

**Research Article**

**Comparative study between total and sub-total thyroidectomy**

**<sup>1</sup>Waqas Raza, <sup>2</sup>Adil Nazeer  
and <sup>3</sup>Hafiz Muhammad Mohsin**

<sup>1</sup>Medical Officer DHQ Hospital Khanewal

<sup>2</sup>Medical Officer DHQ Hospital Khanewal

<sup>3</sup>Medical officer Tehsil Head Quarter Hospital Kotli Sattian

**ABSTRACT**

**Objective:** To compare the outcome between total and sub-total thyroidectomy

**Material and methods:** This comparative study was conducted at DHQ Hospital Khanewal from January 2017 to June 2017. Total 240 patients who have undergone total or subtotal thyroidectomy were selected. Post-operative hypocalcaemia was assessed.

**Results:** Mean age of the patients of Group A was  $30.94 \pm 9.6$  years and Group B was  $31.59 \pm 11.03$ . Asymptomatic hypocalcaemia was found in 62 (35.63%) patients of Group A and 30 (17.245%) patients of Group B. Significant difference was observed in both groups statistically. P. value 0.00.

**Conclusion:** Frequency of asymptomatic hypocalcaemia was significantly higher after total thyroidectomy as compared to sub-total thyroidectomy. Male or female can be equally victim of asymptomatic hypocalcaemia after total or subtotal thyroidectomy. There is an equal chance of development of asymptomatic hypocalcaemia in younger and older age groups after total or subtotal thyroidectomy.

**Keywords:** MNG, FNAC, HPE, thyroid isotope scan, thyrotoxicosis, subtotal thyroidectomy, total thyroidectomy

**INTRODUCTION**

Thyroidectomy is a frequently performed operation, one of its complications is post-operative hypocalcaemia which occurs in about 0.33% to 65% patients.<sup>1</sup> Hypocalcaemia is evident in both total and subtotal thyroidectomy clinically and biochemically. Hypocalcaemia is usually symptomatic showing carpopedal spasms, twitching of the facial muscles, irritability and even seizures. On the other hand it can be completely asymptomatic.<sup>2,3,4,5</sup> It causes great misery to the patient not only in the immediate post-operative period but can also be a permanent problem. That's why it is important to keep an eye on the patient's clinical and biochemical profile. This was helpful to decrease the mortality and morbidity in post thyroidectomy patients. In

the literature, the incidence of temporary hypocalcaemia after thyroid surgery ranges from 1.6% to 50%, and permanent hypocalcaemia occurs in 1.5% to 4% of surgeries.<sup>6</sup> The causes of hypocalcaemia include hemodilution secondary to intravenous fluid administration during the perioperative phase, increased urinary calcium excretion secondary to surgical stress, calcitonin release after thyroid gland manipulation, and hungry bone syndrome in patients with metabolic bone disease.<sup>7</sup> However, hypoparathyroidism through direct injury, removal or devascularization of parathyroid glands is the most likely cause of postoperative hypocalcaemia.<sup>7</sup> Acute, severe hypocalcaemia is a medical emergency so it needs immediate remedy.

Hypocalcaemia potentially prolongs the hospital stay. Early detection of low calcium level even at asymptomatic stage may reduce unnecessary stay.<sup>8</sup> The symptoms of hypocalcaemia become evident when serum level drops below 8 mg/dl (normal range 8.5-10.5 mg/dl).<sup>8</sup> Immediate fall in serum calcium level after surgery is a sensitive predictor for later clinically symptomatic hypocalcaemia.<sup>9</sup>

Keeping in view the above facts hypocalcaemia which in thyroidectomy patients present as medical emergency and needs immediate management, our study was designed to find out the frequency of post-operative asymptomatic hypocalcaemia between total and sub-total thyroidectomy. So that to decrease the morbidity and mortality related to it. Also depending on the results of the study, we was recommend one better technique over the other in future.

#### **OPERATIONAL DEFINITION**

**Asymptomatic Hypocalcaemia:** Serum calcium level <2mmol/l (8mg/dl) not showing clinical signs and symptoms of hypocalcaemia after 24 hours of surgery was labelled as asymptomatic hypocalcaemia.

#### **MATERIAL AND METHODS**

This comparative study was conducted at DHQ Hospital Khanewal from January 2017 to June 2017. Total 240 patients who have undergone total or subtotal thyroidectomy were selected.

##### **Inclusion Criteria:**

- Patients who have undergone total or subtotal thyroidectomy.
- Both male and female.
- Age from 14 to 50 years.

##### **Exclusion Criteria:**

- Patients who have hypocalcaemia due to any other reason or systemic disease e.g. renal disease, lactating mother either pre or post operatively.
- Symptomatic post-operative hypocalcaemia following total or subtotal thyroidectomy.

#### **DATA COLLECTION PROCEDURE:**

All patients who would underwent total or subtotal thyroidectomy were included in this study

after scrutinized by inclusion criteria and after taking written consent from Institutional Review Board. Written consent was taken from every patient. All included patients for surgery (total or subtotal thyroidectomy) was offered to pick up a slip from total mixed up slips (half-slips was contain letter "A" and other half-slips contain letter "B") and he/she was placed in that group (Group-A or Group-B according to slip). Group-A was include those patients who were undergo total thyroidectomy and Group-B was include those patients who were undergo sub-total thyroidectomy.

Serum calcium level was sent to the relevant laboratory before the surgery and after 24 hours of surgery. Demographic data including age, gender, type of surgery was entered into a predesigned proforma.

#### **DATA ANALYSIS PROCEDURE:**

The data was entered in SPSS V16 for statistical analysis. Quantitative variable like age was presented as mean  $\pm$  SD, while qualitative variable like gener, asymptomatic hypocalcemia was presented in frequency and percentages. Chi-square test was applied to compare the frequency of asymptomatic hypocalcemia in both groups. Stratification was done for age and gender. Post stratification. Chai-square test was applied to see the level of significance. P-values  $\leq$  0.05 was considered statistically significant.

#### **RESULTS**

Mena age of the patients was  $31.27 \pm 10.33$  years. Mean age of the patients of Group A was  $31.52 \pm 8.7$  years and in Group B was  $32.45 \pm 10.08$ .

Group A was consisted on 120 patients and total thyroidectomy was performed in this group. Asymptomatic hypocalcaemia was found in 45 (37.5%) patients. In Group B, subtotal thyroidectomy was performed in 120 patients and asymptomatic hypocalcaemia was observed in 19 (15.83%). Significant (P= 0.000) difference was observed between the both groups for the frequency of asymptomatic hypocalcaemia. (Table 1). Stratification with respect to gender of both

groups was done. Comparison for the frequency of asymptomatic hypocalcaemia between the male patients of both groups and female patients of both groups was done.

Among the 38 male patients of group A, asymptomatic hypocalcaemia was observed in 18 (47.37%) patients and in 41 male patients of Group B, asymptomatic hypocalcaemia was seen in 7 (17.07%) patients. Statistically significant (P= 0.007) difference between the male patients of both groups for the frequency of asymptomatic hypocalcaemia was seen. Out of 82 female patients of Group A, Asymptomatic hypocalcaemia was seen in 32 (39.02%) patients and among the 79 female patients of Group B, Asymptomatic hypocalcaemia was observed in 16 (20.25%) patients. Statistically significant (P=0.010) difference between the both groups for the frequency of asymptomatic hypocalcaemia was seen. (Table 2)

Patients of the both groups were divided into two age groups, age group 18-32 years and age group 33-50 years. Comparison for the frequency of asymptomatic hypocalcaemia between the age group 18-32 years and age group 33-50 years of both groups was done. Among the 72 patients of age group 18-32 years, a symptomatic hypocalcaemia was seen in 25 (37.5%) patients and out of 70 patients of age group 33-50 years, a symptomatic hypocalcaemia was seen in 13 (18.58%) patients. Statistically significant (P=0.015) difference between the both groups for the frequency of asymptomatic hypocalcaemia was seen. In age group 33-50 years, asymptomatic hypocalcaemia was seen in 16/48 (33.33%) patients and 7/50 (14%) patients respectively from Group A and Group B. Statistically significant (P=0.032) difference between the both groups for the frequency of asymptomatic hypocalcaemia was seen. (Table 3).

**Table 1** Comparison of Asymptomatic Hypocalcaemia between both groups

Group	Asymptomatic Hypocalcaemia		Total	P. Value
	Yes(%)	No(%)		
A	45(37.5)	75(62.5)	120	0.001
B	19(15.83)	101(84.17)	120	

**Table 2** Comparison of asymptomatic hypocalcaemia between both groups for male and female

Group	Asymptomatic Hypocalcaemia		Total	P. Value
	Yes(%)	No(%)		
Male patients of both groups				
A	18(47.37)	20(52.63)	38	0.007
B	7(17.07)	34(82.93)	41	
Female patients of both groups				
A	32(39.02)	50(60.98)	82	0.010
B	16(20.25)	63(79.75)	79	

**Table 3** Comparison of asymptomatic hypocalcaemia between both groups for different age groups

Group	Asymptomatic Hypocalcaemia		Total	P. Value
	Yes(%)	No(%)		
Age group 18-32 years				
A	27(37.5)	45(62.5)	72	0.015
B	13(18.58)	57(81.42)	70	
Age group 33-50 years				
A	16(33.33)	32(66.67)	48	0.032
B	7(14)	43(86)	50	

**DISCUSSION**

The development of post-thyroidectomy hypocalcaemia is multifactorial. The suggested

contributory factors include hemodilution secondary to intravenous fluid administration during the perioperative phase, increased urinary

calcium excretion secondary to surgical stress, calcitonin release after thyroid gland manipulation, and hungry bone syndrome in patients with metabolic bone disease. However, hypoparathyroidism through direct injury, removal or devascularization of parathyroid glands is the most likely cause of postoperative hypocalcemia.<sup>10</sup>

In present study frequency of asymptomatic hypocalcaemia was significantly higher in patients of Group A 37.5% as compare to Group B (15.83%). In a study conducted by Islam MS et al<sup>11</sup> in Bangladesh, Total 65 patients were enrolled those came for total thyroidectomy irrespective of age and sex. The incidence of asymptomatic hypocalcaemia was 88%. Findings of this study are much higher than our study. Iqbal J et al<sup>12</sup> reported asymptomatic hypocalcaemia in 18.8% patient in his study after total thyroidectomy. In another study by Malik V et al,<sup>13</sup> frequency of asymptomatic hypocalcaemia was found in 24.14% patients. All the patients underwent total thyroidectomy. Findings of this study is comparable with the present study. In one study of Erbil et al, total thyroidectomy was performed in 130 patients with multinodular goiter and asymptomatic hypocalcaemia was found in 31.2% patients.<sup>15</sup> In another study by Lankarani et al, sub-total thyroidectomy was performed in 102 patients with multinodular goiter and asymptomatic hypocalcaemia was found in 19.6% patients.<sup>16</sup> In another study by Gentileschi et al,<sup>17</sup> asymptomatic hypocalcaemia was reported as 19.27%. In the present study, asymptomatic hypocalcaemia was seen in male patients of Group A and B as 47.37% and 17.07% respectively and in female patients of Group A and B as 39.02% and 20.25% respectively. Díez el al,<sup>18</sup> observed asymptomatic hypocalcaemia in 21.4% male and 35.8% female patients. These findings are comparable with my study. In present study, significant (P= 0.015) difference was found in younger and older age groups for post thyroidectomy asymptomatic hypocalcaemia. But Unalp HR et al<sup>19</sup> observed significant higher asymptomatic hypocalcaemia in older age group.

In their study out of 34 patients, asymptomatic hypocalcaemia was seen in 41.2% patients.

## CONCLUSION

Frequency of asymptomatic hypocalcaemia was significantly higher after total thyroidectomy as compare to sub-total thyroidectomy. Male or female can be equally victim of asymptomatic hypocalcaemia after total or subtotal thyroidectomy. There is an equal chance of development of asymptomatic hypocalcaemia in younger and older age groups after total or subtotal thyroidectomy.

## REFERENCES

1. Pesce CE, Shiue Z, Tsai H-L, Umbricht CB, Tufano RP, Dackiw APB, et al. Postoperative Hypocalcemia After Thyroidectomy for Graves' Disease. *Thyroid*. 2010 Nov;20(11):1279–83.
2. Rios A, Rodriguez JM, Balsalobre MD, Tebar FJ, Parrilla P. The value of various definitions of intrathoracic goiter for predicting intraoperative and postoperative complications. *Surgery* 2010;147(2):233-38.
3. Papavramidis TS, Michalopoulos N, Pliakos J, Triantafillopoulou K, Sapalidis K, Deligiannidis N, et al. Minimally invasive video-assisted total thyroidectomy: an easy to learn technique for skillful surgeons. *Head Neck*. 2010 Oct;32(10):1370–6.
4. Emre AU, Cakmak GK, Tascilar O, Ucan BH, Irkorucu O, Karakaya K. Complications of total thyroidectomy performed by surgical residents versus specialist surgeons. *Surg Today* 2008;38(10):879-85.
5. Asari R, Passler C, Kaczirek K, Scheuba C, Niederle B. Hypoparathyroidism after total thyroidectomy: A prospective study. *Arch Surg* 2008;143(2):132-37; discussion 138.
6. Sippel RS, Ozgul O, Hartig GK, Mack EA, Chen H. Risks and consequences of incidental parathyroidectomy during thyroid resection. *Aust N Z J Surg*. 2007;77():33-36.

7. Jessie WU, Harrison B. Hypocalcemia after Thyroidectomy: The Need for Improved Definitions. *WJOES*.2010;2(1):17-20.
8. Tredici P, Grosso E, Gibelli B, Massaro MA, Arrigoni C, Tradati N. Identification of patients at high risk for hypocalcemia after total thyroidectomy. *ActaOtorhinolaryngol Ital*. 2011 Jun;31(3):144–8.
9. P Tredici, E Grosso, B Gibelli, Ma Massaro, C Arrigoni, and N Tradati. Identification of patients at high risk for hypocalcemia after total thyroidectomy. *ActaOtorhinolaryngol Ital*.2011;31(3):144-148.
10. Jessie WU, Harrison B. Hypocalcemia after Thyroidectomy: The Need for Improved Definitions. *World Journal of Endocrine Surgery*. 2010;2(1):17–20.
11. Islam MS, Paul D, Sultana T, Rahman MQ, Rehena Z, Ahmed ANN. Evaluation of serum calcium level measurement in total thyroidectomy patients - a prospective study in tertiary hospitals. *Bangladesh J Med Biochem*.2011;4(1):4-9.
12. Iqbal J, Ali B, Pasha HK. Total thyroidectomy: A study of 58 cases. *J CollPhyscSurg Pak*1997; 7(1):20-1.
13. Vikas M, Watson GJ, Phua CQ, Murthy P. Fluctuation of corrected serum calcium levels following partial and total thyroidectomy. *Int. J. Clin. Med*. 2011;02(04):411–7.
14. Erbil Y, Bozbora A, Özbey N. Predictive Value of Age and Serum Parathormone and Vitamin D3 Levels for Postoperative Hypocalcemia After Total Thyroidectomy for Nontoxic Multinodular Goiter. *Arch Surg*. 2007;142(12):1182-87.
15. Erbil Y, Bozbora A, Özbey N. Predictive Value of Age and Serum Parathormone and Vitamin D3 Levels for Postoperative Hypocalcemia After Total Thyroidectomy for Nontoxic Multinodular Goiter. *Arch Surg*. 2007;142(12):1182-87.
16. Lankarani M, Mahmoodzadeh H, Poorpezeshk N, Soleimanpour B, Haghpanah V, Heshmat R. HYPOTHYROIDISM FOLLOWING THYROID SURGERY. *ActaMedica Iranica*.2008;46(3):225-32.
17. Gentileschi P, Gacek IA, Manzelli A, Coscarella G, Sileri P, Lirosi F, et al. Early (1 hour) post-operative parathyroid hormone (PTH) measurement predicts hypocalcaemia after thyroidectomy: a prospective case-control single-institution study. *Chir Ital*. 2008 Aug;60(4):519–28.
18. Díez Alonso M, Sánchez López JD, Sánchez-Seco Peña MI, Ratia Jiménez T, Arribas Gómez I, Rodríguez Pascual Á, et al. Serum PTH levels as a predictive factor of hypocalcaemia after total thyroidectomy. *Cirugía Española (English Edition)*. 2009;85(2):96–102.
19. Unalp HR, Erbil Y, Akguner T, Kamer E, Derici H, Issever H. Does near total thyroidectomy offer advantage over total thyroidectomy in terms of postoperative hypocalcemia? *International Journal of Surgery*. 2009 Jan;7(2):120–5.