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Original Research Article

Surgical profile of patients undergoing thyroid surgery and its complications at a tertiary care centre: A hospital based retrospective study

Arunkumar Tukaram[1], Prashanth N Hudge[1], Prashanth Kumar B[1], Vishwanath S Mogali[1,*]

[1] *Dept. of Surgery, ESIC Medical College, Gulbarga, Karnataka, India*

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ABSTRACT

Background: Patient related, surgeon related and thyroid gland related factors affect complication rate of surgery of thyroid gland. Hence, it is important to carry out more studies on surgical profile of patients undergoing surgery of thyroid gland and associated complications to help young surgeons understand the depth of the topic.
Objective: To study surgical profile of patients undergoing thyroid surgery and its complications
Materials and Methods: Retrospective observational analysis has been performed. Study population included all patients who had a thyroidectomy operation performed. Medical records of all patients who underwent thyroid surgery were retrospectively evaluated. A data forms were set up for the detailed collection of data on surgical techniques and their related complications. Data extraction was carried out from the patients' medical records manually.
Results: Most commonly affected age group was 31-40 years. Females were commonly affected (93.7%). Right lobe was affected in almost half of cases. Majority i.e. 95.8% of lesions of the thyroid gland were benign in nature and only 4.2% were malignant. Most commonly performed surgical procedure was hemi-thyroidectomy in 54.1% of cases. Complication rate was only 15.6% and all complications were mild. There was no recurrent laryngeal nerve injury and No death was recorded. Most common complication was transient hypocalcemia and seroma in four cases each.
Conclusion: Middle aged and females are commonly affected with the thyroid disease requiring surgery. Right lobe of thyroid commonly affected. Complication rate is low and all complications were mild in nature. This suggests that now a day, the thyroid surgery is not associated with mortality and severe morbidity as was the case in previous days.

1. Introduction

The mortality and morbidity associated with thyroidectomy was high during earlier during the 20^{th} century. Hence, those days, surgery of the thyroid was not considered appropriate. It was actually banned due to high mortality by the French Medical Society. But over the period of time, with improved understanding of the function of the thyroid gland, the surgeries of the thyroid gland have become safer. But, even then the surgeries of the thyroid gland are associated with some complications as with any other surgeries. The rate of complications associated with surgeries of the thyroid glands get reduced with the proper surgical skills, and thorough anatomical and physiological knowledge about the thyroid gland. Complete de-vascularization is the key to minimize the rate of complications. [1]

* *Corresponding author*.
E-mail address: vsmdoc@gmail.com (V. S. Mogali).

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Surgery of the thyroid gland is simple. But a variety of factors can create complications. Present days surgery of the thyroid gland is not associated with the deaths. It is also associated with the low rates of morbidity after the surgery. But, it must be performed by the highly skilled surgeon. Sometimes, death can occur or patient may land into serious complications. The various factors that can lead to complications are not only associated with the doctors but also are related with the gland itself and the patient also. The surgeon should be properly trained and highly skilled.[2,3]

It is necessary that the nerves around the thyroid gland should be properly identified. The dissection should be accurate. Blood supply to parathyroid should be preserved. This will lead to good outcome and fewer rates of complications. Normal anatomy can be distorted if the thyroid gland swelling is very large or if it is pathological. In case of toxic goiter and cancer of the thyroid glands, the vascularity increases. In such cases, thyroidectomy becomes difficult. These are all the thyroid gland related factors that can increase the complication rates after the thyroid surgery. If the patient is obese, having the short neck, having cervical spondylitis and such things also lead to the increased rates of complications after the surgery of the thyroid gland. There are also surgeon factors like years of experience, knowledge level, peer pressure, issues of the married life, place of training, personality type etc. affect the complication rate associated with surgery of the thyroid gland.[4,5]

The surgeon should be careful and he should try to balance for safety of the patient and the training of the surgery. Difficulty level of the surgery of the thyroid gland depends upon factors like rate of complications, time taken for the surgery, and loss of the blood.[6]

The levels of assessment of the difficulty for the surgery of the thyroid gland subjective. The data comes mainly from case reports and individual papers.[7,8] For other surgeries, the difficulty can be measured. But for the surgery of the thyroid gland, it is difficult to measure the difficulty level.[9]

Present study was carried out to study surgical profile of patients undergoing thyroid surgery and its complications.

2. Materials and Methods

A retrospective observational analysis has been performed. Approval to conduct a retrospective review of the medical records of patients was obtained from the institutional ethics and scientific committee of Employees State Insurance Corporation medical college and hospital, Gulbarga. Karnataka. Our study population included all patients who had a thyroidectomy operation performed at Employees State Insurance Corporation medical college and hospital, Gulbarga. Karnataka from April 2016 to March 2021. Medical records of all patients who underwent thyroid surgery at Employees State Insurance Corporation medical college and hospital, Gulbarga. Karnataka were retrospectively evaluated. We excluded patients with preoperative hypoparathyroidism, chronic kidney disease, history of dysphonia, patients with missing data, and those lost to follow up, were excluded from the study. A data forms were set up for the detailed collection of data on surgical techniques and their related complications. Data extraction was carried out from the patients' medical records manually.

Data were categorised preoperative data included demographic data (age and sex); measurements from related laboratory examinations, such as thyroid function test, serum calcium; ultrasound-colour Doppler of the neck; vocal cord function estimated using flexible fiber-optic laryngoscopy; and preoperative fine needle aspiration biopsy (FNAB). Operation data included details of surgery and postoperative histopathological analysis. Post-thyroidectomy complications data such as recurrent laryngeal nerve injury, hypocalcaemia, hematoma formation, wound infection, hoarseness, loss of high pitch sound, seroma, sinus, hypertrophic scar, tracheal injury, and thoracic duct injury. Those complications were established based on clinical assessment aided by biochemical and/or radiological investigations. No routine preoperative parathyroid hormone (PTH) level is measured. Calcium level is measured routinely preoperatively and postoperatively (in both total and subtotal thyroidectomies) every eight hours until the patient is discharged home. Postoperatively, vocal cord assessment had done if there was a change in voice or a clinical concern for vocal cord injury.

Thyroidectomy procedures

1. Hemithyroidectomy- Hemithyroidectomy is resection of one lobe of thyroid gland along with isthmus.
2. Subtotal thyroidectomy-Subtotal thyroidectomy leaves a remnant of thyroid tissue bilaterally. The typical reason to leave a remnant at the ligament of Berry is the pursuit of preservation of the RLN and blood supply to the parathyroids.
3. Near -total thyroidectomy-Near-total thyroidectomy is complete resection on one side while leaving a remnant of thyroid tissue on the contralateral side, leaving less than 1 g of tissue adjacent to the RLN at the ligament of Berry.
4. Total thyroidectomy- Total thyroidectomy involves excision of all visible thyroid tissue.
5. Total thyroidectomy with neck dissection- Total thyroidectomy with dissection of level 6 group lymph nodes

Data were analysed using the Statistical Package for Social Sciences Version. Descriptive statistics were presented as means and proportions.

Table 1: Age and sex distribution of study subjects

Variables		Number	%
Age (years)	10-20	6	6.3
	21-30	19	19.8
	31-40	39	40.6
	41-50	20	20.8
	51-60	12	12.5
Sex	Male	6	6.3
	Female	90	93.7

3. Results

Table 1 shows age and sex distribution of study subjects. Most commonlyaffected age group was 31-40 years followed by 41-50 years. Females were commonly affected (93.7%).

Table 2: Distribution of study subjects as per laterality of the thyroid lesion

Laterality	Number	%
Right lobe	45	46.9
Left lobe	23	23.9
Bilateral	28	29.2
Total	96	100

Table 2 shows distribution of study subjects as per laterality of the thyroid lesion. Right lobeof the thyroid gland was found to be affected in almost half of the cases.

Table 3: Distribution of study subjects as per FNAC diagnosis

FNAC diagnosis	Number	%
Benign disease	92	95.8
Malignant disease	4	4.2
Total	96	100

Table 3 shows distribution of study subjects as per FNAC diagnosis. Majority i.e. 95.8% of the lesions of the thyroid gland were benign in nature and only 4.2% were malignant.

Table 4: Distribution of study subjects as per procedure performed

Procedure performed	Number	%
Hemi-thyroidectomy	52	54.1
Sub-total thyroidectomy	2	2.1
Near total thyroidectomy	1	1.1
Total thyroidectomy	37	38.5
Total thyroidectomy with neck dissection	4	4.2
Total	96	100

Table 4 shows distribution of study subjects as per procedure performed. Most common performed surgical procedure was hemi-thyroidectomy in 54.1% of the cases followed by total thyroidectomy in 38.5% of the cases.

Table 5: Distribution of study subjects as per complications after surgery

Complications after surgery	Number	%
Transient hypocalcemia	4	4.2
Hoarseness of voice	1	1.1
Loss of high pitch	1	1.1
Hematoma	3	3.1
Sinus	1	1.1
Seroma	4	4.2
Hypertrophic scar	1	1.1
Total	15	15.6

Table 5 shows distribution of study subjects as per complications after surgery. The complication rate in the present study was only 15.6% and all complications were of mild nature. There was no recurrent laryngeal Nerve injury and No death was recorded. Most common complication was transient hypocalcemia and seroma in four cases each.

4. Discussion

Most commonly affected age group was 31-40 years followed by 41-50 years. Females were commonly affected (93.7%). Right lobe of the thyroid gland was found to be affected in almost half of the cases. Majority i.e. 95.8% of the lesions of the thyroid gland were benign in nature and only 4.2% were malignant. Most common performed surgical procedure was hemi-thyroidectomy in 54.1% of the cases followed by total thyroidectomy in 38.5% of the cases. The complication rate in the present study was only 15.6% and all complications were of mild nature. No death was recorded. Most common complication was transient hypocalcemia and seroma in four cases each.

Bothra S et al[10] performed a prospective study to develop the difficulty scales for thyroidectomy using 11 items among 52 cases. They included patient factors like height of the patient, weight of the patient, neck length of the patient etc. before surgery. 19 was the minimum score and 54 was the maximum score. They found that after recording the surgeons pulse using the novel pulse oximeter, it was high when he was operating on recurrent laryngeal nerve dissection. Overall, the 20 was the minimum score and the 35.5 was the maximum score.

Chen KC et al[11] analyzed data of 14 years including 9316 patients who underwent surgery for the thyroid gland. They also calculated the hazard ratio. They observed that 13.5% of the cases had hypoparathyroidism over nine years of period who underwent bilateral total thyroidectomy. The incidence of the hypoparathyroidism was lowest to the tune of 1.2% among those patients who underwent unilateral sub-total thyroidectomy. The hazard of getting hypoparathyroidism was 11.86 for patients who underwent bilateral total thyroidectomy. The hazard ratio was 8.56 for those who underwent radial thyroidectomy with unilateral

neck lymph node dissection. The hazard ratio was 4.39 for those cases who underwent unilateral total thyroidectomy. The hazard ratio was 2.8 for those cases who underwent another side sub-total thyroidectomy.

Osmolski A et al[12] carried out a retrospective analysis of those cases who were diagnosed with the cancer of the thyroid in 77 cases and those cases who were diagnosed with the multinodular goiter in 770 cases and were treated surgically. 23% of the cases were operated by using the unilateral lobectomy. 51% of the patients underwent total unilateral lobectomy and for the remaining cases, sub-total thyroidectomy or the partial thyroidectomy was used. The authors did not find any reports of mortality similar to the findings of the present study where we also did not find any cases of death. 4% of cases had to undergo the wound exploration. 6% of the cases experienced the thyroid storm. 1% of the cases had injury to the nerve which was bilateral and permanent. The authors observed that there were differences which were statistically significant in terms of injury to the nerve either temporary or permanent between two groups of patients who underwent total and partial thyroidectomy. There was no difference between two groups of patients as cancer and goiter of multinodular in nature in terms of thyroidectomy for the nerve injury. 4% experienced hypoparathyroidism which was temporaryin nature.

Chahardahmasumi E et al[13] included 204 cases who underwent thyroidectomy over a period of one year. They reported that the prevalence of thyroidectomy in females was 81.9% which is similar to the finding of the present study where we also found that the thyroidectomy rate in women was over 90%. The authors reported that the total thyroidectomy was the most commonly performed surgery which is also similar to the findings of the present study. The authors also observed that the fine needle aspiration cytology suspected cases of cancer of the thyroid gland were the most common cause of patients undergoing surgery for the thyroid. In our study, we had more frequency of the benign thyroid disease for which the patients underwent thyroid surgery. 54.4% of the cases in their study had hypocalcemia while only 4.2% of the cases in the present study had hypocalcemia.

Patoir A et al[14] studied 3454 cases operated for thyroidectomy. The all patients were operated by 28 different surgeons at five different hospitals. The authors used the multi-level linear regression to explain the variations. Preoperative variables were responsible for 86% of the operative time. 32% of the variation in the outcome was explained by factors related to the surgeons. 29% of the variation in the outcome was explained by factors related to the location of the surgery. 24% of the variation in the outcome was explained by factors related to the variables of the patients or procedure of the surgery. Experienced surgeons took significantly lesser time compared to the less experienced surgeons for the thyroidectomy procedure. When the surgery was supervised by the experienced surgeons, it actually increased the operative time. 13% of the variation in the outcome was explained by factors related to the technical difficulties which could not be anticipated.

Padur AA et al[15] carried out a review using available data on safety of the total thyroidectomy. They also compared it with the subtotal thyroidectomy and other surgeries of the thyroid gland. They observed that the transient hypocalcemia is the most frequent complication associated with the total thyroidectomy and less frequent among those undergoing subtotal thyroidectomy. We also observed that the transient hypocalcemia was the most common complication in our study but it was limited to only 4.2% of the total cases. The authors found in their review of the available data that the incidence of injury to the recurrent laryngeal nerve is not significantly different between those who underwent thyroidectomy or subtotal thyroidectomy. The authors thus concluded that in the present era, total thyroidectomy is safe with few manageable complications arising out of it.

5. Conclusion

Middle aged and females are commonly affected with the thyroid disease requiring surgery. Right lobe of thyroid is affected commonly. Complication rate is low and all complications were mild in nature. This suggests that now a day, the thyroid surgery is not associated with mortality and severe morbidity as was the case in previous days.

6. Conflict of Interest

There are no conflicts of interest in this article.

7. Source of Funding

None.

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Author biography

Arunkumar Tukaram, Associate Professor

Prashanth N Hudge, Senior Resident

Prashanth Kumar B, Assistant Professor

Vishwanath S Mogali, Assistant Professor

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