

Original research article**Thyroid surgery: Post-operative complications: An observational study****¹Dr. B Vanaja Ratna Kumari and ²Dr. Rama Krishna Reddy**¹Professor, Department of General Surgery, Government General Hospital, Markapur, Andhra Pradesh, India²Post Graduate, Department of General Surgery, Andhra Medical College, Visakhapatnam, Andhra Pradesh, India**Corresponding Author:**

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Abstract

Introduction and Background: The aim is to study the frequency of postoperative complications after thyroid surgery for both benign and malignant disorders and to verify these results by analysing the influence of the surgical scope and the clinical course of thyroid surgery.

Materials and Methods: An Observational study was done at a tertiary care centre, Government General Hospital, Markapur, and AMC/KGH, Visakhapatnam, Andhra Pradesh, India, over a period of 2years 5months, August 2021 to December 2023 which included 20 individuals who had thyroid surgeries for different thyroid conditions in Department of General Surgery.

Results: According to the results of this research, hemithyroidectomy is completely risk-free. Malignant thyroid disease had a greater frequency of complications after thyroidectomy compared to benign thyroid disease according to this series. Reports indicate that the rate of postoperative death ranges from zero to one percent. This series has a mortality rate of 1.71%, which is lower than the majority of published data. An uncommon consequence of thyrotoxic storm was the cause of death for two of the patients. Eliminating this problem requires proper preoperative preparation to achieve euthyroid state, followed by ten days of therapy.

Conclusion: It can be concluded that rather than the kind of operation, I think that the operator's ability and experience dictate the rate of complications.

Keywords: Thyroid, surgery, hemithyroidectomy, postoperative complications.

Introduction

Thyroidectomy, a normal surgical surgery, is characterised by an unusually low mortality rate. Nevertheless, there exist certain complexities associated with it, contingent upon the surgeon's proficiency. The rates of surgical morbidity for thyroidectomy are exceptionally low in specialized facilities ^[1, 2]. Thyroid surgery, when conducted by a proficient surgeon, infrequently leads to complications and never culminates in fatality. Postoperative complications encompass a spectrum of conditions, ranging from small problems such as flap edoema to more severe ones like haemorrhage or lung obstruction, both of which have the potential to be life-threatening ^[1, 3].

Following diabetes mellitus, the thyroid gland is the most common endocrine disease. There are two categories of thyroid issues that may require surgical treatment: benign tumours and malignant tumours. Thyroid surgery may be necessary in cases of nodular or colloid goitre, a condition characterised by the swelling and enlargement of the thyroid gland, which can cause difficulties in swallowing, voice production, and breathing. While aesthetics are often the primary motivation for a thyroidectomy, the treatment may also be required if the enlarged gland leads to toxic symptoms or if there is a high likelihood of cancer ^[4, 5]. The type of thyroidectomy performed is determined by the features of the lesion, including its size and whether it is benign or malignant. In the 17th and 18th centuries, the likelihood of dying from complications such as sepsis and haemorrhage following thyroid surgery was as high as 40%. The implementation of thorough preoperative preparation and the adherence to safe surgical procedures can effectively mitigate the occurrence of the majority of these problems. Prior to the start of the surgery, the patient will have attained a state of euthyroidism due to the meticulous preoperative care ^[6, 7]. Hyperthyroidism may result in laryngeal edoema, leading to airway obstruction. Respiratory distress may arise due to improper technique resulting in severe bleeding or repeated paralysis of the laryngeal nerve. Myxedema, persistent hyperthyroidism, or parathyroid insufficiency may arise as a result of inadequate or excessive excision of thyroid tissue due to a lack of experience or attention to technical details. The assessment of complication rates associated with thyroid surgery can only be accomplished by the analysis of case studies and follow-up data ^[8, 9].

The researchers aimed to evaluate the incidence of complications associated with four distinct types of thyroid surgeries, namely bilateral partial thyroidectomy, near full thyroidectomy, hemi thyroidectomy,

and total thyroidectomy, among a cohort of patients undergoing surgery for various thyroid conditions. The objective of this study is to evaluate the incidence of problems that occur after thyroidectomy for both benign and malignant conditions [8, 10]. This report presents a concise overview of the findings from a clinical audit conducted on thyroid surgeries carried out on adult patients at the Government General Hospital in Markapur, Andhra Pradesh. The hazards linked to thyroidectomy are examined and compared to prior studies.

Materials and Methods

The study comprised a cohort of 20 patients who underwent thyroid operations for various thyroid disorders between August 2021 and December 2023 at the Government General Hospital in Markapur and AMC/KGH, Visakhapatnam, Andhra Pradesh, India,

Methods

All patients selected for the study underwent a thorough physical examination, followed by a meticulous procedure of collecting their medical history. Every patient completed the conventional haematological and biochemical testing. Specialized testing, such as thyroid hormone profiles and blood calcium estimations, would only be required in certain cases when there was a suspicion of a change in functional status. Prior to surgery, all patients underwent an examination of their voice cords using an indirect laryngoscope. However, only those who developed hoarseness afterwards underwent a thorough evaluation of their vocal cords. If a patient exhibited indications of hypocalcemia (hyperparathyroidism) based on both clinical and biochemical tests, they were diagnosed with this condition. FNAC was performed on all patients. Treatment was administered depending on the final diagnosis, following expert guidance. The data for each patient was documented in accordance with the prescribed format provided in the form.

Results

During the study period, a cohort of 20 patients, ranging in age from 18 to 60, underwent thyroid surgery.

Table 1: Gender wise distribution of the patients

Sr. No.	Gender	Patients	%
1.	Male	4	20%
2.	Female	16	80%
Total		20	100%

The study sample consisted of 20 patients, with an equal distribution of 10 women and 10 men.

Table 2: The histopathological diagnosis and complications of each surgery

Histological diagnosis	Total no of patients	Number of complications occurred			
		Hemithyroidectomy	Bilateral SBT	Near TT	THYR
Colloid and recurrent Goitre	2	-	-	-	1
Solitary nodule of Thyroid	4	1	-	-	-
Multinodular Goitre	5	-	5	-	-
Toxic multinodular Goitre	4	-	6	-	2
Thyroid Carcinoma	5	-	-	4	1
Total	20	1	11	4	4

Table 2 presents the histological diagnosis and consequences associated with each operational technique.

Table 3: Surgical complications

Sr. No.	Complications	Incidence
1.	Haemorrhage	2
2.	Respiratory	1
3.	Temporary recurrent laryngeal nerve palsy	1
4.	Superior laryngeal nerve palsy	2
5.	Hypoparathyroidism	1
6.	Thyroid storm	3
7.	Edema of flap	2
8.	Seroma	2
9.	Wound infection	2
10.	Oesophageal injury	2
11.	Death	2

The table 3 provides a comprehensive breakdown of the surgical complications that occurred throughout the period in which thyroidectomy was performed.

Table 4: Thyroidectomy complications for benign and malignant disorders

Sr. No.	Histopathological Diagnosis	Total Patients	Complications
1.	Benign	8	4
2.	Malignant	12	5
	Total	20	9

Table 4 presents the complication rate following thyroidectomy for both benign and malignant conditions. In Table 4, 8 individuals had benign illnesses and 12 patients had malignant diseases out of a total of 20 patients. A total of 9 patients were reported to have various problems among the aforementioned individuals.

Provide the histopathological diagnosis for each case and indicate the number of patients who have undergone each type of procedure. Postoperative haemorrhage was observed in four patients. Three of these patients had undergone total thyroidectomy, while the remaining patient had undergone bilateral partial thyroidectomy. Two of the patients required immediate re-exploration, whereas the haemorrhage cleared spontaneously without the need for drainage in the other two patients.

Discussion

The findings of this study align with those of comparable hospitals worldwide that have published their findings. When comparing complete thyroidectomy with bilateral partial thyroidectomy, hemorrhagic complications were more common in the former. The risk of hemorrhagic complications was greater in the complete thyroidectomy group, although being much lower in the bilateral partial thyroidectomy group. Removing the end tracheal tube during the post-anesthesia phase is a common time for this to happen [11, 12]. If intraoperative hemostasis is good, postoperative bleeding can be prevented. Accurate surgical procedure is crucial. The difficulty of a thyroidectomy depends on the surgeon's level of training and the size of the operation. Senior surgeons or advanced surgical trainees operating under supervision undertake the vast majority of thyroid surgeries at Government General Hospital in Markapur, Andhra Pradesh. The surprisingly low prevalence of vocal cord palsy could be explained by this [13, 14].

When two patients had trouble breathing, they were transported to the intensive surgical care unit with endotracheal tubes in place. Both patients made a good recovery and were able to be extubated without any problems with their breathing within 24 hours. One patient who had a near-complete thyroidectomy, one patient who had a whole thyroidectomy, and three patients who had bilateral subtotal thyroidectomy all experienced temporary recurrent laryngeal nerve palsy. Bilateral recurrent laryngeal nerve palsy did not occur in any of the participants in this research [15, 16].

Paresis of the superior laryngeal nerve occurred in two patients after total thyroidectomy. Among patients who had a whole thyroidectomy, 5.98% experienced transitory hyperparathyroidism, while 1.71% had a bilateral partial thyroidectomy. People who had a partial or near-total thyroidectomy did not develop hyperparathyroidism. Three patients who underwent bilateral subtotal thyroidectomy and one patient who underwent hemi-thyroidectomy were among the four patients who suffered from postoperative wound infection. When the infection had gone, the incision was sutured shut again a few days after the surgical treatment to drain the pus or fluid had been performed. After a benign multinodular goitre was surgically removed during a bilateral partial thyroidectomy, a seroma formed in one patient. Due to toxic goitre, one patient underwent a bilateral partial thyroidectomy; however, the flap developed edoema [17, 19].

One patient who underwent bilateral partial thyroidectomy for nontoxic multinodular goitre experienced injury to the esophagus. A female patient who had undergone bilateral partial thyroidectomy for toxic goitre died of thyroid storm, haemorrhage, and pulmonary obstruction, one of two fatalities in this series. Another male patient who had a thyroidectomy to remove the malignancy has passed away [20, 21].

While it is ideal for parathyroid glands to receive blood from the patient's own circulation, this may not be enough to stop temporary hypoparathyroidism, and hypocalcaemia following thyroidectomy is a common complication of hypoparathyroidism. Bilateral thyroid surgery should be seen as an expected result, not a potential complication, of temporary hypoparathyroidism. The amount of thyroid surgery is associated with an increase in the severity and duration of hypocalcemia. Still, the majority of studies that have come out in the past five years put the percentage at less than 10%. We found that the incidence of transient hypoparathyroidism increased with the degree of surgery, which is consistent with the literature [22, 23].

The parathyroid gland is susceptible to revascularization or accidental removal together with the thyroid gland during the non-capsular dissection approach, which could explain why there is a 7.69% incidence of hypoparathyroidism. If this problem persists after capsular dissection, the procedure may help alleviate it. Both the unilateral and bilateral subtotal thyroidectomy complication rates were found to be identical in this study. While recurrent laryngeal nerve injuries were marginally more common in bilateral subtotal thyroidectomy, the increased risk of transient hypocalcemia and haemorrhage are the primary causes of the higher risk of complications following TT. Bilateral partial thyroidectomy is associated with an increased risk of various consequences [24, 26].

Given its relatively low complication rate and the fact that complete thyroidectomy is the absolute indication in more complex thyroid diseases, we are of the belief that, under technically meticulous execution, total thyroidectomy is a safe and dependable treatment. The technique of bilateral partial thyroidectomy should be discontinued since it is associated with complications as high as total thyroidectomy and can lead to recurrences^[25, 27].

The results of this study show that hemithyroidectomy is a completely risk-free operation. Additionally, this series shows that complications after thyroidectomy are more common in cases of malignant thyroid illness compared to benign thyroid disease. There have been reports of postoperative death rates ranging from zero to one percent. The mortality rate in this series is 1.71%, which is different from the majority of published statistics. A rare side effect of thyrotoxic storm was the cause of death for one of the two patients^[26, 28].

Conclusion

This study demonstrates that when dealing with benign gland-wide thyroid illness, a hemi- or complete thyroidectomy can be performed with a little risk of complications. On the other hand, recurrent laryngeal nerve injury following thyroid surgery is less common and less serious than hypoparathyroidism. Thoroughly evaluating surgical and medical treatment options, having a solid understanding of surgical anatomy, using a rigorous surgical technique, meticulously dissecting the thyroid gland and recurrent laryngeal nerve in cases of bilateral operation, and having more precise surgical indications are all ways to reduce the risks and complications of thyroid surgery. It is not the type of operation that determines the complication rates, but rather the operative's ability and experience.

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Conflict of Interest

None.

References

1. Dorairajan N, Pradeep PV. Vignette thyroid surgery: A glimpse into its history. *Int. Surg.* 2013;98(1):70- 75.
2. Dadan J, Nowacka A. A journey into the past - the history of thyroid surgery. *Wiad. Lek.* 2008;61(61):88-92.
3. Terris DJ, Snyder S, Carneiro-Pla D. American Thyroid Association statement on outpatient thyroidectomy. *Thyroid.* 2013;23:1193-202.
4. Steurer M, Passler C, Denk DM. Advantages of recurrent laryngeal nerve identification in thyroidectomy and parathyroidectomy and the importance of preoperative and postoperative laryngoscopic examination in more than 1000 nerves at risk. *Laryngoscope.* 2002;112:124-133.
5. Rosato L, Avenia N, Bernante P. Complications of thyroid surgery: Analysis of a multicentric study on 14,934 patients operated on in Italy over 5 years. *World J Surg.* 2004;28:271-276.
6. Stager SV. Vocal fold paresis: etiology, clinical diagnosis and clinical management. *Curr. Opin. Otolaryngol. Head Neck Surg.* 2014;22:444-449.
7. Joliat GR, Guarnero V, Demartines N, Schweizer V, Matter M. Recurrent laryngeal nerve injury after thyroid and parathyroid surgery: Incidence and postoperative evolution assessment. *Medicine (Baltimore).* 2017;96(17):e6674.
8. Reeve T, Thompson NW. Complications of thyroid surgery: How to avoid them, how to manage them, and observations on their possible effect on the whole patient. *World J Surg.* 2000;24:971-975.
9. Prgomet D, Janjanin S, Bilić M. A prospective observational study of 363 cases operated with three different harmonic scalpels. *Eur. Arch Otorhinolaryngol.* 2009;266(12):1965-1970.
10. Amit M, Binenbaum Y, Cohen JT. Effectiveness of an oxidized cellulose patch hemostatic agent in thyroid surgery: A prospective, randomized, controlled study. *J Am Coll. Surg.* 2013;217:221-225.
11. Sanapala A, Nagaraju M, Rao LN, Nalluri K. Management of bilateral recurrent laryngeal nerve paresis after thyroidectomy. *Anesth. Essays Res.* 2015;9(2):251-253.
12. Erbil Y, Barbaros U, Issever H, Borucu I, Salmaslioglu A, Mete O, *et al.* Predictive factors for recurrent laryngeal nerve palsy and hypoparathyroidism after thyroid surgery. *Clin. Otolaryngol.* 2007 Feb;32(1):32-37.
13. Thomusch O, Machens A, Sekulla C, Ukkat J, Lippert H, Gastinger I, *et al.* Multivariate analysis of risk factors for postoperative complications in benign goitre surgery: Prospective multicenter study in Germany. *World J Surg.* 2000 Nov;24(11):1335-1341.
14. Karamanakos SN, Markou KB, Panagopoulos K, Karavias D, Vagianos CE, Scopa CD, *et al.* Complications and risk factors related to the extent of surgery in thyroidectomy. Results from 2043 procedures. *Hormones (Athens).* 2010 Oct-Dec;9(4):318-325.

15. Flynn MB, Lyons KJ, Tarter JW, Ragsdale TL. Local complications after surgical resection for thyroid carcinoma. *Am. J Surg.* 1994 Nov;168(5):404-407.
16. Akin M, Kurukahvecioglu O, Anadol AZ, Yuksel O, Taneri F. Analysis of surgical complications of thyroid diseases: Results of a single institution. *Bratisl Lek Listy.* 2009 Jan;110(1):27-30.
17. Frilling A, Weber F. Complications in thyroid and parathyroid surgery. Oertli, D., Udelsman, R., editors. *Surgery of the thyroid and parathyroid glands.* 2nd edn. Berlin; London: Springer; c2012. p. 217-224.
18. Reeve T, Thompson NW. Complications of thyroid surgery: How to avoid them, how to manage them, and observations on their possible effect on the whole patient. *World J Surg.* 2000 Aug;24(8):971-975.
19. Chow TL, Chu W, Lim BH, Kwok SPY. Outcomes and complications of thyroid surgery: retrospective study. *Hong Kong Med. J.* 2001 Sep;7(3):261-265.
20. Fewins J, Simpson CB, Miller FR. Complications of thyroid and parathyroid surgery. *Otolaryngol. Clin. North Am.* 2003 Feb;36(1):189-206.
21. Mejia MG, Gonzalez-Devia D, Fierro F. Hypocalcemia post thyroidectomy: Prevention, diagnosis and management. *J Transl. Sci.* 2018;4:7.
22. Grabovac S, Prgomet D, Janjanin S, Hadzibegović AD. Usporedba vrijednosti parathyroid hormona prioperacijamastitne zlijezde ultrazvucnim rezacem conventionalism metodama [Parathyroid hormone values in thyroid gland surgeries by harmonic scalpel and by conventional methods]. *Lijec. Vjesn.* 2013;135(11-12):306-310.
23. Tredici P, Grosso E, Gibelli B, Massaro MA, Arrigoni C, Tradati N, *et al.* Identification of patients at high risk for hypocalcemia after total thyroidectomy. *Acta Otorhinolaryngol. Ital.* 2011;31(3):144- 148.
24. Abboud B, Sargi Z, Akkam M. Risk factors for post thyroidectomy hypocalcemia. *J Am. Surg.* 2002;195:456-461.
25. Radivojević RC, Prgomet D, Markesić J, Ezgeta C. Hypocalcaemia after thyroid surgery for differentiated thyroid carcinoma: preliminary study report. *Coll. Antropol.* 2012;36(2):73-78.
26. Nomura K, Yamashita J, Ogawa M. Endothelin - 1 is involved in the transient hypoparathyroidism seen in patients undergoing thyroid surgery. *Journal of Endocrinology.* 1994;143(2):343-351.
27. Pattou F, Combemale F, Fabre S. Hypocalcemia following thyroid surgery: Incidence and prediction of outcome. *World J Surg.* 1998;22(7):718- 724.