Original Article

Thyroidectomy

Comparison of Transient Hypocalcaemia Due to Parathyroid Injury in Subtotal versus Total Thyroidectomy

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ABSTRACT

Objective: The objective of this study was to compare the frequency of transient hypocalcaemia due to parathyroid injury in subtotal versus total thyroidectomy.
Study Design: Quasi Experimental Study.
Place and Duration of Study: This study was conducted in indoor Department of *General Surgery* Nishtar Hospital Multan from 01-03-2016 to 30-12-2016.
Materials and Methods: 60 patients of either gender and 25-60 year of age admitted for thyroidectomy were included in this study. All patients were divided into two groups. 30 patients were in total thyroidectomy group and 30 patients were in sub-total thyroidectomy group.
Thyroidectomies were performed by a standard procedure of capsular dissection; the total thyroidectomy method included the expulsion of entire gland from one tracheoesophageal section to other. In subtotal thyroidectomy method, complete lobectomy was performed on prevailing lobe and couple of grams of thyroid tissue was left along the posterior aspect of contralateral lobe. Every surgical specimen was subjected for histopathological examination to evaluate the presence of parathyroid gland in surgical specimen. Parathyroid injury and transient hypocalcaemia was noted in both groups.
Results: Age range in this study was from 25 to 60 years with mean age of 44.233±6.77 years in Total thyroidectomy group while 44.466±7.19 years in Sub-total thyroidectomy group. Majority of patients were females in both groups. Postoperative parathyroid injury was seen 36.7% in Total thyroidectomy group as compare to 10% in Sub-total thyroidectomy group (P=0.014). While transient hypocalcaemia was seen 23.3 % in Total thyroidectomy group as compare to 6.7% in Sub-total thyroidectomy group (P=0.070). Majority of transient hypocalcaemia was seen in patients with postoperative parathyroid injury in both groups.
Conclusion: We conclude that the sub total thyroidectomy has minimum chance of any injury to the parathyroid gland and it is better option for reducing the risk of transient hypocalcaemia.
Key Words: Thyroidectomy, Parathyroid injury, Hypocalcaemia

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INTRODUCTION

Hypocalcemia is one of the major complication after thyroidectomy which cause severe symptoms along with anxiety in patients by increasing hospital stay time.[1] Transient hypocalcaemia, observed after surgery, but it responds fairly to replacement supplement treatment in a few days.[2] Hypocalcemia is called permanent when calcium levels remain abnormal about 6 months.[2] The fundamental driver of hypocalcaemia is optional hypoparathyroidism after damage to, or devascularization of, at least one parathyroid gland amid surgery.[3]

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Mistakenly parathyroid evacuation is also responsible.[3] Factors for post-surgery hypocalcaemia after total thyroidectomy incorporate size of thyroid gland, substernal augmentation of the thyroid, kind of thyroid issue, degree of procedure, and if re-procedure is essential.[3] The conceivable reasons for hypocalcaemia are damage to the parathyroid gland, broad resection, neck surgery with total thyroidectomy, Graves' illness, tumor, and hemo dilution.[4]
In these parathyroid gland damage is the most widely recognized variable for creating hypocalcemia.[5] To minimize parathyroid damage, an endeavor to search for all the parathyroid glands and safeguarded their blood supply ought to be made in the procedure. Notwithstanding, it is hard to discover all parathyroid glands and to protect these recognized parathyroid glands because of the high likelihood of perpetrating damage to their blood supply during the search procedure and analyzation. Additionally, the degree of thyroidectomy and node surgery improves the probability of harming the blood supply of the parathyroid glands.[6,7] Parathyroid glands might be found inside the postoperative specimen, when it was

accidentally evacuated with the thyroid or lymph node during the procedure.[8] It is intriguing to know what number of parathyroid glands ought to be saved in situ keeping in mind to avert postoperative hypocalcaemia.
The aim of this study was to compare the frequency of transient hypocalcaemia due to parathyroid injury in subtotal versus total thyroidectomy.

MATERIALS AND METHODS

This quasi experimental study was conducted in indoor Department of *General Surgery* Nishtar Hospital Multan from 01-03-2016 to 30-12-2016. 60 patients of either gender and 25-60 year of age admitted for thyroidectomy were included in this study. Patients of anomalous serum albumin (not in range of 3.4-4.8 g/dl), abnormal calcium level(not in range of 8.0-10.4 mg/dl; not normal pre-procedure parathyroid hormone levels (not in range of 9.5-75 pg/ml) were excluded.
All patients were divided into two groups. 30 patients were in total thyroidectomy group and 30 patients were in sub-total thyroidectomy group.
Before procedure calcium level was measured to eliminate any other reason of abnormal calcium level. Thyroidectomies were performed by a standard procedure of capsular dissection; the total thyroidectomy method included the expulsion of entire gland from one tracheoesophageal section to other. In subtotal thyroidectomy method, complete lobectomy was performed on prevailing lobe and couple of grams of thyroid tissue was left along the posterior aspect of contralateral lobe. The measure of thyroid tissue was assessed as 1 cm3=1gram. Intermittent laryngeal nerves were routinely recognized on both sides and each endeavor was made to distinguish and save the parathyroid glands.
All wounds were shut with suction drains and in absence of any post op complication patients were sent home on the fifth post operation day. Every surgical specimen were subjected for histopathological examination to evaluate the presence of parathyroid gland in surgical specimen. Presence of any parathyroid gland in surgical specimen was labeled as parathyroid injury.
Transient hypocalcaemia was defined as if there was no history of hypocalcaemia before procedure but showed any one or more symptoms (1. Circumoral & digital numbness 2. Paraesthesis. 3. Carpopedal spasm. 4. Laryngeal spasm. 5. Fits.) after surgery for 1-5 days were defined as transient hypocalcaemia. It will be confirmed by serum calcium level < 8.5 mg/dl. Data regarding parathyroid injury and Transient hypocalcaemia was noted in both groups.
Data was statistically analyzed with IBM-SPSS-V-22. Frequency and percentage was calculated for qualitative variables like gender, parathyroid injury and hypocalcaemia. Chi-square test was applied to compare hypocalcaemia in both groups taken p ≤0.05 as significant. Effect modifier like parathyroid injury was controlled by stratification to see its effect on hypocalcaemia. Post stratification chi-square test was applied; p-value ≤ 0.05 was taken as significant.

RESULTS

Age range in this study was from 25 to 60 years with mean age of 44.233±6.77 years in Total thyroidectomy group while 44.466±7.19 years in Sub-total thyroidectomy group. Majority of patients were females in both groups as shown in Table-I.

Table No.I: Basic Demographics

Demographics	Total thyroidectomy group n=30	Sub-total thyroidectomy group n=30
Mean Age (years)	44.233±6.77	44.466±7.19
Gender	n(%)	n(%)
Male	7(23.3%)	9(30%)

Postoperative parathyroid injury was seen 36.7% in Total thyroidectomy group as compare to 10% in Sub-total thyroidectomy group (P=0.014) as shown in Table-2.

Table No.2: Comparison of Parathyroid Injury in both groups n=60

Parathyroid Injury	Total thyroidectomy group n=30	Sub-total thyroidectomy group n=30	p value
Yes	11(36.7%)	3(10%)	0.014
No	19(63.3%)	27(90%)	

While transient hypocalcaemia was seen 23.3 % in Total thyroidectomy group as compare to 6.7% in Sub-total thyroidectomy group (P=0.070) as shown in Table 3.

Table No.3: Comparison of transient hypocalcaemia in both groups n=60

Transient hypocalcaemia	Total thyroidectomy group n=30	Sub-total thyroidectomy group n=30	p value
Yes	7(23.3%)	2(6.7%)	0.070
No	23(76.7%)	28(93.3%)	

Table No.4: Stratification of transient hypocalcaemia with respect to parathyroid injury in both groups

With parathyroid injury

Group	Hypocalcaemia		P value
	Yes	No	
Total thyroidectomy	7(63.6%)	4(36.4%)	0.922
Sub-total thyroidectomy	2(66.7%)	1(33.3%)	

Without parathyroid injury

Group	Hypocalcaemia		P value
	Yes	No	
Total thyroidectomy	0(0%)	19(100%)	1.000
Sub-total thyroidectomy	0(0%)	27(100%)	

Majority of transient hypocalcaemia was seen in patients with postoperative parathyroid injury in both groups. 7(63.6%) out of 11 patients of parathyroid injury show transient hypocalcaemia in Total thyroidectomy group while 2(66.7%) out 3 patients of parathyroid injury show transient hypocalcaemia in Sub-total thyroidectomy group as shown in Table-4.

DISCUSSION

Transient hypocalcaemia was seen 23.3 % in total thyroidectomy group as compare to 6.7% in sub-total thyroidectomy group (P=0.070). Hypocalcaemia after total thyroidectomy is generally transitory. A low frequency of 3 to 8 % has been accounted for constant hypocalcaemia in studies.[9]

In a study out of 310 patients 17 patients (5.55%) had transient hypocalcaemia with total thyroidectomy.[10]

Subtotal thyroidectomy in which little pieces of thyroid tissue are left helps adjusting the more serious dangers of parathyroid failure with additional focal benefits that leftovers may have of some function of thyroid post-operatively.[11]

The magnificence of this strategy is by all accounts blurred when we envision repeat procedure. On the off chance that if recurrence happened because of left over thyroid tissue and likely challenges that must be confronted. But when we go through the studies there is no more prominent distinction in recurrence after total and subtotal thyroidectomy within the sight of thyroid substitution treatment for entire life of patients.12 there is critical decrease in the rate of complications of transient parathyroid failure that lessens the patient's troubles and indoor stay after procedure.

The incidence of transient hypocalcaemia after subtotal thyroidectomy is around 2 to 3 % and most extreme recorded is 8% as indicated by few studies.9 These figures are fundamentally not as much as that found after total thyroidectomy. We also showed comparable outcomes in our study; 6.7% recurrence of transient hypocalcaemia after total thyroidectomy and 23.3% after subtotal thyroidectomy.

In the present study, the main reason of postoperative hypocalcaemia was unsuccessful conservation of the parathyroid gland. Extensive dissection of central node has been recognized as a hazard figure for hypocalcaemia by Thompson et al.13 The analyzation may expand the danger of damage to the inferior parathyroid glands and its blood supply. The parathyroid glands and their blood supply can be isolated from the thyroid organ and the node inside the fat by careful dissection. There is some kind of a limit, via precisely analyzing the overlying belt, between the parathyroid gland and their blood supply inside the thymic tissue and the node inside the fat. Extreme care ought to be utilized when a central node procedure is to be directed.

There are many reasons why endeavors at saving the parathyroid gland may fall flat. Parathyroid gland may not be effectively saved in the event that they are found anterior to or within thyroid gland. Parathyroid glands that were evacuated deliberately and afterward embedded into muscle cannot survive. Direct injury to the parathyroid gland that cause organ staining tend to bring about the parathyroid gland not being preserved.[14]

CONCLUSION

Our study conclude that the sub total thyroidectomy helps to reduce any injury to the parathyroid gland is the better option for reducing the risk of hypocalcaemia.

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Kluijfhout WP, van-Beek DJ, Verrijn-Stuart AA. Postoperative complications after prophylactic thyroidectomy for very young patients with multiple endocrine neoplasia type 2: retrospective cohort analysis. Medicine 2015; 94(29):e1108.
2. Lorente-Poch L, Sancho JJ, Muñoz-Nova JL, Sánchez-Velázquez P, Sitges-Serra A. Defining the syndromes of parathyroid failure after total thyroidectomy. Gland Surg 2015; 4(1):82–90.
3. Steen S, Rabeler B, Fisher T, Arnold D. Predictive factors for early postoperative hypocalcemia after surgery for primary hyperparathyroidism. Proc Bayl Univ Med Cent 2009;22(2):124–7.
4. Song CM, Jung JH, Ji YB, Min HJ, Ahn YH, Tae K. Relationship between hypoparathyroidism and the number of parathyroid glands preserved during thyroidectomy. World J Surg Oncol 2014; 12:200.
5. Oran E, Yetkin G, Mihmanlı M. The risk of hypocalcemia in patients with parathyroid autotransplantation during thyroidectomy. Ulus Cerrahi Derg 2016; 32(1):6–10.

6. Shaha AR, Jaffe BM. Parathyroid preservation during thyroid surgery. Am J Otolaryngol 1998; 19:113-7.
7. Cheah WK, Arici C, Ituarte PH, Siperstein AE, Duh QY, Clark OH. Complications of neck dissection for thyroid cancer. World J Surg 2002; 26:1013-6.
8. Lee NJ, Blakey JD, Bhuta S, Calcaterra TC. Unintentional parathyroidectomy during thyroidectomy. Laryngoscope 1999; 109:1238-40.
9. Noureldine SI, Genther DJ, Lopez M, Agrawal N, Tufano RP. Early predictors of hypocalcemia after total thyroidectomy: an analysis of 304 patients using a short-stay monitoring protocol. JAMA Otolaryngol Head Neck Surg 2014; 140(11): 1006–13.
10. Chaudhary LA. Complications of thyroid surgery. Pak J Surg 2006;22:134-7.
11. Khairy GA, Al-Saif A. Incidental parathyroidectomy during thyroid resection: incidence, risk factors, and outcome. Ann Saudi Med 2011;31(3):274–78.
12. Yoldas T, Makay O, Icoz G. Should subtotal thyroidectomy be abandoned in multinodular goiter patients from endemic regions requiring surgery? Int Surg 2015;100(1):9–14.
13. Thompson NW, Olsen WR, Hoffman GL. The continuing development of the technique of thyroidectomy. Surgery 1973;73:913-27.
14. Kim YS. Impact of preserving the parathyroid glands on hypocalcemia after total thyroidectomy with neck dissection. J Korean Surg Soc 2012; 83(2):75–82.