

Comparison Between Total And Subtotal Thyroidectomy In Graves' Disease

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Abstract Objective: To compare the results of total thyroidectomy and subtotal thyroidectomy amongst the surgically treated patients with Graves' Disease. **Material and Method:** This study includes 50 patients of Graves' disease out of which 27 patients underwent for total thyroidectomy and 23 underwent for subtotal thyroidectomy. Comparison done in regards to postoperative complication between total and subtotal thyroidectomy in terms of advantages and disadvantages. **Results:** Incidence of transient or permanent recurrent laryngeal nerve palsy and hypocalcemia were high amongst the patients operated for total than subtotal thyroidectomy. Thyroid function tests were normal in all patients after total thyroidectomy with hormone replacement therapy and 17.39% of patients had hypothyroidism after subtotal thyroidectomy. Recurrence rate was nil and 21.73% respectively in total and subtotal thyroidectomy. One patient of subtotal thyroidectomy had occult carcinoma in histopathological examination which required revision of surgery. **Conclusion:** Total thyroidectomy is superior to subtotal thyroidectomy based on the considerable surgical risk and lack of recurrence in total thyroidectomy as well as the risk of occult carcinoma and questionable ability of the subtotal thyroidectomy to maintain the euthyroid state. [Suthar K et al NJIRM 2013; 4(1) : 29-33]

Key Words: : Graves' Disease, Subtotal Thyroidectomy, Total Thyroidectomy

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Introduction: Graves' disease is the most common form of hyperthyroidism and is autoimmune in origin. It is also called as Parry's disease or Basedow's disease¹. The disease entity was originally described by an Irish Physician, Dr. Robert Graves in 1835². Around 1960, pathogenesis of Graves' disease was clearly delineated². In Graves' disease, whole of the functioning thyroid tissue is involved and the hypertrophy and hyperplasia are due to abnormal thyroid stimulating antibodies (TSH-Rab) that binds to TSH receptors sites and produce a disproportionate and prolonged effect³.

It is now recognized as a multisystem disease characterized by diffuse goiter, thyrotoxicosis, infiltrative ophthalmopathy and occasionally by infiltrative dermopathy^{1,4}. The most common symptoms are nervousness, fatigue, irritability, palpitation, intolerance to heat, weightloss, tremors, increased appetite and decreased menstrual periods in women⁴. The diagnosis of hyperthyroidism is generally straightforward with raised serum thyroid hormones, suppressed serum thyrotropin and raised antithyroid antibody levels⁵. The treatment of the Graves' disease therefore, lies essentially in complete and permanent control of thyrotoxicosis¹. The treatment options are radioactive iodine ablation, administration of

antithyroid drugs and surgery. Both the nonsurgical modalities require longterm continued patient follow up, which is not feasible in the Indian setup. Also surgery is a rapid, consistent and effective method of making the patient euthyroid. Thyroid surgery has been practiced since the time of Albucacius and Kocher. However, it is only in the last two decades that surgery has assumed a prominent role in the treatment of hyperthyroidism especially when other modalities are not available, not useful or contraindicated. Amongst the different surgery, total and subtotal thyroidectomy are most commonly performed for Graves' disease. The purpose of the present study is to compare the results of total and subtotal thyroidectomy and to identify as to which may be the better option in management of Graves' disease.

Material and Methods: This study includes 50 patients of Graves' disease operated at the general surgical department with prior permission of IRB. All the patients included in the study were diagnosed on the basis of clinical and biochemical features (raised serum free T3, free T4, low TSH and raised Antithyroid Antibodies) and ultrasonography of thyroid tissue. All the patients had received antihyroid drug (Neomercazole-carbimazole) and beta-blockers for the period of

3 months to 5 years. On admission, euthyroid state and uniform uptake of isotope on radioactive iodide scan were confirmed and indirect laryngoscopy along with all other routine investigations for medical fitness was performed. Patients with coexistent medical illness including diabetes mellitus, hypertension, major cardiovascular illness and all other conditions resulting in increased anaesthetic risk were excluded. In our study total thyroidectomy was defined as removal of all visible thyroid tissue and subtotal thyroidectomy as excision with a remnant of 6-8 gram of thyroid tissue.

After taking written consent, Subtotal thyroidectomy was carried out in 23 patients and total thyroidectomy was carried out in 27 patients. Postoperatively all the patients were given analgesics with antibiotics and in patients of total thyroidectomy, hormone replacement therapy started. Serum calcium level was done on 3rd and 6th postoperative day and during follow up every third month upto the end of the first year. Postoperatively laryngoscopic examination was done in all patients on 5th postoperative day and than at an interval of 3 months upto the first year. Drainage tube was kept for 48-72 hours. Stitches were removed on 10th to 12th day of operation and patients were discharged between 10th to 16th days of operation. During follow up, serum free T3, free T4, TSH and Antithyroid antibodies levels were done periodically and histopathology reports were collected. In patients presenting with exophthalmos, the clinical status of regression or progression was measured using an ophthalmometer. Hormone replacement therapy was continued and titrated to maintain the euthyroid state in patients operated for total thyroidectomy.

Results: Amongst the 50 patients, 80% of cases were presented between 20-40 years of age and 36 were females and 14 were males. Post operative antithyroid antibodies titers were decreased as compared to preoperative values in both total as well as subtotal thyroidectomy group with a comparative greater decrease in the total thyroidectomy group. Other observations are shown in Table 1.

Discussion: Graves' disease can be marked or subtle, with periods of exacerbation or remission⁴. It is more common in younger females³. In our study, 80% of patients were between 20-40 years of age and females are more affected than males. In our study increased sweating, intolerance to heat, fatigue and nervousness were common symptoms and exophthalmos was present in 18 cases (36%). These findings are consistent with literature⁴.

Table 1: Postoperative Complications

Complication	Total Thyroidectomy	Subtotal Thyroidectomy
Transient hypocalcaemia	18.51% (n=5)	8.69% (n=2)
Transient Recurrent Laryngeal Nerve Palsy	11.11% (n=3)	8.69% (n=2)
Permanent hypocalcaemia	11.11% (n=3)	4.34% (n=1)
Permanent Recurrent laryngeal Nerve Palsy	7.40% (n=2)	4.34% (n=1)
Haematoma	3.70% (n=1)	4.34% (n=1)
Wound Infection	3.70% (n=1)	4.34% (n=1)
Hypothyroidism	0%	17.39% (n=4)
Recurrence	0%	21.73% (n=5)
Occult Carcinoma	0%	4.34% (n=1)

HRT- Hormone Replacement Therapy, n- Total No. of Patients affected

In our study, failure (ineffectiveness, side effects or recurrence after drug discontinuation) of the antithyroid drugs (41.55%), large size of goitre (14.28%) and patient's choice (18.18%) were the most common indications which is alike to literature and other series^{5,6} and other frequent indications in our study were exophthalmos (14.28%)⁷, planning for pregnancy (6.49%) and cardiac disease (5.19%).

The treatment of Graves' disease seeks to restore normal thyroid function as rapidly as possible while minimizing the risk of complication. In our study, the incidence of transient and permanent hypocalcaemia is higher in total thyroidectomy group than subtotal thyroidectomy group. This is due to removal of the parathyroid gland or infarction through damage to the parathyroid end artery³. In other series^{6, to11}, transient hypocalcaemia is more in the total thyroidectomy group while there is negligible difference for the permanent hypocalcaemia in both groups. This suggests that in our study, this result can be achieved by harvesting and autoimplantation of the parathyroid gland in total thyroidectomy patients.

In our study, the incidence of transient and permanent recurrent laryngeal nerve palsy is higher in the total thyroidectomy group than subtotal thyroidectomy group. In other series^{7 to10}, it is negligible. Transient recurrent laryngeal nerve palsy occurs due to oedema and can be lowered by lozenges and/or humidified air⁵ while the permanent recurrent laryngeal nerve palsy can be avoided by identifying the nerve on each side during all operations on the gland. Permanent recurrent laryngeal nerve palsy should not be accepted unless it lasts for more than 9 months⁵. Exploration and resuturing of the nerve with grafting when necessary, is now feasible⁴.

In our study, the incidence of haematoma is negligible in total and subtotal thyroidectomy group and life threatening deep tension haematoma did not occurred in any patient. Postoperative haematoma is due to slippage of a ligature on the superior thyroid artery, occasionally, haemorrhage from a thyroid remnant or a thyroid vein may be responsible³.

By removing adequate volume of thyroid tissue, the stimuli for TSH antibody production is reduced and thereby preventing the progression of ophthalmopathy. In our study, in patients presenting with exophthalmos, regression of the exophthalmos is almost same in total and subtotal

thyroidectomy group which is consistent with the findings of Barczyrski M et al¹⁰ and Wite J et al¹¹.

From the Table 2, it is evident that risk of hypothyroidism is more in total thyroidectomy patient than subtotal thyroidectomy patient when hormone replacement therapy is not given and it is almost nil when given hormone replacement therapy which is obvious. The occurrence of postoperative hypothyroidism in the subtotal thyroidectomy group depends on the factors such as severity of disease before surgery, age of the patient, presence of high concentration of antithyroid antibodies before surgery, the size of the gland and histological evidence of lymphoid infiltration⁵, change of autoimmune response from stimulation to destruction³. There is however, a definite relationship between the estimated weight of the thyroid remnant and the development of thyroid failure after subtotal thyroidectomy for Graves' disease³. The concept of 'critical mass' or the ideal volume remnant thyroid tissue to be left behind during a subtotal thyroidectomy for Graves' disease remains an enigmatic question today. An agreement among surgeons is yet to be reached regarding the 'ideal volume'. In series of Palit TK et al⁹, there was an 8.9% decrease in hypothyroidism and 6.9% increase in euthyroidism for each gram of thyroid

Table 2: Risk of Hypothyroidism

Study	Total thyroidectomy	Subtotal thyroidectomy
	Percentage	Percentage
Present study	0% with HRT (n=27)	17.39% (n=23)
Nicolosi A et al ⁶	0% with HRT (n=33)	31.5% (n=70)
Clech GL et al ⁷	100% without HRT (n=46)	33.3% (n=72)
Ku CF et al ⁸	0% with HRT (n=98)	72.3% (n=119)
Palit TK et al ⁹	100% without HRT (n=538)	25.6% (n=6703)

HRT – Hormone Replacement Therapy, n- Total No. Of Patients Operated

remnant ($p < 0.0001$ each). But the exact measurement of this volume proved difficult and further, any small amount can cause unacceptable high recurrence rate of hyperthyroidism in subtotal thyroidectomy. So, in this regard total thyroidectomy with hormone replacement therapy is better than subtotal thyroidectomy.

Table 3: Risk of Recurrence

Study	Total thyroidectomy	Subtotal thyroidectomy
	Percentage	Percentage
Present study	0 % (n=27)	21.73% (n=23)
Nicolosi A et al ⁶	0% (n=33)	5.5% (n=70)
Clech GL et al ⁷	0% (n=46)	6.9% (n=72)
Ku CF et al ⁸	0% (n=98)	5.9% (n=119)
Palit TK et al ⁹	0% (n=538)	7.9% (n=6703)

n = Total No. Of Patients Operated

From Table 3, it is evident that for preventing the recurrence of hyperthyroidism in Graves' disease the critical mass of the thyroid remnant has to be reduced to near zero. This can be achieved only by doing a total thyroidectomy. In our study and also in other series, there are no cases of recurrence after total thyroidectomy due to obvious reason. Thyrotoxic osteoporosis or hunger bone syndrome is also less likely to occur after a total thyroidectomy. Total thyroidectomy scored over the subtotal thyroidectomy in this regard also.

There is risk of occult carcinoma in Graves' disease. According to the Koulas SG et al¹², incidence is as high as 10.8% and most of this occult carcinoma in Graves' disease is less than 9 mm with no capsular invasion in whom total thyroidectomy has to be done rather than subtotal thyroidectomy. In our study, one patient of subtotal thyroidectomy group had occult carcinoma which required further surgery.

Conclusion: On summarizing our data, it can be concluded that total thyroidectomy is superior to subtotal thyroidectomy based on the considerable surgical risk and lack of recurrence with hormone replacement therapy in total thyroidectomy as well as the risk of occult carcinoma and questionable ability of the subtotal thyroidectomy to maintain the euthyroid state. It is better to treat hypothyroidism with hormone replacement therapy than recurrence. Further, the surgical risk in total thyroidectomy can be reduced to below the critical level if done by experienced surgeon with refinement of technique as discussed above¹³.

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