

**Research Article**

**Assessment of post-operative transient hypocalcemia  
in cases undergone thyroidectomy**

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**ABSTRACT**

**Objective:** to assess the post-operative transient hypocalcemia in cases undergone thyroidectomy.

**Material and methods:** This case series study was conducted at Department of Surgery Sahiwal Medical College, Sahiwal from July 2017 to December 2017. Total 50 patients undergoing thyroidectomy having age >60 years either male or female were selected. Post-thyroidectomy transient hypocalcemia was assessed in selected patients.

**Results:** Out of 50 patients hypocalcemia was found in 14 (28%) patients after 24 hours of thyroidectomy. Among the 14 patients of hypocalcemia, transient hypocalcemia was noted in 12 (86%) patients and permanent hypocalcemia was noted in 2 (14%) patients. Transient hypocalcemia was noted in 2 (25%) male patients and 10 (23.81%) female patients. Statistically insignificant association of development of transient hypocalcemia with gender was noted with p value 0.94. Transient hypocalcemia was found in 9 (36%) patients who were managed with near or total thyroidectomy and in 3 (60%) patients with re-surgery and no case of transient hypocalcemia was noted in Subtotal and hemi thyroidectomy cases. Development of transient hypocalcemia was significantly associated with type of thyroidectomy with p value 0.002.

**Conclusion:** In this study transient hypocalcemia was noted in most of hypocalcemic patients. Most of the patients undergone thyroidectomy were female and transient hypocalcemia was more common in female patients as compared to male patients but the difference was not significant. Statistically significant association of transient hypocalcemia with type of surgery noted.

**Keywords:** hypocalcemia, thyroidectomy

**INTRODUCTION**

Thyroid surgery is accepted as a safe operation, and now has lower morbidity and satisfactory postoperative outcomes resulting in a shorter hospital stay. It is even performed as day surgery.<sup>1-2</sup> Thyroidectomy is a widely performed

operation in the practice of general surgery and has a complication rate lower than 5%. Most frequently, postoperative hypocalcemia has been observed.<sup>3</sup>

The incidence of transient hypocalcemia ranges from 10% to 50%, and permanent hypocalcemia usually occurs in 0%–2% of patients according to different definitions.<sup>4</sup> It is known that not all patients with hypocalcemia will have associated symptoms such as numbness and spasm. Some surgeons advocated prolonged stays that are not cost-effective nowadays.<sup>5</sup>

Since postoperative hypocalcemia requires calcium replacement and monitoring of serum calcium levels, it leads to prolongation of hospital stay and ensuing increase in hospital expenditures.<sup>6</sup> Trauma to 1 or more parathyroid glands or vasculature during thyroidectomy, or incidental removal of parathyroid gland with the specimen may lead to development of postoperative hypocalcemia. Etiological considerations include postoperative alkalosis-induced hypocalcemia resulting from hyperventilation triggered by postoperative pain, and dilutional hypocalcemia.<sup>7</sup> Incidental rate of parathyroid organs in thyroidectomy specimens have been reported to range between 6.4–31%.<sup>8</sup>

## MATERIAL AND METHODS

This case series study was conducted at Department of Surgery Sahiwal Medical College, Sahiwal from July 2017–December 2017. Total 50 patients undergoing for thyroidectomy having age >60 years either male or female were selected. Patients with a history of pancreatitis, nephritic syndrome, chronic renal failure, malabsorption and pre-operative abnormal serum calcium were excluded. An approval was taken from institutional ethical committee and written informed consent was taken from every patient.

History of all the selected patients was taken. The type of thyroidectomy was planned according to the diagnosis. After 48 hours of surgery, 5ml blood sample of all the patients was drawn and sent to laboratory for analysis of calcium. Patients who developed hypocalcaemia were treated with 10% calcium gluconate administered intravenously over a period of 10 minutes. Hypocalcaemia which resolved within a week was

labeled as transient and which needed calcium supplementation beyond 3 months as permanent. Patients, who developed hypocalcaemia postoperatively were treated with 10% calcium gluconate intravenously over a period of ten minutes. Findings were noted on pre-designed proforma along with demographic profile of the patients.

Collected data was entered in SPSS version 20 and analyzed. Mean and SD was calculated for numerical data i.e. age. Frequencies were calculated for categorical data like, hypocalcemia (Yes/No) type of hypocalcemia (transient/permanent), gender, histology and type of surgery performed.

## RESULTS

Out of 50 patients hypocalcemia was found in 14 (25%) patients after 24 hours of thyroidectomy. (Fig. 1)

Among the 14 patients of hypocalcemia, transient hypocalcemia was noted in 12 (86%) patients and permanent hypocalcemia was noted in 2 (14%) patients. (Fig. 2)

Male patients were 8 (16%) and female patients were 42 (84%). Transient hypocalcemia was noted in 2 (25%) male patients and 10 (23.81%) female patients. Statistically insignificant association of development of transient hypocalcemia with gender was noted with  $p$  value 0.94. (Table 1)

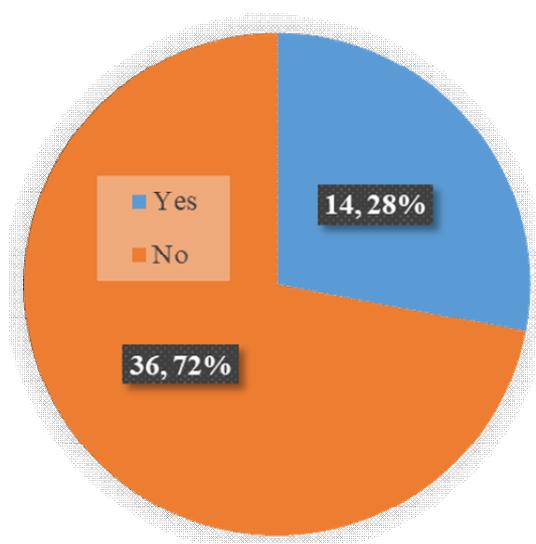
Patients were divided into two age groups i.e. age group  $\leq 50$  years and age group  $>50$  years. Total 39 (78%) patients belonged to age group  $\leq 50$  years and 11 (22%) patients belonged to age group  $>50$  years. Transient hypocalcemia was noted in 6 (15.38%) patients of age group  $\leq 50$  years and in 6 (54.55%) patient of age group  $>50$  years. Difference of frequency of transient hypocalcemia between the both age groups was not significant ( $P = 0.277$ ). (Table 2)

Near total or total thyroidectomy was performed in 25 (50%) patients followed by Subtotal and hemi thyroidectomy in 20 (40%) patients and Re-surgery was done in 5 (10%) patients. Transient

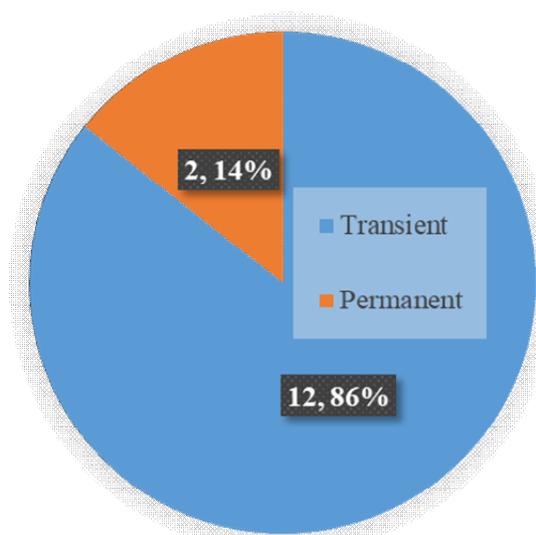
hypocalcemia was found in 9 (36%) patients who were managed with near or total thyroidectomy and in 3 (60%) patients with re-surgery and no case of transient hypocalcemia was noted in Subtotal and hemi thyroidectomy cases. Development of transient hypocalcemia was significantly associated with type of thyroidectomy with p value 0.002. (Table 3)

Out 50 patients, total 31 (62%) patients were benign and 19 (38%) patients were malignant. Transient hypocalcemia was found in 9 (29.03%) benign cases and in 3 (15.79%) malignant cases. Statistically insignificant association between development of transient hypocalcemia and histology was noted with p value 0.29. (Table 4)

**Fig:** Frequency of hypocalcemia



**Fig: 2** Type of hypocalcemia



**Table 1:** Association of transient hypocalcemia with gender

Gender	Transient Hypocalcemia		Total	P value
	Yes	No		
Male	2 (25%)	6 (75)	8 (16%)	0.94
Female	10 (23.81%)	32 (76.19%)	42 (84%)	
<b>Total</b>	12	38	50	

**Table 2:** Association of transient hypocalcemia with age

Age	Transient Hypocalcemia		Total	P value
	Yes	No		
≤ 50 years	6 (15.38%)	33 (84.62%)	39 (78%)	0.277
>50 years	6 (54.55%)	5 (45.45%)	11 (22%)	
<b>Total</b>	12	38	50	

**Table 3:** Association of transient hypocalcemia with type of thyroidectomy

Type of thyroidectomy	Transient Hypocalcemia		Total	P value
	Yes	No		
Near or total	9 (36%)	16 (64%)	25 (50%)	0.002
Subtotal and hemi thyroidectomy	0	20 (100%)	20 (40%)	
Re-surgery	3 (60%)	2 (40%)	5 (10%)	
<b>Total</b>	12	38	50	

**Table 4:** Association of transient hypocalcemia with histology

Histology	Transient Hypocalcemia		Total	P value
	Yes	No		
Benign	9 (29.03%)	22 (70.97%)	31 (62%)	0.29
Malignant	3 (15.79%)	16 (84.21%)	19 (38%)	
<b>Total</b>	12	38	50	

## DISCUSSION

Post-operative hypocalcaemia is frequently seen within the first few days after total thyroidectomy. It is most often transient and may indicate iatrogenic injury to parathyroid gland.<sup>9</sup>The incidence of inadvertent parathyroidectomy was reported to be 12-16.4% in the literature. The risk factors include total thyroidectomy, extra thyroidal extension and thyroiditis.<sup>10</sup>The response to calcium replacement therapy for transient hypocalcaemia after thyroidectomy can be seen in a few days to weeks.<sup>11</sup> The persistent hypocalcaemia after 6 months of thyroidectomy is considered permanent hypocalcaemia. The incidence of permanent hypocalcaemia is less than 1-2%.<sup>12-13</sup>

In present study, out of 50 patients hypocalcemia was found in 14 (25%) patients after 24 hours of thyroidectomy. Among the 14 patients of hypocalcemia, transient hypocalcemia was noted in 12 (86%) patients and permanent hypocalcemia was noted in 2 (14%) patients. In one study by Tredici et al, post thyroidectomy hypocalcemia was developed in 62% patients at second day of

surgery which is higher than our study.<sup>14</sup> In one study by Raviraj et al, post thyroidectomy was noted in 26 patients, of which transient hypocalcemia was noted in 25 (96.15%) patients.<sup>15</sup> In another study by Viswanathan et al, authors observed hypocalcaemic symptoms appearing in 40% of patients on the first day, 50% on the second day and 10% on the third day of surgery.<sup>16</sup> Therefore, it is very important to identify the risk factors of developing hypocalcaemia in patients who undergo day care surgery as majority of transient hypocalcaemia develop on the second day. Calo et al found hypocalcaemia as the commonest cause for extended hospital stay.<sup>17</sup> Tongol et al reported,<sup>18</sup> the overall incidence of post-thyroidectomy hypocalcemia in 11.98% patients. In a previous local retrospective study, the overall prevalence rate of postthyroidectomy hypocalcemia was 21%.<sup>19</sup>

In our study, transient hypocalcemia was noted in 6 (15.38%) patients of age group ≤ 50 years and in 6 (54.55%) patient of age group >50 years. Difference of frequency of transient hypocalcemia between the both age groups was not significant

( $P = 0.277$ ). Randall et al observed significantly elevated risk of hypocalcaemia in patients younger than 45 years irrespective of malignancy compared to older age group, who have increased protective effect against hypocalcaemia.<sup>20</sup> However, a previous study has shown that patients above the age of 65 years experienced increased incidence of hypocalcaemia.<sup>21</sup>

In this study, male patients were 8 (16%) and female patient were 42 (84%). Transient hypocalcemia was noted in 2 (25%) male patients and 10 (23.81%) female patients. Statistically insignificant association of development of transient hypocalcemia with gender was noted with  $p$  value 0.94. A study by Gann et al has included female sex as one of the factors for increased incidence of hypocalcaemia as women are more prone for calcium and vitamin D deficiency than men.<sup>22</sup> In present study, the age and sex were not significant. In our study, we found that near total thyroidectomy with or without block dissection was a significant risk factor for postoperative transient hypocalcaemia ( $p=0.002$ ). More aggressive surgery leads to injury to parathyroid and transient hypocalcaemia.<sup>23</sup>

## CONCLUSION

In this study transient hypocalcemia was noted in most of hypocalcemic patients. Most of the patients undergone thyroidectomy were female and transient hypocalcemia was more common in female patients as compared to male patients but the difference was not significant. Statistically significant association of transient hypocalcemia with type of surgery noted.

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