4.	Cyst	4	8%

Solitary thyroid nodule (62%) was the most common ultrasonographic finding in our study followed by multinodular goiter (28%). 8% had cysts and 2% had microcalcifications. However, all 50 patients in our study were euthyroid (100%).

Table 3: Surgery

	Surgery	No. of patients	Percentage
1.	Lobectomy	4	8%
2.	Right hemi thyroidectomy	12	24%
3.	Left hemi thyroidectomy	19	38%

4.	Subtotal thyroidectomy	12	24%
5.	Total thyroidectomy	3	6%

All 50 patients were managed surgically. Left hemi thyroidectomy (38%) was the most common surgical procedure followed by right hemi thyroidectomy (24%). 3 patients underwent total thyroidectomy and 4 patients had lobectomy.

Table 4: Histopathological Report

	HPE	No. of patients	Percentage
1.	Nodular goiter	24	48%
2.	Colloid goiter	15	30%
3.	Hashimoto's thyroiditis	2	4%
4.	Follicular adenoma	6	12%
5.	Follicular carcinoma	0	0
6.	Papillary carcinoma	3	6%

Nodular goiter (48%) was the most common finding on histopathological examination, followed by colloid goiter (30%).

Discussion

Thyroid gland nodules have a reported prevalence of 4% to 7% in the general adult population. Multinodular goiter (MNG) is one of the most common thyroid problems responsible for 80% to 85% of thyroid pathology. Thyroid lesions usually present with swelling of the thyroid gland with or without hyper or hypo function of the thyroid gland.

Most commonly affected are females accounting for about 44 patients (88%) in our study with male to female ratio being 1:7.3. Similar gender distribution was observed in studies done by Afroze N *et al.* [8] and Bhansal *et al.* [9] (the male-to-female ratio 1:10 and 2:7 respectively)

The minimum age of presentation in the study is 22 years whereas the maximum age is 58 years. The mean age of presentation is 36 years.

Table 5: Comparison of mean age

Authors	Mean Age in Years
Ergete <i>et al.</i> [10]	34.4
Yang <i>et al.</i> [11]	37
Present Study	36

The thyroid gland is placed superficially and enlargement of the thyroid gland clinically presents as swelling in front of the neck. Most of these patients are usually euthyroid; however, some may be associated with hypothyroidism or hyperthyroidism. In our study, only patients with euthyroid status were included in the study. Patients with deranged thyroid function were medically treated to bring back thyroid status to normal.

Apart from clinical examinations, FNAC has now supplanted most of the other tests for preoperative evaluation of thyroid nodules [10, 11]. FNAC of the thyroid is a well-established and cost-effective diagnostic test for the evaluation of thyroid disorders. It has a central role in the management of thyroid lesions and should be used as an initial diagnostic test. It also contributes significantly to the preoperative investigation of patients with thyroid swellings. The sensitivity and specificity of thyroid gland FNAC reportedly range from 57% to 99% and 90% to 99% respectively [12]. USG-guided FNAC is known to increase the diagnostic yield in comparison to conventional FNAC [13].

In the present study, 42 cases out of 50 cases were non-neoplastic. i.e., 82%, whereas the rest were neoplastic. Among the non-neoplastic majority were nodular goiter (38%), colloid goiter (31%), and Hashimoto's thyroiditis (8%). Among the neoplastic lesions, FNAC detected follicular neoplasm in 2 cases (4%) and papillary carcinoma in 3 cases (6%). The distribution was comparable to studies by Kessler *et al.* [14] and Tabaqchali *et al.* [15].

Few cases, nearly 6% were reported as non-neoplastic lesions in fine needle aspiration cytology turned out to be neoplastic in histopathological examination. Darwish *et al.* [16] stress on pre-op aspiration cytology missing out neoplasm in some cases, which are later reported in histopathology specimens.

Ultrasonography (USG) or computerized tomography may help assess the location and type of lesion; differentiate cystic from solid swellings of the thyroid gland and also know about the nodularity of the thyroid. All patients in our study underwent ultrasonography of the thyroid gland, and the majority of them had solitary thyroid nodules (62%), followed by multinodularity (28%).

Treatment modalities range from conservative management to surgical resection. The type of thyroid surgery depends on the size of the thyroid swelling, the location of the swelling, and the fixity of underlying structures. In our study, hemi thyroidectomy (62%) was the most common surgery

performed. Sub-total thyroidectomy (24%) was performed when lesions affected both lobes of the thyroid. Total thyroidectomy (6%) was done when the whole of the thyroid is involved, usually seen in long-standing cases of multinodular goiter or cases of malignancy.

The surgical complications of thyroid surgery include superior laryngeal nerve palsy, recurrent laryngeal nerve palsy, hypocalcemia due to removal of the parathyroid gland, secondary hemorrhage, and recurrence of malignancy.

Conclusion

Multinodular goiter is commonly observed in 3rd decade of life. In most cases, one can diagnose several nodules clinically. However, ultrasonography has an important role in detecting the actual number of nodules. Pre-operative evaluation with ultrasound and FNAC can minimize the extent of surgery to be performed. Hemi thyroidectomy, subtotal, and near total thyroidectomy are safer surgical procedures than total thyroidectomy to prevent permanent post-surgical complications. Malignancy can still come as a surprise on postoperative histopathological examination which is dealt with accordingly by completion of thyroidectomy and post-op irradiation.

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