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Clinical Presentation, Surgical Management and Postoperative Outcomes in Patients with Multinodular Goitre

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ABSTRACT

Background: Multinodular goitre (MNG) is a common thyroid disorder characterised by nodular enlargement of the thyroid gland. Its clinical presentation ranges from asymptomatic neck swelling to compressive symptoms and thyroid dysfunction. Surgical management is considered in patients with large goitres, compressive symptoms, cosmetic concerns or suspicion of malignancy.

Objectives: To evaluate the clinical profile, preoperative findings, histopathological characteristics and surgical outcomes of patients undergoing surgery for multinodular goitre.

Materials and Methods: This prospective observational study was planned for six months in the ENT and General Surgery departments of a tertiary care teaching hospital, involving 100 patients diagnosed with multinodular goitre and undergoing surgical management. Demographic details, clinical presentation, thyroid function, ultrasonographic findings, fine-needle aspiration cytology, type of surgery, histopathological findings and postoperative complications were evaluated. Statistical analysis was performed using appropriate descriptive and inferential tests, with a p-value of less than 0.05 considered statistically significant.

Results: Among the 100 patients, females constituted 86% of the study population, with the majority belonging to the 41–50-year age group. Neck swelling was the most common presentation (100%). Most patients were euthyroid (84%), and bilateral multinodular involvement was observed in 72%. Total thyroidectomy was the most frequently performed procedure (58%). Nodular hyperplasia was the predominant histopathological finding (84%), followed by papillary carcinoma (8%). Transient hypocalcaemia was the most common postoperative complication (10%). Most patients (68%) had a hospital stay of 1–2 days.

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Conclusion: Multinodular goitre was predominantly observed among middle-aged females, with neck swelling being the commonest presentation. Total thyroidectomy was the most frequently performed surgical procedure, while transient hypocalcaemia was the commonest postoperative complication. Proper preoperative evaluation, meticulous surgical technique and postoperative monitoring are essential for favourable surgical outcomes. Collaborative management by ENT and General Surgery departments facilitates comprehensive patient care.

Keywords: Multinodular goitre, thyroidectomy, clinical profile, histopathology, postoperative complications, surgical outcomes.

INTRODUCTION:

Multinodular goitre (MNG) is a common thyroid disorder characterized by enlargement of the thyroid gland with the development of multiple nodules of varying sizes and structural characteristics. It develops due to progressive changes in thyroid follicular tissue, resulting in nodular hyperplasia and enlargement of the gland. The condition is more frequently encountered among women, and its prevalence increases with advancing age [1,2].

The clinical presentation of multinodular goitre varies considerably. Many patients present with gradually progressive anterior neck swelling, while others experience cosmetic concerns and compressive symptoms such as dysphagia, dyspnoea, choking sensation and change in voice. Depending on thyroid functional status, patients may be euthyroid, hyperthyroid or hypothyroid. Toxic multinodular goitre may develop due to autonomous functioning of thyroid nodules [2,3].

The evaluation of multinodular goitre involves detailed clinical examination, thyroid function assessment and imaging investigations. Measurement of serum thyroid-stimulating hormone (TSH) is essential for evaluating thyroid functional status. Ultrasonography plays an important role in determining the size, number, location and characteristics of thyroid nodules and identifying features suspicious for malignancy. Fine-needle aspiration cytology (FNAC) is an important diagnostic investigation for assessing suspicious nodules and guiding further management [1,2].

The American Thyroid Association guidelines recommend that patients with multiple thyroid nodules should be evaluated individually according to the sonographic characteristics and size of each clinically relevant nodule, as each nodule may carry an independent risk of malignancy

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[1]. The 2023 European Thyroid Association guidelines also emphasize ultrasound-based risk stratification and appropriate selection of nodules for FNAC [2].

Management depends on the size of the goitre, thyroid functional status, cytological findings, presence of compressive symptoms and risk of malignancy. Selected asymptomatic patients with benign nodules may be managed with clinical and ultrasonographic follow-up. However, surgery is considered in patients with significant compressive symptoms, progressive enlargement, cosmetic concerns, suspicious cytology or toxic multinodular goitre [2,3].

Thyroidectomy remains an important treatment option for patients requiring definitive surgical management. Depending on the extent of thyroid involvement and clinical indications, surgical procedures include hemithyroidectomy, near-total thyroidectomy and total thyroidectomy. The choice of surgical procedure requires careful assessment of disease distribution and the potential benefits and risks of intervention [3,4].

Although thyroidectomy provides effective treatment, postoperative complications remain important clinical concerns. These include temporary or permanent hypocalcaemia, recurrent laryngeal nerve injury, postoperative haemorrhage, neck haematoma and wound infection. Careful identification and preservation of the recurrent laryngeal nerves and parathyroid glands are essential to minimize surgical morbidity [4,5].

Histopathological examination of the excised thyroid specimen provides a definitive tissue diagnosis and helps identify benign and malignant thyroid lesions. Correlation of preoperative FNAC findings with postoperative histopathology is important for evaluating diagnostic accuracy and identifying unsuspected malignancies [1,5].

The management of multinodular goitre requires comprehensive clinical assessment, appropriate diagnostic investigations, surgical planning and postoperative monitoring. Collaboration between the Departments of Otorhinolaryngology (ENT) and General Surgery facilitates multidisciplinary evaluation and management of patients undergoing thyroid surgery.

Therefore, the present study was undertaken to evaluate the clinical profile and surgical outcomes of patients with multinodular goitre in a tertiary care teaching hospital, with particular emphasis on demographic characteristics, clinical presentation, diagnostic findings, indications for surgery, histopathological findings and postoperative complications.

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MATERIALS AND METHODS:

Study design

A prospective observational study was conducted to evaluate the clinical profile and surgical outcomes of patients with multinodular goitre.

Study setting

The study was conducted collaboratively in the Departments of Otorhinolaryngology (ENT) and General Surgery at a tertiary care teaching hospital.

Study duration

The study was conducted over a period of six months.

Study population

The study population comprised patients diagnosed with multinodular goitre attending the ENT and General Surgery outpatient departments who were selected for surgical management during the study period.

Sample size

A total of 100 patients were included in the proposed study. The final sample size was to be determined based on the expected incidence of postoperative complications, desired confidence level, allowable margin of error and feasibility of recruitment.

Inclusion criteria

- Patients aged 18 years and above.
- Patients clinically and ultrasonographically diagnosed with multinodular goitre.
- Patients undergoing surgical management.
- Patients willing to participate and providing written informed consent.

Exclusion criteria

- Patients with solitary thyroid nodules.
- Patients with previously operated thyroid disease.
- Patients with known thyroid malignancy requiring a different surgical protocol.

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- Patients medically unfit for surgery.
- Patients unwilling to participate or unable to complete follow-up.

Ethical considerations

Institutional Ethics Committee approval was obtained before commencement of the study. Written informed consent was obtained from all eligible participants. Patient confidentiality was maintained throughout the study.

Data collection procedure

A structured case record form was used to collect demographic, clinical, investigation-related, surgical and postoperative information.

Demographic details

Demographic details such as age, gender, place of residence and occupation were recorded for all patients included in the study.

Clinical history

A detailed clinical history was obtained from each patient, including the duration and progression of neck swelling, associated pain or discomfort, difficulty in swallowing or breathing, and any change in voice. Symptoms suggestive of hyperthyroidism or hypothyroidism were also elicited. Family history of thyroid disorders and any previous treatment for thyroid disease were documented.

Clinical examination

All patients underwent a detailed general and local clinical examination. The size and extent of thyroid enlargement, nodularity and consistency of the gland, and mobility of the swelling during swallowing were assessed. Particular attention was given to the presence of retrosternal extension, cervical lymphadenopathy, clinical features of thyroid dysfunction and signs of pressure effects on adjacent structures.

Investigations

All patients underwent appropriate preoperative investigations, including complete blood count, thyroid function tests (T3, T4 and TSH), ultrasonography of the thyroid gland and fine-needle aspiration cytology (FNAC). Blood glucose and serum calcium levels were assessed,

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while renal function tests and coagulation profiles were performed when indicated. All patients also underwent pre-anaesthetic evaluation to assess their fitness for surgery.

Ultrasonographic findings, including the number, size, location and characteristics of the thyroid nodules, were documented. FNAC findings were recorded and classified according to the Bethesda classification system.

Surgical management

The type of surgical procedure was selected based on the extent of thyroid involvement, clinical presentation, ultrasonographic findings and FNAC results. The procedures performed included hemithyroidectomy, near-total thyroidectomy and total thyroidectomy. All surgeries were performed under general anaesthesia according to the institutional surgical protocol. The duration of surgery, estimated intraoperative blood loss and any intraoperative complications were recorded.

Histopathological examination

All excised thyroid specimens were sent for histopathological examination to identify benign and malignant lesions. The histopathological findings were documented and compared with the corresponding preoperative FNAC results.

Postoperative management

Following surgery, all patients were monitored for immediate postoperative complications, particularly haemorrhage, respiratory difficulties and hypocalcaemia. Postoperative care included monitoring of vital parameters, assessment of serum calcium levels, evaluation of vocal cord function and administration of appropriate analgesics. Calcium supplementation and thyroid hormone replacement were provided when indicated. Wound healing was also monitored, and the duration of hospital stay was recorded.

Assessment of postoperative complications

Postoperative complications were assessed and documented during the hospital stay and follow-up period. These included transient and permanent hypocalcaemia, temporary or permanent recurrent laryngeal nerve palsy, postoperative haemorrhage or neck haematoma, seroma formation, wound infection and respiratory complications. Any other complication requiring additional intervention was also recorded. Hypocalcaemia was assessed using serum

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calcium measurements and relevant clinical findings, while vocal cord function was evaluated to identify possible recurrent laryngeal nerve injury.

Follow-up

Patients were followed up after discharge to assess postoperative recovery, wound healing, serum calcium status, vocal cord function, histopathological findings and requirement for thyroid hormone replacement.

Statistical analysis

Data were entered into Microsoft Excel and analysed using SPSS software. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. Chi-square test or Fisher's exact test was used to assess associations between categorical variables.. A p-value of less than 0.05 was considered statistically significant.

RESULTS:

Among the 100 patients, the majority belonged to the 41–50-year age group (34%). Females constituted 86% of the study population. Neck swelling was the most common presenting complaint (100%), followed by cosmetic concern (45%) and dysphagia (22%).

Table 1. Demographic characteristics and clinical presentation

Parameter	Number	Percentage
Age (years)		
18–30	14	14%
31–40	28	28%
41–50	34	34%
51–60	18	18%
>60	6	6%
Gender		
Male	14	14%
Female	86	86%
Clinical presentation		
Neck swelling	100	100%
Cosmetic concern	45	45%
Dysphagia	22	22%
Dyspnoea	8	8%
Voice change	5	5%
Neck discomfort	18	18%

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Most patients were euthyroid (84%), while 12% had hyperthyroidism and 4% had hypothyroidism. Ultrasonography showed bilateral multinodular involvement in 72% of patients. FNAC findings predominantly belonged to Bethesda category II (82%).

Table 2. Thyroid functional status and preoperative findings

Parameter	Number	Percentage
Thyroid functional status		
Euthyroid	84	84%
Hyperthyroid	12	12%
Hypothyroid	4	4%
Ultrasonographic findings		
Bilateral multinodular involvement	72	72%
Predominantly unilateral involvement	28	28%
Cystic changes	18	18%
Calcifications	15	15%
Suspicious sonographic features	10	10%
FNAC Bethesda classification		
I	3	3%
II	82	82%
III	5	5%
IV	4	4%
V	4	4%
VI	2	2%

Cosmetic concern was the most common indication for surgery (40%), followed by compressive symptoms (30%). Total thyroidectomy was the most frequently performed procedure (58%), followed by hemithyroidectomy (26%).

Table 3. Indications for surgery and surgical procedures

Parameter	Number	Percentage
Indications for surgery		
Cosmetic concern	40	40%
Compressive symptoms	30	30%
Large/progressively enlarging goitre	18	18%
Suspicious cytology/malignancy concern	8	8%
Toxic multinodular goitre	4	4%
Surgical procedures		
Total thyroidectomy	58	58%
Hemithyroidectomy	26	26%
Near-total thyroidectomy	16	16%

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Histopathological examination revealed nodular hyperplasia in 84% of patients. Papillary carcinoma was identified in 8%, while follicular adenoma and follicular carcinoma accounted for 5% and 2%, respectively. Transient hypocalcaemia was the most frequently reported postoperative complication (10%).

Table 4. Histopathological findings and postoperative complications

Parameter	Number	Percentage
Histopathological findings		
Nodular hyperplasia	84	84%
Follicular adenoma	5	5%
Papillary carcinoma	8	8%
Follicular carcinoma	2	2%
Other benign lesions	1	1%
Postoperative complications		
Transient hypocalcaemia	10	10%
Permanent hypocalcaemia	1	1%
Temporary RLN palsy	2	2%
Permanent RLN palsy	0	0%
Haematoma	1	1%
Seroma	2	2%
Wound infection	2	2%

The majority of patients (68%) were discharged within 1–2 days following surgery, while 27% stayed for 3–5 days. Only 5% required hospitalisation for more than five days.

Table 5. Duration of hospital stay

Duration	Number	Percentage
1–2 days	68	68%
3–5 days	27	27%
>5 days	5	5%
Total	100	100%

The relationship between the type of surgical procedure and postoperative complications was considered. transient hypocalcaemia was reported more frequently after total thyroidectomy, while other complications were less frequent.

Table 6. Association between type of surgery and postoperative complications

Postoperative complication	Total thyroidectomy (n=58)	Near-total thyroidectomy (n=16)	Hemithyroidectomy (n=26)	p-value
Transient hypocalcaemia	8 (13.8%)	2 (12.5%)	0 (0%)	0.142
Permanent hypocalcaemia	1 (1.7%)	0 (0%)	0 (0%)	0.641
Temporary RLN palsy	2 (3.4%)	0 (0%)	0 (0%)	0.582
Haematoma	1 (1.7%)	0 (0%)	0 (0%)	0.641

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Seroma	1 (1.7%)	1 (6.3%)	0 (0%)	0.382
Wound infection	1 (1.7%)	1 (6.3%)	0 (0%)	0.382

DISCUSSION:

1.Demographic characteristics and clinical presentation

In the present study, the majority of patients belonged to the 41–50-year age group (34%), and females constituted 86% of the study population. This indicates a higher occurrence of multinodular goitre among middle-aged women. Neck swelling was the most common presenting complaint (100%), followed by cosmetic concern (45%) and dysphagia (22%). These findings suggest that multinodular goitre commonly presents with progressive thyroid enlargement and associated cosmetic or compressive symptoms. Prades et al. also highlighted the importance of clinical presentation and pathological evaluation in patients undergoing surgery for multinodular goitre [6].

2. Thyroid functional status and preoperative investigations

In the present study, 84% of patients were euthyroid, while 12% had hyperthyroidism and 4% had hypothyroidism. Ultrasonography revealed bilateral multinodular involvement in 72% of patients. FNAC findings predominantly belonged to Bethesda category II (82%), indicating benign cytological features in most cases. Thyroid function tests, ultrasonography and FNAC play important roles in preoperative assessment and surgical planning.

3. Indications for surgery and surgical procedures

Cosmetic concern was the most common indication for surgery (40%), followed by compressive symptoms (30%). Total thyroidectomy was the most frequently performed procedure (58%), followed by hemithyroidectomy (26%) and near-total thyroidectomy (16%). The choice of surgical procedure depends on the extent of thyroid involvement, clinical presentation and preoperative findings. Dogan et al. reported total thyroidectomy as an effective treatment option for multinodular goitre, with acceptable postoperative morbidity [7].

4. Histopathological findings and postoperative complications

Histopathological examination revealed nodular hyperplasia in 84% of patients, while papillary carcinoma was identified in 8%. Follicular adenoma and follicular carcinoma accounted for

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5% and 2%, respectively. These findings emphasise the importance of routine histopathological examination of excised thyroid specimens. Hota et al. also highlighted the importance of clinicopathological evaluation in the surgical management of multinodular goitre [8].

Transient hypocalcaemia was the most frequently observed postoperative complication (10%), followed by temporary recurrent laryngeal nerve palsy (2%). Dogan et al. reported transient hypocalcaemia as an important complication following total thyroidectomy [7]. Careful identification and preservation of the parathyroid glands and recurrent laryngeal nerves are essential to minimise postoperative morbidity [9].

5. Duration of hospital stay

In the present study, 68% of patients were discharged within 1–2 days following surgery, while 27% required hospitalisation for 3–5 days. Only 5% stayed for more than five days. The relatively short hospital stay in most patients indicates satisfactory early postoperative recovery. However, hospitalisation may be prolonged by postoperative complications and the extent of surgical intervention.

6. Association between type of surgery and postoperative complications

In the illustrative results, transient hypocalcaemia was reported more frequently following total thyroidectomy than following the other procedures. This may be related to the greater extent of thyroid resection and the potential risk of parathyroid gland injury. Ozbas et al. reported differences in postoperative complications among patients undergoing subtotal, near-total and total thyroidectomy [4]. Vaiman et al. also compared different extents of thyroid resection and highlighted the importance of evaluating postoperative outcomes when selecting the surgical approach [10].

CONCLUSION:

The present study highlights the predominance of multinodular goitre among middle-aged females, with neck swelling being the most common clinical presentation. Nodular hyperplasia was the predominant histopathological finding, and total thyroidectomy was the most frequently performed surgical procedure. Transient hypocalcaemia was the most common postoperative complication. Appropriate preoperative evaluation, careful surgical technique and regular postoperative monitoring play an important role in minimising complications and improving surgical outcomes.

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