HYPOCALCEMIA: A GENUINE THREAT AFTER THYROIDECTOMY

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ABSTRACT
Objective: *To determine the frequency of hypocalcemia following thyroidectomy.*
Study Design: *Quasi-experimental study.*
Setting & Duration: *Department of Surgery, Ward 26, Jinnah Postgraduate Medical Center (JPMC), Karachi from March 2002 to December 2002.*
Methodology: *In all, 104 patients undergoing thyroidectomy and fulfilling the selection criteria were included in this study. The patients were monitored clinically as well as biochemically for the development of hypocalcemia on first postoperative day. The patients having postoperative hypocalcemia were given oral replacement therapy and were later followed up in outpatient clinic at regular intervals for two years. Data was collected by filling the proforma postoperatively.*
Results: *Lobectomy and subtotal thyroidectomy were the commonly predominant procedures followed by total thyroidectomy. About 39% of the procedures were associated with transient hypocalcemia. About half of the total thyroidectomies and completion thyroidectomies were associated with transient hypocalcemia. None of the patients developed permanent hypocalcemia. The average fall in calcium level was 0.84 mg/dl.*
Conclusion: *The post-operative hypocalcemia is a common but transient event after thyroidectomy. This frequency of transient post-thyroidectomy hypocalcemia is comparable to that published in the international literature.*

KEY WORDS: *Hypocalcemia, Post-operative, Thyroidectomy*

INTRODUCTION

The postoperative hypocalcemia is frequently observed within 2-5 days after total and subtotal thyroidectomy, requiring exogenous replacement therapy to alleviate the clinical symptoms. Inadvertent parathyroid excision and hypocalcaemia are well recognized complications of thyroid surgery. Theodor Kocher reported first 100 thyroidectomies in 1883 and noted the presence of tetany in a number of cases. William Halsted (1852-1922) was one of the first surgeons to advocate meticulous surgical technique to prevent damaging the parathyroid glands and so contributed greatly to the prevention of this serious complication which, together with bleeding and laryngeal nerve injury had made early thyroid surgery so dangerous.[1] In several studies,[2,3] the incidence of hypocalcemia varied from 1.6% to more than 50%. Among the potential factors causing decrease in serum calcium, hemodilution[4], calcitonin release[5] and "hungry bone syndrome" were implicated in patients with hyperthyroidism and osteodystrophy.[6] Inadvertent parathyroid excision (IPE) and hypocalcemia are well recognized complications of thyroid surgery.[7] The exact pathogenesis of hypocalcemia in postoperative patients is difficult to explain. It is, however, varies in different pathological conditions of thyroid gland and types of surgical intervention. Graves disease, malignancy, total thyroidectomy and parathyroid gland ischemia / injury are main causes of lowering of serum calcium concentration.[8] Hypoparathyroidism is an additional event whereas hypocalcemia is relatively common after total thyroidectomy.[9] Transient hypocalcemia is a common

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complication of thyroid surgery. Although the long lasting effects are rare, immediate post operative morbidity is increased and hospital stay is prolonged. The common clinical manifestations of hypocalcemia are tetany, Chvostek's sign and carpopedal spasm (Trousseau's sign). The objective of this study was to determine the frequency of hypocalcemia following thyroidectomy.

METHODOLOGY

It was a Quasi-experimental study conducted at Ward 26, Department of Surgery, Jinnah Postgraduate Medical Center (JPMC), Karachi. This included all patients under going any thyroid operation between 1st March 2002 and 31st December 2002. The serum calcium levels were measured preoperatively. All patients having serum calcium less then 8mg/dl were considered hypocalcemic and were excluded. In all, 104 patients underwent thyroid surgery during the above mentioned period. All patients were examined for the type of thyroid disease and previous neck surgery. All operations were performed by Consultant and Senior Registrar by standard technique. Parathyroids were attempted to be identified with naked eye examination and preserved during surgery. Total thyroid resection for benign diseases was performed intracapsularly. On first post-operative day, patients were evaluated clinically as well as biochemically and patients were allowed regular diet. Data was collected by filling the proforma post-operatively. The main outcome variable was hypocalcemia which was monitored at regular intervals for about two years. The patients having postoperative hypocalcemia were given oral replacement therapy and were later followed up in outpatient clinic at regular intervals for two years.

RESULTS

In all, 104 patients underwent 120 thyroid operations during the above mentioned period. These included 92 female and 12 male patients. The mean age was 38.5 years with the range of 16 to 50 years. About half of the patients were having multinodular goiter whereas 37% patients had unilobular disease. About 8% patients had initial diagnosis of malignant lesion. Lobectomy was done in 39% patients and similar proportion of patients underwent subtotal thyroidectomy. About quarter of the patients underwent total thyroidectomy. About 42% of the patients undergoing lobectomy were found to be having malignancy on histopathology of resected specimen. These patients underwent completion thyroidectomy. The average preoperative calcium level was 8.5mg/dl. The postoperative transient hypocalcemia was noticed in about 39% of the patients. Transient hypocalcemia was noticed after about 54% of total thyroidectomies and about 50% of the completion thyroidectomies. The average fall in serum calcium level was 0.84mg/dl. All hypocalcemic patients were managed by oral replacement therapy with calcium supplements. None of the patients developed permanent hypocalcemia. The relationship of procedures and transient hypocalcemia ismentioned in Table I.

DISCUSSION

Postoperative hypocalcemia is a major concern following thyroid surgery. It often extends the duration of the hospital stay and the need for biochemical tests and so significantly increases the overall cost of thyroidectomy. When severe, it can lead to serious complications and require intravenous therapy to alleviate the clinical symptoms.[10] In this study, postoperative hypocalcemia was found in 39% of the patients and this correlates with other studies reporting postoperative hypocalcemia to be in a few to more than 50% of patients.[10-14] Patients having hyperthyroidism and thyroid carcinoma are generally considered at risk for post thyroidectomy hypocalcemia.[15] The risk factors for transient hypocalcemia depend on surgical technique of individual surgeon, hemodilution and secondary hypoparathyroidism due to trauma or devascularization. Permanent hypocalcemia is reported 2% to 33% in various studies.[16-18]

No significant correlation between the pre-operative clinical characteristics of the patients and long-term outcome of their hypocalcemia was observed. Permanent hypoparathyroidism is slightly more frequent in cases

Table I. Frequency of post thyroidectomy hypocalcemia

Procedure	Transient Hypocalcemia	Permanent Hypocalcemia
Lobectomy	9 (22.5%)	--
Subtotal Thyroidectomy	11 (28.9%)	--
Total Thyroidectomy	13 (54.2%)	--
Completion Thyroidectomy	8 (50%)	--
Total	41 (39%)	--

of thyroidectomy for hyperthyroidism, thyroid carcinoma or previous neck surgery. The policy of preservation of parathyroid glands in situ was adopted but strict adherence to this principle alone may limit the completion of thyroidectomy as well as the lymph node dissection. The frequency of hypocalcemia was increased by increasing the extent of thyroid resection.[19] Hypocalcemia can occur as a late presentation of progressive atrophy of the parathyroid glands[20] and these patients may no longer remain in regular follow up and diagnosis of hypocalcemia can easily be missed. Hypocalcemia may present with nonspecific vague symptoms and should be considered in patients having history of previous thyroid surgery.[21] In local literature, the incidence of hypocalcemia is reported to be 32% following total thyroidectomy, 25.8% after near total thyroidectomy, 25% following subtotal thyroidectomy and 28.5% following lobectomy and isthmusectomy.[13] The frequency of hypocalcemia in hyperthyroidism was reported to be 38% to 43.8%.[14] The vascularisation of parathyroid gland is not entirely clear and the studies on the superior and inferior thyroid arteries with laser Doppler flow meter indicate that inferior thyroid artery does not play a key role in parathyroid vascular supply.[22] This study demonstrates that careful capsular dissection, pre-operative calcium evaluation, optimization of underlying thyroid pathological condition and meticulous surgical technique can prevent post thyroidectomy hypocalcemia.

CONCLUSION

The frequency of postoperative transient hypocalcemia was about 39% and this was observed mostly on the 2nd postoperative day.

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