

# Clinico-Epidemiological Study and Treatment Outcome of Multinodular Goitre at A Tertiary Care Hospital

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## ABSTRACT

**Background:** Thyroid enlargement has been a common problem encountered in general surgical practice. Thyroid being an endocrine gland, its involvement has a diverse issue from a meagre cosmetic problem to a more concerned malignancy.

**Aim:** This study was conducted to study the age and sex distribution along with the mode of presentation of Multinodular Goitre (MNG). The incidence of malignancy and the surgical complications in the study population were also studied.

**Materials and Methods:** In this descriptive study, patients diagnosed with MNG from January 2011 to July 2012 were chosen from the in-patient of our teaching hospital. One hundred such patients who qualified to undergo surgery were included in the study after a detailed history and clinical examination. Patients underwent Fine needle aspiration cytology (FNAC) for preoperative pathological diagnosis and the goitre was confirmed to be benign. Patients diagnosed with malignancy were excluded from the study. Following thyroidectomy, the thyroid specimens were subjected to histopathological examination.

**Results:** Among the 100 cases of MNG, 59% patients belonged to 3<sup>rd</sup> and 4<sup>th</sup> decade of life, 90% patients were females, 82% presented before 5yrs. The most common symptom at presentation was swelling (100%). Among the patients 80% were in euthyroid state, 19% were hyperthyroid and 1% hypothyroid. Most of the patients were treated with sub-total thyroidectomy (59%), followed by total (20%), near total (11%), and Hemithyroidectomy (10%). Following surgery complications like stridor and laryngeal oedema (3%), wound infection (2%), hypocalcemia (2%), haemorrhage (1%) and seroma (1%) were noted. On Histopathological examination (HPE) of the surgical specimen, 3% were reported to be malignant.

**Conclusion:** As noted by this study, Multinodular Goitre is more common among females in the third and fourth decades. Patients can present with various complaints. MNG can present as hyperthyroid, hypothyroid but mostly in euthyroid state. The indication for surgery in patients with MNG includes cosmesis, hyperthyroidism, local compressive symptoms and most importantly malignancy. Subtotal thyroidectomy is the preferred surgery, but a trend towards total and near total thyroidectomy is noticeably replacing the old belief in subtotal thyroidectomy.

**Keywords:** Malignancy, Thyroidectomy, Thyroid Swelling

## INTRODUCTION

Thyroid gland and its diseases are known to clinical practice since the time of Hippocrates and is still an important subject of interest. Normal thyroid function is necessary for physiological activity of most organs. Thyroid enlargement has been a common problem encountered in general surgical practice. Thyroid being an endocrine gland, its involvement has a diverse issue from a meagre cosmetic problem to a more concerned malignancy.

In nodular goiter, multiple nodules form the Multinodular goiter [1]. Appropriate diagnosis and proper treatment is the need of the hour, and MNG has to be managed appropriately. The process involves a good physiological and medical knowledge combining a sound surgical and anatomic knowledge, taking into account the pathological diagnosis. Management of thyroid problems pose a great challenge to the medical fraternity and needs to be studied vastly. Magnitude of the thyroid goiter problem in India is far greater than what it was estimated earlier. Now about 170 million people are estimated to be affected in the country [2]. Endemic growth is a significant problem affecting upto 12% of the world population. Nodular goitre is probably the most common endocrine problem in the world today [3].

India being a developed country, there is a lack of resource in health sector and lack of health awareness. The presentation is diverse. The clinical evaluation of the patient in such scenario is of utmost importance. The complications of thyroid presentation are a great problem and have to be studied in view of the complications during presentation and management.

## MATERIALS AND METHODS

In this prospective analysis, 100 patients with MNG were selected from the in-patient ward of our teaching hospital from January 2011 to July 2012.

In this study we aimed to study the age and sex distribution along with the mode of presentation of the MNG. We also studied the incidence of malignancy, the surgical complications in the study population and to review the existing knowledge of the disease.

One hundred patients with enlargement of thyroid gland with more than one nodule palpable, enlarged thyroid gland with nodular surface, or enlarged thyroid with a single nodule in a lobe with other palpable lobe were considered for the above study. Toxic, non-toxic multinodular goitre was included in the study. Only patients who consented for surgery were included. Patients with diffuse hyperplastic goitre, solitary nodule of thyroid, Grave's disease were excluded. Patients opting for conservative management and those who were diagnosed with malignancy were also excluded from the study. In this prospective study, we had 264 patients with thyroid swelling. Among them 100 were selected after excluding the patients based on the criteria. Patient were analysed and evaluated with respect to variables like age and sex distribution, duration of swelling, symptoms, hormonal (thyroid) analysis and radiological (x-ray) examination. FNAC for preoperative analysis and histopathological evaluation for postoperative diagnosis were carried out. Surgical modality of treatment was adopted and postoperative complication was studied.

Non availability of the facility for Ultrasound guided biopsy and radioiodine scan limited the study.

After tabulating the variables, results were analysed by SPSS 16.

## RESULTS

The results are depicted in the [Table/Fig-3] here. In our study of 100 patients with MNG, 90% were females and 10% were males. Maximum presentation was in the third decade (34%). About 48% presented between 6months to 5year. Symptomatology varied, but all patients complained of swelling in front of the neck. On evaluating most patients (80%) were in euthyroid state. Though FNAC suggested benign findings in all the patients, HPE could pick up three cases of malignancy after surgery. Subtotal thyroidectomy was the commonly done surgery (59%).

Age group (years)	Males	Females	Total cases	Percentage (%)
0 - 10	-	-	-	-
11 - 20	1	7	8	8
21 - 30	2	32	34	34
31 - 40	-	25	25	25
41 - 50	2	17	19	19
51 - 60	3	8	11	11
61 - 70	1	1	2	2
71 - 80	1	-	1	1
Total	10	90	100	100

[Table/Fig-1]: Age and sex distribution in multi-nodular goitre

Variables	Categories	Percentage (%)
Duration	< 6 months	34
	6 months to 5 year	48
	5-10 years	13
	> 10 years	5
Symptom	Swelling in front of neck	100
	Palpitations	15
	Sweating	10
	Anxiety	8
	Discomfort	5
	Fatigue	5
	Weight loss	5
	Diarrhoea	3
	Increased appetite	1
Difficulty swallowing	1	
Type of goitre	Non-toxic MNG	80
	Toxic MNG	19
	Hypothyroid	1

[Table/Fig-2]: Clinical characteristics (N=100)

## DISCUSSION

In the present study, all the patients presented with swelling in front of the neck; among them 94 patients reporting that it was of insidious in onset and gradually progressing. Rest of the patients could not comment on the onset and rate of growth as the swelling was noticed by others first.

The least age recorded among both males and females was 18 years. Maximum age among males was 71 years and female 66 years, mean age being 36.48 years. A total of 59% of the patients have presented in the age group 21-40 years [Table/Fig-1]. Similar prevalence has been observed in the prospective studies by Rahman MM et al., Sengupta et al., and Imad et al., where the prevalence was highest in the middle age group 3<sup>rd</sup> and 4<sup>th</sup> decades [4-6]. Study by Hanumanthappa et al., reported an incidence of 35% in the age group 21-30 years and 30% in the age group 31-40 years

Variables	Categories	Percentage (%)
FNAC Cytology report	Nodular/Colloidal goitre	73
	Hashimoto's thyroiditis/ Lymphocytic thyroiditis	14
	Papillary hyperplasia, Hyperplastic nodules, Nodular hyperplasia	10
	Follicular neoplasm, secondary changes, adenoma, papillary foci	8
Type of Surgery	Subtotal thyroidectomy	59
	Total thyroidectomy	20
	Near total thyroidectomy	11
	Hemithyroidectomy (Right)	5
	Hemithyroidectomy (Left)	5
Histo-pathological report	Multinodular goitre	77
	Hashimoto's thyroiditis (Benign neoplasia)	14
	Follicular adenoma/ Micro follicular adenoma	6
	Papillary carcinoma	2
	Follicular carcinoma	1
Type of complications	Haemorrhage	1
	Wound infection	2
	Seroma	1
	Stridor with laryngeal oedema	3
	Hypocalcemia	2
Diagnostic accuracy of FNAC in diagnosing malignancy in the study was 97% (91.55, 98.97)		

[Table/Fig-3]: Outcome characteristics (N=100)

[7]. The present study is comparable to the above studies. This is of concern because most of the patients being managed were in reproductive age group.

It was observed that in the present study, out of 100 cases, 90 cases (90%) were females and 10 cases (10%) were males, with a sex ratio, female to male 9:1 [Table/Fig-1]. Bombil et al., reported that out of 162 cases, 139 cases (85.8%) were females and 23 cases (14.2%) males with a sex ratio 6:1 [8]. In a study by Mushtaq Ahamed et al., of 105 cases, 90 were females and 15 were males with the sex ratio 6:1 [9]. Also, in a prospective study of 854 Danish Patients (10) 726 (85%) were females and 128 (15%) were males with a sex ratio 5.6:1.

Majority of our patients (34%) presented within 6 months duration [Table/Fig-2]. Only 5% patients presented at or above 10 years, 82% of patients presented within 5 years. All the patients presented with swelling in front of the neck, palpitation was presented in 15% of the patients, sweating in 10% of patients, anxiety in 8% of patients fatigue and weight loss in 5% each of patients, diarrhoea in 3% and increased appetite in 1% of patient. Five percentage patients presented with discomfort and 1% with difficulty in swallowing. That is, 6% of patients presented with pressure symptoms. From the above data, 26% of our study population had toxic features clinically [Table/Fig-2]. Most of the studies reviewed also reports that swelling is the most common complaint at the time of presentation followed by complaints of pressure symptoms like dysphagia and breathlessness [4,7,10].

On investigating, in 19% patients, Thyroid Function Test (TFT) showed toxic features, and only 1% were hypothyroid [Table/Fig-2]. In the study conducted by Muhammed A Altae et al., [11] of the total 127 cases studied 93 (73.2%) were euthyroid, 30 (24.4%) were hyperthyroid and 4 (3.4%) hypothyroid. The present study is fairly comparable with the above study. Unlike solitary nodule, in MNG it is the combination of hyper, hypo and normally functioning lesions within the same gland. So the overall functioning balance may vary [12].

Patients were subjected to FNAC, [Table/Fig-3] and malignancy was excluded. On indirect laryngoscopy, all the patient's vocal cords were normally mobile.

All patients were operated; surgery was advocated in view of cosmesis, pressure symptoms, secondary thyrotoxicosis and fear of long standing goitre going in for malignant change. Hyperthyroid patients were made euthyroid with appropriated medical management and then operated. Only one patient who was hypothyroid was operated when T3 and T4 were normal but TSH was marginally elevated.

As depicted on [Table/Fig-3], the most common surgery performed was subtotal thyroidectomy in 59% of patients, 20% underwent total thyroidectomy, 11% underwent near total thyroidectomy. A study by Mattioli FP et al., subtotal thyroidectomy was shown to be as an adequate surgical intervention for MNG [13]. Also, a study by Lopez LH et al., has shown that bilateral subtotal thyroidectomy was the best treatment for MNG [14]. In our study population, 5% underwent right hemithyroidectomy and another 5% left hemithyroidectomy. Out of this, one patient who underwent right hemithyroidectomy turned out to be follicular carcinoma on histopathological examination and the two cases which underwent subtotal thyroidectomy turned out to be papillary carcinoma. These three patients diagnosed with malignancy underwent completion thyroidectomy and were referred to higher center for oncological management. In a recent review by Masslot et al., they preferred total thyroidectomy over the subtotal thyroidectomy [15]. They argue that the latter procedure may require re-intervention in the long term follow-up, and the subsequent surgeries had higher chances of complications like hypoparathyroidism and vocal cord palsy.

From [Table/Fig-3], in the present study of one hundred patients, 3% patients developed stridor with laryngeal oedema, and they were treated with steroids. 2% patients developed wound infection; pus was sent for culture sensitivity and managed accordingly. Bleeding was noted in 1% patient after skin suturing and before extubation. Surgical wound was reopened and managed by ligating the bleeding artery. Seroma was found in 1% patient who resolved in three weeks without any intervention.

In a recent review by Hayward NJ et al., permanent Recurrent Laryngeal Nerve Palsy (RLNP) occurs in 0.3% to 3% and transient palsies in 5-8% cases [16]. The study stated that the patients undergoing re-operative thyroid surgery and thyroid surgery for malignancies are at increased risk of RLNP. In another retrospective review by Zakaria HM et al., the various factors predisposing to RLNP were evaluated [17]. It was found that thyroid carcinoma, re-operation for recurrent goiter, non-identification of RLN and total thyroidectomy were associated with a significantly increased risk of recurrent laryngeal nerve injury. In the present study, none of the cases in the present study developed laryngeal nerve injury and there was no mortality.

In our study, 2% patients developed clinical features suggestive of hypocalcemia, blood sample sent for analysis and hypocalcemia confirmed and treated with IV calcium gluconate and was later to oral calcium. A nationwide in-patient study done in USA [18] has reported the incidence of hypocalcemia following total thyroidectomy as 9% compared to the unilateral thyroidectomy. Thyroidectomy with bilateral neck dissection was the strongest independent risk factor of postoperative hypocalcemia with an incidence of 23.4%. In a study, conducted by Rosato L et al., wound infection was reported in 0.3% cases [19].

On histopathological analysis [Table/Fig-3] of the present study of 100 cases, 91% were non-neoplastic, 77% being multinodular goitre and 14% being Hashimotos, another 9% were neoplasia in which 6% were benign and 3% were malignant. Rahman et al., reported 3.87% incidence of malignancy among MNG patients [20]. Mohammed A Altae et al., reported the incidence of thyroid tumours to be 11.8% and those with malignant changes to be of

5.5% [11]. Though the present study is comparable to the above studies, the study conducted by Hanumanthappa MB [7] quoting malignant incidence of 10%. Gandolfi et al., quoting 13.7% incidence of malignancy among MNG [21]; Anwar, Kurshid et al., quoting incidence of malignancy among MNG to be 14.37% is a reason for concern [22].

Malignancy was diagnosed in 3% of patients, though the FNAC findings were benign. However, no metastasis was detected. As previously discussed in the methodology, non availability of the ultrasound guided FNAC was one of the limitation of the study. An important limitation of FNAC in MNG is the possibility of a false negative result because the needle may not go into the nodule which needs testing [20].

Patients were put on thyroxine supplements when indicated. On follow up visits, patients were monitored for T3, T4 and TSH levels and evaluated clinically. Patients were assessed for any recurrence of symptoms, recurrence of nodules and hypothyroid features. Patients diagnosed with malignancy were sent to higher centres for thyroid scan and need of radioiodine therapy, to be managed by oncologists. In the present study, 2 cases of subtotal thyroidectomy showed signs of hypothyroidism and these patients were supplemented with oral levothyroxine.

## CONCLUSION

Multinodular goitre is more common among females in third and fourth decades. The most common presentation is swelling of the gland which may be associated with discomfort. This may be associated with clinical signs of palpitations, anxiety, and sweating and weight loss. Depending on the functioning balance MNG can present as hyperthyroid, hypothyroid but mostly in euthyroid state. The indication for surgery in patients with MNG includes cosmesis, hyperthyroidism, local compressive symptoms and most importantly malignancy. Though FNAC is very useful in diagnosis and management of multinodular goitre, it is not a good mode for diagnosing malignancy in MNG. Malignancy can still come as a surprise on postoperative histopathological examination. Subtotal thyroidectomy is the preferred surgery by most clinicians, but a trend towards total thyroidectomy is noticeably replacing the old belief in subtotal thyroidectomy.

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