

THYROIDECTOMY AT CHRIS HANI BARAGWANATH ACADEMIC HOSPITAL: IS ROUTINE ADMISSION TO INTENSIVE CARE UNIT JUSTIFIED?

A. Elgahani^{*1}, MBChB; I. Bombil¹, MD, MMED (Wits), FCS (SA), FACS; R A. Muganza¹, MD, FRCS (I), FCS (SA), FACS; S. Omar², MBChB, FC Path (Chem) SA, DA (SA), Critical care (SA)

¹Department of surgery, Chris Hani Baragwanath Academic Hospital and the University of the Witwatersrand

²Intensive Care Unit, Chris Hani Baragwanath Academic Hospital and the University of the Witwatersrand

Abstract

Keywords: *thyroidectomy, Routine intensive, Patients, endocrine operation.*

Introduction: Thyroidectomy is the commonest endocrine operation performed often in healthy patient at elective setting. Patients are discharged early and the post-operative course is mainly uneventful. The need for intensive care is not essential in most cases. This article reviews the cases of thyroidectomy at CHBAH that are sent to intensive care routinely to assess the relevance of this practice.

Objectives: To establish the profile, the outcome of thyroidectomy patients admitted in intensive care and the incidence of uneventful ICU stay.

Method: Review of all thyroidectomy admitted in intensive care from January 2013 to July 2017

Results: In 88.42% of cases, intensive care admission was not justified. Of the 11.57% that needed ICU, 90.90% was predicted pre-operatively by the underlying comorbidity and the surgical approach. Altogether only 1.06% of cases had unpredicted ICU admission.

Conclusion: Routine intensive care admission was unnecessary in most cases.

Introduction

Thyroidectomy is usually an elective procedure; therefore, sufficient time is available for adequate preoperative preparation¹.

The main concern around thyroidectomy remains the risk of post-operative complications such as bleeding, recurrent laryngeal nerve (RLN) damage, tracheomalacia, and hypoparathyroidism².

In a multicentre study involving 14934 patients, Rosat et al, 2004 reported the following rate of major complications following thyroidectomy: bleeding 1.2%, permanent recurrent laryngeal nerve palsy 1%, transient palsy 2%, superior laryngeal nerve injury 3.7% and persistent hypoparathyroidism in 1.7%³.

There is a correlation between the volume of thyroid surgery performed per centre and the rate of complications⁴. A high-volume centre is defined as the one performing more than 25 thyroidectomies per year⁵. Both high volume centres and high volume thyroid surgeons are associated with a reduction in postoperative complications⁶.

Hypocalcaemia due to hypoparathyroidism is the most common post thyroidectomy complication but is transient in majority of cases⁷.

The risk of hypoparathyroidism is reduced by meticulous surgical procedure, identification and preservation of parathyroid glands⁷.

Postoperative hematoma is a rare but potentially fatal complication (1.2%)³. A meta-analysis of 455242 patients conducted by Liu et al, 2017 reported 1.44% (6573/455242) incidence of post thyroidectomy hematoma⁷.

The following groups were identified as risk factors for the development of post thyroidectomy hematoma: old age (above 45 years), male gender, thyroidectomy for graves' disease, patients on anticoagulant or antiplatelet medications, bilateral surgery, neck dissection and reoperation^{8,9}. Lang et al, 2012 recognized thyroid nodule size of more than 3 centimetres as another risk factor for post thyroidectomy hematoma¹⁰. Thyroidectomy for malignancy and drain insertion do not affect the post-operative hematoma formation (P = 0.46, P = 0.4 respectively)^{8,9}. Meticulous haemostasis is still the most important factor to avoid post thyroidectomy hematoma formation¹¹.

Unilateral RLN injury leads to ipsilateral vocal cord palsy with swallowing difficulties and increased risk of aspiration. Bilateral RLN injury is associated with complete loss of airway post extubation and requires re-intubation and immediate or delayed tracheostomy. Adequate surgical skills and good knowledge of RLN anatomy and its variations are important factors to minimize injury¹².

Other complications such as tracheomalacia, Horner's syndrome and thoracic duct injury happens in 1.8% to 8.3% of thyroidectomy, most commonly when performing lateral neck dissection¹³.

With the advances in surgical techniques and skills, outpatient thyroidectomy has become possible for unilateral exploration. When Life threatening post thyroidectomy hematoma occurs, it almost invariably happens acutely in the immediate postoperative period while the patient is still being observed in the recovery room¹⁴.

It is therefore not a major concern to send the patient who has survived recovery room to the ward. In a retrospective study done by Kolawole et al, 2009 in Nigeria, 11.8 % of 169 post thyroidectomy patients needed ICU care for different reasons¹⁵. Similarly, a study done in Chinese University of Hong Kong which included 268 elective major head and neck procedures showed that it is safe and cost effective to send low risk patients back to the ward post-operatively¹⁶.

Recently, the rate of outpatient thyroidectomy has increased dramatically. High volume thyroid Surgeons feel comfortable to perform lobectomy as day case and to discharge total thyroidectomy after 24 hours⁴.

The Endocrine Surgery Unit at Chris Hani Baragwanath Academic Hospital (CHBAH) is a high volume thyroid unit that perform about 50 thyroidectomies per year. For years, it has been a routine to send all patients to ICU for better monitoring as a precautionary measure in anticipation of potential complications. This approach is not practised in other academic hospitals attached to the University of the Witwatersrand where patients are sent back to general ward post thyroidectomy. In case of complications, are they of such magnitude to warrant high care management? Our problem statement is to answer the question whether routine ICU or high care admission of all patients following thyroidectomy as practised at CHBAH is justified.

Objective

1. To evaluate the profile and outcome of post thyroidectomy patients that justified admission to intensive care unit.
2. To determine the incidence of uneventful stay in ICU

Method

This is an observational descriptive study done retrospectively. We reviewed all thyroidectomies performed at CHBAH from January 2013 to July 2017. Data were obtained from theatre registry, ICU registry, National Health Laboratory Service (NHLS), and patient files from the department of records.

We looked at patient demographics, comorbidities, indication for surgery, surgical approach (total thyroidectomy vs lobectomy, the need for sternotomy and neck dissection). We singled out those ICU patients who had an eventful ICU stay. Eventful ICU stay were defined as one of the following: pre-existing conditions that were expected to be

exacerbated by surgery, surgical approach (sternotomy or neck dissection where high doses of analgesics is required and higher rate of complications is anticipated), threatened airway from surgical complications (hematoma and RLN injury) and anaesthetic consideration (difficult intubation with potential for laryngeal oedema). We excluded all patients who were directly sent to the ward after the operation.

Ethics approval was obtained from the Human Research Ethics Committee of the University of the Witwatersrand and the research review board of CHBAH (clearance certificate No 170922)

All data were entered into an excel spreadsheet. A software (Stata version 14.2) was used to analyse the data. Mean and standard deviation were used for continuous variables. Frequency and percentage were used for categorical variables.

Results

Out of 216 Thyroidectomy performed, 26 patients were sent back to general ward postoperative and the remaining 190 patients were admitted to ICU. They were 171 females (90 %) and 19 males (10 %). 188 patients were black and 2 non-black. The mean age was 47.23 years ranging from 16 to 85 years.

122 patients had total thyroidectomy (64.21%). 68 patients (35.79%) had lobectomy. Index surgery was performed in 178 cases and redo surgery accounted for 12 cases. Neck dissection were done in 7 patients. 5 patients required sternotomy as an additional procedure for mediastinal goitre.

On Histopathological report, 122 patients had benign disease (including 9 Grave's disease, 4 toxic multinodular goitre, 5 adenoma and one Hashimoto thyroiditis). 66 patients had confirmed malignancies (40 papillary thyroid carcinoma, 15 follicular thyroid carcinoma, 6 medullary thyroid carcinoma, one poorly differentiated carcinoma, two anaplastic thyroid carcinoma, one parathyroid carcinoma and one spindle cell neoplasm). The histopathology of the remaining two patients were not found.

154 patients (80.53%) stayed in ICU for one day. The length of ICU stay for the remaining 24(13.62%), 8 (4.21%) and 4 (2.10%) patients was two,3-5 and 6-10 days respectively.

Out of the 190 patients, 3 (1.57%) developed hematoma, 2 (1.05%) had bilateral vocal cord palsy and none had tracheomalacia.

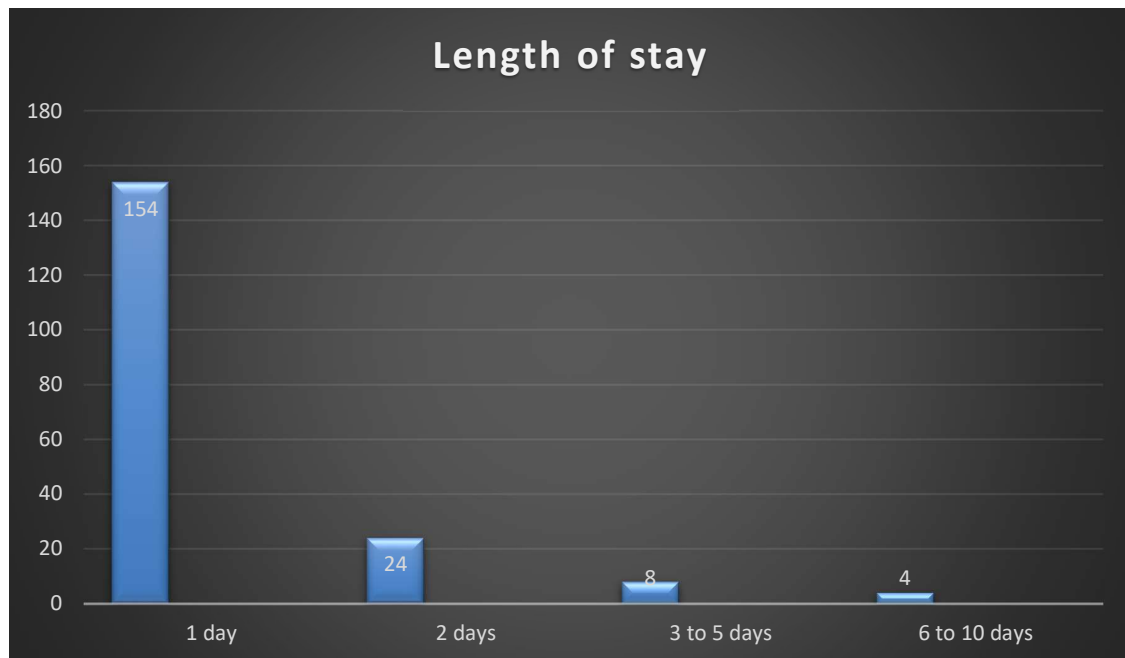
Justified admissions were 22 (11.57%) cases. In 88.42% (168/190) of the cases, ICU admission was not justified. Of the 22 ICU admissions, two were unexpected (9.09%) and were related to post operatively hematoma. The remaining 20 cases (90.90%) were anticipated. Altogether 2/190 (1.06%) cases had unpredicted ICU admission

Table 1. Indications that Justified ICU admission

Indication	Number	Comment	Predicted need for ICU?
Exacerbation of underlying conditions	2	Well known cardiac patients with previous CCF	Yes Both with Significant comorbidity, one had sternotomy

Intraoperative bleed requiring transfusion	1	79-year-old lady, known with carotid body tumour, parotid tumour,	Yes. Had Sternotomy.
Evacuation of hematoma	3	2 had total thyroidectomy, one of them was redo who had bilateral vocal cord palsy	No
Re-intubation for Stridor	4	2 had bilateral vocal cord palsy that required tracheostomy. 2 extubated on second day with no evidence of nerve injury.	No
Sternotomy / neck dissection	7 neck dissection 5 sternotomies	Extensive surgery	Yes.
Anaesthetic considerations	4	Difficult intubation	Yes.

Note: there are 22 cases of justified ICU admission with 26 indications because some patients had more than one reason to be in ICU.



Discussion

Thyroid surgery in the hand of skilled high volume surgeon is relatively a safe procedure. It is usually performed in healthy patients with little or no comorbidities. The rate of complications in our study mirrors other high volume centres. Incidence of hematoma was 1.57 %, which is comparable to what was reported by Rosat et al 2004 and Liu et al, 2017 (1.2% and 1.44% respectively). Vocal cord palsy in our study was 1.05% vs 1% as reported by Rosat et al, 2004.

The justified need for ICU was 11.57 %. Kolawole et al, 2009, in Nigeria found similar picture (11.8%). The need for ICU admission was divided in three categories,

Category 1. Pre-operative prediction.

- a. Known patients with significant comorbidities that can be exacerbated by surgery
- b. The planned surgical approach (sternotomy, Neck dissection)

Category 2: Intra-operative prediction.

- a. Difficult intubation
- b. Significant Intraoperative bleeding.
- c. Stridor after trial of extubation.

Category 3: Unpredicted cases

The two patients who developed post-operative hematoma had none of the pre-operative or intra-operative reasons to be admitted in ICU. We believe that when life threatening hematoma happens, it is almost invariably an acute event in the immediate post-operative period while the patient is still in the recovery room. Delayed hematoma is gradual and can be dealt with in the general ward

Conclusion

Routine ICU admissions post thyroidectomy were not necessary in majority of cases (88.42%). Although 11.57% of patients had justified ICU admission based on pre and intra-operative decisions, unpredicted admission was rather rare (1.06%).

Recommendation

The need for ICU bed should be individualised. A prospective study to correlate goitre characteristics and type of surgical approach with the rate of surgical complications is advised to better identify the ICU candidates.

References

1. Kluijfhout WP, van Beek D-J, Verrijn Stuart AA, Lodewijk L, Valk GD, van der Zee DC, et al. Postoperative Complications After Prophylactic Thyroidectomy for Very Young Patients With Multiple Endocrine Neoplasia Type 2: Retrospective Cohort Analysis. *Medicine*. 2015 Jul;94(29):e1108.
2. Rogers-Stevane J, Kauffman GL. A Historical Perspective on Surgery of the Thyroid and Parathyroid Glands. *Otolaryngologic Clinics of North America*. 2008 Dec;41(6):1059–67.
3. Rosato L, Avenia N, Bernante P, De Palma M, Gulino G, Nasi PG, et al. Complications of Thyroid Surgery: Analysis of a Multicentric Study on 14,934 Patients Operated on in Italy over 5 Years. *World Journal of Surgery*. 2004 Mar 17;28(3):271–6.
4. Tuggle CT, Roman S, Udelsman R, Sosa JA. Same-Day Thyroidectomy: A Review of Practice Patterns and Outcomes for 1,168 Procedures in New York State. *Annals of Surgical Oncology*. 2011 Apr 18;18(4):1035–40.
5. Adam MA, Thomas S, Youngwirth L, Hyslop T, Reed SD, Scheri RP, et al. Is There a Minimum Number of Thyroidectomies a Surgeon Should Perform to Optimize Patient Outcomes? *Annals of Surgery*. 2017 Feb;265(2):402–7.
6. Loyo M, Tufano RP, Gourin CG. National trends in thyroid surgery and the effect of volume on short-term outcomes. *The Laryngoscope*. 2013 Aug;123(8):2056–63.
7. Sabiston DC, Townsend CM, editors. *Sabiston textbook of surgery: the biological basis of modern surgical practice*. 19th ed. Philadelphia, PA: Elsevier Saunders; 2012. 2124 p.
8. Liu J, Sun W, Dong W, Wang Z, Zhang P, Zhang T, et al. Risk factors for post-thyroidectomy haemorrhage: a meta-analysis. *European Journal of Endocrinology*. 2017 May;176(5):591–602.
9. Weiss A, Lee KC, Brumund KT, Chang DC, Bouvet M. Risk factors for hematoma after thyroidectomy: Results from the nationwide inpatient sample. *Surgery*. 2014 Aug;156(2):399–404.
10. Lang BH-H, Yih PC-L, Lo C-Y. A review of risk factors and timing for postoperative hematoma after thyroidectomy: is outpatient thyroidectomy really safe? *World J Surg*. 2012 Oct;36(10):2497–502.
11. Harding J, Sebag F, Sierra M, Palazzo FF, Henry J-F. Thyroid surgery: postoperative hematoma--prevention and treatment. *Langenbecks Arch Surg*. 2006 Jun;391(3):169–73.
12. Hartl DM, Travagli J-P, Leboulleux S, Baudin E, Brasnu DF, Schlumberger M. Clinical review: Current concepts in the management of unilateral recurrent laryngeal nerve paralysis after thyroid surgery. *J Clin Endocrinol Metab*. 2005 May;90(5):3084–8.
13. Roh J-L, Kim DH, Park CI. Prospective identification of chyle leakage in patients undergoing lateral neck dissection for metastatic thyroid cancer. *Ann Surg Oncol*. 2008 Feb;15(2):424–9.
14. Dixon JL, Snyder SK, Lairmore TC, Jupiter D, Govednik C, Hendricks JC. A novel method for the management of post-thyroidectomy or parathyroidectomy hematoma: a single-institution experience after over 4,000 central neck operations. *World J Surg*. 2014 Jun;38(6):1262–7.
15. Kolawole IK, Olurode YA. Complications and indications for intensive care unit admission after thyroidectomy in a University Teaching Hospital. *Niger Postgrad Med J*. 2009 Jun;16(2):149–53.
16. To EWH, Tsang WM, Lai ECH, Chu MC. Retrospective study on the need of intensive care unit admission after major head and neck surgery. *ANZ J Surg*. 2002 Jan;72(1):11–4..