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RESEARCH ARTICLE

TOTAL VERSUS HEMI-THYROIDECTOMY FOR SOLITARY NODULAR GOITRES - A RETROSPECTIVE HOSPITAL BASED COMPARATIVE STUDY

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SNT – solitary nodule thyroid,
HPE – histopathology examination,
FNAC – fine needle aspiration cytology.

ABSTRACT

Surgery for thyroid disorders are of several types depending on the amount of tissue that is left behind rather than the amount of tissue that is actually removed. In this regard, the thyroid surgeries that are widely practiced at present are total thyroidectomy, near-total thyroidectomy, hemithyroidectomy and the recent advance being the laparoscopic procedures. Though the type of surgery that is required depends on the anatomical diagnosis, consideration of the pathological diagnosis is essential before planning for surgery.Doing a total thyroidectomy for a benign solitary nodule of thyroid which is considered as over treatment, becomes the standard of care if the postop HPE proves it to be malignant and a hemithyroidectomy if done for the same patient might become an undertreatment.As there are no standardised institutional protocol for the management of solitary nodular thyroid, a retrospective analysis was done on 60 patients who had solitary nodule thyroid, half of whom underwent total thyroidectomy and 30 others who underwent hemithyroidectomy for the same.The main objective of this study is to compare the complication rates between total and hemi thyroidectomy for solitary nodule goitre. All the patients were preoperatively workedup which includedthyroid function test, ultrasound of neck and FNAC of the nodule. A comparative analysis was done based on the complication rates of the 2 procedures (Total and Hemithroidectomy). Though the incidence of clinically significant nerve injury was same in both, the need for resurgery was there in 9% of patients who underwent hemithyroidectomy. The other justifications for total thyroidectomy were based on intraoperative presence of nodules in the opposite lobe, incidence of malignancy, incidence of recurrence, difficulty of resurgery, patients losing followup, easier postoperative titration of thyroxine with total thyroidectomy and the pathological evidence in support of total thyroidectomy. In spite of all these, larger prospective trials with long term follow up is required to decide upon the standard of care for such patients.

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INTRODUCTION

Thyroid disorders are by far, one of the most common endocrine disorders that surgeons encounter in their daily practice. In that case, the management of a benign solitary nodule goitre as directed by the endocrine society guidelines is watchful waiting (Unnikrishnan *et al*., 2011) unless the patient wants it to be removed for cosmetic reasons. The pathology hidden within a solitary nodular goitre may be malignant or benign. As per the guidelines, only suspicious or malignant lesions need to be operated. More over, the surgery that is recommended if at all done, for a benign solitary nodule is a hemithyroidectomy of the involved lobe and not Total thyroidectomy. Before analysing this, we should know if this really needs addressal. In India, the prevalence of solitary thyroid nodule is around 12.2% (Usha Menon *et al*., 2009) with a greater female preponderance with incidence of thyroid cancers being 8.7 per 100000 people per year and this has been increasing over years. (Davies and Welch, 2006) The incidence of nodular goitre/adenoma among the solitary nodules is around 70% whereas malignancy constitutes 20% and Thyroiditis, cysts constitute 5% each. The adenomas constitute the majority and follicular adenomas are the most common among them and follicular neoplasms have a overall malignancy rate of 20-30%. (Goldstein *et al*., 2002) It has been suggested by the endocrine society to follow up the benign nodules whereas prompt treatment is essential in case of malignant nodules. However, the indication for surgery for benign nodules is found to be mainly cosmesis and pressure effects if any. Therefore the magnitude of problem though

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doesn't appear huge, is significant. Solitary nodules of thyroid that come to the attention of a general surgeon form half the lot of thyroxine swellings. So, the surgeon is subjected to a feeling of dilemma in deciding upon the treatment. Though watchful waiting can be offered to patients with benign solitary nodules, surgical management gives the complete cure with regard to their cosmesis and symtoms such as dysphagia. Total thyroidectomy with /without lymphadenectomy is the standard of care for the 20% of malignant swellings. However, standard of care for the rest 80% of solitary nodules is yet to be decided. The need for this study is to throw light on the fact that there is not much difference total thyroidectomy and hemithyroidectomy except for the lifelong thyroixine supplementation for total thyroidectomy patients. Furthur more, the dilemma in treating suspicious and false negative FNAC reports could be overcome by total thyroidectomy.

MATERIALS AND METHODS

The analysis was made retrospectively from the patients who were on follow up after thyroid surgery in the Institute of General Surgery in Rajiv Gandhi Government General Hospital, a tertiary care hospital. The study participants are patients who got operated during the year 2014 for benign solitary nodule thyroid (clinically and radiologically). The case records maintained in the Medical records department were analysed and two groups of patients were arbitrarily selected: One group of patients who underwent total thyroidectomy for the solitary nodule of thyroid and one group who underwent hemithyroidectomy for the same. The patients were of age 25-50 years irrespective of their sex. All the patients had underwent the routine thyroid evaluation including clinical examination, USG of thyroid, Thyroid function tests and FNAC of the nodule. The decision of the type of surgery carried usually rests with the operating surgeon after consultation with the patients in our institution. We selected 30 patients in each group who had undergone the respective surgeries in the year 2014.Patients with other complications and co-morbidities not related to thyroid disease were not included in the analysis. The two groups were compared in terms of the baseline patient characteristics, operative details (mean duration of surgery and blood transfusion if any) and their post-operative complications. As there were no confounding factors with regard to this study, matching was not required. The complications that were taken into account were: nerve injury, hypoparathyroidism (evaluated as hypocalcaemia in thepostop period – day 1 and 5), postoperative thyroxine supplementation. Alsodisparity between preoperative and postoperative histopathology reports were analysed. The difference in proportions for each complication between the two groups was tested for statistical significance by Fischer's exact test. Since this was a record based study no ethical clearance was sought. All measures were taken while extracting the data to protect patient identity and strict confidentialty of information was maintiained.

RESULTS

The results clearly show that there isn't much difference between hemithyroidectomy or total thyroidectomy (with regard to the complication rates) though there is a slight increased duration of surgery in total thyroidectomy group. The recurrent laryngeal nerve injury was seen in both groups. Though, the hypoparathyroidism incidence was a little more in the total thyroidectomy group, it was only transient. In hemithyroidectomy patients there was no need for the lifelong thyroxine supplementation and as expected all patinets with total thyroidectomy had to be given lifelong thyroxine supplementation. The disparity in the preoperative FNAC and postoperative HPE between the 2 groups was quite high in the hemithyroidectomy group though it was not statistically significant. The preoperative FNAC was benign but the postoperative HPE was malignant in 6 out of the total 30 patients, who had to undergo completion thyroidectomy, whereas the same in total thyroidectomy group didn't warrant any additional surgical treatment.

Table I: Baseline patient characteristics and clinical evaluation details in the two groups

Patient characteristics	Hemi-thyroidectomy N=30	Total thyroidectomy N=30
Age (mean)	46	40
Sex (Female:Male)	5:1	4:1
TFT (preop status)	Euthyroid	Euthyroid
Preop diagnosis (clinical, radiological, pathological)	Benign solitary nodule	Benign solitary nodule

Table II: Operative details of the two groups

Operative details	Hemi-thyroidectomy N=30	Total thyroidectomy N=30
Operative duration (mean)	55 min	1 hr 20 min
Need for blood transfusion	Nil	Nil
Duration of hospital stay (mean)	4 days	4 days
Disparity between preop FNAC & postop HPE	6 (20%)	1 (3%)

Table III: Comparison of post-operative complications in the two groups

Complications	Hemi-thyroidectomy N=30		Total thyroidectomy N=30		P value*
	No.	%	No.	%	
Recurrent Laryngeal nerve injury (U/L)	1	3	1	3	1.0
Recurrent Laryngeal nerve injury (B/L)	0	0	0	0	-
Transient hypoparathyroidism	1	3	2	6	0.5
Need for thyroxine supplements (postop)	0	0	30	100	<0.001

Note: *Fischer's exact test

DISCUSSION

The Endocrine society of india guidelines for patients with thyroid nodules have given an algorithmic approach regarding management of thyroid nodules. Accordingly, benign solitary nodules need follow up and not surgery. The Non-diagnostic nodules should be biopsied (FNAC) again and only those nodules that were suspicious or frankly malignant were considered for surgical management. (Unnikrishnan *et al*., 2011) In general, the evaluation of a solitary thyroid nodule

includes clinical evaluation, imaging studies and FNAC. The justification of surgery management itself is questioned in case of benign solitary nodules except for a clinical suspicion of malignancy and for cosmetic reasons and difficulty in follow up of patients in our country. In that case, the justification for Hemi-thyroidectomy are: Decreased incidence of nerve injury, Decreased incidence of hypocalcemia and there is no need of any lifelong thyroxine supplementation. The Justification for Total thyroidectomy are: 1. Intra operative presence of Nodules in opposite lobe (thus changing the diagnosis to MNG), 2.Incidence of malignancy (false negative FNAC rate - 5%), 3.Incidence of Recurrence, 4.Difficulty of Resurgery, 5.Patients lose followup, 6.Postop titration of thyroxine is easy, 7. Nerve injuries can occur in hemithyroidectomies also. The Genetic / Pathological justification for total thyroidectomy is that, in most solitary thyroid nodules, the pathology exists in the entire gland and not just in the nodule and are more commonly associated with malignant changes. Hence, it is ideal to get the gland removed in total rather than to leave behind a pathological gland. Some of the genetic changes seen are: 1.TSH receptor signalling pathway mutation (Holzapfel *et al*., 2002), 2.RAS mutations, 3.phosphotidylinositol-3-kinase subunit (PIK3CA) mutations, 4.PAX8-PPARG fusion gene. Not enough literature support exists regarding helping a surgeon decide upon what should be done. But still, there are evidences in support of total thyroidectomy due to the high rate of recurrence after lobectomy ("High rate of recurrence after lobectomy for solitary thyroid nodule" - *Eur J surg 2002; 168; 397-400)* (Maurizio Marchesi *et al*., 2002) and that there are not much difference in complication rates between total or hemithyroidectomy. The complications of removing the contralateral normal thyroid lobe in a patient with a dominant thyroid nodule is negligible. Lobectomy frequently requires subsequent thyroid surgery. Many patients treated by lobectomy may require thyroid hormone replacement to achieve euthyroidism. (Spanheimer *et al*., 2011)

Strengths and limitations of the study

The limitation of the study is its sample size and the duration of the study. However, the strength of the study is that it throws some light into this often overlooked management protocol. It also clearly demonstrates that there is not much difference between hemi and total thyroidectomy procedures with regard to nerve injury which is the most dreaded complication next only to hypothyroidism except for a slightly higher duration of surgery for total as against hemithyroidectomy.

Conclusion and Recommendations

The Surgical management of solitary nodule thyroid is still debatable with respect to follow up / hemithyroidectomy / total thyroidectomy. However, several other factors should be taken into account before making a decision and larger trials and long term follow up studies are required to frame a standard of care in such cases.

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