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Pararthyroid Preservation during Total Thyroidectomy and its Outcome

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Abstract- *Objectives:* To know the incidence of hypocalcaemic tetany at post surgical state of total thyroidectomy.

Methods: It was a cross sectional observational study among 50 patients who underwent total thyroidectomy in the Dept. of Otolaryngology and Head Neck Surgery, Sir Salimullah Medical College and Mitford Hospital & Dhaka Medical College Hospital during the period from January 2014 to December 2014.

Results: In this study out of 50 patients 14 (28%) were male and 36 (72%) were female. Male to female ratio is 1:2.57. Maximum patients (34%) were in 4th decade. Among them 29 (58%) for multinodular goiter, 19(38%) patients for papillary thyroid carcinoma, 1 (2%) patients for medullary thyroid carcinoma and 1 (2%) and for Graves disease. 12 (24%) patients were presented along with cervical lymphadenopathy.

Keywords: *arathyroid glands, total thyroidectomy, hypocalcaemic tetany.*

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Paraarthyroid Preservation during Total Thyroidectomy and its Outcome

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Results: In this study out of 50 patients 14 (28%) were male and 36 (72%) were female. Male to female ratio is 1:2.57. Maximum patients (34%) were in 4th decade. Among them 29 (58%) for multinodular goiter, 19(38%) patients for papillary thyroid carcinoma, 1 (2%) patients for medullary thyroid carcinoma and 1 (2%) and for Graves disease. 12 (24%) patients were presented along with cervical lymphadenopathy. Lymph nodes involvements were most common in level III (90.9%) and level IV (72.72%). Clinically no palpable lymph nodes were found in level I. Most of the hypocalcaemia developed in patients underwent thyroidectomy with neck dissection (58.33%); it was followed by completion thyroidectomy 40% and total thyroidectomy 18.18%. Maximum patients 10 (66.73%) developed hypocalcemic tetany in second postoperative day (n= 15), 3(20%) cases developed hypocalcaemia in 3rd post operative day. Temporary hypocalcaemia occurred in 24% cases and permanent hypocalcaemia occurred in 6% cases.

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I. Introduction

In the past century, a lethal outcome occurred in more than 40% of patients undergoing thyroidectomy and morbidity levels were also consequently very high. Through the contribution of several pioneers in thyroid surgery such as Billroth, Halsted and Kocher, thyroid surgery has become a relatively safe operative procedure.[1] Nonetheless, there are still many complications related to thyroid surgery. Among them hypoparathyroidism is perhaps the most distressing. Parathyroid preservation during thyroidectomy is not only desirable, but essential for the effective management of surgical diseases of the thyroid gland.[1] Most individuals possess at least two pairs of parathyroid glands. To the unaided eye, the glands are a yellow brown orange colour. At operation brown fat, yellow fat, sequestrated thyroid tissue, thymus, lymph node and autonomic ganglia may all mimic these appearances.[2] Each weighs about 50 mg .[3] The lowest post-operative serum-calcium level that can be regarded as normal has not been agreed. Wade(1960) thought that any patient with a serum-calcium level between 8 and 9 mg/100 ml was in need of treatment, and those with a level below 7.5 mg/100 ml were in need of urgent treatment.[4] Biochemical monitoring of serum calcium and PTH levels can assist in initiating early management for postoperative hypocalcemia and reducing hypocalcemic symptoms during the early weeks after surgery.[5] The reasons for postoperative hypoparathyroidism are devascularizations of parathyroid glands during surgery owing to the close proximity to the thyroid capsule, the accidental removal of one or more parathyroid gland (s), destruction of the parathyroid glands as a result of lymphadenectomy or hypoparathyroidism due to hematoma formation.[6]

Permanent and transient hypoparathyroidism can be reduced by identification of the parathyroid glands, dissection close to the thyroid gland, preservation of the blood supply to the parathyroid glands and avoiding manipulation of parathyroid glands.[7] Ligation of the inferior thyroid artery preferably should be performed close to the thyroid capsule to minimize the risk of postoperative hypoparathyroidism .[8] Vascular injury probably far more important than inadvertent removal. The incidence of permanent hypoparathyroidism should be less then1% and most cases present dramatically 1 – 5 days after operation; however very rarely onset is delayed 2 – 3 weeks or a patient with marked hypocalcaemia remain asymptomatic.[9] The incidence of temporary hypoparathyroidism is approximately 10 – 20 percent and is often an inevitable consequence of total thyroidectomy and this may be reduced by sound anatomical knowledge, surgical technique and experience.[10] Removal of a single parathyroid gland is not associated with postoperative hypocalcemia, resection of at least 2 parathyroid glands increases the risk of transient and permanent hypoparathyroidism.[11] Careful examinations of the surgical specimen intraoperatively decreases the incidence of inadvertent parathyroidectomy during thyroidectomy, ligation of the superior thyroid artery after identifying and saving its

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anastomotic vessel to inferior thyroid artery and ligation of the inferior thyroid artery close to the gland if at all possible.[12]

II. Results

Table –I : Age and sex distribution of the sample (n=50)

Age	Sex		
	male	female	Total
10-20yrs	0	3	3
21-30yrs	4	9	13
31-40yrs	5	12	17
41- 50 yrrs	2	5	7
>50yrs	3	7	10
Total	14	36	50

Table -II : Case diagnosis of sample underwent total thyroidectomy (n=50)

Diagnosis	Number of patients	Percentage(%)
Multinodular goiter	29	58
Papillary thyroid carcinoma	19	38
Medullary thyroid carcinoma	1	2
Graves disease	1	2
Total	50	100

Table-III : Clinical presentation of study population (n = 50)

	Frequency	Percentage
Only thyroid swelling	38	76.0
Thyroid swelling with nodal metastasis	12	24.0
Total	50	100.0

Table-IV : Level of lymph node involvement (n=12)

Levels	Rt. Side	Lt. side	Total(%)
II	4	2	6 (54.54)
III	8	2	10 (90.90)
IV	7	1	8 (72.72)
V	4	0	4 (36.36)
VI	3	1	4 (36.36)

Table- V : Frequency of hypocalcaemia on the basis of extent of surgery (n = 50).

Surgery	No. of patients	No. of Hypocalcemia	Percentage (%)
Total thyroidectomy	33	6	18.18
Completion thyroidectomy	5	2	40
Thyroidectomy and neck dissection	12	7	58.33

Table-VI : Incidence of hypocalcaemia in parathyroid identified and not identified during thyroid surgery (n = 50).

Group	Hypocacaemia	No Hypocacaemia	Total Patient	Percentage of Hypocalcaemia
Group A (Parathyroid Identified)	10	32	42	23.8%
Group B (Parathyroid not Identified)	5	3	8	62.5%
Total	15	35	50	

Table- VII : Time interval for development of hypocalcaemia after thyroid surgery.

Time interval	No. of patients	Percentage (%)
1st POD	1	6.66%
2nd POD	10	66.73%
3rd POD	3	20%
4th POD	1	6.66%

Table- VIII : Type of hypocalcaemia after thyroid surgery (n = 15).

Type	No. of patients	Percentage (%)
Temporary hypocalcaemia	12	24
Permanent hypocalcaemia	3	6
Total	15	30

III. Discussion

In this series 50 patients were included in the study those who had undergone total or completion thyroidectomy with or without neck dissection. Among them 14 (28%) were male and 36 (72%) were female. Male to female ratio is 1:2.57 (Table-I). Similar sex distribution has been found in another study where male 22% and female 78% and male to female ratio was 1:3.57. [13]

In our study out of 50 patients 29 (58%) were multinodular goiter, 19 (38%) patients were papillary thyroid carcinoma, 1 (2%) patients were medullary thyroid carcinoma and 1 (2%) and were Graves disease(Table - II). In a study shows that indication of thyroidectomy in thyroid cancer 52% case and Benign multinodular goiter 48%.[7]

Regarding clinical presentation of the study population thyroid swelling was present in all cases (100%). Out of them 12 (24%) patients were presented along with cervical lymphadenopathy (Table-III). Lymph nodes involvement was most common in level III (90.9%) and level IV (72.72%). Clinically no palpable lymph nodes were found in level I. Unilateral lymphadenopathy was 9(75%), whereas bilateral involvement was 3 (25%) (Table- IV). Result correspond with the other study which showed in level III 82% and in level IV 75%.[15]

In our study most hypocalcaemia developed in patients underwent thyroidectomy with neck dissection (58.33%); it was followed by completion thyroidectomy 40% and total thyroidectomy 18.18% (Table- V).

The difference between thyroidectomy with neck dissection and thyroidectomy alone in the development of hypocalcaemia was statistically significant. χ^2=6.03, P< 0.05 i.e. in case of more extensive disease, the chance of developing hypocalcaemia is significantly more. In one study shows that hypoparathyroidism occurs more frequently in patients with large extension and invasive thyroid cancer and when total thyroidectomy is associated with central and lateral neck dissection.[14]

In this study (Table- VI) it is found that occurrence of hypocalcemic tetany is more in the group where parathyroid was not identified peroperatively.

The difference in the development of hypocalcaemic tetany between identification and not identification of parathyroid gland was statistically significant (χ^2= 4.79, p < 0.05).

So it can be concluded that there is a significant association between development of hypocalcaemia and not identification of parathyroid peroperatively which coincides with other study.[16]

In our study it is found that maximum patients 10 (66.73%) were developed hypocalcemic tetany in second postoperative day (n= 15), 3(20%) cases developed hypocalcaemia in 3rd post operative day (Table-VII). One study shows that symptoms of hypocalcaemia usually appear 24-48 hours after surgery. [13] This finding is similar to that of the current study.

A study conducted at King Abdul Aziz University. Jeddah, Saudi Arabia in 2005 revealed transient hypocalcaemia occurred 6.9% to 42% and permanent hypocalcaemia 4% to 29% .[18]

One study shows that post operative hypocalcaemia is the most common complication with incidence ranging from 1.6 to 50% .[13]

The result in this series showed that temporary hypocalcaemia occurred in 24% cases and permanent hypocalcaemia occurred in 6% cases (Table- VIII), which is within the range of other study.

IV. Conclusion

In this study we suggest that inferior thyroid artery should be ligated close to the thyroid capsule and at least two parathyroid gland should be identified and preserved .In the context of our country, now a days most of our thyroid surgeons are expert enough to identify and preserve recurrent laryngeal nerve and external branch of superior laryngeal nerve but identification and preservation of parathyroid gland during thyroid surgery is not well practiced. Even if all the parathyroid glands cannot be completely accounted for, the surgeon should make an attempt at identifying and preserving parathyroid glands without damaging their blood supply. Proper knowledge and expertness regarding parathyroid preservation can alleviate sufferings of the patient due to iatrogenic morbidity.. Now a days it is more concern all over the world.

Magnification during surgery is helpful in preservation of parathyroid gland.

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