

A Clinical Study on the Diagnosis and Management of Multinodular Goiter

Ramanachalam Chanda¹, Sai Krishna Mekala², Adinarayana Yesupogu³

¹Associate Professor, Department of General Surgery, Government General Hospital, Guntur Medical College, Andhra Pradesh, India. ²Assistant Professor, Department of General Surgery, Government General Hospital, Guntur Medical College, Andhra Pradesh, India. ³Postgraduate, Department of General Surgery, Government General Hospital, Guntur Medical College, Andhra Pradesh, India.

ABSTRACT

BACKGROUND

In this study we wanted to evaluate the incidence, clinical presentation, management and outcome of multinodular goiter. We also wanted to correlate pre-operative diagnosis made from FNAC and USG neck with post-operative histopathological diagnosis.

METHODS

This is a prospective study conducted in the Department of General Surgery at Government General Hospital, Guntur, during the period from January 2019 to December 2019. A total of 110 patients clinically diagnosed as multinodular goiter who got admitted to the General Surgery ward were included in this study. All the patients were clinically evaluated, subjected to relevant investigations, and were managed accordingly which included both operative and medical management. Patients were followed up for a period of three months.

RESULTS

Out of 110 patients studied, female to male ratio was 21:1, predominant age group was 31-40 years. 67.27% of the patients were in euthyroid state. The ratio of non-neoplastic to neoplastic pathology was 4.5:1. Papillary carcinoma was the most common malignant condition in multinodular goiter accounting for 73.9% of malignancies. Total thyroidectomy was the surgery undertaken. A minority of the patients were managed medically. Mortality rate was zero. Hypocalcemia was the most common post-operative complication.

CONCLUSIONS

In our clinical study of 110 cases of multinodular goiter there was remarkable female preponderance, especially in the middle-aged group. Majority of them were clinically euthyroid (67.27%). Majority of nodular goiters were benign (81.81%). About 18.18% were malignant in nature out of which papillary carcinoma thyroid was the most common. Total thyroidectomy was the surgery undertaken except for Hashimoto's thyroiditis which was managed medically. Hypocalcemia continues to be the most common post-operative complication.

KEYWORDS

Total Thyroidectomy, Multinodular Goiter, Hypocalcemia, Papillary Carcinoma Thyroid.

Corresponding Author:
Dr. Sai Krishna Mekala,
Flat No. C-7, Family Quarters,
Katuri Medical College and Hospital,
Katuri Nagar, Chinakondrupadu,
Guntur- 522019, Andhra Pradesh, India.
E-mail: drsaiKrishna05@gmail.com

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BACKGROUND

Thyroid gland is an endocrine gland located anteriorly in the lower neck.¹ The thyroid hormones (T3 and T4) play a vital role on various systems of the body and in maintaining basal metabolic rate.² The normal thyroid gland is impalpable. The term goiter is used to describe enlargement of the thyroid gland. Simple goiter develops as a result of stimulation of thyroid gland by TSH as a result of inappropriate secretion from a microadenoma in anterior pituitary or in response to a chronically low level of circulating thyroid hormones.³ Persistent stimulation of thyroid gland by TSH leads to diffuse hyperplasia. Fluctuating stimulation leads to mixed pattern of active and inactive lobules with areas of hemorrhage, necrosis and finally the development of multi nodular goiter.⁴ Thyroid nodules are discrete lesions either on clinical examination or on imaging. Multinodular goiter can be toxic or nontoxic. The tumors of thyroid gland can be benign or malignant. A simple nodular goiter is managed by total thyroidectomy in view of complications like secondary thyrotoxicosis, pressure symptoms and malignant changes. Malignant tumors of the thyroid gland except for anaplastic carcinoma are managed by total thyroidectomy, combined with Radical Neck Dissection if there are cervical lymph node metastases.

METHODS

This is a prospective study conducted in the Department of General Surgery at Government General Hospital, Guntur, from January 2019 to December 2019. A total of 110 patients who presented to General Surgery OPD, with multinodular goiter were admitted, evaluated clinically by noting down symptoms and their duration. Note was made of any positive family history of goiter. Clinical features of hypothyroidism or hyperthyroidism were specifically looked for. Pressure symptoms due to MNG like dysphagia or stridor were noted. Hoarseness of voice due to involvement of recurrent laryngeal nerve was specifically looked for. Cervical lymphadenopathy if any is made note of. Systemic examination included a thorough search for distant metastasis from a possible thyroid malignancy. A provisional diagnosis was made, and the patients were subjected to relevant investigations like FNAC of thyroid nodule, thyroid function tests, USG neck and indirect laryngoscopy to know the status of vocal cords in addition to routine haematological investigations. X-ray chest and USG abdomen were undertaken. Therapeutic plan was made by collaborating the clinical findings and the reports of various investigations, which included a non-operative management for certain conditions like Hashimoto's thyroiditis and appropriate surgical management for others. Thus 94 patients were undertaken total thyroidectomy and 4 patients underwent total thyroidectomy combined with modified radical neck dissection. Thyroidectomy specimens were sent for histopathological examination. All patients who underwent total thyroidectomy were kept on either

replacement or suppressive doses of levothyroxine. Post-operative complications were identified promptly and attended to as necessary. Patients were followed up postoperatively for three months.

Inclusion Criteria

- Patients between 12 to 70 years of age.
- Patients who were diagnosed as multinodular goiter.
- Patients who were willing for surgery and follow up.

Exclusion Criteria

- Patients who were 12 years and below.
- Patients who were not willing for surgery.
- Patients with neck swelling arising from other than the thyroid.
- Patients with solitary nodule of the thyroid.
- Patients with diffuse goiter.

RESULTS

In the present study of 110 cases of multinodular goiter, 105 (95.4%) patients happened to be females and 5 (4.6%) patients happened to be males. The female to male ratio was 21:1.

In our study of 110 patients, 40 (36.36%) patients have fallen in the age group of 31-40 years followed by 28 (25.45%) patients in 21-30 years age group. 27 (24.54%) patients in the age group of 41-50 years, 10 (9.09%) patients in 51-60 years, 5 (4.54%) patients in 61-70 years age group. Most of the patients belonged to the fourth decade of life.

Out of 110 patients, 70 (63.63%) had no family history of goiter, 40 patients had a positive family history for goiter. All the 110 patients studied had multinodular goiter as a common clinical finding. 4 (3.63%) patients complained of dysphagia and 6 (5.45%) patients were found to have stridor. None of them had hoarseness of voice, 4 (3.63%) patients presented with cervical lymphadenopathy in association with MNG. 28 (25.45%) patients presented with features of hypothyroidism in contrast to 8 (7.27%) patients with features of hyperthyroidism. Pain was not complained by any of the patients.

Out of 110 patients of MNG, 74 (67.27%) were in euthyroid state. 8 (7.27%) patients were hyperthyroid whereas 28 (25.45%) were in hypothyroid state. The number of cases who underwent surgery (Total thyroidectomy) was 98.

FNAC Report	No. of Cases	%
Nodular Goiter	62	56.36
Colloid goiter	20	18.18
Hashimoto's thyroiditis	12	10.9
Follicular neoplasm	6	5.45
Papillary carcinoma	10	9.09

Table 1. FNAC of Thyroid Nodule

FNAC- Fine Needle Aspiration Cytology

HPE Diagnosis	No. of Cases	%
Multinodular Goiter	78	79.59
Papillary Carcinoma	12	12.24
Follicular Carcinoma	8	8.16

Table 2. Histopathology Report

Out of 110 cases of MNG, 90 (81.81%) were of benign pathology and 20 (18.18%) cases were of malignant nature. The ratio of benign to malignant lesions in our study was 4.5:1.

Out of 20 cases of thyroid malignancies found in our study of 110 cases of MNG, Papillary carcinoma thyroid accounted for 12 (60%) cases and 8 (40%) cases were Follicular carcinoma thyroid. No cases were reported of Medullary carcinoma thyroid/ Anaplastic carcinoma/ Lymphoma/ secondary deposits in thyroid. Thus, papillary carcinoma of thyroid was the most common thyroid malignancy in our study. Number of cases who underwent surgery was 98.

Post-Operative Complications	No. of Cases	%
Bleeding	0	0
Subcutaneous Hematoma	3	3.06
Hypocalcemia	36	36.73
RLN paralysis	6	6.12
SLN paralysis	3	0
Thyrotoxic storm	0	0
Airway obstruction	0	0
Seroma	3	3.06
Wound infection	1	1.02
Hypertrophic scar	0	0

Table 3. Post-Operative Complications

SLN- Superior Laryngeal Nerve; RLN- Recurrent Laryngeal Nerve

Hypocalcemia was the most common post-operative complication in our study. They were managed according to the severity of hypocalcemia with parenteral or oral calcium and vitamin D supplementation. 3 patients suffered from transient SLN paralysis, 6 patients suffered from transient RLN paralysis and all of them recovered within 2-6 weeks.

One patient developed a surgical site infection postoperatively was managed with oral antibiotics. Seroma was found in about three patients; it was drained by opening skin sutures and applying compression bandage.

DISCUSSION

The chief complaint in our study was nodular swelling of thyroid seen in all 110 patients, and only a few patients had complaints like difficulty in swallowing or breathing.

The patients were subjected to USG neck, thyroid function tests and FNAC of the nodule.

Those patients with FNAC reported as Hashimoto's thyroiditis and in hypothyroid state were offered medical management with Levothyroxine and oral Prednisolone which showed significant improvement. Those with clinical and biochemical evidence of hyperthyroidism were put on anti-thyroid drugs. After optimizing the thyroid function these patients were taken up for total thyroidectomy. Rest of the patients with multinodular goiter involving both lobes, clinically euthyroid and also the patients with evidence of malignancy were taken up for total thyroidectomy after pre-

operative indirect laryngoscopy. Those with secondaries in the cervical lymph nodes were undertaken for Modified Radical Neck Dissection. Thyroidectomy specimens were sent for histopathological examination. Follow-up of the patients was in accordance with the HPE report. All post-operative patients of total thyroidectomy were kept on replacement or suppressive doses of Levothyroxine as required.

In our study hypocalcemia was the most common post-operative complication. Transient Recurrent Laryngeal nerve injury was seen in 6.12% of the patients and recovery period ranged between 2-6 weeks.

The observations and results of the present study were compared with that of available previous studies.

Sex	Present Study	Antonio Rios et al. (2005) ⁵
Female	95.4%	90%
Male	4.6%	10%

Table 4. Comparison of Sex-Wise Incidence

In our study female to male ratio was 21:1, which shows more female preponderance in comparison to other studies.

Study	Peak Age
Bremer and Moll Night	40-49 years
Present study	31-40 years

Table 5. Comparison of Peak Age of Incidence

In our study, most of the patients belonged to the age group of 31-40 years. However, in the western literature quoted by "Bremer and Moll Night," the age incidence was maximum between the age group of 40-49 years. The average age incidence in our study is low compared to that of the western series.

Type	Khadilkar et al. ⁶ (n=100)	Present Study (n=110)
Benign	66%	81.81%
Malignant	34%	18.18%

Table 6. Comparison of Incidence of Benign and Malignant Lesions in FNAC

	Khadilkar et al. ⁶	Sakorafas ⁷	Rix ⁸	Present Study
Benign	79%	83%	90%	79.6%
Malignant	21%	27%	10%	20.4%

Table 7. Comparison of Benign and Malignant Lesions Based on HPE Report

HPE- histopathological examination

Authors	Incidence of RLN Palsy
Karamanakis SN et al ⁹	2.6%
Ozbas S et al ¹⁰	1.6%
Zambudio et al ¹¹	9.6%
Present study	6.12%

Table 8. Comparison of Post-Operative RLN Palsy In Various Studies

RLN- recurrent laryngeal nerve

CONCLUSIONS

Multinodular goiter was most commonly seen in the female population in the fourth decade of life. All patients presented with nodular swelling of the thyroid gland. Most of the patients were in euthyroid state. In our study, most of the swellings were benign. Papillary carcinoma was the most

common malignant tumor of thyroid gland. Total thyroidectomy was the surgery performed in 98 out of 110 patients of multi nodular goiter under study. Transient hypocalcemia was the most common post-operative complication. Mortality rate in our study was zero.

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