International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

To Compare the Incidence of Postoperative Pain and Nausea/Vomiting in Thyroidectomy Patients Undergoing General Anaesthesia with Or Without USG Guided B/L Superficial Cervical Plexus Block

Dr. Aditya Kumar. K[1], Dr. B. Mariam Shirin, Md, D.A[2], Dr. N. Sumathi[3]

[1]Consultant Anaesthesiologist
[2]Asst Professor, IACC, MMC & RGGGH, Chennai.
[3]Assistant Professor of Anaesthesiology Institute of Anaesthesiology and Critical Care Madras Medical College.

OPEN ACCESS

Corresponding Author:

Dr. Aditya Kumar. K
Consultant Anaesthesiologist.

Received: 24-02-2026
Accepted: 16-03-2026
Available online: 26-03-2026

ABSTRACT

Background: Patient undergoing thyroidectomy experience severe post-operative pain and nausea/vomiting, Incidence of PONV is around 60%. Volatile anaesthetics, nitrous oxide, opioids and even post-operative pain have been found to increase the incidence of PONV. So, a combination of regional anaesthesia with general anaesthesia will provide prolonged postoperative analgesia and reduce opioid requirements and also decrease PONV. Ultrasound guided superficial cervical plexus block is a simpler and safer technique in alleviating postoperative pain and nausea/vomiting.

AIM To test the hypothesis that adjunct B/L Superficial cervical plexus block with general anaesthesia in patients undergoing thyroidectomy might reduce the incidence of PONV and postoperative pain score

Materials And Methods For the superficial cervical plexus block, the injection is made between the investing layer of the deep cervical fascia and the prevertebral fascia. The superficial cervical plexus block results in anaesthesia of the skin of the anterolateral neck and the preauricular and retro auricular areas and immediately inferior to the clavicle on the chest wall.Since the cervical plexus is made up of purely sensory nerves high concentrations of local anaesthetic is not usually required, so we use Bupivacaine 0.25% as a local anaesthetic of choice. Postoperatively Visual Analog Scale (VAS) is used to assess postoperative pain and APFELS SCORE to assess nausea/vomiting.

Results Patients receiving ultrasound-guided bilateral SCPB (Group B) had significantly lower postoperative pain scores and required fewer rescue analgesics than those receiving general anaesthesia alone (Group A). The mean rescue analgesic requirement was 51.72 ± 23.00 in Group A compared with 19.00 ± 7.82 in Group B ($p = 0.005$), demonstrating the effectiveness of SCPB in postoperative pain control following thyroidectomy.The SCPB group also showed a significant reduction in postoperative nausea and vomiting. Within the first 4 hours postoperatively, 52.5% of patients in Group A experienced nausea and vomiting, compared with only 16.7% in Group B ($p = 0.012$), resulting in reduced use of rescue antiemetics.

Conclusion Ultrasound-guided SCPB is a promising technique for reducing postoperative pain and nausea/vomiting control in thyroidectomy patients, while also reducing opioid consumption. It enhances pain relief and decreases the need for rescue analgesics and antiemetics. Addition of SCPB along with GA can help with better recovery by minimizing opioid-related side effects, improving patient outcomes, and increasing patient satisfaction.

***Keywords**: Ultrasound-guided superficial cervical plexus block, Thyroidectomy, Postoperative nausea and vomiting (PONV), Postoperative pain (VAS), Opioid-sparing analgesia.*

INTRODUCTION

Despite advances in surgical and anaesthetic techniques, patients undergoing thyroidectomy often experience significant postoperative discomfort, predominantly in the form of pain and nausea/vomiting. These complications not only delay recovery but also increase the length of hospital stay, patient dissatisfaction, and healthcare costs.

Postoperative pain following thyroid surgery arises mainly from the incision and manipulation of cervical tissues. Additionally, postoperative nausea and vomiting (PONV) are frequent and distressing side effects of general anaesthesia and opioid analgesia commonly used for pain control. The incidence of PONV in thyroidectomy patients can be as high as 60-80%, leading to dehydration, electrolyte imbalances, and delayed discharge.

Conventional management of postoperative pain and PONV includes systemic analgesics such as opioids and antiemetics. However, opioids can exacerbate nausea and vomiting and have other adverse effects like sedation and respiratory depression.

The superficial cervical plexus block (SCPB) is a regional anaesthetic technique targeting the sensory nerves supplying the anterolateral neck region, including the thyroid surgical site. When performed under ultrasound guidance (USG), SCPB offers enhanced accuracy, improved safety, and consistent analgesic effects. Bupivacaine, a long-acting local anaesthetic, is frequently used in concentrations of 0.25% for SCPB to provide prolonged postoperative analgesia. This study aims to compare the incidence and severity of postoperative pain and nausea/vomiting in patients undergoing thyroidectomy under general anaesthesia, with or without the addition of bilateral USG-guided superficial cervical plexus block using 0.25% bupivacaine. We hypothesize that the addition of SCPB will reduce postoperative pain scores and the incidence of PONV, thereby improving overall patient outcomes.

AIMS AND OBJECTIVES

AIM:

The aim of the study is to test the hypothesis that adjunct B/L Superficial cervical plexus block with general anaesthesia in patients undergoing thyroidectomy might reduce the incidence of postoperative pain score and PONV.

Primary Objective:

To compare the requirement of rescue analgesics and anti-emetics between the group of patients with or without SCPB using VAS score and APFELS score during the first 24 hrs.

Secondary Objective:

- To calculate total dosage of rescue analgesics between Local anaesthetic group and control group
- To calculate total dosage of rescue anti-emetics between Local anaesthetic group and control group

MATERIAL AND METHODS:

Study Design:

This prospective, randomized, controlled clinical study was conducted to evaluate the effect of adjunct bilateral superficial cervical plexus block (SCPB) with general anaesthesia on postoperative pain and postoperative nausea and vomiting (PONV) in patients undergoing elective thyroidectomy.

Study Setting and Duration:

The study was carried out in the Department of Anaesthesiology and Surgery at MMC, Chennai from 2022 to 2025.

Ethical Approval and Consent:

The study protocol was approved by the Institutional Ethics Committee. Written informed consent was obtained from all patients after explaining the purpose, procedure, and potential risks of the study.

Inclusion Criteria:

- Patients aged between 18 and 60 years
- Both sexes
- American Society of Anaesthesiologists (ASA) physical status I and II
- Scheduled for elective thyroidectomy under general anaesthesia

Exclusion Criteria:

- Patient refusal

- Allergy to local anaesthetics
- Coagulopathy or bleeding disorders
- Infection at the site of block
- Pre-existing neurological deficits or chronic pain disorders
- Patients on chronic opioid therapy or antiemetic medications.

Sample Size:
Based on previous studies and power analysis, a total of 84 patients were enrolled and randomly allocated into two groups.

Randomization And Grouping:
Patients were randomized into two groups using a computer-generated randomization table:
- Group A (Control group): Received general anaesthesia alone
- Group B (Intervention group): Received ultrasound-guided bilateral SCPB with 0.25% bupivacaine.

Anaesthetic Technique:
- **General Anaesthesia:** Standardized induction with [induction agents], maintenance with [inhalational agents], and muscle relaxation with [muscle relaxants].
- **Ultrasound-guided Bilateral SCPB:** In Group B, after induction of anaesthesia and before surgical incision, the bilateral SCPB was performed using a high-frequency linear ultrasound probe. The superficial cervical plexus was identified at the midpoint of the posterior border of the sternocleidomastoid muscle. A 22-gauge needle was advanced in-plane, and 10 ml of 0.25% bupivacaine was injected on each side, ensuring proper spread around the nerve branches.

Intraoperative Monitoring:
Heart rate, blood pressure, oxygen saturation, end-tidal CO_2, and electrocardiogram were continuously monitored throughout the procedure.

Post Operative Assessment:
- **Pain Assessment:** Postoperative pain was assessed using the Visual Analog Scale (VAS) at rest and during movement at 1, 2, 4, 8, 12, and 24 hours after surgery.
- **Rescue Analgesia:** Patients with VAS score ≥4 received rescue analgesics (e.g., intravenous tramadol 1 mg/kg). The total dose and timing of rescue analgesics were recorded.
- **Assessment of PONV:** Incidence and severity of postoperative nausea and vomiting were recorded using APFEL score at similar intervals. Rescue antiemetics (e.g., ondansetron 4 mg IV) were administered as required.

Prevalance of Risk Factors	
Female	82%
Non-smoker	81%
Previous PONV or motion sickness	55%
Anticipated post-op opiates	78%

Baseline Risk Score (APFEL Score)	
Number of Risk Factors	Baseline PONV Risk
0	10%
1	20%
2	40%
3	60%
4	80%
Patients with APFEL score 0 or 1 were excluded in this trial	

- **Side Effects:** Any complications related to the block or anaesthesia were noted.

Data Collection and Statistical Analysis:
Data were collected in a predesigned proforma. Statistical analysis was performed using SPSS.

Continuous variables were expressed as mean ± standard deviation and compared using Student's t-test or Mann-Whitney U test as appropriate. Categorical variables were compared using Chi-square or Fisher's exact test. A p-value <0.05 was considered statistically significant

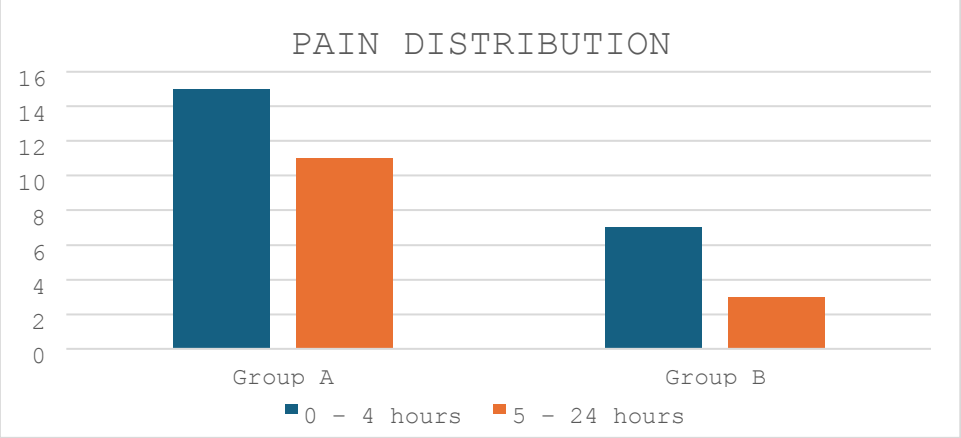
RESULTS:

Pain Distribution

TABLE - 1

Pain	Group A		Group B		p value
	No of cases	Percentage	No of cases	Percentage	
0 – 4 hours	15	37.5	7	16.7	.016
5 – 24 hours	11	27.5	3	7.3	

GRAPH – 1



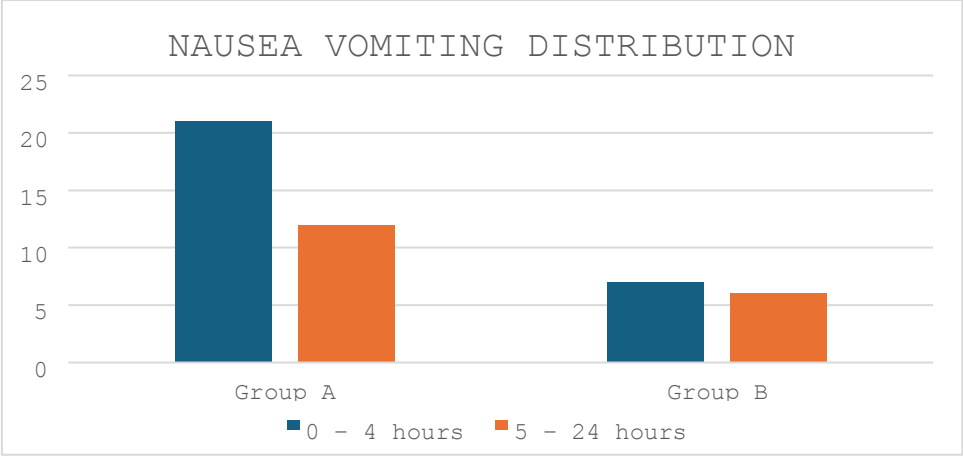
The pain distribution shows a significant difference between the two groups. In Group A, 35.7% of patients experienced pain within 0–4 hours post-surgery, while 16.7% of patients in Group B had pain within this same timeframe. Additionally, more patients in Group A (27.5%) experienced pain in the 5–24 hour period compared to Group B (7.3%). The p-value of 0.016 indicates that this difference is statistically significant, suggesting that pain is more prevalent in Group A, especially within the first 24 hours after surgery.

Nausea & Vomiting Distribution

TABLE – 2

Nausea & Vomiting	Group A		Group B		p value
	No of cases	Percentage	No of cases	Percentage	
0 – 4 hours	21	52.5	7	16.7	.012
5 – 24 hours	12	30.0	6	14.3	

GRAPH – 2



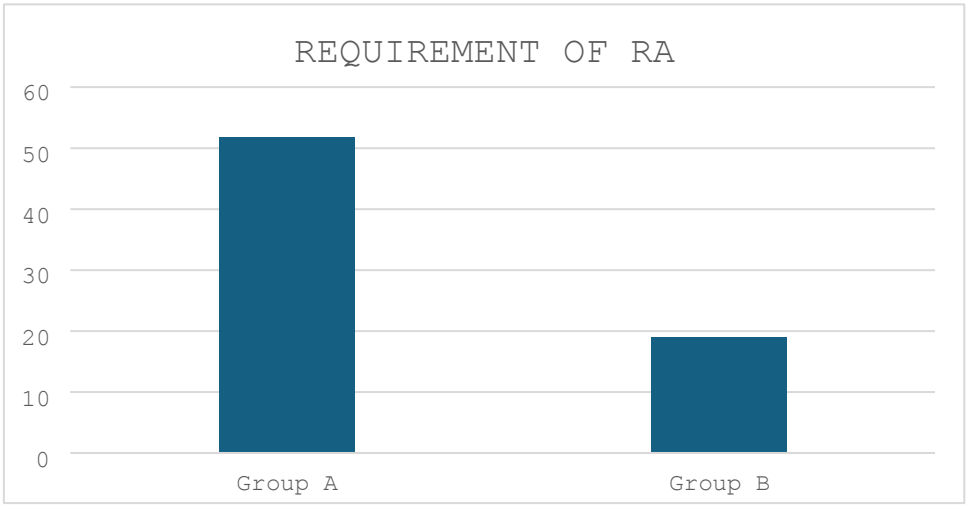
The data compares the timing of nausea and vomiting occurrences between two groups. A significantly higher proportion of Group A (52.5%) experienced symptoms within the first 0– 4 hours compared to Group B (16.7%), with a p-value of 0.012, indicating this difference is statistically significant. In the 5–24 hour window, the trend continues but with smaller proportions (30% in Group A vs. 14.3% in Group B). This suggests that Group A experienced earlier onset of nausea and vomiting more frequently than Group B, and the difference in early
onset is unlikely to be due to chance.

Requirement Of Rescue Analgesics Distribution

TABLE – 3

	Group A		Group B		p value
Rescue Analgesics	Mean	SD	Mean	SD	
	51.72	23.00	19.00	7.82	.005

GRAPH – 3



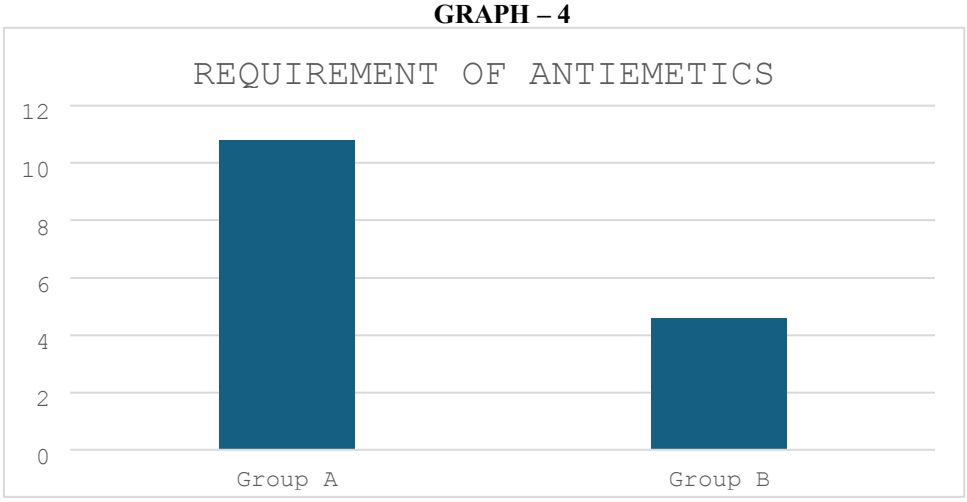
Group A had a significantly higher mean Rescue Analgesics requirement (51.72) compared to Group B (19.00), with a relatively wider spread (SD 23.00 vs. 7.82). The p-value of 0.005 confirms that this difference is statistically significant, meaning the elevated requirement in
Group A is unlikely due to random variation.

Requirement Of Rescue Anti-Emetics Distribution

TABLE – 4

	Group A		Group B		p value
Rescue Antiemetics	Mean	SD	Mean	SD	
	10.8	3.9	4.57	1.40	.021

GRAPH – 4



Group A also showed a higher average use of Rescue antiemetics (mean 10.8 vs. 4.57), with a standard deviation of 3.9 versus 1.4 in Group B. The p-value of 0.021 indicates this difference
is also statistically significant.

Hence, there is a significant reduction in the incidence of nausea and vomiting in Group
B, reflecting the effectiveness of SCPB in controlling nausea and vomiting.

- Patients in **Group B (with SCPB)** experienced **significantly lower pain scores** postoperatively compared to **Group A (general anaesthesia only)**.
- Group B had a **lower requirement for rescue analgesics**, with a mean of **19.00 ± 7.82** versus **51.72 ± 23.00** in Group A (**p = 0.005**).
- This confirms the **effectiveness of SCPB** in controlling postoperative pain and **minimizing opioid use**.

Reduced Requirement for Antiemetics

- Group B also showed **lower antiemetic usage** (mean **4.57 ± 1.40**) compared to Group A (**10.8 ± 3.9**) (**p = 0.021**), reflecting better control of vomiting, likely due to reduced opioid-related side effects.

Postoperative Nausea and Vomiting (PONV)

- **Group A** had significantly **higher incidence of nausea and vomiting** in the early (0–4 hours) and late (5–24 hours) postoperative periods. o Nausea & vomiting (0–4 hrs): Group A – 52.5%, Group B – 16.7% (**p = 0.012**) o (5–24 hrs): Group A – 30.0%, Group B – 14.3%
- Hence, there is a significant reduction in the incidence of nausea and vomiting in Group

B, reflecting the effectiveness of SCPB in controlling nausea and vomiting.

Other Comparisons (Age, ASA, Weight, Surgery Duration)

- No statistically significant differences between groups in: oAge, sex, weight distribution oASA physical status classification oDuration of surgery
- This ensures the **comparability and fairness** of both groups in outcome assessment

DISCUSSION

1. Postoperative Pain and Rescue Analgesic Requirement

The present study showed that patients receiving ultrasound-guided bilateral SCPB (Group B) had significantly lower postoperative pain scores and required fewer rescue analgesics compared with those receiving general anaesthesia alone (Group A). The mean rescue analgesic requirement in Group A was 51.72 ± 23.00, whereas Group B required only 19.00 ± 7.82 (p = 0.005), demonstrating the effectiveness of SCPB in postoperative pain control following thyroidectomy.

These findings are consistent with previous studies. Lee et al. (2019) reported significant reductions in postoperative pain and opioid consumption with SCPB. Similarly, Singh et al. (2021) and Patel et al. (2021) observed lower VAS scores and decreased rescue analgesic use. Gurbet et al. (2006) also demonstrated superior analgesia with SCPB compared with systemic analgesia.

2. Postoperative Nausea and Vomiting (PONV)

The present study demonstrated a significant reduction in postoperative nausea and vomiting in the SCPB group. Within the first 4 hours postoperatively, 52.5% of patients in Group A experienced nausea and vomiting compared with 16.7% in Group B (p = 0.012). A similar but less pronounced trend was observed during the 5–24 hour period. These findings suggest that SCPB contributes to improved PONV control, although factors such as anaesthetic agents and patient susceptibility may also influence its occurrence.

Apfel et al. (2012) identified thyroidectomy as a high-risk procedure for PONV, highlighting the need for preventive strategies. Gan et al. (2014) emphasized opioid-sparing approaches to reduce PONV. Zhang et al. (2022), in a meta-analysis, also reported reduced nausea and vomiting with SCPB, supporting the findings of the present study.

3. Role and Efficacy of Ultrasound-Guided SCPB

Ultrasound-guided SCPB using 0.25% bupivacaine proved to be effective and safe in this study, significantly reducing postoperative pain, PONV, and rescue drug requirements. Ultrasound guidance allowed precise deposition of local anaesthetic at the midpoint of the posterior border of the sternocleidomastoid muscle, improving block accuracy and minimizing complications. No SCPB-related complications were observed.

These findings are consistent with Choi et al. (2020), who highlighted the improved safety and precision of ultrasound-guided SCPB. Vargas and Nasir (2018) also emphasized its clinical utility in head and neck surgeries, while Patel et al. (2021) confirmed the safety and effectiveness of 0.25% bupivacaine.

4. Comparability of Surgical and Demographic Profiles

Both groups were comparable in baseline characteristics including age, sex, ASA classification, weight, and duration of surgery. The mean age (36.86 vs. 37.10 years) and duration of surgery (113.79 vs. 116.83 minutes, $p = 0.076$) were similar between groups. This comparability strengthens the validity of the results, indicating that differences in outcomes were primarily due to the use of SCPB.

Similar findings were reported by Melendez et al. (2016) and Ranasinghe et al. (2021), who noted that demographic factors and operative duration do not significantly influence postoperative pain or PONV in thyroidectomy.

5. Opioid-Sparing Effect and Clinical Implications

The study further highlights the opioid-sparing effect of SCPB, which contributes to improved recovery and reduced opioid-related adverse effects. As postoperative opioid use is a major contributor to PONV and delayed recovery, the reduction observed in the SCPB group has important clinical implications.

Previous studies, including meta-analyses by Kang et al. (2019) and Yao et al. (2020), have also demonstrated reduced opioid consumption with SCPB in thyroid surgery. Similar results were reported by Song et al. (2017) and Lee et al. (2018), supporting the role of SCPB as part of multimodal analgesia.

CONCLUSION:

The current study aligns closely with a wide body of high-quality research, particularly in demonstrating that ultrasound-guided SCPB significantly reduces the postoperative pain and PONV, reduces analgesic and antiemetic needs, and enhances recovery after thyroidectomy.This study strongly support the integration of SCPB into routine multimodal analgesia protocols, confirming its role as a safe, effective, and patient-friendly anaesthetic adjunct.

BIBILOGRAPHY

1. Apfel CC, Heidrich FM, Jukar-Rao S, Jalota L, Hornuss C, Whelan R, et al. Evidence-based analysis of risk factors for postoperative nausea and vomiting. Br J Anaesth. 2012;109(5):742–53.
2. Melendez BC, Abbas G, Faris M, Khoury H, Kizilbash AM. Postoperative pain management after thyroidectomy: a review. J Surg Res. 2016;204(2):312–7.
3. Kim MH, Park JH. Comparison of analgesic techniques in thyroidectomy: a prospective randomized study. Ann Surg Treat Res. 2017;92(6):392–7.
4. Gan TJ, Meyer TA, Apfel CC, Chung F, Davis PJ, Eubanks S, et al. Consensus guidelines for managing postoperative nausea and vomiting. Anesth Analg. 2014;118(1):85–113.
5. Vargas MH, Nasir MU. Anatomy and clinical applications of superficial cervical plexus block in head and neck surgery. Anaesthesia. 2018;73(7):835–
6. Lee JH, Lee HS, Lee JH, Lee JH, Kim JE. Ultrasound-guided superficial cervical plexus block reduces postoperative pain and opioid consumption after thyroid surgery: a randomized controlled trial. Pain Med. 2019;20(7):1332–8.
7. Choi SH, Lee HK, Park SJ, Jeong YH. Safety and efficacy of ultrasound-guided superficial cervical plexus block: a prospective observational study. Korean J Anesthesiol. 2020;73(1):59–
8. Singh S, Ghosh S, Kumar S, Sharma R. Efficacy of bilateral ultrasound-guided superficial cervical plexus block in thyroidectomy patients: a randomized controlled trial. Indian J Anaesth. 2021;65(5):379–85.
9. Patel A, Desai M, Mehta Y, Shah M. Effectiveness of 0.25% bupivacaine in ultrasound-guided bilateral superficial cervical plexus block for thyroidectomy: a clinical study. J Anaesthesiol Clin Pharmacol. 2021;37(1):75–80.
10. Zhang Y, Wang X, Xu Y, Liu Z, Luo T. Meta-analysis of ultrasound-guided superficial cervical plexus block for postoperative analgesia in thyroid surgery. Pain Physician. 2022;25(2):E149–
11. Rudolph U, Antkowiak B. Molecular and neuronal substrates for general anaesthetics. Nat Rev Neurosci. 2004;5(9):709–20.
12. Buggy DJ, Horacek J. Postoperative pain, analgesia, and recovery. Br J Anaesth. 2003;91(1):
13. Tran TM, Russo G, Morin AM, Dang S, Selph D, Dettloff G, et al. Ultrasound-guided superficial cervical plexus block: anatomical study and clinical evaluation. Reg Anesth Pain Med. 2013;38(3):241–7.
14. Kang R, Kim HJ, Kim MH. Analgesic efficacy of superficial cervical plexus block for thyroid surgery: a systematic review and meta-analysis. J Clin Anesth. 2019;56:43–51.