

# Post Thyroidectomy Hypocalcaemia – An Audit of 100 Cases

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Purpose of our study is to compare the incidence of hypocalcaemia after total, near total or subtotal thyroidectomy for benign multinodular goitre. One hundred consecutive thyroidectomies performed for euthyroid benign multinodular goitre at West surgical unit, Mayo hospital, Lahore Pakistan, were included in the study. Mean age of patients was 33 (range 14 to 60) years. Preoperative serum calcium level ranged from 7.7 to 10.0 with an average of 8.8mg/dl. 34 patients had total thyroidectomy, 31 had near total thyroidectomy, 28 had subtotal thyroidectomy and 7 had lobectomy & isthmusectomy. Consultants performed 46 thyroidectomies, while senior registrars and residents performed 52 and 2 thyroidectomies respectively. 28 patients developed clinical features of hypocalcaemia. 8 out of 31 patients who had near total thyroidectomy developed hypocalcaemia (25.8%). Out of 34 total thyroidectomies, 11 patients had hypocalcaemia (32.3%). In 28 patients who had subtotal thyroidectomy, 7 developed hypocalcaemia (25%). 2 out of 7 lobectomy & isthmusectomy patients also required treatment for hypocalcaemia (28.5%). Hypocalcaemia developed within 48 hours of surgery in 53% of our patients. Incidence of hypocalcaemia among patients operated by consultants was 23.9 % (11 out of 46), while among patients operated by senior registrars and residents 17 out of 54 developed hypocalcaemia i.e. 31.5%. Average postoperative duration of hospital stay was 5.42 days in hypocalcaemic patients (range 2–17 days) and it was 2.77 days in normocalcaemic patients (range 1–6 days). We conclude that post thyroidectomy hypocalcaemia is a complication with significant morbidity. The incidence of this complication can be reduced by meticulous surgical technique with special emphasis on haemostasis. Identification and preservation of well vascularized parathyroid glands must be attempted in every thyroidectomy.

**Key words:** thyroidectomy, complication, hypocalcaemia, multinodular goitre.

Surgical treatment of multinodular goitre is controversial as there is no consensus on the optimal surgical procedure. Surgical options include lobectomy & isthmusectomy, subtotal thyroidectomy, near total thyroidectomy and total thyroidectomy. There is a recent trend towards performing total or near total thyroidectomy for benign multinodular goitre instead of subtotal resections<sup>1</sup>. Presumed benefits of subtotal thyroidectomy are low incidence of complications like parathyroid and recurrent laryngeal nerve injuries with preservation of normal functioning thyroid tissue that maintains euthyroid status post operatively<sup>2</sup>. But reoperation for recurrent goitre after subtotal thyroidectomy has significantly higher risk of these complications<sup>3,4</sup>. Total or near total thyroidectomies although eliminate the risk of recurrence but they are associated with increased incidence of complications. Various studies showed that complication rates might be similar among total and subtotal resections<sup>1,3,5,6</sup>. Hypocalcaemia and recurrent laryngeal nerve injury are main complications of thyroidectomy. Aim of our study is to compare rate of hypocalcaemia after subtotal, total and near total thyroidectomy for simple benign multinodular goitre.

## Material and methods:

It is a retrospective study of 100 consecutive patients who underwent surgery for benign multinodular goitre at west surgical ward, Mayo hospital Lahore. Data was collected from hospital record. Preoperative assessment included thyroid function test, isotope scan in all patients. Soft tissue x rays of neck and C T scan neck and chest were

also carried out when required, especially in large goitres with retrosternal extension. Patients who had thyroid malignancy or hyperthyroidism were excluded. All patients had indirect laryngoscopy. Serum calcium levels were also checked preoperatively. Type of surgery and grade of surgeon (consultant, senior registrar or resident) were noted. Recurrent laryngeal nerves were identified and preserved in every case. Vocal cords were checked at the time of extubation of endotracheal tube and any change in the quality of voice was noted. Postoperative calcium levels were recorded. Patients were monitored for the clinical features of hypocalcaemia. Timing of clinical manifestation of hypocalcaemia and its duration was noted. Duration of postoperative hospital stay was recorded. Hypocalcaemia was defined on occurrence of clinical features and permanent hypocalcaemia was defined as patients on calcium replacement therapy one year after surgery.

## Results:

Total 100 patients who had simple benign multinodular goitre were included in this study. Mean age of patients was 33 (range 14 to 60) years. Indirect laryngoscopy showed normal vocal cords in all the patients. Preoperative serum calcium level ranged from 7.7 to 10.0 with an average of 8.8 mg / dl (normal value 8.5 to 10.5mg/dl). 34 patients had total thyroidectomy, 31 had near total thyroidectomy, 28 had subtotal thyroidectomy and 7 had lobectomy & isthmusectomy (Graph 1).

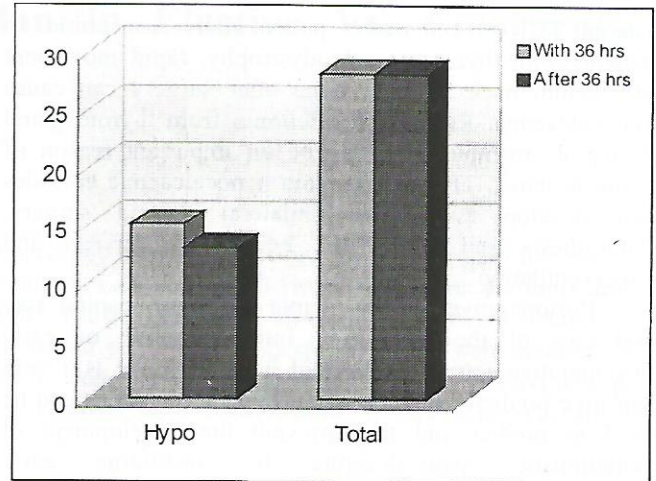
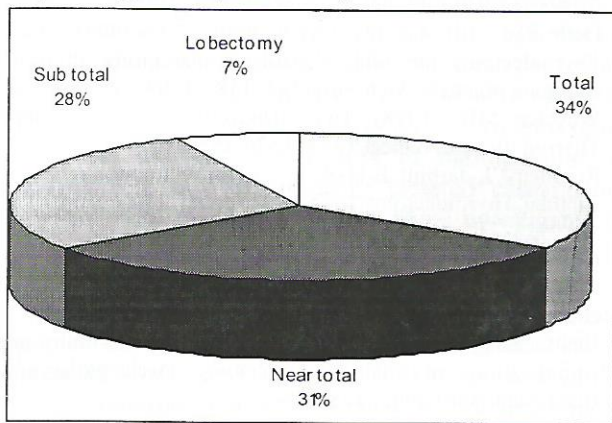
Consultants performed 46 thyroidectomies, while senior registrars performed 52 and residents 2



thyroidectomies, under direct supervision of consultants. There was no injury to recurrent laryngeal nerve. 28 patients developed clinical features of hypocalcaemia. 8 out of 31 patients who had near total thyroidectomy developed hypocalcaemia (25.8 %). Out of 34 total thyroidectomies, 11 patients had hypocalcaemia (32.3 %). In 28 patients who had subtotal thyroidectomy, 7 developed hypocalcaemia (25%). 2 out of 7 lobectomy & isthmusectomy patients also required treatment for hypocalcaemia (28.5 %). (Graph 2).

3 of our patients developed hypocalcaemia within twenty-four hours of surgery. 12 developed hypocalcaemia on first postoperative day and 7 on second postoperative day. In six patients hypocalcaemia appeared on third postoperative day. (Graph 3)

Graph 1: Type of thyroidectomy.



Incidence of hypocalcaemia among patients operated by consultants was 23.9 % (11 out of 46), while among patients operated by senior registrars and residents 17 out of 54 developed hypocalcaemia i.e. 31.5 %. Average postoperative duration of hospital stay was 5.42 days in hypocalcaemic patients (range 2 – 17 days) and it was 2.77 days in normocalcaemic patients (range 1 – 6 days). All patients were discharged on thyroxin 100 ug daily. Most of the patients were lost in follow up. So the true incidence of permanent hypocalcaemia could not be noted.

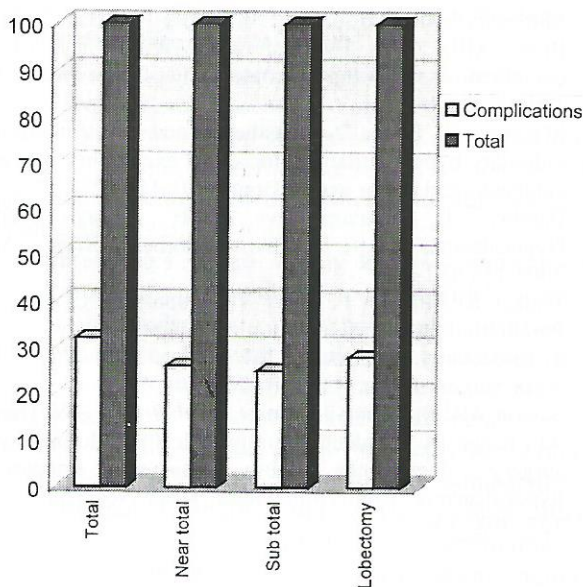
**Discussion:**

Surgical treatment of benign multinodular goitre is controversial. The main controversy surrounding surgical treatment of benign multinodular goitre is related to the appropriate extent of resection. Traditional subtotal thyroidectomy is now challenged by various recent studies advocating more extensive resections like total or near total thyroidectomy especially in patients who have bilateral nodular disease<sup>7, 8,9,10</sup>. Recurrence rates as high as 45 % have been reported after subtotal thyroidectomy for bilateral multinodular goitre<sup>11</sup> and the rate of recurrence is proportional to the remnant volume of thyroid<sup>12</sup>. Surgery for recurrent goitre is associated with higher complication rates<sup>3,4</sup>.

The only substantial argument against total thyroidectomy is its potentially higher complication rates as compared to subtotal thyroidectomy. However the morbidity of initial total thyroidectomy can be minimized by meticulous surgical technique<sup>4, 13,14</sup>.

Postoperative hypocalcaemia is one of the major complications of thyroidectomy. Reported incidence of temporary hypocalcaemia is between 10-50%<sup>15</sup> whereas permanent hypocalcaemia is reported among 0.7-3% of thyroidectomies<sup>9,13,16</sup>. Injury to the parathyroid gland like excision or devascularization is obviously the main reason of hypocalcaemia. There are however other contributing factors which can play a role. Malnutrition can result in low total body calcium, low total body protein, low

Graph 2: Incidence of hypocalcaemia



Graph 3: Timing of postoperative hypocalcaemia



vitamin D level and makes patient more susceptible. In patients with thyrotoxic osteodystrophy, rapid movement of calcium back into the bone after surgery can cause hypocalcaemia. Release of calcitonin from thyroid gland during its manipulation may be an important reason of hypocalcaemia. This may explain hypocalcaemic episodes that develop even after unilateral thyroid surgery. Paraesthesia and tetany can be due to anxiety and hyperventilation<sup>17</sup>.

Postoperative hypocalcaemia prolongs hospital stay and cost of the procedure. Intra operative or early postoperative serum parathyroid hormone level is a very sensitive predictor of subsequent hypocalcaemia. It can be used to predict and thus prevent the development of symptomatic hypocalcaemia by instituting early treatment<sup>18</sup>.

Reimplantation of parathyroid tissue in muscle is considered as an efficient way in preventing long-term hypoparathyroidism<sup>9,19</sup>. Some authors believe that reimplantation increases the risk of temporary postoperative hypocalcaemia<sup>20</sup>. We did not perform reimplantation of parathyroid gland in any of our patient.

Temporary hypocalcaemia developed in 28% of our patients and there was no significant difference in incidence between total, near total and sub total thyroidectomies. Incidence of hypocalcaemia among patients operated by consultants was 24%, while among patients operated by senior registrars and residents 31.5% developed hypocalcaemia, which reflects learning curve of the surgeons in training.

We also noted that more than 50% of our patients developed hypocalcaemia within 48 hours of surgery, which reflects diminished total body calcium in our population.

We conclude that post thyroidectomy hypocalcaemia is a complication with significant morbidity. Incidence of this complication is even higher in patients whose preoperative calcium levels are in lower normal range. Low preoperative serum calcium level is a risk factor for development of post thyroidectomy hypocalcaemia. The incidence of this complication can be reduced by meticulous surgical technique with special emphasis on haemostasis. Identification and preservation of well vascularized parathyroid glands must be attempted in every thyroidectomy.

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