

A Study of Complications in Patients Undergoing Thyroid Surgery in a Tertiary Hospital in Central India.

1. Dr.AvinashRinait,Assistant Professor Dept. SurgeryDatta Meghe Medical College, Nagpur-441110
2. Dr. Anil Akulwar,Professor and Head, Dept. of Surgery,Datta Meghe medical college, Nagpur-441110
3. Yashwant Lamture Professor Dept. of Surgery Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences, Sawangi (Meghe), Wardha-442001

Corresponding Author

Dr. Anil Akulwar,

Professor and Head, Dept. of Surgery,

Datta Meghe medical college, Nagpur

Abstract

Background: Thyroid surgery may result in post-operative complications and hence this study was done to assess the early and late complication rates of thyroidectomy in patients undergoing surgery of thyroid in a tertiary teaching hospital in Central India.

Materials and methods: This study was an observational study with prospective design, which included a total of 102 patients undergoing thyroidectomy in the department of General Surgery between January 2020 and December 2020. The patients were followed up for a period of 3 months post surgery.

Results: Out of 102 patients, 82.4% were women. The total thyroidectomy was the most common thyroid surgery performed and the most common indication for the surgery was suspicious fine-needle aspiration report for malignancy of thyroid. Among the complications, Hypocalcemia was most common complication with a frequency of 58.82% while a total of 3 patients died.

Conclusion: Thyroid surgery has hypocalcemia commonly and the follow up should be done for at least 3 months for the late complications.

Keywords: thyroid surgery, complications, hypocalcemia

Introduction:

In the recent times, thyroid disorders have emerged as one of the most common diseases of the endocrine glands.¹ Surgery is often needed for the treatment of the benign condition such as large goiters causing symptoms and for the treatment of thyroid gland cancers.² Thyroid surgery i.e. thyroidectomy has some potential complications, the important postoperative complications among them include hypocalcemia, hematoma, wound infection, recurrent laryngeal nerve (RLN) injury, and Horner's syndrome.^{3,4,5} Among these, postoperative complication of hypocalcemia is the important complication of thyroid surgery which may cause potentially dangerous symptoms and an increased hospitalization stay.^{6,7} Hypocalcemia is mostly caused by hypoparathyroidism, which results from accidental injury to the gland, its removal, or its devascularization.^{6,7} Hoarseness of voice is mostly caused by Recurrent Laryngeal Nerve injury, which results mostly in vocal and laryngeal dysfunction.⁸ The quality of life following these complications is reduced and often leads to rise in the cost of individual's health-care often requiring a lifelong medical care.⁹ The complications of thyroidectomy are influenced by the type of the thyroid disease, the disease extent, its removal approaches, the quality of surgeon's training and the experience in the field.^{10,11,12,13} This study was undertaken to assess the early and late complications in the patients undergoing thyroid surgery in a tertiary teaching hospital in Central India.

Methodology: This study was an observational study with prospective design, which included a total of 102 patients undergoing thyroidectomy in the department of General Surgery between January 2020 and December 2020. The patients were followed up for a period of 3 months post surgery. The clinical data was gathered from all the patients by convenience sampling.

Exclusion criteria: The patients who had the following were excluded from the study:

1. hypocalcemia,
2. vocal cord paralysis,
3. Horner's syndrome,
4. tracheal injury and esophagus injury.

The patients were systematically examined by the surgeon and the demographic profile, the past medical history and the indication of thyroidectomy were noted. Also, weight, height and blood pressure were measured and a general examination was performed.

After the thyroidectomy, the patients were followed up for a period of 3 months for the early and late complications which included hypocalcemia, hematoma, hoarseness, infection, dysphagia and Horner's syndrome.

Normal value of total calcium is between 8.5 mg/dl and 10.5 mg/dl and hence below 8.5 mg/dl was considered as hypocalcemia.

The SPSS software (version 21) was utilized for the statistical analysis of the data. Quantitative data in the study were expressed as mean \pm standard deviation (SD) and the qualitative data were reported by frequency (%). The values for the 95% confidence interval and the calculated odds ratio were reported. The significance level was considered as to be <0.05 .

Results:

This study included a total of 102 patients undergoing thyroidectomy with 18 [17.6%] men and 84 [82.4%] women. The means of age and BMI were calculated. Among the past history, Hypertension was found to be significantly more common among women than men. Also, smoking was found to be significantly more frequent among men than women ($P < 0.05$). Other variables studied were not found to be different between men and women ($P > 0.05$).

The type of thyroidectomy and its indication in the patients undergoing thyroidectomy were shown in table 2. The total thyroidectomy was the most common thyroid surgery performed and the most common indication for the surgery was suspicious fine-needle aspiration report for malignancy of thyroid. Subtotal thyroidectomy was the least frequent types of surgery and Graves' disease was the least frequent indication for thyroid surgery. There difference between the frequency distributions of the type of surgery and indication for surgery by genders was not statistically significant ($P > 0.05$).

The postoperative complications, early and late, in the patients undergoing thyroidectomy were shown in table 3. 26 patients (25.5%) were uncomplicated. 54 patients (52.9%) were with hypocalcaemia, 33 patients (32.4%) had hoarseness, 4 (3.9%) had wound infection, 33 (32.4%) had

dysphagia to solids. Late complications were observed after a 3 month follow up study after the surgery and data was collected from 94 patients (as 8 patients did not respond), 74 (78.8%) had no complications and the remaining 20 were associated with complications as follows; 7 (7.4%) had hypocalcemia, 4 (4.3%) had dysphagia and 8 (8.5%) had hoarseness. Also, 3 (3.2%) patients had died after 3 months as shown in table 3.

Discussion

Our study was done in a tertiary hospital in central india with a total of 102 patients. In our study, Women (82.4%) had the highest prevalence of thyroidectomy. The total thyroidectomy was the most common thyroid surgery performed and the most common indication for the surgery was suspicious fine-needle aspiration report for malignancy of thyroid. Post operative hypocalcemia was found to be the most common complication with a frequency of 52.9%. Our study is in accordance the study by Yan *et al.*¹⁴ who in his study of 7385 patients undergoing thyroidectomy found that 71% were female and also by Huang *et al.*¹⁵ who reported that out of 3428 patients undergoing thyroidectomy, the ratio of female to male was found to be 5.24:1, while the mean age of patients was found to be more than 40 years. The findings of many of the epidemiological studies had shown a higher prevalence of thyroid disorders among women than men.^{15,16}

Out of 102, 26 were uncomplicated and 76 cases (74.5%) had postoperative complications of thyroidectomy, in which hypocalcemia was the most common early complication with a frequency of 52.9%. In many previous studies also, hypocalcemia was identified as the most common early postoperative complication. In some studies, the incidence of temporary hypocalcemia was found to be 2%–53% and that of permanent hypocalcemia was found to be 0.4%–13.8%.^{6,17,18,19} Suwannasarn *et al.*¹⁹ in their study observed that immediate hypocalcemia was found in 38.5% patients. Seo *et al.* study showed early postoperative hypocalcemia to be 42%.¹⁸ Our study had higher incidence which maybe due to the higher percentage of total thyroidectomy. Hypocalcemia is mostly caused by hypoparathyroidism, which results from accidental injury to the gland, it's removal, or it's devascularization.^{6,7} The hypocalcemia presents as paraesthesia, carpopedal spasm, positive Chvostek's sign, positive Trousseau's sign, numbness around the mouth and finger-tips, tetany, convulsion, prolonged QT interval on the electrocardiogram, laryngospasm, coma, and death.³ Hypocalcemia presented mostly on the first and second days after surgery.

Transient hypocalcemia responds well to calcium replacement therapy within few days or weeks but when the hypocalcemia does not return to normal within 6 months, it is considered permanent.^{6,7}

In our study, the late complication of hypocalcemia was found to be 7.4% in a 3 months' follow-up post surgery. The early diagnosis of this complication (within the first 24 hours after surgery) and the early onset of medications controlled the symptoms and prevented the long-term complications. According to few studies, delayed hypocalcemia may occur in the first postoperative week and has been found to occur months and even years following thyroidectomy.^{6,20} The development of hypocalcemia after thyroid surgery for Graves' disease may have serious repercussions though.²¹ Even with the best surgical technique and an anatomical preservation of the parathyroid glands and their blood supply, the patients may present with a delayed and rapid drop in serum calcium in just 2–3 days after total thyroidectomy.

Other complications found in our study were hoarseness of voice, wound infection and dysphagia to solids. The previous studies have found Recurrent Laryngeal Nerve injury, hypoparathyroidism and transient hypocalcemia as the common complications of thyroidectomy and other complications such as damages to the carotid artery, jugular vein, and esophagus and cellulitis to be uncommon.^{22,23} It is believed that the incidence of these complications is associated with the extent of surgery and the surgeon's experience.^{10,24,25}

Some previous studies have found that the incidences of hypocalcemia, RLN injuries and other post-operative complications in the patients undergoing total thyroidectomy were comparatively significantly higher than patients undergoing unilateral thyroidectomy.^{15,26} In our study, however, the complications were not influenced by the extent of surgery. Taksandere reported on sensory nerve conduction study in patient of thyroid dysfunction²⁷. Wagh et. al. assessed relationship between hypothyroidism and body mass index in women²⁸. Few of the related studies were reported by Agrawal et. al.²⁹, Balwani et. al.³⁰, Gulve et. al.³¹, and Jose et. al.³². Fulzele et. al. reported on methods for early detection of postoperative infection³³.

Our observational study with a prospective design showed more better quality data especially about the early postoperative complication rate as retrospective studies are not that great to detect all cases and hence some complications are often missed by them.

Conclusion: This study concluded that hypocalcemia was the most common early complication and that total thyroidectomy is the most common surgery and that the chance of complications increases during the 3-month postoperative follow-up hence all patients should be followed upto minimum 3 months.

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Tables and figures:

1. Baseline characteristics of patients undergoing thyroidectomy.

Characteristics	Male (n=18)	Female (n=84)	Total (n=102)	<i>P value</i>
Age (year)	41.6 ± 12.9	39.8±13.2	40.2±13.4	0.447
BMI (kg/m ²)	24.0±2.7	27.3 ±3.6	26.9 ±3.6	0.573
Past history				
Diabetes	1/18 (2.7)	13/84 (7.8)	14/102 (6.9)	0.276
Hypertension	2/18 (5.4)	32/84 (19.2)	34/102 (16.7)	0.007
Hyperlipidemia	6/18 (16.2)	23/84 (13.8)	29/102 (14.2)	0.826
IHD	0/18 (0)	6/84 (3.6)	6/102 (2.9)	0.589
COPD	2/18 (5.4)	3/84 (1.8)	5/102 (2.4)	0.248
Cancer	0/18 (0)	1/84 (0.6)	1/102 (0.5)	0.621
Smoking	6/18 (16.2)	4/84 (2.4)	10/102 (4.9)	0.003
Educational status				
Illiterate	9/18 (24.3)	24/84 (14.4)	33/102 (16.2)	0.008
Elementary	10/18 (27.0)	57/84 (34.1)	67/102 (32.8)	
Diploma	6/18 (16.2)	62/84 (37.1)	68/102 (33.3)	
Bachelor	12/18 (32.4)	24/84 (14.4)	36/102 (17.6)	

2. Surgical variables in patients undergoing thyroidectomy

Variables	Male (n=18)	Female (n=84)	Total (n=102)	<i>P</i>
Type of surgery:				
Lobectomy	2 (5.4)	7 (10.2)	9 (9.3)	0.666
Total thyroidectomy	10 (56.8)	46 (56.9)	56 (56.9)	
Subtotal thyroidectomy	1 (2.7)	5 (3)	6 (2.9)	
Near-total thyroidectomy	2 (10.8)	14 (14.4)	16 (13.7)	
Other	3 (24.3)	12 (15.6)	15 (17.2)	
Indication for surgery:				
Grave's disease	1 (2.7)	0 (0)	1 (0.5)	0.319
Multinodular goiter	4 (27)	50 (29.9)	60 (29.4)	
Suspicious FNA for malignancy	9 (59.5)	96 (57.5)	118 (57.8)	
MTC	2 (5.4)	11 (6.6)	13 (6.4)	
Others	2 (5.4)	10 (6)	12 (5.9)	

Some patients have more than 1 complication.

3. Early and late postoperative complications in patients undergoing thyroid surgery (thyroidectomy).

Complication	Early Complication (n=102)	Late Complication (n=94)
Uncomplicated	26/102 (25.5)	74/94 (78.8)
Hypocalcemia	54/102 (52.9)	7/94 (7.4)
Hoarseness	33/102 (32.4)	8/94 (8.5)
Dysphagia	33/102 (32.4)	4/94 (4.3)
Wound infection	4/102(3.9)	0/94 (0)
Death	0/102 (0)	3/94 (3.2)

Some patients have more than 1 complication. Late complication assessed within 3 months..