

FREQUENCY OF HYPOCALCAEMIA AFTER SUBTOTAL THYROIDECTOMY.

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ABSTRACT:

OBJECTIVE: This study design to find out and evaluate the frequency of hypocalcaemia postoperative sub-total thyroidectomy either temporary or permanent, the proper management of post-operative hypocalcaemia. **PLACE AND DURATION OF STUDY:** This is a cross sectional study was conducted in the department of surgery Liaquat university hospital Jamshoro. The period of study was three years from January 2016 to December 2018. Liaquat university hospital is tertiary care hospital in the region of Hyderabad and Jamshoro. **PATIENTS AND METHOD:** Total 160 patients were admitted through outpatient department. Male 30 patients (18.75%) female 130 patients (81.25%) with the ratio of male to female (1:4.5) with mean age of male 32.9 years, with mean age of female 34.08 years. 160 patients with non-toxic multinodular goiter underwent sub-total thyroidectomy. Other thyroid swellings like toxic goiter, carcinomas excluded from study. **RESULTS:** Total 160 patients were admitted through outpatient department. Male 30 patients (18.75%) female 130 patients (81.25%) with the ratio of male to female (1:4.5) with mean age of male 32.9 years, with mean age of female 34.08 years. 160 patients with non-toxic multinodular goiter underwent sub-total thyroidectomy. From 160 patients who underwent sub-total thyroidectomy eleven patients (6.875%) developed Hypocalcemia. All eleven patients who developed hypocalcemia, all were female, no male patient developed hypocalcemia because goiter is most common in female in our study group number female patients were more as compare to male. Patients developed hypocalcemia during hospital stay post-operatively immediately. They were managed accordingly to give intravenous injection of calcium gluconate. Monitoring of serum calcium level with the follow up of one week, two week and three months on OPD basis, patient were advised serum calcium when they come to OPD. All the patients followed up for 3 months and no one developed Hypocalcemia during three months. **CONCLUSION:** Hypocalcaemia develops in eleven patients (6.875%), after subtotal thyroidectomy most of the patients on the first the post-operative day. Hypocalcemia can follow subtotal thyroidectomy it can be reduced with preservation of parathyroid glands. In our study no parathyroid gland was identified and tries to preserve blood supply of parathyroid gland, because all patients were operated by senior faculty surgeon associate professor level.

KEY WORDS: Sub-Total thyroidectomy, Multinodular Goiter, Hypocalcaemia

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INTRODUCTION

Thyroid surgery (either sub-total or near total thyroidectomy) can cause the serious complications, to the patient it consists of transient or permanent hypocalcemia, lead to serious bleeding during surgery. However, hypocalcemia is the most common and serious complication after thyroid surgery.^{1, 2} Transient or permanent hypocalcemia commonly complicates post-operative care of patients who have underwent thyroid surgery. After thyroidectomy hypocalcemia developed due to trauma to parathyroid gland, devascularization which cause the state of transient or permanent hypoparathyroidism. Even the proper knowledge of anatomy of thyroid gland and embryological development of parathyroid glands and their location is the most important element to reduce the incidence of post thyroidectomy

hypocalcemia.³ The rate of hypocalcemia can decrease parathyroid preserving technique have developed, the rates of transient hypocalcemia still range between 6.9 and 49.0% of patient undergone surgery of thyroid.^{4, 5, 6} Surgeon can evaluate on knowledge the occurrence of post thyroidectomy hypocalcemia is very significant for treat post-operatively. Early identifying of any risk of hypocalcemia occurrence can decrease patient stay in the hospital and reduce the cost of investigation and medicines. When symptoms of hypocalcemia can develop, treatment started prophylactically with calcium supplements can avoid the development of symptoms of hypocalcemia and early discharge of patient from hospital. In many studies try to identify the risk factors can cause hypocalcemia immediately after thyroid surgery.³ Post-surgery level of serum calcium within 24 hours, can be

vary with perioperative calcium levels. The difference between preoperative and post-operative level of calcium, the presence of thyroiditis according to histopathological report. Decrease in serum calcium after surgery routinely developed and noticed on 2nd to 5th postoperative day after a total or subtotal thyroidectomy, require urgent replacement of calcium to decrease the clinical symptoms.⁷ After thyroid surgery hypocalcemia is a main issue. It can extend the hospital stay and need for laboratory investigations, when it more severe; it can cause more serious complications and patient need urgent intravenous treatment to decrease the sign and symptoms of hypocalcemia.⁸ Early diagnosis and immediate start of treatment after thyroidectomy hypocalcemia are lifesaving for better outcome in the early post-operative following thyroidectomy. There are many factors causing the hypocalcemia are still under study to develop effective management in the post-operative period after thyroid surgery to treat the patient after thyroidectomy hypocalcemia successfully.⁹ Thyroid disorder and its surgical treatment are more frequent to any surgeon's routine practice of surgery. Post-operative complications after thyroid surgery are reported in literature more in the hands of new surgeons. Hypocalcemia can develop after bilateral surgery of thyroid is a more lead to early complication.⁶ it can develop in between from 9.2% to 25% of transient Hypocalcemia are written in literature and the development of permanent Hypocalcemia ranges from 0.5% to 2%.¹⁰ After sub-total thyroidectomy Hypocalcemia is one of the major complications, it is also known as a major cause of morbidity in patients under went thyroid surgery. The suggested causes of post-surgery hyperparathyroidism after sub-total thyroidectomy is ischemia, incidentally removal or trauma to parathyroid glands during surgery because of their small size and unusual position near to thyroid gland.^{11, 12} Parathyroid autotransplantation for accidentally removed or blood supply of parathyroid glands dissected during thyroidectomy, sub-total thyroidectomy reported occurrence of permanent or temporarily hyperparathyroidism is less than 6% (0.4% to 4%).^{13, 14} In some studies, written incidence of permanent hyperparathyroidism has been reported to be 0% after routine parathyroid auto-transplantation after thyroid surgery. Seen after

thyroidectomy due to thyroid cancer is widely accepted. However; there are only very rarely reported auto-transplantation of parathyroid gland, post total thyroid surgery for benign thyroid disease.¹⁴ The cause of postoperative hypocalcaemia and tetany are difficult to diagnose and not yet clear, this condition can be developed after surgery due to damage of parathyroid gland, and osteo-dystrophy can be present in patients before thyroid surgery, due to this a rapid uptake of calcium from skeletal and developed a hungry bone syndrome. It can develop on first postoperative day.

PATIETS AND METHODS

This study was conducted in the department of general surgery at the Liaquat university hospital Jamshoro. The period of study was three years from January 2016 to December 2018. Liaquat university hospital is tertiary care hospital in the region of Hyderabad and Jamshoro.

Data collection and data analysis

Data was collected predesigned proforma all the relevant investigation was performed like Blood complete picture, Serum calcium, s. urea S. creatinine, hepatitis B and Hepatitis C. Data was analyzed use SPSS version 19. This study was approved by ethical review committee of Liaquat University of medical and health sciences jamshoro.

RESULTS

Total 160 patients were admitted through outpatient department. From total were Male 30 patients with (18.75%) female were 130 patients (81.25%) with the ratio of male to female (1:4.5) with mean age of male 32.9 to years, with mean age of female 34.08 years. 160 patients with non-toxic multinodular goiter underwent sub-total thyroidectomy. From 160 patients who underwent sub-total thyroidectomy eleven (11) patients (06.875%) developed hypocalcaemia. In all eleven patients who developed hypocalcaemia, all were female, no male patient developed hypocalcaemia. Patients developed hypocalcaemia during hospital stay post-operatively immediately. They were managed accordingly. The infusion of calcium gluconate started immediately and monitors serum calcium level and serum parathyroid level. With the follow up of one week, two week and three months on OPD basis, patient were advised serum calcium when they come to OPD. All the patients followed up for 3 months and no one developed hypocalcaemia during three months.

Table: No: 1 Clinical presentation and data of Patient's.						
No. of Patients	Male	%	Female	%	Patients: developed hypocalcaemia	%
160	30	18.75	130	81.25	11	06.875

Table: No: 2, Symptoms and signs of hypocalcaemia after subtotal thyroidectomy		
Symptoms	No. of Patient:	%
Numbness	03	75
Tingling	03	75
Paresthesia	02	50
Signs		
Chvostek's sign	02	50
Trousseau's sign	01	25
	11	100

Table: No: 3, Post-operative Serum Calcium		
DAY		SERUM CALCIUM MEq/L

	No of patients	03	03	04	01
1 ST postoperative		06	5.4	4.5	3.5
After 8hours		08	8.5	8.1	8.3
One week		09	8.7	8.8	8.5
15 days		9.1	9.5	8.9	8.8
One month		8.9	8.8	8.5	8.7
3 months		09	8.5	8.8	8.9

DISCUSSION

Post thyroidectomy hypocalcemia is most common complication. It can occur on first post-operative day; sometime patient can present with symptoms or without symptoms. The transient hypoparathyroidism frequency post thyroid is between 6.9% and 49%.^{4, 15} The cause of hypocalcemia post thyroidectomy is not clearly known, it is clear that multiple factors are involve many just like surgical procedure, trauma to parathyroid during surgery like (injury, edema, infarction, ischemia), duration of thyroid surgery, hyperthyroidism, malignant disease, gender of patient, drop of serum calcium during surgery, diabetes mellitus, try to identified parathyroid gland during operation can be causative factors.^{16, 5} Many studies show that surgeons experience of thyroid surgery noticed that 37.7% of patients were underwent that procedure developed mostly hypocalcemia, in patients we found serum calcium level lower than 8.0mg/dl post-surgery within 24 hours in 795 patients out of 2108. Due to that cause wetried to seek out patient factors, with disease related or operating procedures that can cause the hypocalcemia.⁴ In other study done by E dafé et al. found no significant difference of hypocalcemia in relation with age. Some studies shows there is relation of hypocalcemia can be have a relation with age of patient after surgery.^{17, 18} Some studies shows hypocalcemia more common in female patients.^{4, 6, 17, 18} some other studies results showed there were no significant difference between gender the development of post-surgery hypocalcemia.¹⁹ As compare to male, female have more risk to develop hypocalcemia study done by Sands NB et al their results showed that female patients developed more hypocalcemia 42% (701/1669) of cases, which was more increase in number as compared with 21.4% (94/439) seen men (p < 0.001). There was no difference of hypocalcemia or hypoparathyroidism in premenopausal women as compared with postmenopausal women, it was also seen in other research.²⁰

Study done by Paolo Del Rio et al²¹ their results show no clear difference has been seen in level of calcium before or after surgery. There was a more difference in level of serum calcium decrease as compared with before surgery. There a result also favors strong association in female patients.

Some studies shows that hypocalcemia more associated with hyperthyroidism, it is not clear but can be related with the size of gland and more blood supply and more difficult to operate due to more chances of bleeding.²² Result of our study shows that there is post thyroidectomy hypocalcemia develop in 11 patients (06.875%) out of 160 patients all are female patients they develop temporary hypocalcemia and treated

successfully. Results of our study are very low as compared with other studies done in literature nationally and internationally. Identification of all two pair parathyroid glands during thyroid surgery, it is very difficult to identify the parathyroid glands. In some studies, it is recommended to identify parathyroid gland during thyroid surgery, can preserve as possible.²³ After thyroid surgery hypocalcaemia is major issue. Due to hypocalcemia and its complication hospital stay of patient increase and expenses more from routine due to this total cost of patient increased. Post sub-total thyroidectomy hypoparathyroidism is condition causing weakness in a patient after surgery. In literature written that improvement in surgical technique, care full dissection of the parathyroid gland and supplying blood vessels. Inferior thyroid artery ligated very near to the thyroid gland, and less radical resection during total thyroidectomy have been used to avoid this complication. It is technically more difficult during surgery to identify parathyroid glands because it needs differentiation from fat globules, lymph nodes, thyroid tissue as well as thymus. Results of our study shows total eleven (11) (06.875%) of patients developed hypocalcaemia post sub-total thyroidectomy as compared with to other studies in literature shows hypoparathyroidism ranged from 4% to 32%, in the many other studies shows the duration of hypocalcaemia ranges from 3 months to one year. Another study done in our institute Talpur A. A. et al his results shows transient hypocalcaemia was noted in 16 patients out of 112(14.28%) patients & permanent hypocalcaemia in 8 patients out of 112(7.14%) patients.²⁴ In our study postoperative hypocalcaemia was defined as patient required medication to maintain normal calcium when they were discharged from hospital on 3rd or 4th postoperative day. The causative factors for transient hypocalcaemia depend on surgical procedure of individual surgeon, haemodilution and secondary hypoparathyroidism due to trauma or de-vascularization of glands. Permanent hypocalcaemia is reported 2% to 33% in many studies²⁵. In our study the occurrence of hypocalcaemia was happen in eleven patients (06.875%) is lesser than other studies compared to national and international studies

CONCLUSION

Post-thyroidectomy most common complication occur is transient hypocalcemia, can be avoided with pre-operative patients preparation with more care and during surgery proper care full dissection, proper identification of parathyroid glands and post-operative regularly monitoring of serum calcium and early management of it can prevent the morbidity and mortality. Post-operative hypocalcaemia develops in eleven (11)

patients (06.875%), after subtotal thyroidectomy mostly on the first the post-operative day.

RECOMMENDATIONS: Limited studies are available locally so we recommended on mass number of patients from every aspect.

LIMITATIONS: Many patients not coming for follow up in our study two patients after one month not coming in outpatients department.

DATA AVAILABILITY: data will be available on request

ETHICS APPROVAL: The ERC gave ethical review approval

CONSENT TO PARTICIPATE: written and verbal consent was taken from subjects and next of kin

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CONFLICT OF INTEREST: No competing interest declared.

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