

## ORIGINAL ARTICLE

**Inadvertent Parathyroidectomy During Thyroidectomy.**

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**Summary**

*Incidental finding of parathyroid gland(s) in thyroidectomy specimen and postoperative temporary or permanent Hypokalemia was studied in 350 thyroidectomy patients undergoing lobectomy or total thyroidectomy. Histopathological examination of thyroidectomy specimen of 350 patients and postoperative serum calcium level of patients showing features of tetany were done in patients undergoing thyroid surgeries between January 1998 -April 2004. The study was done to assess the incidence of unintentional parathyroid removal during routine thyroidectomy and to identify factors that might predict patients at high risk. The size and histological nature of the lesion was not predictive of inadvertent parathyroid removal. Preoperative thyroid surgery was associated with significantly higher risk of inadvertent parathyroid gland removal. Fourteen percent of the 350 patients were found to have had inadvertent removal of parathyroid tissue. Majority (95%) has 2 or less parathyroid gland in their specimen. 2% patients of total thyroidectomy showed clinical features of tetany postoperatively.*

**Introduction**

Modern thyroid surgery is associated with minimal complications and rare postoperative mortality and morbidity. It is the credit of surgeons that thyroid surgery today is not only one of the most frequently done surgery but also one of the safest<sup>1</sup>. The proximity of the thyroid gland to certain important structures makes this operation interesting and challenging<sup>2</sup>. Postoperative complications like hemorrhage, injury to the recurrent laryngeal nerve, the external branch of the superior

laryngeal nerve or the parathyroid glands removal resulting hypokalemic tetany are related. There is no doubt that the complication rate the thyroid surgery is inversely proportional to the experience of the operating surgeon and directly proportional to the extent of surgery<sup>3</sup>. Removal of all parathyroid will result in permanent morbidity of Hypokalemia and its consequences but removal of one or more parathyroid glands

may not have necessarily have any clinical relevance. All thyroid surgeons do not look for parathyroid during thyroid surgery but not always removing the parathyroid, nonetheless thyroid surgeons even with meticulous dissection, occasionally surprised with a report revealing the presence of parathyroid tissue along with the thyroid specimens. It is important for the thyroid surgeons to identify factors that increase the risk of inadvertent parathyroidectomy during thyroid operations and exercise appropriate caution in those patients. The present study was undertaken to assess incidence and clinical significance of inadvertent removal of parathyroid during thyroidectomy and to identify factors that might predict patients at increased risk.

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## Patients And Methods

The present study is a retrospective review of all of 350 Thyroidectomies (lobectomy, subtotal and total) performed by the authors in different hospitals of Dhaka City, Dhaka Medical College Hospital, Dhaka and women medical college hospital, Dhaka. Uttara, Dhaka National medical college hospital, dhaka, Holy Family Red Crescent Medical College Hospital, dhaka Comilla Medical centre, comilla & Islamia Aroghya Sadan, Dhaka from January 1998 - April 2004. Thyroidectomies were performed with careful dissection along the thyroid capsule attempting to identify and preserve the parathyroid glands with their vascular supply as well as the recurrent laryngeal nerves. Histopathologists were requested to search for parathyroid in the specimen and to note accordingly. Pathological reports were evaluated for the presence of parathyroid tissue with the thyroid specimen, histopathological appearance of both thyroid and parathyroid tissue, no of parathyroid glands inadvertently removed. Intentional removal of parathyroids and reports not mentioning about parathyroid were not included in the study. Postoperative complications like vocal cord paralysis, features of hypokalemia and tetany were noted. Data was analyzed in proportion test.

## Results

Three hundred and fifty patients (220 female and 130 male) undergone thyroid surgery by the principal author in different hospitals of Dhaka City from January 1998 to April 2004. Operations were total and subtotal thyroidectomy in 110 patients, lobectomy in 222 patients and completion thyroidectomy in 18 patients. Primary thyroid lesions were multinodular goitre in 290 patients, malignant neoplasm in 48 patients, diffuse toxic goiter in 12 patients. 48 (14%) of 350 thyroid specimens shows parathyroid tissues in histopathological reports. Parathyroids were found in 18 patients who has undergone total and subtotal thyroidectomy, 27 patients of lobectomy and 3 cases of completion thyroidectomy. Thirty-four patients had one, ten patients had two and four patients had three parathyroid glands in their specimen. Parathyroid tissue was located within the thyroid capsule in 5 patients (10%). Parathyroids were found in 34 (11.25%) specimens of 302 thyroid swellings (multinodular & diffuse toxic) cases, and in 8(37.50%) specimens of 48 malignant cases. 6(50%) patients of diffuse toxic goitre had parathyroid tissue in the specimen. 3(16.66%) patients of completion thyroidectomy had parathyroid in their specimen.

Table :1 Showing frequency of parathyroids removed with type of surgery (n=350).

Type of surgery	No of patients	Parathyroids present	Percentage
Total and subtotal thyroidectomy	110	18	16.36
Lobectomy	222	27	12.16
Completion thyroidectomy	18	3	16.00



## Discussion

The preservation of parathyroid glands has been a constant challenge and a difficult feat to accomplish during total thyroidectomy. Not only the parathyroid glands be carefully separated from the adjacent thyroid tissue and preserved intact, but their blood supply must be meticulously dissected and preserved as well. Following strict surgical guidelines and adhering with the anatomical principles it is possible to minimize the incidence of iatrogenic hypothyroidism after thyroidectomy to 0.5% to 4%<sup>4,7</sup>. Although the actual incidence and clinical relevance of iatrogenic parathyroid removal during thyroidectomy has not widely studied, Lee *et al*<sup>8</sup> reported 11% and Sesson *et al*<sup>9</sup> reported 15% and Lin *et al*<sup>2</sup> 9.1% inadvertent parathyroid removal during thyroidectomy which is consistent with our findings of 14% iatrogenic parathyroid removal found in thyroid specimens.

Familiarity of anatomy of parathyroids is of crucial importance in thyroid surgery. Most commonly there are four parathyroid glands covered by a layer of pretracheal fascia along with the thyroid but distinct from the thyroid gland itself. Each approximately 6 to 8 mm diameter. Superior parathyroids are located at the superior pole of the thyroids and the position is almost constant. The position of the inferior parathyroids are variable, it often lies the hilum of the thyroid lobe or near the point where the inferior thyroid vessels enter the thyroid gland; it may lie on the on the thyroid gland on anterior or anterolateral position at a great distance from its arterial blood supply; it may be found below the lower pole of the thyroids gland, or even in the superior mediastinum and at times intrathyroid<sup>10,11</sup>.

The incidence of intrathyroid location of the parathyroid glands is approximately 0.2% according to autopsy studies<sup>11</sup> but the incidence rises to 2%-5% for patients with primary hyperparathyroidism<sup>12,13</sup> incidentally excised parathyroid, on the other hand had been located in intrathyroid location in 40% to 50% cases<sup>8,9</sup>, although incidence of intrathyroid parathyroid glands was not as high in our study, this finding may

explain the occurrence of inadvertent parathyroidectomy even in the hands of experienced thyroid surgeons.

The blood supplies of the parathyroids are of paramount importance to the surgeon operating on the thyroid. The inferior parathyroid artery always arises from a branch from inferior thyroid artery. It may arise from main subdivisions or from terminal branches of the artery. The superior parathyroid artery also generally arise from branches of inferior thyroid artery but on occasion may obtain blood supply from branches of the inferior thyroid artery but on occasions may obtain its blood supply from a branch of the superior thyroid artery or more rarely the superior parathyroid artery may arise from an anastomotic loop between superior and inferior thyroid arteries<sup>11</sup>.

We find no correlation between type of thyroid pathology eg malignancy or multinodular goitres except graves disease/toxic goitres where in our series about 50% (6 out of 12) specimens had parathyroids, which may be attributed to the high vascularity of the thyroid interfering the clean dissection plane. In cases of second operation for completion thyroidectomy, or recurrence of disease we found to have significantly higher association unintentional parathyroid removal compared to patients undergoing primary thyroidectomy which might be due to surgical difficulties consequence of formation of scar tissue and fibrosis encountered in revision operation and status of preservation of parathyroids in primary surgery. Transient biochemical hypokalemia has been reported in the majority of patients following thyroid surgery<sup>14</sup> and percentages cited in the literature with clinical manifestations range between 0.3% and 5% for temporary and 0% to .5% for permanent Hypokalemia<sup>4,5</sup>, our series has got 3 (0.85%) patients of Hypokalemia. Our policy has been to identify and preserve the parathyroid glands as a matter of routine for every patient undergoing any form of thyroid surgery for benign and malignant diseases. Patient undergoing completion thyroidectomy or revision surgeries are at increased risk and were provided with more attention.



## Conclusion

Inadvertent excision of parathyroid glands occurred in 14% patients in our series of 350 cases undergoing thyroid surgery and majority (10%) had one parathyroid in their specimen. Histological appearance or size of the tumor did not predict inadvertent parathyroidectomy. 3% our patients show temporary and 0.5% patients shows permanent hypokalemia requiring supplement therapy.

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