



TO STUDY THE OUT COMES OF SURGICAL MANAGEMENT IN TOXIC MULTINODULAR GOITER - ORIGINAL ARTICLE

KEYWORDS

Thyroidectomy, Multinodular goiter, Thyrotoxicosis

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ABSTRACT

AIMS & OBJECTIVES: 1. Study the out comes of subtotal, near & total thyroidectomy as treatment of choice for toxic multinodular goiters.

MATERIALS & METHODS: Over the last 5 years 2010 - 2015 in a prospective review the demographic and clinical data of patients operated for toxic multinodular goiters in the department was entered into a predesigned proforma and analyzed. The objective of the study is to review the results of subtotal, near-total & total thyroidectomy as treatment for multinodular toxic goiters.

Results: Total 58 patients 4 males (6.8%) and 54 females (93.1%) with male: female ratio of 1:5 and the mean age of 40-50± 10.9 (range, 20-70 years), underwent thyroidectomy for toxic multinodular goiters. The duration of symptoms was 1-10 years. There was no case of permanent recurrent laryngeal nerve palsy or permanent hypocalcemia. Transient hypocalcemia occurred in 8 cases (13.7%) patients. There were 5 cases of seroma (8.6%) and no postoperative mortality. The mean hospital stay was 8.6 ± 2.34 (range 7-14 days). There was no disease recurrence over a mean follow-up of 20.7 (range 2-48) months.

Conclusion: In this study, the only criterion for the type of surgery chosen was surgeon preference and experience based on evaluation of the gland. The main indications of surgery in Toxic MNG are large goitre, irregular control of thyrotoxicosis, pressure effect symptoms, and patients preference. Total thyroidectomy is the surgery of choice for toxic MNG because it results in rapid, reliable resolution of hyperthyroidism on removal of goitre, requires no retreatment, removes any coexisting malignancy.

INTRODUCTION:

Thyrotoxicosis is a common endocrine disorder of the thyroid gland in developing countries. The incidence of secondary toxicosis in multinodular goiter according to literature is 30%. Surgery is the ideal treatment for toxic MNG as it reduces the critical mass of thyroid gland and achieves euthyroid state in the immediate post operative period. Toxic MNG constitutes 11% of total goiter cases. Thyroidectomy can induce rapid remission of thyrotoxic symptoms compared to radio-active iodine and antithyroid drugs. The nonsurgical treatment modalities seem more attractive because of their ease of administration, but delayed hypothyroidism is very frequent after radioiodine and continuous antithyroid drugs use may be expensive for many of our patients. Improvement in surgical techniques and resulting low incidence of postoperative complications have made surgery the treatment of choice in toxic goiters. However adequate thyroid remnant size should eliminate both recurrent hyperthyroidism and hypothyroidism and result in low incidence of other complications to justify surgery as treatment for toxic goiters. There is a robust, statistically significant association between increasing surgeon volume and superior patient outcomes for thyroidectomy.

MATERIALS AND METHODS:

This is a prospective study conducted at King George Hospital, Visakhapatnam in Surgical departments during the study period from July 2010 – September 2015. This study was done on subjects satisfying the inclusion and exclusion criteria from in-patients registry.

Study design- prospective study evaluation as a diagnostic tool.

Study setting

Surgical wards of King George Hospital, Visakhapatnam. This institution is the largest multi specialty hospital of Andhra Pradesh serving a major portion of three districts.

Study period- from July 2010 - September 2015

Study subjects- Patients with toxic nodular thyroid disease admitted to the surgical departments in King George Hospital who met the criteria below.

Data analysis- The collected data were statistically analyzed using descriptive statistics frequency and percentage.

Inclusion Criteria:

- Patients with clinical diagnosis of MNG with toxic symptoms.
- Known toxicosis patient on treatment referred from endocrinology department.
- At least one FNAC done at the time of initial presentation
- Thyroid profile including T3, T4, and TSH levels done prior to any treatment.
- Patients with TMNG patients in euthyroid state on medication who attended surgery OPD.

Exclusion Criteria:

- Patients with multinodular goiter without toxicosis clinically and biochemically.
- Those cases with malignancy on FNAC.
- Younger age group less than 20 years.
- Those cases with thyroglossal cyst or any swelling other than toxic MNG.
- Patients who had previous thyroid surgery.

A total of 500 goiter patients were examined. Out of which 58 patients with TMNG who were treated during this period were included in the present study. Among them 54 patients were female, and remaining 4 were males. All patients were admitted and a detailed history was taken, underwent thorough clinical examination, investigated as per the written proforma. Informed consent was taken and thyroid profile and a FNAC was done in all cases of nodules greater than 10 mm in diameter and nodules 5-10 mm in diameter having

calcification. All cases that gave consent for surgery were explained about risk and complications of surgery and anesthesia.

¹Surgery was performed in all the 58 patients by making all the patients euthyroid after using antithyroid drugs and propranolol. Preoperatively investigations were done according to the surgical protocol including ultrasound neck, FNAC. A preoperative indirect laryngoscopy was done in all cases to check for the status of vocal cords and medico legal purposes.²The type of surgery subtotal, Near total or total thyroidectomy depended on the clinical diagnosis, ultrasound neck and FNAC report.

All the excised thyroid specimen was sent for Histopathological examination. Patients were discharged after removing the sutures on sixth post operative day and were under follow up. Post operative thyroid profile was done on 1st post operative week and after 1 month. Results of surgery were compared with different modalities of surgical management.

OBSERVATIONS AND RESULTS:

In this study, we discuss the experience of the surgical management of toxic MNG at a specialized tertiary care center in a developing country, highlighting the minimal morbidity and satisfactory outcome in experienced hands. In the present study the criterion for the type of surgery chosen was the surgeon's preference.

AGE GROUP

The patients were in the age group of 20 to 60 years. The average age group of patients being 40-50 years. Maximum number of patients in this study group is 40-50 years with mean age of 48.2%. TOXIC MNG is more prevalent in later age group.

SEX DISTRIBUTION:

Total number of patients of the study were 58, out of which male patients constituted 4, whereas female patient were 54 as shown below. The ratio of female to male patients was 5:1. In our study maximum number of toxic MNG in female patients was 93.1%

INCIDENCE OF PRESENTING SYMPTOMS:

All the patients presented with swelling and toxic symptoms. Greater than 12% presented with swelling associated with pain. Two patients each were associated with hoarseness of voice and difficulty in swallowing and breathing.

Most common FNAC report of TOXIC MNG is adenomatous goiter. Most common HPE report finding of TOXIC MNG is colloid nodular goiter. Three cases of Hashimotos thyroiditis are reported. Two cases of malignancy were reported. In the present series 3.44% of cases were malignant.

ULTRASOUND FINDING OF THYROID: Diffuse thyromegaly, altered echogenicity, cystic degeneration, Nodular goiters.

Thyroid Profile:(T3,T4,TSH):

In the present study irrespective of age, sex and size of thyroid swelling T3, T4 levels were elevated and serum TSH levels were less than 0.005 or undetectable in 68.96% of patients.

In 22.41% of patients T3,T4 levels were normal with subnormal TSH levels of less than 0.1 mu/l.

MODE OF SURGERY IN TOXIC MNG:

Total thyroidectomy was done in 32 cases. Subtotal thyroidectomy was done in 22 cases. Dunhill's operation was done in 4 cases.

In this study 8 patients had temporary hypoparathyroidism, no cases of permanent hypoparathyroidism were recorded. 6 patients had transient vocal cord palsy, no permanent vocal cord palsy were recorded. 5 case of post operative seroma and 2 cases of wound infection.

Table 1: Showing frequency distribution of mode of surgery, Post operative results and follow up of 58 patients with TMNG

Total cases	58	100%	
	Total thyroidectomy	Subtotal thyroidectomy	Dunhill's operation
Number of cases	32(55.17%)	22(37.93%)	4(6.89%)
Mean weight of the gland	120gms(90-180)	85-95gms	95-105gms
Mortality	0	0	0
Morbidity	7(12.06%)	4(6.89%)	3(5.17%)
Post operative hemorrhage	0	0	0
Temporary hypoparathyroidism	4(6.89%)	2(3.44%)	2(3.44%)
Permanent parathyroidism	0	0	0
Transient RLN	3(5.17%)	2(3.44%)	1(1.72%)
Permanent RLN	0	0	0
POST OPERATIVE STAY	4.5days(4-8)	4.2days	5.4days
Early follow up hypothyroid after 1month	32(55.17%)	22(37.93%)	4(6.89%)
Late follow up	0	0	0
31 ablation due to associated thyroid carcinoma	2(3.44%)	0	0
Recurrence	0	3(5.17%)	0

DISCUSSION :

The prevalence of nodular goiters that produce hyperthyroidism is approximately 2%, in women and 0.2% in men.³ Hyperthyroidism from toxic multinodular goiter (TMNG) iodine deficient areas account for about 35-40% and as per the previous studies conducted in other parts of world (Ogbera and Kuku 2011 and Santaniello et al 2012). Duration of swelling ranged with an average of five to ten years, it ranged from one year duration to ten year duration, as per the results of the present study the duration of most toxic MNG, lies in between 5-10 years. progression of swelling may be gradual, rapid or stationary, as per the results of the present study most of the toxic MNG swelling progresses gradually which constituted 18.6% of the study group. The most common histopathology report of resected thyroid specimen showed features are consistent with multinodular goitre. In the study 89.6% showed features suggestive of multinodular goitre, 5.1% showed features of Hashimotos and 3.44% showed features of malignancy (Follicular carcinoma) Malignancy arising in a hyperthyroid goitre is an uncommon but consistent finding in most surgical series. The reported incidences range from 2.6% to 10%. Nahl RA et al studied co existence of hyperthyroidism and thyroid cancer. Pacine and her colleagues observed a 7.5% incidence of cancer in TMNG and 2.5% in AFTN. In the present series 3.44% of malignancies were reported and it was comparable with the above study.⁴ The incidental thyroid cancer incidence is relevant, non palpable nodules have the same risk of malignancy as palpable nodules of similar size. Besides the complications of total thyroidectomy are similar to conservative procedures. The recurrence of goitre and incidental thyroid cancer requires a second surgical procedure with a higher risk of complications. So total thyroidectomy is the standard surgical treatment. Giles Y et al studied advantage of total thyroidectomy to avoid reoperation for incidental thyroid cancer. Today total thyroidectomy is among the most commonly performed procedure involving the endocrine glands. Of the 58 cases, 32 cases were subjected to total thyroidectomy, cases were subjected to Dunhill's operation and remaining 22 cases underwent subtotal thyroidectomy.⁵ Surgery is indicated in patients deserving or requiring rapidly efficient definitive treatment.⁶ It is also preferred treatment of choice for patients with suspicion of malignancy, massive goiter with local compressive symptoms, urgent

need for control of disease and severe hyperthyroidism. In 2008 Agarwal et al stated that total thyroidectomy is a safe option in the hands of expert surgeon and Dunhill's operation is similarly effective safer option. There is statistically significant association between increasing surgeon volume and superior patient outcomes for thyroidectomy. Postoperative complications are related to size of goiter, level of control of toxic symptoms, experience of the surgeon and to a lesser extent, the duration of the goiter and surgical technique used. The recurrent goiters may be associated with more incidences of RLN palsies because of the distorted anatomy and fibrosis.

^{7,8} The surgical techniques were subtotal and near-total thyroidectomy, with total unilateral lobectomy and isthmusectomy (Dunhill's operation) for the two patients with toxic nodules. Particular attention must be given to surgical techniques aiming at minimizing the most important postoperative complications. Delbridge and colleagues have advocated the capsular dissection over the noncapsular technique to bring the incidence of permanent hypoparathyroidism and RLN palsy to the minimum. In the capsular dissection, branches of the superior and inferior thyroid arteries are ligated individually as well as directly on the surface of the thyroid gland, where as the noncapsular technique involves mass ligation of the superior pole, with the inferior thyroid artery ligated in continuity to preserve the blood supply to the parathyroid glands. There is change in surgical procedure from subtotal to near total or total thyroidectomy in the treatment of patients with benign multi nodular goiter, Barczynski et al reported that there was no significant difference in operation when comparing total thyroidectomy and subtotal thyroidectomy^{9,10}. In this study also more than 55% of them underwent Total Thyroidectomy.

TABLE 2: Studies comparing primary outcome of various surgeries

Study	Study Design	Recurrence of MNG	Result %	Reoperation	Result%
Barczynskietal 2010 Poland	RCT	TT vs BST TT vs DO	0.52 vs 11.58 0.52 vs 4.71	TT vs BST	0.52 vs 3.68 0.52 vs 1.57
Tezelman et al 2008 turkey	NRCT	TT vs BST	0 vs 7.1	TT vs DO	0 vs 2.24
Vaiman et al 2008 Israel	CS	TT vs NTT + STT	0 vs 20.5	TT vs BST	NIL
Yang et al 2008 China	NRCT	TT vs STT	0 vs 6.7	TT vs STT	NIL
Present Study	PCS	TT vs STT TT vs DO	0 vs 5.1	NIL	NIL

As can be seen from the above table, primary outcome of various surgeries as per various studies are comparable to the present study, which shows that recurrence is usual with subtotal thyroidectomy when compared to other types of surgery which is 5.17%.¹¹

TABLE 3 -Studies comparing compliations of various surgeries – secondary outcome

Study	Surgical Technique	Recurrent L Nerve Injury	Hypoparathyroidism
Barczynski	TT vs BST* TT vs DO	5.49 vs 2.1% 5.49 vs 4.23%	10.99 vs 2.1% 10.99 vs 4.23%
Tezelman	TT vs BST*	Non Significant	8.4 vs 1.42%
Vaiman	TT vs NTT** TT vs STT**	1.4 vs 1.2% 1.4 vs 1.1%	2 vs 1.9% 2 vs 2%
Yang et al	TT vs STT*	1.89 vs 1.68%	6.92 vs 5.03%
Present Study	TT vs STT* TT vs DO*	5.17 vs 3.44% 5.17 vs 1.72%	6.89 vs 3.44% 6.89 vs 3.49%

*Transient recurrent laryngeal nerve injury and temporary hypoparathyroidism.

*Permanent recurrent laryngeal nerve injury and permanent

hypoparathyroidism.

According to the above table, transient RLN injury in Barczynski et al study is comparable to the present study in TT is around 5% and temporary hypoparathyroidism is higher when compared to the present study. Temporary hypoparathyroidism is high in Tezelman et at study(10.99%) when compared to the present study(6.89%) in total thyroidectomy. In TT transient RLN injury is low in Yang et al study(1.89%) when compared to present study(5.17%) and transient hypoparathyroidism is comparable to the study. Transient RLN injury in STT is lower in Barczynski et at study(2.1%) when compared to this study which is(3.44%) and Transient hypoparathyroidism is (2.1%) and (3.44%) respectively. In STT transient RLN injury is low in Yang et at study(1.68%) when compared to this study(3.44%) and transient hypoparathyroidism is (5.03%) and (3.44%) respectively. In STT no transient RLN injury was reported in Tezelman et at study whereas (3.44%) was reported in the present study and (3.44%) of temporary hypoparathyroidism was reported when compared to (1.42%) in Tezelman et al. In DO transient RLN injury is higher in Barczynski et at study(4.23%) when compared to the study(1.72%) and Transient hypoparathyroidism is (4.23%) and (3.49%) respectively. In the present study complications were few, out of which 8 patients had temporary hypoparathyroidism¹² with no cases of permanent hypoparathyroidism. All the 8 cases were reported during the first post operative week. All of them recovered completely with intravenous calcium therapy and oral calcium preparations. Prim MP et al studied factors related to nerve Injury and hypocalcaemia in thyroid surgery.¹³ Temporary recurrent laryngeal nerve palsy were observed in 6 cases and no cases of permanent RLN damage were reported. All the cases recovered within a span of one month with improved quality of speech. Five cases of post operative seroma and two cases of wound infection were reported which responded very well to wound exploration and broad spectrum antibiotics.^{14,15} Total thyroidectomy is the surgery of choice for toxic MNG because it results in rapid, reliable resolution of hyperthyroidism on removal of goitre, requires no retreatment, removes any coexisting malignancy. Rapid control of thyrotoxicosis, which could minimize the cardiac effects of coexisting severe cardiotoxicity, is the major advantage of surgical therapy of TMNG.

CONCLUSION:

In this study, the only criterion for the type of surgery chosen was surgeon preference and experience based on evaluation of the gland. The main indications of surgery in Toxic MNG are large goitre, irregular control of thyrotoxicosis, pressure effect symptoms, and patients preference. Total thyroidectomy is the surgery of choice for toxic MNG because it results in rapid, reliable resolution of hyperthyroidism on removal of goitre, requires no retreatment, removes any coexisting malignancy. Rapid control of thyrotoxicosis, which could minimize the cardiac effects of coexisting severe cardiotoxicity, is the major advantage of surgical therapy of TMNG. Large scale trials and further studies on surgical management of TMNG will have proven benefits in the near future for standardization of management guidelines.

LIST OF ABBREVIATIONS:

- FNAC- FINE NEEDLE ASPIRATION CYTOLOGY
- RLN- RECURRENT LARYNGEAL NERVE
- T3- TRI IODO THYRONINE
- T4- TETRA IODO THYRONINE
- TSH - THYROID STIMULATING HORMONE

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