

## FREQUENCY OF EARLY COMPLICATIONS IN THYROID SURGERY

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### Abstract

#### OBJECTIVE

To determine the frequency of early complications among patients undergoing thyroid surgery at tertiary care hospital.

#### STUDY DESIGN

cross-sectional

#### PLACE AND DURATION OF THE STUDY

Department of General Surgery, Shaheed Mohtarma Benazir Bhutto Medical University (SMBBMU), Larkana, from 10<sup>th</sup> July 2023 to 10<sup>th</sup> December 2023.

#### METHODOLOGY

Patients who went through thyroid surgery and were between the ages of 20 and 70, regardless of gender, met the inclusion criteria. Patients with recurrent malignancy, recurrent laryngeal nerve paralysis, laboratory evidence of hypoparathyroidism or recurrent goitre were excluded. Patients reported with thyroid surgery, including hypocalcaemia, hoarseness, dysphagia, haemorrhage, and wound infections. SPSS version 26 was used to statistically analyse the data.

#### RESULTS

The mean age of the 164 participants was noted as 46.65±9.75. Early complications in thyroid surgery were analysed across 164 patients who underwent various thyroidectomy procedures. Hypocalcaemia was the most common early complication, occurring in 51.2% (84/164) of patients, followed by hoarseness in 35.4% (58/164) with the odds ratios (hypocalcaemia OR=0.978, 95% CI: 0.704–1.357, p=0.876; hoarseness OR=1.252, 95% CI: C.I:0.879–1.785, p=0.185). Gender differences were also noted; hypocalcaemia was more common among female patients. This association was not statistically significant (p=0.588).

#### CONCLUSION

Hypocalcaemia and hoarseness were the most common early complications following thyroidectomy, particularly after total thyroidectomy. Patients with a diagnosis of female appeared to be more vulnerable to calcium imbalance after surgery; however, the difference was not statistically significant. Larger studies with longer follow-up periods are recommended to confirm these findings.

## INTRODUCTION

Thyroid surgery is a frequently performed operation in which all or part of the thyroid is removed [1]. As with any surgery, there are early complications associated with thyroid surgery [2]. Benign or malignant tumours can cause thyroid issues that need to be surgically treated [3]. Goitre is another sign of thyroid surgery; it is nodular or colloid and may result in symptoms such as breathing difficulty, voice change, dysphagia, etc. [4] These incisional complications are linked to specific procedures, the level of technological skill demonstrated by the surgeon, and the patient's fitness status [5]. Multinodular goitre (MNG) is the most frequent thyroid disease [6]. In Pakistan, MNG is the most common thyroid disease [7]. Patients who have thyroidectomies run the risk of developing long-term problems [8]. The type of thyroidectomy depends on the size of the lesion, the extent of damage, and the nature of the lesion, whether it is benign or malignant [9].

Wound infection; haematoma/haemorrhage resulting in airway compromise; hypocalcaemia; damage to the superior or recurrent laryngeal nerve; and thyroid storm are among the most common postoperative problems following thyroid surgery [10]. Accurate understanding of the complex anatomical intricacies and exacting surgical technique are essential factors that determine effective results and restrict problems to tolerable levels [11]. Thyroidectomy-related complications are correlated with the disease's kind, stage, and methods of removal as well as the expertise and training of the surgeon [12]. Increased surgeon expertise has been strongly linked to lower rates of problems following thyroid surgery, according to several studies [13].

As far as we are aware, there aren't many published studies about the early issues that Pakistani thyroid surgery patients face. Therefore, the present study aimed to assess the early problem prevalence among thyroid surgery patients. The findings from this study will provide accurate and current information on the early complications after thyroid surgery that will be used to guide the development of strategies to improve management

and reduce the risk of complications from timely therapy administration.

## METHODOLOGY

A descriptive cross-sectional study was conducted in the Department of Surgery of SMBBMU at Larkana, Sindh, with 164 patients selected by the non-probability consecutive sampling technique. Informed consent was taken for all participants before enrolling. The sample size was calculated by the WHO sample size calculator. The frequency of respiratory obstruction is 4.14%, with a 95% confidence level and a margin of error of 3%. The minimum required sample size was calculated to be 164 patients. Patients with proven or recurrent malignancy, previous thyroid surgery, recurrent goitre, recurrent laryngeal nerve palsy, laboratory evidence of hypoparathyroidism, or unwillingness to participate were excluded. All patients underwent thyroid surgery according to hospital protocol. Following surgery, patients were transferred to the ward and monitored for postoperative complications until discharge. Postoperative complications assessed in the present study included hypocalcaemia, hoarseness, dysphagia, haemorrhage, and wound infection. Haemorrhage was defined as any blood loss from the vessels surrounding the thyroid gland. Hypocalcaemia was defined as a serum calcium level  $\leq 8$  mg/dL on the fifth postoperative day, confirmed on at least one additional occasion. Hoarseness was diagnosed as postoperative voice alterations that indicated laryngeal nerve irritation or dysfunction. Difficulty in swallowing (dysphagia) was defined as difficulty reported after surgery. Wound infections were categorised as pain, swelling, redness, and purulent discharge within 7 days after surgery.

Data collected was analysed in SPSS-26. Continuous data were presented as mean  $\pm$  standard deviation (SD), and categorical data were presented as frequencies and percentages. The chi-square test was used to determine association between categorical variables. Crude odds ratios with 95% confidence intervals were computed from 2 $\times$ 2 contingency tables for the estimation of the strength of association.

## RESULTS

| Table I: Demographic Characteristics of Study Participants (n=164)                        |            |
|-------------------------------------------------------------------------------------------|------------|
| Characteristics                                                                           | n (%)      |
| <b>Age (Mean <math>\pm</math> SD) = 46.65 <math>\pm</math> 9.75</b>                       |            |
| 20-45 years                                                                               | 82 (50.0)  |
| >45 years                                                                                 | 82 (50.0)  |
| <b>Body Mass Index (Mean <math>\pm</math> SD) = 25.74 <math>\pm</math> 3.56</b>           |            |
| 20-26 kg/m <sup>2</sup>                                                                   | 105 (64.0) |
| >26 kg/m <sup>2</sup>                                                                     | 59 (36.0)  |
| <b>Systolic Blood Pressure (Mean <math>\pm</math> SD) = 120.73 <math>\pm</math> 10.93</b> |            |
| 100-120 mmHg                                                                              | 85 (51.8)  |
| >120 mmHg                                                                                 | 79 (48.2)  |
| <b>Diastolic Blood Pressure (Mean <math>\pm</math> SD) = 74.30 <math>\pm</math> 12.88</b> |            |
| 50-80 mmHg                                                                                | 102 (62.2) |
| >80 mmHg                                                                                  | 62 (37.8)  |
| <b>Duration of Hospital Stay (Mean <math>\pm</math> SD) = 8.21 <math>\pm</math> 2.05</b>  |            |
| 2-8 days                                                                                  | 104 (63.4) |
| >8 days                                                                                   | 60 (36.6)  |
| <b>Gender</b>                                                                             |            |
| Male                                                                                      | 40 (24.4)  |
| Female                                                                                    | 124 (75.6) |
| <b>Diabetes Mellitus</b>                                                                  |            |
| Diabetic                                                                                  | 47 (28.7)  |
| Non-Diabetic                                                                              | 117 (71.3) |
| <b>Hypertension</b>                                                                       |            |
| Hypertensive                                                                              | 95 (57.9)  |
| Non-Hypertensive                                                                          | 69 (42.1)  |
| <b>IHD</b>                                                                                |            |
| Yes                                                                                       | 10 (6.1)   |
| No                                                                                        | 154 (93.9) |
| <b>COPD</b>                                                                               |            |
| Yes                                                                                       | 7 (4.3)    |
| No                                                                                        | 157 (95.7) |
| <b>Smoking Status</b>                                                                     |            |
| Smoker                                                                                    | 27 (16.5)  |
| Non-Smoker                                                                                | 137 (83.5) |

Among 164 patients in this study who had thyroid surgery, demographic and clinical data are included in **Table I**. The mean age was 46.65 $\pm$ 9.75 years and equally distributed for age groups 20–45 years and over 45 years. The BMI values indicated that the majority of patients (64%) had a BMI in the healthy range (20–26 kg/m<sup>2</sup>), and 36% were

in the category of overweight. The average length of stay was 8.21 $\pm$ 2.05 days, and 63.4% of patients were discharged within 8 days post-operatively. Gender distribution was female predominant (75.6%), with diabetes mellitus as a significant comorbidity (28.7%) along with hypertension (57.9%); a few others were ischaemic heart disease (6.1%) and COPD (4.3%).

| Table II: Early Complications in Patients Undergoing Thyroidectomy |                 |           |          |          |                        |         |
|--------------------------------------------------------------------|-----------------|-----------|----------|----------|------------------------|---------|
| Early Complications                                                | Type of Surgery |           |          |          |                        | P-Value |
|                                                                    | Lobectomy       | TT        | STT      | NTT      | O.R 95% C. I           |         |
| Hypocalcaemia                                                      | 12 (7.3)        | 46 (28.0) | 10 (6.1) | 16 (9.8) | 0.978<br>(0.704–1.357) | 0.876   |
| Hoarseness                                                         | 12 (7.3)        | 30 (18.3) | 7 (4.3)  | 9 (5.5)  | 1.252<br>(0.879–1.785) | 0.185   |
| Dysphagia                                                          | 4 (2.4)         | 18 (11.0) | 3 (1.8)  | 8 (4.9)  | 0.861<br>(0.577–1.284) | 0.851   |
| Haemorrhage                                                        | 4 (2.4)         | 20 (12.2) | 1 (0.6)  | 11 (6.7) | 0.774<br>(0.527–1.138) | 0.108   |
| Wound Infection                                                    | 3 (1.8)         | 3 (1.8)   | 2 (1.2)  | 0 (0.0)  | 2.057<br>(0.766–5.523) | 0.057   |

Total Thyroidectomy: TT. Subtotal Thyroidectomy: STT: Near-Total Thyroidectomy: NTT

**Table II** shows the early complications based on the type of thyroid surgery performed (lobectomy, total thyroidectomy, subtotal thyroidectomy and near-total thyroidectomy). The increased rates of complications were reported for patients that received a total thyroidectomy (hypocalcaemia 28% vs other types: lobectomy 7.3%). In the present study, 18.3% of patients after total

thyroidectomy had hoarseness as a reason, which could be related to trauma and irritation during extensive surgical intervention on neural structures in larger-sized tumours that increased the incidence of voice changes. Wound infections were rare and occurred only in the patient's undergoing lobectomy or total thyroidectomy surgery, irrespective of the type of surgery.

| Table III: Comparison of Early Complications with Gender (n=164) |           |           |                         |         |
|------------------------------------------------------------------|-----------|-----------|-------------------------|---------|
| Early Complications                                              | Gender    |           |                         | P-Value |
|                                                                  | Male      | Female    | O.R 95% C. I            |         |
| Hypocalcaemia, n (%)                                             | 19 (47.5) | 65 (52.4) | 0.821<br>(0.402–1.677)  | 0.588   |
| Hoarseness, n (%)                                                | 17 (42.5) | 41 (33.1) | 1.496<br>(0.721–3.105)  | 0.278   |
| Dysphagia, n (%)                                                 | 11 (27.5) | 22 (17.7) | 1.759<br>(0.765–4.045)  | 0.181   |
| Haemorrhage, n (%)                                               | 9 (22.5)  | 27 (21.8) | 1.043<br>(0.443–2.455)  | 0.923   |
| Wound infection, n (%)                                           | 4 (10.0)  | 4 (10.0)  | 3.333<br>(0.794–14.000) | 0.100   |

**Table III** shows the distribution of early complications in both male and female patients. Hypocalcaemia was observed in 52.4% (65/124) of female patients and 47.5% (19/40) of male

patients. However, this difference was not statistically significant ( $p=0.588$ ). Other complications, such as hoarseness, dysphagia, haemorrhage and wound infections, did not differ

significantly between genders. The findings indicate the need for more careful postoperative monitoring of these complications in female patients and patients undergoing total thyroidectomy.

## DISCUSSION

As the present study included only patients undergoing surgery for benign thyroid disease, comparisons were primarily made with studies evaluating postoperative complications in similar patient populations. The result of this study highlighted the early complications that occur after the surgical procedure of thyroidectomy. Hypocalcaemia and hoarseness were the commonest complications noted in our study in total thyroidectomy patients. Previous Pakistani studies have documented the same complications when comparing early and late results after thyroid surgery [18]. This finding is like the complications reported in other thyroid surgeries, as total thyroidectomy has a greater complication rate due to the wide extent of surgery and the proximity of the parathyroid glands and the recurrent laryngeal nerve to the thyroid gland.

In total thyroidectomy, our study showed a 28% prevalence of hypocalcaemia, which agreed with other studies stating the range of 20-30% [14,15]. This complication is mainly the result of accidental damage or removal of the parathyroid glands [16]. Which is important for regulating calcium. In humans, hypocalcaemia can be clinically seen as perioral numbness, muscle cramps and, in severe cases, tetany. Reported rates vary among studies, most likely because of differences in the care of the parathyroids during surgery and in the monitoring of calcium levels postoperatively, emphasising the need for careful surgical technique [17]. In addition, although not statistically significant, the odds ratio (0.978) for hypocalcaemia in our study did not rule out the clinical significance, but there was a difference in gender even if the association was not statistically significant (OR=0.821, 95% CI: 0.402-1.677; p=0.588). This trend, although not significant, is consistent with other studies that target potential gender differences of calcium metabolism and hypocalcaemia susceptibility.

The second most common complication (18.3%) was hoarseness, which is mainly associated with surgical injuries to the recurrent laryngeal nerves. This nerve is very fragile and very close to the thyroid gland, making it simple to injure when being dissected. Previously reported rates of hoarseness are similar, at 10-20%, especially in total thyroidectomy [20]. However, other factors like dysphagia and haemorrhage were more prevalent in patients undergoing total thyroidectomy than in the ones who did less extensive procedures, which may indicate that higher surgical complexity and longer operative time are associated with higher complications after surgery [21]. Though it's usually temporary, this condition can have a major impact on the patient's quality of life, especially when it comes to speech and, in extreme cases, breathing. The analysis of our study once again points out the importance of nerve monitoring during the surgery and careful surgical care to reduce this risk.

Wound infection was a relatively uncommon complication in our study, 1.8% of all thyroidectomy patients and 1.8% of all lobectomy patients, but this is in line with other literature reporting a 1-3% incidence of wound infection [22]. Patients undergoing total thyroidectomy showed a higher risk of wound infection (odds ratio = 2.057), but this finding was not statistically significant, suggesting that wound infection is a potential concern for patients undergoing total thyroidectomy, but it can be managed effectively with proper post-thyroidectomy care and sterilisation of surgical techniques.

These rates of complications are found to be comparable to other studies conducted in the region, including Pakistan and Saudi Arabia. Similar trends were observed for the incidence of hoarseness and hypocalcaemia, which were noted by Saaq et al. in total thyroidectomy cases, helping to substantiate that these complications are prevalent in various healthcare settings [23]. A similar incidence of hypocalcaemia (25%) and of hoarseness (15%) was reported by Alqahtani et al. in a Saudi population [24]. In the postoperative period, there was no difference in the complication rates in the 2 groups of patients with thyroid cancer surgery and in similar groups of

patients with thyroid disease [19], but caution should be exercised in making direct comparisons, as the present study population consisted only of patients with benign thyroid disease. The consistent results obtained in the various regions indicate how significant the surgical experience and postoperative management are in reducing complication rates.

Based on these findings, our study adds to the body of evidence that shows that the risk of complications, such as hypocalcaemia and hoarseness, is greater after total thyroidectomy. This is achieved by patient selection, intraoperative monitoring, and postoperative care, which are key factors that can mitigate these risks. Observed trends were not statistically significant but were clinically significant and like those of other studies. Larger groups of patients and longer follow-up periods in thyroid surgery will allow for more confident statements to be made and improved risk stratification and management plans.

## CONCLUSION

Hypocalcaemia and hoarseness were the most common early complications following thyroidectomy, particularly after total thyroidectomy. Patients with a diagnosis of female appeared to be more vulnerable to calcium imbalance after surgery; however, the difference was not statistically significant. Larger studies with longer follow-up periods are recommended to confirm these findings.

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