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KEYWORDS:

PREDICTORS OF TRANSIENT HYPOCALCEMIA IN POST THYROIDECTOMY PATIENTS

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ABSTRACT

Background-

Parathyroid dysfunction leading to symptomatic hypocalcemia is not uncommon following a total or subtotal thyroidectomy and is often associated patient morbidity and a prolonged hospital stay. This study aims to

1. To evaluate preponderance of transient hypocalcemia in post thyroidectomy patients and to see its relation with other variables
2. To evaluate a predictor for the transient hypocalcemia in patients who haveundergone thyroidectomy

Materials And Methods-

This study was a prospective study which included all patients who underwent thyroidectomy with transient hypocalcemia, satisfying inclusion and exclusion criteria in Father Muller Medical College between November 2018 and October 2020.

Results-

30 patients were included in this study(26 females and 4 males) all of whom developed transient hypocalcemia post thyroidectomy. The age group of the patients ranged from cases 23 years to 63 years with the highest number of cases being between the age group of 41-50 years(36.6%). 27 cases presented with multinodular goitre(90%) and 3 cases with solitary thyroid nodule(10%).

22(73.7%) of patients had normal thyroid function tests pre-operatively,3 (10%) had hyperthyroidism and 5(16.67%) had hypothyroidism. Pre operative calcium levels were normal in 22 patients (73.3%) with only 8 patients having hypocalcemia(26.7%). 100 percent of patients had normal parathyroid levels pre operatively. 13 cases (43.33 %) had bilobed disease and 17 had unilateral lobe involvement (56.67%) and 3,3 % had evidence of retrosternal extension .The mean size of the gland was 15,76 (SQ CM), the smallest gland excised was 7.5 (SQ CM)and the largest was 24 (SQ CM) with mean duration of surgery being 186minutes. Post operatively 8 patients had hypocalcemia in 24 hours and 24 patients (80%0 developed the same in 48 hours. The lowest measured value of serumcalcium levels being 7.7 mg/ dl.

24 hours post surgery, 9 patients had noral parathyroid levels(30.00%) and 22 had hypoparathyroidism(70.00%) at 48 hours.

The mean duration of hospital stay post operatively was 3.97 days, the longest being 6 days and the shortest being 2 days.

The study showed a higher incidence of hypocalcemia in those who had a larger thyroid or features of thyroiditis or malignancy intraoperatively (P value less than 0.001). We also noted that patients with abnormal thyroid levels preoperatively (hyper or hypothroisism) had a higher chance of developing hypocalcemia (r=0.45 p=0.034)post operatively.

Conclusion:

Hypocalcaemia is the most common problem in the post-operative period following the total thyroidectomy causing potentially severe symptoms and anxiety in affected patients and increasing hospitalization time. Transient hypocalcaemia ,often observed after the operation, generally responds favourably to replacement therapy within a few days or weeks. An anticipation and screening of patients pre operatively helps determine the risk factors for the development of hypocalcemia and helps us treat the patients earlier to decrease hospital stay.

INTRODUCTION

Most common surgical diseases for which the patient seeks surgery is multinodular goitre [1]. Over the period of time the number of patients seeks surgery for thyroid for cosmetic purposes has increased as compared to the past.

The ultimate goal in the management of a thyroid swelling is to identify the small group of patients who could be malignant and treat them early with aggressive treatment in the form of surgery so that it can help to avoid unnecessary complications; and in those who have benign disease the surgery done early is to prevent the further the stress caused by goitre to the patient so as to help the patient to lead a quality life [2].

Thyroid swellings have been one of the common presentations to surgeon since time immemorial. A victim of any thyroid swelling will ultimately require surgery; this is because once goiter sets in it is a reversible and it's a progrssive disease.

The other idea between surgery is to identify the small group of patients who could be malignant and if recognised early can lead a normal life .As compared to other diseases ; the malignancy of thyroid is more common in younger age group and hence for all swellings that are related to the thyroid surgery is advised. The treatment modalities in terms of thyroid surgery.

The most common surgery being done for MNG is near total thyroidectomy as it is related to have a lesser rate of complication in terms of RLN injury and parathyroid ischemia leading to hypocalcemia [3].PTH dysfunction causing hypocalcaemia is common surgical morbidity related to thyroidectomy .[4, 5] Postoperative hypocalcaemia following total thyroidectomy, requires adequate perioperative monitoring of calcium and is the cause behind the increased hospitalization especially in the pot operative ward [6].

Hypocalcemia, is a transient condition in around 27% and permanent in 1%. Clinical examination often is not conclusive [7,8,9]. Hence, this helped to see the diagnostic accuracy of parathyroid

,calcium estimation and correlating with those who have transient hypocalcaemia.

Aims and objectives

1. To evaluate preponderance of transient hypocalcemia in post thyroidectomy patients and to see its relation with other variables
2. To evaluate a predictor for the transient hypocalcemia in patients undergone thyroidectomy

MATERIALS AND METHODS

This study was a prospective study where all patients with transient hypocalcemia satisfying inclusion and exclusion criteria who have been admitted or treated at Father Muller Medical College were included. After purposive sampling method 30 were selected in a time frame of 18monthd from November 2018 to October 2020. Serum parathormone at POD 1 and calcium post operative day 2 findings were recorded.

RESULTS

Demographic data:

Age

AGE	FREQUENCY	PERCENT
20-30 years	6 cases	20.00%
31-40 years	5 cases	16.67%
41-50 years	11 cases	36.67%
51-60 years	6 cases	20.00%
>60 years	2 cases	6.67%
Total	30 cases	100.00%

The most common age was between 41-50 years ,11 cases (36.67%) .the age group of cases ranged between 23 years and 63 years with mean being ±SD years chi square p = 0.02 S

Gender

GENDER	NUMBER OF PATIENTS	%
FEMALE	26	86.7
MALE	4	13.3
TOTAL	30	100.0

The most common gender was Female 26(86.7 %) and male 4(13.3), chi square p = 0.001 HS

Clinical Type Of Goitre

CLINICAL TYPE OF GOITRE	NUMBER OF PATIENTS	%
SOLITARY THYROID	3	10.0
MNG	27	90.0
TOTAL	30	100.0

Table 5: Clinical Type Of Goitre

Clinically the goitre was Solitary Thyroid in 3 cases 10.0 % and it was MNG in 27 cases 90.0 %.

Preoperative Thyroid Function Test Findings

TYPE OF THYROID DYSFUNCTION	NUMBER OF PATIENTS	%
NONE	22	73.3
HYPERTHYROIDISM	3	10.0
HYPOTHYROIDISM	5	16.67
TOTAL	30	100.0

Table 8 : Preoperative Thyroid Function Test Findings

Pre-operatively at the time if initial presentation , 26.67% had evidence of thyroid dysfunction of which 3 cases (10 percent) had hyperthyroidism and 5 cases 16.67 % had hypothyroidism .

Preoperative Thyroid Usg Findings

PREOPERATIVE THYROID USG FINDINGS	NUMBER OF PATIENTS	%
UNILATERAL LOBE INVOLVEMENT	17	56.67
BILOBED DISEASE	13	43.33
TOTAL	30	100.0

In our study 13 cases 43.33 % bilobed disease and unilateral lobe involvement was seen in 17 cases 56.67% .

Operative Findings-thyroid Gland

OPERATIVE FINDINGS	NUMBER OF PATIENTS	%
FEATURES SUSPICIOUS OF THYROIDITIS	22	73.33
FEATURES SUSPICIOUS CARCINOMA	3	10.0
UNILATERAL LOBE INVOLVEMENT	5	16.67
TOTAL	30	100.0

Operative findings had features suspicious of thyroiditis in 22 cases 73.33 %, features suspicious carcinoma 3 cases 10.0 unilateral lobe involvement in 5 cases 16.67 .

Operative Findings-thyroid Gland Size Findings

SIZEV(SQ CM)	NUMBER OF PATIENTS	%
1-10 (SQ CM)	10	27.1
11-20 (SQ CM)	20	54.1
>20 (SQ CM)	7	18.9
TOTAL	37	100.0

Table 15: Operative Findings-thyroid Gland Size Findings

The mean size of the gland was 15.76 (SQ CM), the smallest gland excised was 7.5 (SQ CM)and the largest was 24 (SQ CM) .

Findings Of Post Operative Serum Parathyroid Levels

PARATHYROIDISM	NUMBER OF PATIENTS	%
YES	5	83.33%
NO	25	16.67%
TOTAL	30	100.0

In our study 26 cases 86.67% had low levels of post operative serum parathyroid levels

Duration Of Surgery

DURATION OF SURGERY	NUMBER OF PATIENTS	%
<2 HOURS	4	13.3
>2 HOURS	26	86.67
TOTAL	30	100.0

Table 18: Duration Of Surgery

The mean duration of surgery was 186 minutes (2.5 hrs) the least duration was 45 minutes and the longest was 215 minutes (more than 5 hrs) .

Duration Of Post Operative Hospital Stay

HOSPITAL STAY	NUMBER OF PATIENTS	%
UPTO 2 DAYS	1	6.67
3-4 DAYS	26	50.0
5-7 DAYS	3	43.3
TOTAL	30	100.0

The mean duration of hospital stay post operatively was 3.97 days SD 1.68 days , the least duration of hospital stay post operatively was 2 days and the longest was of hospital stay post operatively was 6 days .

Pre Operaive Calcium Levels

Calcium pre operative					
Valid		Frequency	Percent	Valid Percent	Cumulative Percent
	Hypocalcaemia (8.4)	8	26.7	26.7	26.7
	Normal	22	73.3	73.3	100.0
	Total	30	100.0	100.0	
Descriptive Statistics					
Calcium (Pre Operative)	N	Minimum	Maximum	Mean	Std. Deviation
	29	8.40	9.88	8.97	.55215

The least pre-operative calcium levels were 8.5, all had normal calcium levels in 8 cases 26.7% .

Post Operative Calcium At 24 Hours

POST OPERATIVE CALCIUM AT 24 HOURS	NUMBER OF PATIENTS			%	
Hypocalcaemia (8.5 OR LESS) Normal	8			26.67%	
	22			73.33%	
Total	30			100.00%	
STATISTICS	Total cases	lowest calcium	highest calcium	mean calcium	SD
POST OPERATIVE	30	8	9.88	8.87	0.55215

Table 26 : Post Operative Calcium At 24 Hours

Graph 26 : Post Operative Calcium At 24 Hours

The least post-operative calcium levels at 24 hours were 8, all had normal calcium levels in 8 cases 26.7%

Post Operative Calcium At 48 Hours

POST OPERATIVE CALCIUM AT 48 HOURS				NUMBE R OF PATIENT S	%
Normal				6	20.00 %
Hypocalcaemia (8.5 OR LESS)				24	80.00 %
STATISTICS	Total cases	lowest calcium	highest calcium	mean calcium	SD
POST OPERATIVE CALCIUM AT 48 HOURS	30	7.89	9.34	7.0124	2.6980 9

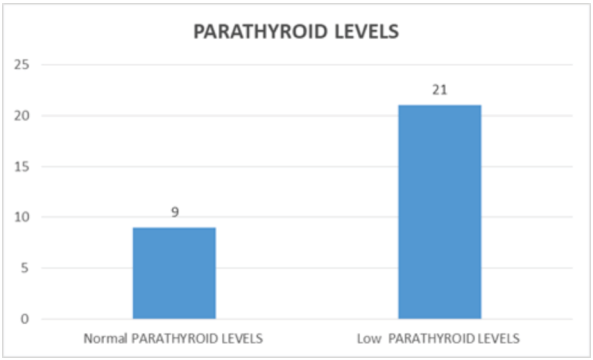
Table 27: Post Operative Calcium At 48 Hours

The least post-operative calcium levels at 48 hours was 7.7 mg/ dl , low calcium levels in 24 cases 80 % .

Post Operative Parathyroid Levels At 24 Hours

PARATHYROID LEVELS	NUMBER OF PATIENTS			%	
Normal PARATHYROID LEVELS	9			30.00%	
Low PARATHYROID	21			70.00%	
Total	30			100.00%	
	Total cases	lowest parathyroid levels	highest parathyroid levels	mean parathyroid levels	SD
PTH (Post Operative - 24 hours)	29	9.00	46.50	28.6310	10.12 278

Table 28 : Post Operative Parathyroid Levels At 24 Hours



Graph 28 : Post Operative Parathyroid Levels At 24 Hours

The post operative parathyroid levels at 24 hours all had normal calcium levels in 9 cases 30.00 %.

DISCUSSION

Demographics

The most common gender included in the study was Female 26(86.7 %) compared to male 4(13.3), chi square p = 0.001 HS. Similar studies done showed a female prepondernace which inclued studies conducted by

Paolo Del Rio (79)	1669	439
Randall L. Baldassarre	96,012 (81.1)	22,363 (18.9)
Raja et al	23	7 men
Our study	Female 26 (86.7 %)	male 4(13.3),

Age Distribution

The most common age was between 41-50 years ,11 cases (36.67%). the age group of cases ranged between 23 years and 63 years with mean being 45 .56 years +SD 12 years chi square p = 0.02 S .Randall L. Baldassarre et al [82] noted that hypocalcemic group mean age was 48.0 Raja et al [7] the mean being 41 years range 19 to 64 years, with an average age of 41. 309 (14.7%) less than 40 years, they had 20.8% most common more than 60 years of age 38.5%.In our study , Pre-operatively 26.67% had evidence of thyroid dysfunction of which 3 cases (10 percent)had hyperthyroidism and 5 cases 16.67 % had hypothyroidism.

Raja et al [7] had corrected the thyroid levels prior to surgery , they noted that 67% of patients euthyroid, 29% hyperthyroid, and 4% hypothyroid. Paolo Del Rio [79] had hyperthyroidism in 18.1%

In our study we included all cases of hypocalcemia . all of them recovered hance we did not have permanent hypocalcemia.

Raja et al [7] 30% of patients developed hypocalcemia postoperatively; in 24% of them it was transient and in 6% was permanent.

Association Of Hypocalcemia With Thyroiditis

Raja et al [7] noted all the patients with cancer had post thyroidectomy hypocalcemia while (60%) of patients with thyroiditis had hypocalcemia. In our study In our study both thyroiditis had a severe degree of hypocalcaemia .

Association Of Hypocalcemia With Thyroidectomy

In study the 3 patients who developed hypocalcaemia following total thyroidectomy were of normal or under normal muscular built, with only one patient out of the 4 who had hypocalcemia following near total was obese and of a short neck.

We also noted that it those patients who had abnormal thyroid levels preoperatively had a higher chance of developing hypocalcemia (r=0.45 p=0.034). Those who underwent surgery for benign disease had a lesser incidence of hypocalcaemia as those who had surgery for a malignant disease (r=0.58 p=0.002). .

In those patients who had pre-operative lower calcium levels that had a higher incidence of hypocalcemia postoperative

Decrease In Calcium An Day 2

Taking in consideration preoperative and postoperative serum calcium levels we found that there was a mean perioperative calcemia decrease of 1.203 (± 0.41) mg/ dl. In the study by Raja et al [7] . We noted a decrease of 1.85 mg / dl. At day 2 post op.

CONCLUSION

Hypocalcaemia is the most common problem in the post-operative period following the total thyroidectomy causing potentially severe symptoms and anxiety in affected patients and increasing hospitalization time.this is more commonly seen in females in the age group of 41-50. Transient hypocalcaemia ,often observed after the operation, generally responds favourably to replacement therapy within a few days or weeks. An anticipation and screening of patients pre operatively helps determine the risk factors for the development of hypocalcemia and helps us treat the patients earlier to decrease hospital stay.