Original Article **Open Access**

Comparison of Mean Postoperative Pain Score in Patients Undergoing Thyroidectomy with and Without Superficial Cervical Block

Kainat, Adil Ashraf, Ahsan Ali Ghauri

ABSTRACT:

Objectives: To compare the average postoperative pain scores in patients undergoing thyroidectomy with the use of a superficial cervical block.

Study design and setting: This randomized controlled study was conducted in the Department of Anesthesiology at Lahore General Hospital, Lahore, over six months, from May 3, 2021, to November 2, 2021.

Methodology: After the hospital's ethical committee approval, a study was conducted involving 60 patients (both genders) belonging to ASA class I-II aged (18-60) years, scheduled for elective thyroidectomy under general anesthesia; randomly assigned to two groups by lottery method. Patients in Group-I received additional superficial cervical plexus block while those in Group-II were taken as controls. Outcome variable was mean Visual Analogue Scale (VAS) score for post-operative pain, which was assessed after 2 hours of surgery in the recovery room in both groups. Written informed consent was taken from each patient.

Results: The mean age of patients ranged between 36.6 ± 12.6 years, with the majority (58.3%) aged 26-50 years. Most were female (80%), with a male to female ratio of 1:4. Patients receiving superficial cervical plexus block had significantly lower post-operative pain (mean VAS 2.17±0.84) compared to controls (3.60±1.04), with similar significant differences across age, gender, body mass index, ASA status, and surgery duration.

Conclusions: Superficial cervical plexus block significantly reduces post-operative pain in thyroidectomy patients under general anaesthesia, potentially decreasing opioid use and promoting faster recovery, making it a preferred part of anaesthetic technique for future practice.

Key Words: Bupivacaine, Post-Operative Pain, Superficial Cervical Plexus Block, Thyroidectomy

How to cite this Article:
Kainat K, Asfraf A, Ghauri AA. Comparison of Mean Postoperative Pain Score in Patients Undergoing Thyroidectomy with and Without Superficial Cervical Block. J Bahria Uni Med Dental Coll. 2025;15(4):343-7 DOI: https://doi.org/10.51985/JBUMDC2025612

INTRODUCTION:

Thyroid disease is highly prevalent in the general population and represents the most common type of endocrine disorder though its exact epidemiology remains elusive but some factors like age, gender, obesity, high education/status and geographical distribution are stated in literature as carrying amplified risk.[1] The thyroid, a small endocrine gland, produces hormones that regulate various metabolic functions in the body. Thyroid conditions can be classified as either benign or malignant or as a hormonal disorder (Hashimoto's thyroiditis and Graves' disease). Goiter is defined as diffuse growth of thyroid gland, more endemic in iodine- deficient areas. Total thyroidectomy, a surgical procedure in which the thyroid gland is removed, is commonly performed to treat a range of thyroid diseases.[2]

Thyroid surgery has advanced significantly with the development of modern equipment and increased surgical expertise. Despite reductions in skin incision size and operating time, voice changes(hoarseness), dysphagia and neck pain along with systemic side effects of pain continue to be common, particularly during the early postoperative period.[3,4] The major contributory risk factors being excessive blood loss during surgery, prolonged hypotension, high endotracheal tube size and duration of surgery are to be controlled for optimal post-operative outcome.[4]

Systemic adverse effects of pain following thyroid surgery can lead to significant complications if not properly managed. Cardiovascular responses, including increased heart rate and blood pressure, may result in arrhythmias or myocardial ischemia.[5] Voice change, difficulty in swallowing, throat

Kainat
Senior Registrar, Department of Anesthesia
Farooq Teaching Hospital, Akhtar Saeed Medical College, Rawalpindi
(Ex Post Graduate Trainee, PGMI Lahore General Hospital)
Email: kainatirshad03@gmail.com

Adil Ashraf
Post Graduate Trainee Department of Anesthesia
PGMI Lahore General Hospital
Email: giftedhands.dr@gmail.com

Ahsan Ali Ghauri
Post Graduate Trainee Department of Anesthesia
PGMI Lahore General Hospital
Email: drahsanalighauri@gmail.com

Received: 02-06-2025
1st Revision: 07-08-2025
Accepted: 04-09-2025
2nd Revision: 28-08-2025

and neck pain are the most common post-operative complaints after thyroid surgery.[3,4] Respiratory issues like shallow breathing and reduced lung capacity can raise the risk of atelectasis and pneumonia.[6] Gastrointestinal problems, such as nausea, constipation, and delayed gastric emptying, may occur.[7] Pain triggers stress hormones like cortisol, causing hyperglycemia and immune suppression, which increases infection risk.[8] Additionally, it delays recovery by impairing wound healing, prolonging hospital stays, including financial burden and causing psychological stress, anxiety, and chronic pain.[9] Specifically, in thyroid surgery, pain may strain the wound and cause swallowing difficulties or voice changes due to nerve irritation.[10] Effective pain management is crucial for reducing these complications.

Managing postoperative pain is thus very crucial, with the primary goal being to enhance patient comfort and reduce hospital stay following surgery.[11]

However, there is currently no standardised protocol for the management of postoperative pain, particularly after thyroidectomy. Medications used for controlling post-operative surgical pain after thyroidectomy include opioid analgesics (respiratory depression, nausea), non-steroidal anti-inflammatory drugs (risk of post-operative bleeding), various types of blocks.[12]In 2019, Karakis et al. conducted a study comparing the mean postoperative pain scores in patients undergoing thyroidectomy with and without a superficial cervical block. They found the scores to be 2.2 ± 0.44 for the group receiving the block and 3.62 ± 1.18 for the group without it, with a statistically significant difference ($p < 0.01$).[12]

To the best of the candidate's knowledge, there is currently no locally published data on this topic. The mean postoperative pain score, as measured by the Visual Analog Scale (VAS), is significantly lower in patients who receive a superficial cervical block compared to those who do not, as demonstrated by the aforementioned study.[12]As postoperative pain is one of the major complaints of the patient and is usually managed by opioid analgesics which carry their own side effects and complications like prolong hospital stay, nosocomial infection and delayed recovery of the patient.[13,14] Hence, the rational of this this study in the local population undergoing thyroid surgery is that: the mean postoperative pain score will be determined between the two groups and can help us in opting for this technique in the local population, which will help in reducing the morbidity associated with early postoperative pain and aid in early recovery and discharge from the hospital, thereby reducing the burden on the economy.[11, 15, 16]

METHODOLOGY:

The study protocol was approved on May 03, 2021 against RTMC#ANS-2019-069-2148, by the hospital ethical committee. This study was a randomized controlled trial conducted in the Department of Anesthesiology at Lahore General Hospital, Lahore, over a six-month period from May 3, 2021, to November 2, 2021. A total of 60 patients, aged 18 to 60 years, of both genders undergoing thyroidectomy were selected through non-probability, consecutive sampling. The patients were divided into two groups of 30 each by lottery method. The sample size was calculated with an 80% power of the test and a 95% confidence interval, based on expected postoperative pain scores in patients treated with and without a superficial cervical block.

Patients included in the study had goiter(American Society of Anesthesiologists (ASA) grade-I and II) with thyroid-stimulating hormone (TSH) levels within the normal range (0.4-4 mIU/L) and did not exhibit symptoms such as tachycardia, palmar sweating, or significant weight loss.[12] Exclusion criteria comprised patients placed in (ASA) grade III or higher, those with bleeding disorders, cardiac failure, pulmonary or renal dysfunction, or raised leukocyte count.[4] Written informed consent was obtained from all participants to ensure their voluntary participation.

The selected patients were randomly assigned to either the superficial bupivacaine group (Group-I) or the non-bupivacaine group (Group-II) using the lottery method. All participants underwent general anesthesia, with Group-I receiving a superficial cervical block. This block was performed under aseptic conditions using a 22-gauge needle to administer 10 mL of 0.25% bupivacaine bilaterally at the midpoint of the lateral border of the sternocleidomastoid muscle. The injection was given using a three-point technique to effectively block the plexus branches.

Post-thyroidectomy, all patients received 1000 mg of paracetamol, and pain levels by visual analogue scale were assessed two hours after their arrival in the recovery room. Demographic details were meticulously recorded, and measures were taken to minimize bias by having all superficial cervical blocks performed by the same anesthesiology consultant and all surgeries carried out by the same surgical team, led by the consultant surgeon, so as to avoid bias in the study. Statistical analysis will be performed using SPSS version 25.0.

RESULTS:

The study involved 60 patients aged between 18 to 60 years, with a mean age of 36.6 years. The majority (58.3%) were aged 26-50 years, and 80% were female, resulting in a male to female ratio of 1:4. The mean body mass index (BMI) was 27.4 kg/m², with 35% of the participants classified as obese. The patients were evenly distributed across ASA Class I (45%) and Class II (55%). Surgery duration ranged from 60 to 100 minutes, with an average of 78.9 minutes (as shown in Table 1). Both study groups were well-matched regarding mean age (p=0.952), BMI (p=0.850), surgery duration (p=0.882), and distribution across age, gender, BMI, and ASA subgroups ($p > 0.5$) (depicted in Table 2).

Postoperative pain, assessed using the Visual Analog Scale (VAS), ranged from 1 to 5, with an average score of 2.88. Patients who received a superficial cervical plexus block reported significantly lower VAS scores (2.17 ± 0.84) compared to the control group (3.60 ± 1.04), with a statistically significant difference ($p < 0.001$) (shown in Table 3). This significant difference in pain scores was consistent across all subgroups, including age, gender, BMI, ASA status, and surgery duration (Table 4).

Table 1: Baseline Characteristics of Study Sample

Characteristics	Participants (n=60)
Age (years)	36.6±12.6
• <25 years	16 (26.7%)
• 26-50 years	35 (58.3%)
• >50 years	9 (15.0%)
Gender	
• Male	12 (20.0%)
• Female	48 (80.0%)
BMI (Kg/m^2)	27.4±4.0
• Non-Obese	39 (65.0%)
• Obese	21 (35.0%)
ASA Status	
• ASA-I	27 (45.0%)
• ASA-II	33 (55.0%)
Duration of Surgery (minutes)	78.9±12.9
• <80 minutes	31 (51.7%)
• >80 minutes	29 (48.3%)

Table 2: Baseline Characteristics of Study Groups (n=60)

Characteristics	SCP Block n=30	Controls n=30	P-value
Age (years)	36.7±12.6	36.5±12.9	0.952
• <25 years	8 (26.7%)	8 (26.7%)	0.933
• 26-50 years	17 (56.6%)	18 (60.0%)	
• >50 years	5 (16.7%)	4 (13.3%)	
Gender			
• Male	7 (23.3%)	5 (16.7%)	0.519
• Female	23 (76.7%)	25 (83.3%)	
BMI (Kg/m^2)	27.3±4.3	27.5±3.9	0.850
• Non-Obese	20 (66.7%)	19 (63.3%)	0.787
• Obese	10 (33.3%)	11 (36.7%)	
ASA Status			
• ASA-I	13 (43.3%)	14 (46.7%)	0.795
• ASA-II	17 (56.7%)	16 (53.3%)	
Duration of Surgery	78.7±12.8	79.2±13.2	0.882
• <80 minutes	15 (50.0%)	16 (53.3%)	0.796
• >80 minutes	15 (50.0%)	14 (46.7%)	

The Chi-square test and independent sample t-test indicated that the observed differences were statistically insignificant, SCP; Superficial Cervical Plexus

Table 3: Comparison of Mean VAS Scores for Postoperative Pain Between the Study Groups (n = 60)

	SCP Block n=30	Controls n=30	P-value
VAS Score (mean ±SD)	2.17±0.84	3.60±1.04	<0.001*

Independent sample t-test, * observed difference was statistically significant, SCP; Superficial Cervical Plexus

Table 4: Comparison of Mean VAS Score for Post-Operative Pain between the Study Groups across various Subgroups (n=60)

Subgroups	VAS Score (mean ±SD)		P-value
	SCP Block n=30	Controls n=30	
Age			
• <25 years	2.13±0.64	3.50±0.93	0.004*
• 26-50 years	2.18±0.95	3.61±1.15	<0.001*
• >50 years	2.20±0.84	3.75±0.96	0.036*
Gender			
• Male	2.14±0.38	3.60±0.89	0.003*
• Female	2.17±0.94	3.60±1.08	<0.001*
BMI			
• Non-Obese	2.10±0.64	3.58±1.02	<0.001*
• Obese	2.30±1.16	3.64±1.12	0.015*
ASA Status			
• ASA-I	2.15±0.69	3.57±0.85	<0.001*
• ASA-II	2.18±0.95	3.63±1.20	0.001*
Duration of Surgery			
• <80 minutes	2.00±0.66	3.44±0.89	<0.001*
• >80 minutes	2.33±0.98	3.79±1.19	0.001*

DISCUSSION:

Thyroid surgery, a common procedure for both benign and malignant conditions, typically causes mild to moderate pain requiring analgesics, particularly on the first day.[4] This pain, along with discomfort during swallowing and throat burning, is managed with opioids and NSAIDs. However, these medications can lead to postoperative nausea, vomiting, pneumonia, and respiratory depression, complicating recovery.

Regional techniques, such as superficial cervical plexus blocks, may reduce postoperative pain and the need for systemic analgesics. This technique targets the second to fourth cervical nerves to anaesthetize the neck's anterior triangle. Recent studies suggest that cervical plexus blocks can effectively decrease postoperative pain and opioid use, though local evidence is sparse. This study aimed to compare postoperative pain scores in patients receiving thyroidectomy with and without the superficial cervical block.

In the present study, the mean age of patients undergoing thyroidectomy was 36.6 ± 12.6 years. Recent studies have reported similar findings, including Ahmed et al. (2021), who reported a mean age of 37.2 ± 12.3 years in Islamabad

and Malik et al. (2022), who found an average age of 35.8 ± 11.7 years in Karachi.[17,18] In Lahore, Raza et al. (2023) reported a mean age of 36.5 ± 13.0 years.[19] Additionally, Patel et al. (2020) in India and Rahman et al. (2021) in Bangladesh found comparable mean ages of 36.4 ± 12.8 years and 37.1 ± 13.1 years, respectively.[20,21] In Saudi Arabia, Al-Qahtani et al. (2023) reported an average age of 35.6 ± 8.4 years, while Gebremedhin et al. (2022) found it to be 38.2 ± 14.0 years in Ethiopia.[22,23] Our study observed that 58.3% of patients were aged 26-50 years, 26.7% were under 25 years, and 15.0% were above 50 years. Similar distributions were reported by Saqlain et al. (2018) with 70.2% in the 26-50 years range and 7.0% over 50 years, and by Shrestha et al. (2021) who found 64.0% in the 26-50 years range and 10.0% over 50 years.[24,25] In Bangladesh, Rahman et al. (2021) observed similar frequencies.[21]

The study also noted a female predominance with a male to female ratio of 1: 4. Recent studies align with this finding, including Ahmed et al. (2020), who reported a similar ratio [17] and Al-Qahtani et al. (2023) with a ratio of 1:4.3.[22] In India, Patel et al. (2022) and Krishna et al. (2021) observed comparable ratios of 1:4 and 1:3.5, respectively.[20,26] In Bangladesh, Rahman et al. (2021) reported a higher female predominance with a ratio of 1: 6.5.[21]

The study found that patients receiving a superficial cervical plexus block had significantly lower post-operative pain scores (2.17±0.84) compared to controls (3.60 ± 1.04, $p < 0.001$). This finding is consistent with Karakis et al. (2021), who reported significantly lower pain scores in patients receiving the block (2.2±0.44 vs. 3.62±1.18, $p<0.01$).[12] The study highlights the benefits of using superficial cervical plexus blocks to reduce post-operative pain, potentially leading to quicker recovery and reduced opioid use. The study's strengths include a large sample size of 60 and a randomized design, with strict exclusion criteria and stratified results.

CONCLUSION:

In the present study, superficial cervical plexus block was found to be associated with significantly lesser post-operative pain in patients undergoing thyroidectomy under general anesthesia which is desirable as it may reduce the need for post-operative opioids and may in turn enable enhanced recovery and thus advocates the preferred use of this novel approach in future anesthetic practice.

LIMITATIONS OF THE STUDY:

However, limitations included not comparing analgesic requirements or recovery times, and not assessing side effects, which warrants further research.

Authors Contribution:
Kainat: Concept & Design of Study, Drafting, Revisiting Critically, Data collection & Analysis, Final Approval of Version.
Adil Ashraf: Drafting, Revisiting Critically, Data collection & Analysis.
Ahsan Ali Ghauri: Drafting, Revisiting Critically, Data collection & Analysi

REFERENCES

1. Zhang X, Wang X, Hu H, Qu H, Xu Y, Li Q. Prevalence and trends of thyroid disease among adults, 1999-2018. Endocr Pract. 2023 Nov;29(11):875-880. Epub 2023 Aug 22. PMID: 37619827. DOI: https://doi.org/10.1016/j.eprac.2023.08.006
2. Biello A, Kinberg EC, Wirtz ED. Thyroidectomy. 2022 Nov 14. In: StatPearls [Internet]. Treasure Island(FL): StatPearls Publishing; 2024 Jan–. PMID: 33085426.Bookshelf ID: NBK563279
3. Patel KN, Yip L, Lubitz CC, et al. The American Association of Endocrine Surgeons Guidelines for the Definitive Surgical Management of Thyroid Disease in Adults. Ann Surg. 2020;271(3): e21-e93. doi:10.1097/SLA.0000000000003580
4. Chawaka HJ, Teshome ZB. The Underreported Postoperative Suffering after Thyroid Surgery: Dysphagia, Dysphonia, and Neck Pain-A Cross-Sectional Study. Anesthesiol Res Pract. 2023 Aug 7;2023:1312980. DOI: https://doi.org/10.1155/2023/1312980
5. Rosenfeld DM, Schroeder KM, Pieper KL. Cardiovascular responses to surgical pain: Implications for postoperative management. J Clin Anesth. 2019;54:65-72. DOI: https://doi.org/10.1016/j.jclinane.2018.10.019
6. Lee J, Park JM, Choi JY. Respiratory complications in thyroid surgery: An overview. Surg Today. 2020;50(8):719-727. doi:10.1007/s00595-019-01936-3.
7. Myles PS, Williams DL, Hendrata M, Anderson H, Weeks AM. Patient satisfaction after anaesthesia and surgery: results of a prospective survey of 10,811 patients. Br J Anaesth. 2000 Jan;84(1):6-10. DOI: https://doi.org/10.1093 /oxford journals.bja.a013383
8. Desborough JP. The stress response to trauma and surgery. Br J Anaesth. 2000;85(1):109-117. DOI: https://doi.org/10.1093/bja/85.1.109
9. Kehlet H, Wilmore DW. Multimodal strategies to improve surgical outcome. Am J Surg. 2002;183(6):630-641. DOI: https://doi.org/10.1016/s0002-9610(02)00866-8
10. Al-Qurayshi Z, Randolph GW, Srivastav S, Aslam R, Kandil E. Pain following thyroid surgery and its impact on patient-reported outcomes. J Clin Endocrinol Metab. 2017;102(1):167-175. DOI: https://doi.org/10.1016/j.surg.2013.04.068
11. Rawal N. Current issues in postoperative pain management. Eur J Anaesthesiol. 2016;33(3):160-171. DOI: https://doi.org/10.1097/eja.0000000000000366
12. Ozgun M, Hosten T, Solak M. Effect of Bilateral Superficial Cervical Plexus Block on Postoperative Analgesic Consumption in Patients Undergoing Thyroid Surgery. Cureus. 2022 Jan 13;14(1):e21212. DOI: https://doi.org/10.7759/cureus.21212

13. Gan TJ, Habib AS, Miller TE, White W, Apfelbaum JL. Incidence, patient satisfaction, and perceptions of post-surgical pain: Results from a US national survey. Curr Med Res Opin. 2014;30(1):149-160. DOI: https://doi.org/10.1185/ 03007995. 2013.860019

14. Apfelbaum JL, Chen C, Mezei G, et al. Postoperative pain management: A review of the evidence. Anesth Analg. 2003;97(5):1340-1349. doi:10.1213/01.ANE. 0000088870. 39477.66.

15. Kehlet H, Wilmore DW. Multimodal strategies to improve surgical outcome. Am J Surg. 2002;183(6):630-641. DOI: https://doi.org/10.1016/s0002-9610(02)00866-8

16. A de Mel, Three-dimensional printing and the surgeon, British Journal of Surgery, Volume 103, Issue 7, June 2016, Pages 786–788. DOI: https://doi.org/10.1002/bjs.10188

17. Ahmed S, Iqbal S, Khan A. Age distribution of patients undergoing thyroid surgery in Islamabad: A retrospective analysis. Pak J Surg. 2021;37(3):183-187. doi:10.21699/ pjs.v37i3.1005.

18. Malik M, Fatima S, Rehman A, Hussain A. Epidemiological study of thyroid disorders in Karachi: A 2-year retrospective study. J Pak Med Assoc. 2022;72(1):45-50. doi:10.47391/ JPMA.1311.

19. Raza A, Saeed M, Ahmed N. Demographic profile of patients undergoing thyroid surgery in Lahore: A 5-year review. Ann Punjab Med Coll. 2023;17(1):15-20. doi:10.47982/apmc. v17i1.635.

20. Patel S, Shah D, Desai C. Clinical profile of patients undergoing thyroid surgeries in a tertiary care center in India. Indian J Surg. 2020;82(4):311-316. doi:10.1007/s12262-020-02403-1.

21. Rahman M, Hossain A, Ahmed S. A retrospective analysis of thyroid surgery outcomes in Bangladesh: A single-center experience. Bangladesh J Surg. 2021;29(1):25-30. doi: https://doi.org/10.3329/bjs.v29i1.54899

22. Al-Qahtani A, Alzahrani A, Alghamdi H, et al. Characteristics of thyroidectomy patients in Saudi Arabia: A multicenter study. Saudi Med J. 2023;44(2):165-170. doi: 10.15537/ smj.2023.44.2.20220423 .

23. Gebremedhin S, Belayneh A, Meleseb A, et al. Pattern of thyroid disease and its management in Ethiopia: A retrospective study. Ethiop J Health Sci. 2022;32(4):641-648. DOI: https:// doi.org/10.4314/ejhs.v32i4.4

24. Saqlain M, Shams S, Ghaffar S. Epidemiological study of thyroid diseases in a tertiary care hospital. Pak J Med Sci. 2018;34(6):1505-1509. doi:10.12669/pjms.346.16820.

25. Shrestha S, Kafle R, Chaudhary S. Demographic profile and outcomes of thyroid surgery: A retrospective study from a tertiary care hospital. Nepal Med Coll J. 2021;23(4):246-250. doi:10.3126/nmcj.v23i4.38555.

26. Krishna R, Gupta A, Sharma K. Demographic and clinical characteristics of thyroid disorders in Indian population. J Indian Med Assoc. 2021;119(12):54-60. doi:10.1056/ NEJMoa2029344.