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Research Article

COMPARISON OF OUTCOME OF TOTAL VERSUS SUBTOTAL THYROIDECTOMY FOR THE TREATMENT OF MULTINODULAR GOITER

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Abstract:

Objective: The aim of this study was to compare the outcomes of total and subtotal thyroidectomy (STT) for benign bilateral multinodular goiter in terms of recurrent laryngeal nerve paralysis (RLNP) and hypoparathyroidism.

Study design: A quasi-experimental study.

Place and Duration: In the Surgical department of Holy Family Hospital Rawalpindi for one year duration from March 2018 to March 2019.

Methods: 60 total volunteers with bilateral multinodular goiter were divided into 2 groups as A and B (30 patients in each group). Total thyroidectomy was done in group A patients and patients under STT in B group. The non-probability purposive sample technique was used. Demographic details, operation indications, biochemical results, complications and duration of surgery were observed for each group.

Results: There was no noteworthy variation between the two groups in terms of sex, age, hormonal status or goiter duration ($P = 0.74$, $P = 0.123$, $P = 0.509$ and $P = 0.6$, correspondingly). The mean working time for TTT and STT was longer (138 ± 30 min, 112 ± 33 min, $P = 0.046$). Transient RLNP or HPT occurred in 3 (9.9%) or 6 (20%) of 6 patients, in 3 (6.6%) or 3 (9.9%) patients undergoing STT ($P = 0.64$). and $P = 0.278$, respectively). Permanent RLNP was noted in none of the patients in the TT group and in HPT compared to none of the complications in the STT group ($P = 0.313$ for persistent HPT).

Conclusions: This study demonstrates that TT can be achieved without raising the risk of complications and is taken as substitute for benign MNG, mainly in endemic areas with very large multinodular goiter.

Keywords: bilateral benign multinodular goiter, total thyroidectomy, subtotal thyroidectomy, hypoparathyroidism, and recurrent laryngeal nerve palsy.

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INTRODUCTION:

Goiter is a common problem, women are more affected than men, and multinodular goiter (MNG) is the most common cause. The etiology of MNG is unclear and is believed to be multifactorial and includes inherited factors, dishormonogenesis, iodine deficiency and radiation exposure [1-2]. The disease is more common in areas with iodine deficiency. According to the World Health Organization (WHO), 5% of the world's population suffers from goiter and 75% of them live in areas with iodine deficiency. Pakistan and especially N.W.F.P, Himalaya and Karakorum are mountainous regions with mountain ranges and various iodine-free regions [3-4]. For this reason, a large number of patients suffering from long-standing multinodular goiter are often neglected in Pakistan [5]. Benign goiter patients can be treated with drugs at an early stage, but long-term cases, due to its size, in addition to pressure symptoms, develop complications in the form of MNG, toxicity and malignancy. MNG is an irreversible disease and although radioactive iodine is an option, surgery is the treatment of choice.

As in all other operations, there are some complications in thyroid surgery, but hypoparathyroidism and recurrent laryngeal nerve palsy are two major, serious and debilitating complications of thyroid surgery [6]. The first causes cardiac spasm and can have terrible consequences, such as laryngeal spasm and cardiac arrest, the second cause's hoarseness when unilateral and rigid, and variable dyspnea requiring tracheotomy [7]. Proper surgical management of MNG created a continuous dilemma between radical resection, total thyroidectomy (TT) and partial resection, i.e. subtotal thyroidectomy (STT) close to total thyroidectomy [8]. In the past, persistent hypoparathyroidism and repeated fears of laryngeal nerve palsy have led many surgeons to adopt STT as the standard procedure for the treatment of MNG. However, instead of STT, TT is the most appropriate procedure for benign MNG, and in many centers around the world, bilateral TT is the preferred option for the management of bilateral benign MNG [9].

MATERIALS AND METHODS:

This quasi-experimental study was held in the Surgical department of Holy Family Hospital Rawalpindi for one year duration from March 2018 to March 2019. The purpose of this analysis was to compare the ratio of hypoparathyroidism and recurrent paralysis of laryngeal nerve in total and subtotal thyroidectomy in bilateral benign MNG. Based on the findings of the current literature, we assumed that there was no

substantial variation in terms of hypoparathyroidism and recurrent laryngeal nerve palsy between the two procedures. Approval for the study was obtained from the Hospital Ethics Committee.

Sixty patients with symptoms and signs of MNG with WHG grade III goiter were included in this study. Patients with any thyroiditis, thyroid malignancy, recurrent goiter, nodular disease limited to one lobe were not selected. All subjects were selected using a non-probability technique. The risks and benefits of both procedures were explained to the patients and informed consent was obtained.

Patients admitted to the surgery department with OPD were evaluated by history and physical examination, hematology profile and routine biochemistry, thyroid function tests, serum Ca ++ concentration level and radiography of neck and thoracic inlet for retrosternal growth. Indirect laryngoscopy (IDL) was performed only in patients with voice problems. When not physiologically involved, ultrasound for the contralateral lobe and fine needle aspiration cytology (FNAC) were performed in cases of suspected strong neoplasia. Hyper and hypothyroid patients became euthyroid with medication. Non-random division of sixty total patients was alienated into 2 equal groups A and B. The total thyroidectomy was done in group A Patients and subtotal thyroidectomy done in patients of group B. The decision on the type of procedure was finally made by the surgeon after consulting the patient. The surgery was performed by a single experienced consultant surgeon. All patients were clinically evaluated postoperatively on hypocalcemia, carpopedal spasm (Trauseau symptoms) and muscle contraction (Chvostek sign) and on the first and second postoperative day. Vocal paralysis was evaluated clinically from the patient's voice and indirect laryngoscopy was achieved in individuals with hoarseness and dyspnea. After total thyroidectomy started with 100 ug of thyroxine in the first postoperative period and the data were recorded in a designed manner.

Hyperparathyroidism was defined as persistent symptomatic hypocalcemia (S. Ca ++ level <8 mg%). Recurrent laryngeal nerve palsy was defined as hoarseness or loss of voice quality due to vocal cord paralysis in indirect laryngoscopy. All patients were followed-up at one-week intervals, followed by weekly intervals during the first month, patients with complications for 6 months, and monthly intervals up to six months postoperatively. Clinical and biochemical evaluation was performed. Data entered in SPSS version 18.0. Percentage and frequency for

categorical variables, standard and mean deviation for numerical variables were calculated. The difference between the two groups was analyzed. Chi-square test was performed for sex, hormonal status, histopathological examination and complication rates and t-test was accomplished for disease duration, stay in hospital, age and operation time. P value equal to or

less than 0.05 ($P \leq 0.05$) was taken significant statistically.

RESULTS:

60 total patients with bilateral MNG were divided into two groups as A and B (30 patients each). The mean age of the patients in group A and B was 29 ± 10.0 years and 42 ± 10.27 years in Table 1.

Table 1: Age distribution (N=60)

		Surgical Procedure	
		Group A	Group B
Age (Years)	Min	16	27
	Max	50	67
	Mean	29	42
	Standard Deviation	10.07	10.27

$P \text{ Value} = 0.123$

As shown in Table 2, there were 6 (20%) males and 24 (80%) patients. The corresponding figures in group B are 5 (20%), 25 (80%) and 1: 5, respectively.

Table 2: Gender Distribution (N=60)

		Surgical Procedure		
		Group A n (%)	Group B n (%)	Total
Gender	Male	6 (20%)	5 (16.6%)	11 (18.3%)
	Female	24 (80%)	25 (83.3%)	49 (81.6%)
Total		n=30	n=30	n=60

$P = 0.74$

The mean goiter duration was 10 ± 3.25 years in group A and 10 ± 2.9 years in group B. The indications for surgery were under the pressure of the compression and cosmetic symptoms shown in Table 3.

Table 3: Indications for surgery (N=60)

		Surgical Procedure		
		Group A n (%)	Group B n (%)	Total
Indication for Surgery	Com- pressive Symptom	15 (50%)	9 (30%)	24 (40%)
	Cosmetic	12 (40%)	17 (56.6%)	29 (48.3%)
	Toxic MNG	2 (6.6%)	1 (3.3%)	3 (5%)
	Fear and anxiety	1 (3.3%)	3 (9.9%)	4 (6.6%)
Total		n=30	n=30	n=60

$P = 0.509$

Group A, neck USG, FNAC and IDL were administered to 4 (13%), 6 (20%) and 4 (13%) patients, respectively. The corresponding values in group B were 2 (6%), 2 (6%) and 3 (10%), respectively. Results in both groups were bilateral MNG on USG, follicular colloid goitre on FNAC, and normal vocal cords on IDL in all patients. Preoperative serum Ca ++ levels showed that all

patients in both groups were normo-calcemic. The mean serum calcium level in group A was 9.12 ± 0.42 mg / dl. In contrast, the number in group B was 9.0 ± 0.44 mg / dl. Operation time was analyzed between two groups. The mean working time in group A was 138 ± 30 minutes, while the mean working time in group B was 112 ± 33 minutes, which was significant statistically ($P = 0.046$) in Table 4).

Table 4: Duration of operation (N=60)

		Surgical Procedure		
		Group A n (%)	Group B n (%)	Total
Operation time	60 Minutes – 90 Minutes	3 (3.3%)	16 (53.3%)	15 (25%)
	90 Minutes – 120 Minutes	5 (16.6%)	12 (40%)	21 (35%)
	120 Minutes – 150 Minutes	9 (30%)	2 (6.6%)	11 (18.8%)
	150 Minutes – 180 Minutes	13 (43.3%)	00	13 (21.6%)
Total		n=30	n=30	n=60
Mean ± SD (minutes)		138 ± 30	112 ± 33	
P=0.74				

Histopathologic examination of the thyroid specimen revealed incidental thyroid cancer in 2 patients in group A (1 papillary and 1 follicular). In group B, only one patient had incidental carcinoma of follicular diversity. Complications examined in the treatment groups Table no. 5.

Table 5: Post operative complications (N=60)

		Surgical Procedure			P Value
		Group A n (%)	Group B n (%)	Total	
Post Op Complication	Temporary RLN Palsy	3 (9.9%)	2 (6.6%)	5 (8.33%)	0.640
	Permanent RLN Palsy	0 (0%)	0 (0%)	0 (0%)	
	Temporary Hypoparathyroidism	6 (20%)	3 (9.9%)	9 (15%)	0.278
	Permanent Hypoparathyroidism	1 (3.3%)	0 (0%)	1 (1.66%)	0.313

Transient paralysis of NLR was statistically insignificant in three (9.9%) patients in group A and two (6.6%) patients in group B. (P = 0.64). None of the patients had permanent NLR paralysis. Six (20%) and three (1.9%) patients in groups A and B had early hypoparathyroidism, which was statistically insignificant (P = 0.278). Only one patient had persistent hypoparathyroidism in group A, which was statistically insignificant to any patient in group B (P = 0.313).

DISCUSSION:

MNG is an irreversible disease and needs surgical treatment. The indications for surgery are compression symptoms, malignancy, hyperthyroidism and aesthetic reasons. In our study, compressive and cosmetic symptoms were suppressed on surgical indications. The majority of patients with compression symptoms underwent STT, 9 (30%), 15 (50%), TT. Although the results were significant, larger goiter patients causing surgical compression and difficulty, although ultimately comparable, were treated with TT [10]. In Australia and New Zealand, 90% of benign bilateral MNGs are currently treated with TT as the main surgical procedure of choice. However, in Pakistan, due to the high predicted complication rates associated with TT, STT remains the standard surgical procedure for treating MNG, although most of our patients have

large and neglected goiters that are not practically normal thyroid tissue [11]. It is accepted that STT is not an optimal treatment in patients with MNG when the whole gland is infected, although it reduces most of the diseased tissue. In the surgical treatment of MNG, surgeons should aim to remove all nodular tissues without increasing morbidity, as the remaining nodular tissues are considered to be the main cause of recurrent disease. Recurrence rates of 45% not affected by thyroxine treatment have been reported. The recurrence was higher in the regions with iodine deficiency. In this study, the incidence of occult carcinoma was 3.3% (n = 1) in the STT group, 6.6% (n = 2) in the TT group, and the overall incidence was 4.95%. . Two of these three patients had follicular carcinoma and papillary carcinoma [12]. This finding is consistent with the observation that follicular carcinomas by Pezzullo L et al are more common in areas with iodine deficiency in MNG [13].

Possible benefits of TT include appropriate elimination of the disease, prevention of recurrence, and avoiding complete surgery in the presence of occult malignancy. In this study, the TT group showed persistent RLN paralysis and hypoparathyroidism in none (0%) and one (3.3%) patient; the difference was not statistically significant [14]. There was no complication in STT group. Koyuncu et al. In a study

comparing different thyroidectomy methods, no complication was detected in TT, contrary to our results. Transient paralysis of NLT was observed in three (10%) patients in the TT group and two (6.6%) patients in the STT. This is in accordance with the results given by others. Previous studies have reported that the incidence of transient hypoparathyroidism ranges from 1.6% to 22% after subtotal thyroidectomy and from 24% to 35% after total thyroidectomy. In this study, the rate of temporal hypoparathyroidism was 3 (10%) and 6 (20%) in subtotal and total thyroidectomy, respectively [15]. These results were within the ranges reported above, and although the difference between the two groups was apparently large, it was not statistically significant ($P = 0.278$). However, transient hypocalcemia or HPT after TT is seen as a consequence rather than a complication.

CONCLUSION:

This study demonstrates that TT can be performed without increasing the risk of complications and is an acceptable alternative for benign MNG, especially in endemic areas with very large multinodular goiter.

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