

THE SAFETY PROFILE AND EFFICIENCY OF THYROIDECTOMY UNDER LOCAL ANAESTHESIA

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Abstract

Introduction: Thyroidectomy is done in many indications ranging from thyroid cancers to nodular types of the thyroid. There are several types of thyroidectomy in which complete removal is done or segmental removal is also preferred. Removal of thyroid tissue is done both in benign and malignant diseases of the thyroid. Thyroid surgery was conducted utilising local anaesthetic procedures in the early twentieth century. As general anaesthesia became safer, doctors began to perform thyroidectomy under general anaesthetic exclusively. Recent accounts of thyroidectomy under local anaesthesia, on the other hand, state that the results are comparable to thyroidectomy under general anaesthetic.

Hypothesis: It is hypothesised that thyroidectomy can be effectively performed by applying local anaesthesia with Monitored Anaesthesia Care. The similar or better outcome can be obtained as compared to general anaesthesia.

Materials and Methods: The present study is a retrospective study that was conducted during the period of eight Months. Applying inclusion and exclusion criteria, 110 patients were considered for this study. These 110 patients were scheduled for thyroidectomy. The study classified the patients according to the type of anaesthesia they received. Group 1 patients are those who were given general anaesthesia while group 2 patients were given local anaesthesia with MAC. The main outcomes were assessed by several factors and specially shifting of choice of anaesthesia (local or general).

Setting: The university affiliated hospital with more than 700 beds.

Results: Significant findings were obtained in number of patients were admitted to PACU, number of patients with PONV, time spent in PACU, difficult urination, etc. These findings have shown that shifting trend to local anaesthesia with MAC after the study. Hence there is a shift of choice towards local anaesthesia with MAC. Half of the patients are later anaesthetized by local anaesthesia ($P < 0.005$).

Conclusion: The study concludes that the local anaesthesia with MAC is effective and safe to be used in thyroidectomy and can replace general anaesthesia.

Keywords: thyroidectomy, thyroid gland, local anaesthesia, general anaesthesia

Introduction

Thyroidectomy is a surgery for removing the thyroid gland that is well-documented. It's a popular surgery in modern medicine, and it can be used to treat cancer, benign disease, or hormonal disorder that doesn't respond to conventional treatment[1]. The extent to which thyroid tissue is surgically removed can be used to classify thyroidectomy. The removal of a neoplasm with a significant margin of normal thyroid tissue is known as partial thyroidectomy, whereas the removal of a tumour with minimal surrounding thyroid tissue is known as thyroid lumpectomy. A subtotal thyroidectomy occurs when more than half of each lobe, including the isthmus, is removed on both sides. The isthmus and one lobe of the thyroid are removed completely during a

hemithyroidectomy or lobectomy. Near-complete thyroidectomy is the excision of one lobe and isthmus extracapsular, with 90 per cent of the contralateral lobe removed, leaving 1 g of thyroid tissue[2]. Thyroidectomy is an important surgical operation for the treatment of benign and malignant thyroid disease that has a lot of evidence behind it. Safe thyroidectomy necessitates thorough anatomic knowledge and cautious patient selection due to the proximity of numerous key anatomic structures[3].

According to the guidelines, thyroidectomy (surgical removal of the thyroid gland) is indicated to be done in goitre (obstructive type or substernal type), thyroid carcinoma

(papillary type or follicular type), medullary thyroid carcinoma (MTC), anaplastic type, hyperthyroidism and nodular thyroid. Although surgery is prescribed for primary thyroid lymphoma, it is done to obtain a biopsy. Even thyroidectomy is done in metastasis to the thyroid from the primary site of other types of cancers like pulmonary or renal cell cancer [4].

Globally, thyroid nodules are found in 1% of males and 5% of females while the majority of the nodules are the benign type with cancerous type nodules which contributes 5% of all the thyroid nodules. In more than 70% of the cases, thyroid nodules are detected in screening programs and it has been shown that most females and the elderly have been found with nodular thyroid conditions [5].

Abnormal and unusual growth of the thyroid tissue and nodular appearances occurs in goitre which is linked with iodine deficiency. This condition is endemically found in areas with iodine-deficient regions. Goitre is found in people with asymptomatic cases, an iodine-deficient diet. Among the aged population, goitre is mostly found. However, the majority of the confirmed cases need not go for surgery. Multinodular type of this condition can be caused by autoimmunity like Hashimoto's thyroiditis in which antibodies are produced against the thyroid tissues [6, 7].

Excision is not required for the majority of thyroid nodules. Fine needle aspiration (FNA) is frequently used to differentiate between benign and malignant nodules in nodules that are at a higher risk of cancer. When nodules are larger than 1 cm in diameter, non-functional (known as a "cold" nodule), and/or have worrying ultrasonography results, they are usually candidates for biopsy [7, 8].

The surgical therapy of choice for benign goitre that causes iodine deficiency is selective morphology- and function-adapted excision. By thoroughly eliminating all nodules, this surgery seeks to eliminate the need for patients to undergo reoperations for recurrence. However, achieving this occasionally necessitates a total thyroidectomy, which is generally ruled out due to a higher risk of complications. 324 patients who had complete thyroidectomy were assessed retrospectively in this study [9]. In many cases, complications due to thyroidectomy like palsy to Recurrent Laryngeal Nerve (RLN), hypocalcemia, bleeding, was not different from the sub-total type of surgery. So, complete thyroidectomy can be considered in Benign Multinodular Goitres [10].

Thyroid surgery was conducted utilising local anaesthetic procedures in the early twentieth century. As general

anaesthesia became safer, doctors began to perform thyroidectomy under general anaesthetic exclusively. Recent accounts of thyroidectomy under local anaesthesia, on the other hand, state that the results are comparable to thyroidectomy under general anaesthetic. [11].

Materials and Methods

The present study is a retrospective study which was conducted between during the period of eight Months.

Inclusion and Exclusion Criteria

The patients who were included in this study were those who visited the hospital's outpatient department (Surgery), underwent the thyroidectomy surgery in the hospital and who gave consent for this study. The excluded patients were those who did not have consent in this study, were suffering from underlying conditions other than indications of the thyroidectomy.

Groupings

Applying inclusion and exclusion criteria, 110 patients were considered for this study. The study classified the patients according to the type of anaesthesia they received. Group 1 patients are those who were given general anaesthesia while group 2 patients were given local anaesthesia with lignocaine. The outcome of the study was assessed in two phases. Firstly, the efficacy of the anaesthesia was determined by the 4-points scale. Secondly, the complications from general anaesthesia and local anaesthesia are evaluated. Each group had 55 patients each.

Ethical Approval

The study was ethically approved by the hospital concerned.

Data Analysis

The data analysis was done in SPSS 25 and Excel software for effective analysis. The study has conducted 2 sample t-test for continuous variable while X2 test was conducted for categorical variable. The statistical analysis was conducted at significance level of 0.005

Results

The study found that the age of the patients in each group is almost similar. In group 1, the mean value of patients is 42.01 ± 13.07 years old while in group 2, the mean value of patients is 48.58 ± 12.09 years old. Figure 1 shows the distribution of patients age in each group while Figure 2 shows the gender distribution in each patient.

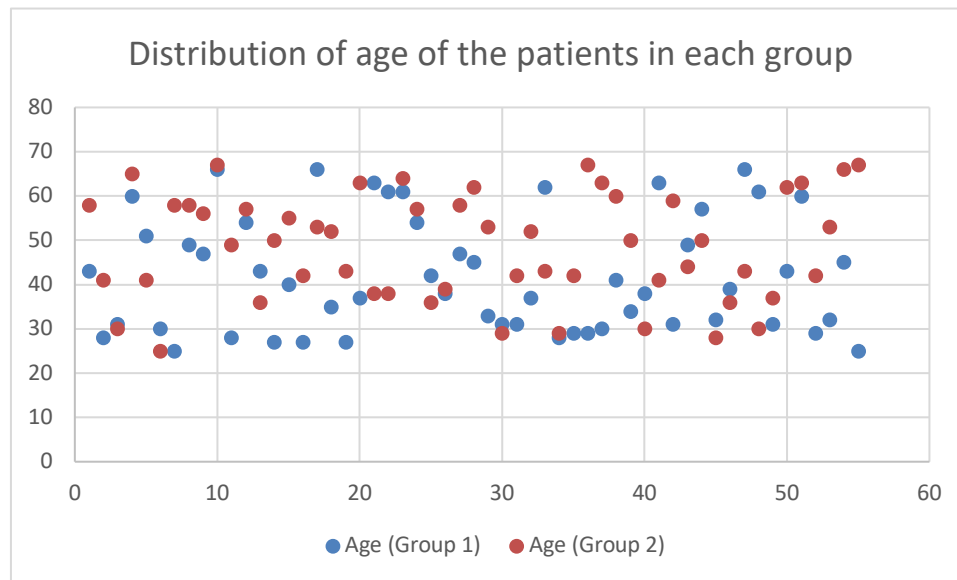


Figure 1: The age distribution of the patients in each group

The baseline characteristics of the study groups are shown with their respective p-values. The demographic features of the study population was same throughout in terms of age, sex, height and weight. This shows that the patients in each group (receiving either general anaesthesia or local anaesthesia) have same demographic characteristics. Table 1 shows the details of the demographic features of the patients in each group.

Table 1: The baseline characteristics of the study groups

Baseline characteristic	Group 1 (n = 55)	Group 2 (n = 55)	P-value
Age, mean $\pm$ SD	42.01 $\pm$ 13.07	48.58 $\pm$ 12.09	0.31
Sex, male/female	28/27	32/23	0.688
Height, mean $\pm$ SD	168.2 $\pm$ 5.6	165.5 $\pm$ 6.1	0.86
Weight, mean $\pm$ SD	81.5 $\pm$ 15.3	84.2 $\pm$ 18.6	0.62
Primary Diagnosis			
Multinodular goiter	14 (25.45%)	15 (27.27%)	>0.99
Thyroid cancer	5 (9%)	6 (10.9%)	0.69
Chronic thyroiditis	4	4	>0.99
Graves disease	2	3	>0.99
Surgical Procedure			
Unilateral	11	12	>0.99
Bilateral	21	24	>0.99
Resected thyroid weight (grams)	29	32	0.29

The main outcomes were assessed by several factors like Surgical Time, Duration of Surgery, Number of Days admitted, number of patients admitted to post anaesthesia care unit or PACU, time spent in PACU, Post Operative Nausea and Vomiting (PONV), difficult urination and other complications. Finally, the outcome was assessed by revealing significance of shifting of choice of anaesthesia. The significance of each of this parameter or outcome is being assessed. The study revealed that the number of group 1 patients admitted to PACU was significantly higher than the number of patients in group 2. The time spent by group 1 patients in PACU is also significantly more than group 2 patients. Post operative nausea and vomiting is much higher

in patients with general anaesthesia (group 1) as compared to the patients received local anaesthesia (group 2). Other complications noted in both the groups are insignificant except difficult urination post surgery which is significantly higher in group 1 patients as compared to group 2 patients. Complications were almost similar in both the groups. Total time spent in Operation Theatre (OT) is more in group 1 patients as compared to group 2 patients but it is not as significant to be considered. This is due to the time taken by the patients of group 1 to revive after general anaesthesia. The number of days patients were admitted in hospital was significantly lesser in group 2 patients as compared to group 1 patients ($P < 0.005$). It was observed that the group 2

patients spent 4 ± 12 minutes in PACU as compared to group 1 patients who spent 85 ± 19 minutes. The comparison was significantly lesser in group 2 patients ($P < 0.005$). Again, significant number of patients were admitted to PACU among group 1 compared to group 2 patients ($P < 0.005$). The study found 25 patients in group 1 (45.46%) with PONV

while only 6 patients in group 2 (10.9%) with PONV ($P < 0.005$). The study found various complication in both the groups but there was significant comparative finding except difficult urination which was significantly more ($P < 0.005$) in group 1 patients with 32 patients (58.18%) as compared to 5 patients in group 2 (9.09%).

Table 2: The main outcomes of the study groups

Outcomes	Group 1 (n = 55)	Group 2 (n = 55)	P-value
Surgical Time, mean $\pm$ SD (minutes)	121 $\pm$ 35	107 $\pm$ 36	0.21
Time in Operation Theatre	162 $\pm$ 39	149 $\pm$ 27	0.15
Days of Admission	24	14	< 0.005
Time in PACU (mean $\pm$ SD), minutes	85 $\pm$ 19	4 $\pm$ 12	< 0.005
Admitted in PACU (mean $\pm$ SD), minutes	35	3	< 0.005
Post Operative Nausea and Vomiting (PONV)	25	6	<0.005
Complications			
Transient vocal cord	2	1	>0.99
Permanent vocal cord paralysis	0	0	>0.99
Change of voice permanently	2	0	>0.99
Hypocalcemia (symptomatic)	1	0	>0.99
Hypocalcemia (asymptomatic)	1	1	>0.99
Hematoma	1	0	>0.99
Post operative pain	6	4	>0.99
Difficult urination	32	5	<0.005

As the outcomes have obtained, it was found that there are many factors that came to be significantly improved in group 2 patients who received local anaesthesia with MAC. Therefore, after this study, a trend of shifting choice towards local anaesthesia with MAC from general anaesthesia was observed.

The study revealed that there is a shift of usage towards local anaesthesia with MAC. Half of the patients are later anaesthetized by local anaesthesia ($P < 0.005$). Table 3 shows the detailed finding.

Table 3: The outcome analysis of the study groups

Outcome	Before Study (n=110)	After Study (n=110)	P-value
Local anaesthesia with MAC*	24	55	< 0.005
General anaesthesia	86	55	< 0.005

*MAC = Monitored Anaesthesia Care

Discussion

Local anaesthesia in thyroidectomy was given long back. Then, safer alternative in general anaesthesia came which were again surpassed by local anaesthesia when developed local anaesthetic agents were released. Local anaesthesia, now a days, have been considered to be used in thyroid surgeries because of efficacy and very nominal side effects. In this, the patients are conscious and have lesser complications [3]. Many other studies in the past have demonstrated regional anaesthesia to be safe, effective, and well-tolerated [13].

Only 50% of patients who had surgery before 1300 hours were discharged within 6 hours, compared to 85% of those who had surgery later in the day. Within 6 hours of surgery, 47% of patients in group A, 65% of patients in group B, and 77% of patients in group C were discharged. Based on previous experience with general anaesthesia, the type of

anaesthetic chosen has no meaningful impact on discharge time. There were no hospital readmissions, but two instances of postoperative haemorrhage necessitated reoperation [13]. The majority of surgeons in today's practice do thyroid surgery under general anaesthesia. This research looked at the effectiveness and safety of local anaesthetic for thyroid surgery. During a 16-year period, prospective data were collected on 1,025 consecutive patients who underwent thyroidectomy under supervised local anaesthetic by a single surgeon at a tertiary referral facility. For factors related to outcomes, multivariate analysis is used to report patient characteristics, surgical data, duration of stay, and complications. A total of 1,025 patients had their thyroid glands removed locally, with 34 requiring general anaesthesia (3.3%) [14].

With more researches showing positive evidences, the usage of local anaesthesia increased in today's surgery of

thyroidectomy. During the surgeries, recurrent nerve injury, hematoma, hypocalcemia or tracheostomy were experienced in the patients. The number of complication came down as compared to the general anaesthesia. The individuals who are at risks were elderly population and obese individuals [13,14]. The number of outpatient treatments (96%) grew significantly as the local anaesthetic programme matured ($p < 0.001$). Patient comorbidity was linked to a length of stay greater than 24 hours ($p < 0.001$, relative risk 3.25). When performed by an experienced surgeon, thyroidectomy under local anaesthesia appears to be safe and applicable to a wide spectrum of patients, including those who pose a general anaesthetic risk or require more difficult procedures[14]. Regional anaesthesia lowers the dangers of general anaesthesia, such as endotracheal intubation and anaesthetic drug side effects. Endotracheal intubation has been proven to cause vocal cord alterations in up to 5% of patients, therefore this is especially helpful for singers and public speakers. It also allows the surgeon to keep track of the patient's vocal cord condition and delivers good postoperative analgesia[15]. When compared to general anaesthesia, it also has a faster post-anaesthesia recovery time. Lo Gerfo et al. documented their outpatient thyroidectomy experience in 76 of 134 patients who were discharged the same day following a 4- to 8-hour postoperative evaluation time. In the outpatient group, there were 21 patients who had complete thyroidectomy[16].

In poorer nations or war ridden nations, local anaesthesia proved to be an alternative to the risks of the individuals. Abnormality in thyroid tissue or over-growth of thyroid gland can also benefit with local anaesthesia which can lead to much lesser complication post operatively. Even in thyroid patients with cardiac abnormalities, local anaesthesia has statistically proved to be better, specially with alleviating the obstructive symptoms. On the other hands, the difficult intubation can be avoided if general anaesthesia can be used lesser than ever [17].

Conclusion

The study found that days of admission is significantly lowered in patients who received local anaesthesia. Other outcomes that came significantly lowered in these patients are time spent in PACU, number of patients in PACU, number of patients with Post Operative Nausea and Vomiting (PONV) and difficult urination. The most important finding of this study was that it was observed that there was a shift of choice of anaesthesia during thyroidectomy, from general anaesthesia to local anaesthesia with MAC. However, there was no significant improvement in complication except PONV. Overall, the choice of local anaesthesia is more convenient making the efficacy of anaesthesia, patients' compliance and complications, similar or better.

Hence the study concludes that the local anaesthesia with MAC is effective and safe to be used in thyroidectomy and can replace general anaesthesia.

References

1. Biello, A., Kinberg, E. C., & Wirtz, E. D. (2021). Thyroidectomy. PubMed; StatPearls Publishing.<https://www.ncbi.nlm.nih.gov/books/NBK563279/>
2. Thyroidectomy - an overview | ScienceDirect Topics. (n.d.). Wwww.sciencedirect.com. Retrieved March 27, 2022, from<https://www.sciencedirect.com/topics/medicine-and-dentistry/thyroidectomy>
3. Haugen, B. R., Alexander, E. K., Bible, K. C., Doherty, G. M., Mandel, S. J., Nikiforov, Y. E., Pacini, F., Randolph, G. W., Sawka, A. M., Schlumberger, M., Schuff, K. G., Sherman, S. I., Sosa, J. A., Steward, D. L., Tuttle, R. M., & Wartofsky, L. (2016). 2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer: The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer. *Thyroid : Official Journal of the American Thyroid Association*, 26(1), 1–133.<https://doi.org/10.1089/thy.2015.0020>
4. Knudsen, N., Perrild, H., Christiansen, E., Rasmussen, S., Dige-Petersen, H., & Jorgensen, T. (2000). Thyroid structure and size and two-year follow-up of solitary cold thyroid nodules in an unselected population with borderline iodine deficiency. *European Journal of Endocrinology*, 224–230.<https://doi.org/10.1530/eje.0.1420224>
5. Yilmaz, H., Akkus, C., Damburaci, N., Adibelli, Z., & Duran, C. (2022). Sonoelastographic Evaluation of Recurrent Thyroid Nodules in Patients with Operated Recurrent Nodular Goiters. *Ultrasound in Medicine & Biology*, 48(2), 209–216.<https://doi.org/10.1016/j.ultrasmedbio.2021.10.008>
6. Terris, D. J., Snyder, S., Carneiro-Pla, D., Inabnet, W. B., Kandil, E., Orloff, L., Shindo, M., Tufano, R. P., Tuttle, R. M., Urken, M., & Yeh for the American Thyroid Associ, M. W. (2013). American Thyroid Association Statement on Outpatient Thyroidectomy. *Thyroid*, 23(10), 1193–1202.<https://doi.org/10.1089/thy.2013.0049>
7. Davies, L., & Welch, H. G. (2014). Current thyroid cancer trends in the United States. *JAMA Otolaryngology-- Head & Neck Surgery*, 140(4), 317–322.<https://doi.org/10.1001/jamaoto.2014.1>
8. Khan, A. Z., Naqi, S. A., Kamal, A., & Abaid, K. J. (2004). Thyroidectomy in carcinoma thyroid - a three years experience. *Annals of King Edward Medical University*, 10(4).<https://doi.org/10.21649/akemu.v10i4.1231>
9. Robens, E., Spelsberg, F., Kabus, S., & Müller, P. E. (2001). Indications, Risks, and Acceptance of Total Thyroidectomy for Multinodular Benign Goiter. *Surgery Today*, 31(11), 958–962.<https://doi.org/10.1007/s005950170002>
10. Katz, A. D., & Bronson, D. (1978). Total thyroidectomy: The indications and results of 630 cases. *The American Journal of Surgery*, 136(4), 450–454.[https://doi.org/10.1016/0002-9610\(78\)90259-3](https://doi.org/10.1016/0002-9610(78)90259-3)

11. Snyder, S. K. (2006). Local Anesthesia With Monitored Anesthesia Care vs General Anesthesia in Thyroidectomy. *Archives of Surgery*, 141(2), 167.<https://doi.org/10.1001/archsurg.141.2.167>
12. U. P, Dr. S. (2015). Thyroidectomy Under Regional Anaesthesia: An ORL Perspective. *JOURNAL of CLINICAL and DIAGNOSTIC RESEARCH*.<https://doi.org/10.7860/jcdr/2015/16055.6617>
13. Gerfo, P. L. (1998). Local/regional anesthesia for thyroidectomy: Evaluation as an outpatient procedure. *Surgery*, 124(6), 975–979.[https://doi.org/10.1016/s0039-6060\(98\)70037-6](https://doi.org/10.1016/s0039-6060(98)70037-6)
14. Spanknebel, K., Chabot, J. A., DiGiorgi, M., Cheung, K., Lee, S., Allendorf, J., & Logerfo, P. (2005). Thyroidectomy using local anesthesia: a report of 1,025 cases over 16 years. *Journal of the American College of Surgeons*, 201(3), 375–385.<https://doi.org/10.1016/j.jamcollsurg.2005.04.034>
15. Lo Gerfo, P. (1998). Local/regional anesthesia for thyroidectomy: evaluation as an outpatient procedure. *Surgery*, 124(6), 975–978; discussion 978–979.<https://pubmed.ncbi.nlm.nih.gov/9854571/>
16. Lo Gerfo, P., Gates, R., & Gazetas, P. (1991). Outpatient and short-stay thyroid surgery. *Head & Neck*, 13(2), 97–101.<https://doi.org/10.1002/hed.2880130203>
17. Akhtar, N., & Abbas, S. A. (2013). Regional anaesthesia in thyroid surgery. *Journal of the College of Physicians and Surgeons--Pakistan: JCPSP*, 23(12), 885–887.<https://pubmed.ncbi.nlm.nih.gov/24304993/>