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24-Hour Analgesic Outcomes After Ultrasound-Guided Bilateral Superficial Cervical Plexus Block With Perineural Dexamethasone for Thyroid Surgery: A Prospective Single-Center Case Series

Rachell Machado, MD [1]*

[1] Anesthesiology, Hospital Ana Francisca Perez de Leon II, Caracas, Venezuela

* Corresponding author: Rachell Machado | rachellcaroline@gmail.com

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ABSTRACT

BACKGROUND:
Bilateral superficial cervical plexus block (BSCPB) is used within multimodal analgesia for thyroid surgery, and dexamethasone has been studied as an adjunct intended to prolong block-related analgesia. Because this study had no comparator group, its findings are interpreted as descriptive outcomes of a combined anesthetic and regional-analgesia protocol rather than as evidence of dexamethasone efficacy.

OBJECTIVE:
To describe 24-hour postoperative pain, rescue-analgesic requirements, and reported block-related complications in adults undergoing thyroid surgery who received ultrasound-guided BSCPB with bupivacaine and perineural dexamethasone.

METHODS:
This prospective single-center case series included 12 adults from a source population of 21 patients scheduled for thyroid surgery at Hospital Ana Francisca Perez de Leon II between January and June 2025. All underwent general anesthesia followed by ultrasound-guided bilateral superficial cervical plexus block using a 10-mL preparation containing bupivacaine 25 mg (final concentration 0.25%) and dexamethasone 4 mg; the source thesis did not specify the exact volume injected per side. Pain was assessed on a 0-10 numerical rating scale at 30 minutes, 2 hours, 12 hours, and 24 hours. Protocol-defined analgesic failure was a score 4 at a scheduled assessment or a patient request for rescue medication; ketorolac 30 mg sublingually was the rescue regimen.

RESULTS:
All 12 patients were ASA physical status II. At 30 minutes and 2 hours, 1 patient (8.3%) reported no pain and 11 (91.7%) reported mild pain (scores 1-3). At 12 and 24 hours, all 12 patients (100%) had mild pain; no moderate or severe pain was reported at any scheduled assessment. No patient met the predefined failure criterion or required rescue analgesia (12/12; post hoc exact 95% CI, 73.5%-100%). No block-related complication was reported in the aggregated source results (0/12; post hoc exact 95% CI, 0%-26.5%).

CONCLUSIONS:
Favorable 24-hour pain and rescue-analgesia outcomes were observed after the combined general-anesthesia and BSCPB protocol. The small single-arm sample, systemic analgesic cointerventions, incomplete reporting of several planned outcomes, and absence of a comparator prevent causal attribution to perineural dexamethasone or definitive conclusions regarding safety.

KEYWORDS

dexamethasone; superficial cervical plexus block; thyroid surgery; postoperative analgesia; bupivacaine; regional anesthesia.

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AUTHOR IDENTIFIERS

Rachell Machado | Structured name: Rachell Caroline Machado | Email: rachellcaroline@gmail.com

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CONFLICTS OF INTEREST

The author declares no conflicts of interest.

AUTHOR CONTRIBUTIONS

Rachell C. Machado conceived the study, participated in methodology development, investigation, data collection, data analysis and interpretation, and preparation and revision of the manuscript.

DATA AVAILABILITY

The data supporting the findings of this study are not publicly available because they contain participant clinical information. Deidentified data may be available from the corresponding author upon reasonable request, subject to institutional and ethical requirements.

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Not Applicable

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ORIGINAL RESEARCH

24-Hour Analgesic Outcomes After Ultrasound-Guided Superficial Cervical Plexus Block With Perineural Dexamethasone in Thyroid Surgery: A Prospective Case Series

Rachell C. Machado A., MD

Department of Anesthesiology, Hospital Ana Francisca Pérez de León II, Petare, Venezuela

Study design: prospective, single-center observational case series (12 analyzed from 21 scheduled patients), January-June 2025. Eligibility criteria were prespecified; reasons for non-inclusion of 9 patients were not documented. No comparator group was included.

ABSTRACT

Background: Bilateral superficial cervical plexus block (BSCPB) is used as part of multimodal analgesia for thyroid surgery. Dexamethasone is frequently studied as an adjunct to prolong block duration, but single-arm observations cannot determine its independent contribution.

Objective: To describe 24-hour postoperative pain, rescue-analgesic requirements, and reported block-related complications in adults undergoing thyroid surgery after ultrasound-guided BSCPB with bupivacaine and perineural dexamethasone.

Methods: This prospective single-center case series analyzed 12 adults from a source population of 21 patients scheduled for thyroid surgery between January and June 2025. Eligibility criteria were prespecified, but patient-level reasons for non-inclusion of 9 patients were not documented. General anesthesia included metamizole 1 g and fentanyl 2 µg/kg at induction plus 30 µg during maintenance. After surgery, a bilateral ultrasound-guided superficial cervical plexus block was performed using a prepared 10-mL solution containing bupivacaine 25 mg (0.25% final concentration), dexamethasone 4 mg, and saline; actual injected volume and volume per side were not documented. Pain was recorded at 30 minutes, 2 hours, 12 hours, and 24 hours. Ketorolac 30 mg sublingual was available for a pain score >=4 or at patient request, including between scheduled assessments.

Results: All 12 patients were ASA physical status II. At 30 minutes and 2 hours, 1 patient (8.3%) reported no pain and 11 (91.7%) reported mild pain (scores 1-3). At 12 and 24 hours, all 12 patients (100%) had mild pain; no moderate or severe pain was reported at any scheduled assessment. No patient required rescue ketorolac (0/12; exact 95% CI, 0%-26.5%), and no block-related complication was reported (0/12; exact 95% CI, 0%-26.5%).

Conclusions: The combined perioperative analgesic protocol was followed by favorable 24-hour pain observations and no rescue-analgesic use in this small cohort. These findings are descriptive and hypothesis-generating; without a comparator, they do not establish a dexamethasone-specific effect, and the absence of observed complications in 12 patients does not establish safety.

Keywords: dexamethasone; superficial cervical plexus block; thyroid surgery; postoperative analgesia; bupivacaine; regional anesthesia.

INTRODUCTION

Thyroid surgery is generally associated with mild-to-moderate postoperative pain, and regional techniques are commonly incorporated into multimodal perioperative analgesia. An updated systematic review and meta-analysis including 31 studies and 2,273 patients found that bilateral superficial cervical plexus block reduced postoperative opioid consumption and rescue-analgesic use, prolonged analgesia, and lowered pain scores during the first 24 hours after thyroid surgery [1].

The duration of a single-injection peripheral nerve block is finite, prompting evaluation of adjuncts such as dexamethasone. Evidence across peripheral nerve blocks indicates that dexamethasone can prolong analgesia, although the incremental benefit of perineural over intravenous administration is modest and route-dependent [2,6]. Thyroid-specific randomized studies have reported longer analgesia or lower postoperative pain scores when dexamethasone is added to cervical plexus block solutions [3-5].

The present study prospectively documented postoperative analgesic outcomes after a standardized dexamethasone-containing BSCPB protocol at Hospital Ana Francisca Pérez de León II. Because all participants received the same intervention and no control group was enrolled, the study was designed and interpreted as a descriptive case series. Its value is therefore in characterizing the observed 24-hour pain trajectory, rescue-analgesic use, and reported block-related complications under a defined local perioperative protocol, while identifying elements that require confirmation in a controlled study.

METHODS

Study design and setting

A prospective, single-center observational case series was conducted at Hospital Ana Francisca Pérez de León II, Petare, Venezuela, from January through June 2025. Twenty-one adults scheduled for thyroid surgery during the collection period constituted the source population; 12 patients were included in the analyzed cohort. Eligibility criteria were defined prospectively. Available study records do not provide a complete screening log or patient-level reasons for non-inclusion of the remaining 9 patients, and consecutive enrollment cannot be confirmed. No comparator group, randomization, or blinding was used.

Participants

Inclusion criteria were age >18 years; thyroid pathology requiring surgical treatment; ASA physical status I-II; no previous surgery in the neck region; no oncologic disease or neoadjuvant treatment; no history of coagulopathy; and voluntary participation with written informed consent. Exclusion criteria were refusal to participate; ASA III-IV; neurologic disease that could interfere with postoperative pain assessment; known allergy to corticosteroids or local anesthetics; history of opioid abuse or substance dependence; coagulation disorder or severe systemic disease; active infection or another condition expected to impair healing; oncologic disease or neoadjuvant treatment; and severe psychiatric illness that could compromise protocol adherence.

General anesthesia and analgesic cointerventions

Premedication included ranitidine 1 mg/kg or omeprazole 1 mg/kg, ondansetron 0.15 mg/kg, and metamizole sodium 1 g. General anesthesia was induced with fentanyl 2 µg/kg, lidocaine 1.5 mg/kg, propofol 2 mg/kg, and rocuronium 0.8 mg/kg and maintained with sevoflurane; fentanyl 30 µg was administered during maintenance. No additional scheduled postoperative systemic analgesic regimen was documented after block placement. Ketorolac 30 mg sublingual was specified as rescue analgesia. Accordingly, postoperative pain outcomes represent the combined anesthetic, systemic-analgesic, and regional-analgesic protocol.

Ultrasound-guided bilateral superficial cervical plexus block

After completion of surgery and before emergence from general anesthesia, bilateral ultrasound-guided superficial cervical plexus block was performed. A 10-mL solution was prepared from 5 mL of 0.5% bupivacaine (25 mg), 1 mL of dexamethasone containing 4 mg, and 4 mL of 0.9% saline, yielding a final bupivacaine concentration of 0.25%. The neck was turned laterally and prepared with chlorhexidine. A linear ultrasound transducer was positioned over the middle third of the sternocleidomastoid muscle at approximately the C5 level. Injection was performed under direct ultrasound visualization with hydrodisection of the intended interfascial plane, and the procedure was repeated contralaterally. The protocol documents 10 mL as the prepared solution volume but does not document the actual total volume injected or the volume administered per side; these values are therefore not inferred. Because every participant received the dexamethasone-containing solution, no dexamethasone-specific treatment effect can be estimated.

Outcomes and follow-up

After extubation, the initial postoperative pain assessment was performed in the post-anesthesia care unit using a 0-10 numerical rating scale. Prespecified assessments were recorded at 30 minutes, 2 hours, 12 hours, and 24 hours. Pain was categorized as absent (0), mild (1-3), moderate (4-6), or severe (7-10). Available study records do not identify the professional role of the assessor or confirm whether the same assessor evaluated all time points. Protocol-defined analgesic success required a score <4 at all scheduled assessments without a request for rescue medication. Analgesic failure was defined as a score >=4 at a scheduled assessment or an explicit patient request for additional analgesia. Rescue ketorolac 30 mg sublingual was available whenever either criterion was met and was not limited to scheduled assessment times.

Block-related surveillance included recurrent laryngeal nerve block, phrenic nerve block, intravascular injection or systemic local-anesthetic toxicity, and hematoma or bleeding at the puncture site. The case-report form also included postoperative nausea/vomiting, general adverse events, and length of stay; aggregated results for these variables were not available for this report. Safety findings are therefore limited to the block-related events explicitly reported in the analyzed cohort.

Statistical analysis

Analyses were prespecified as descriptive because the study was single-arm and exploratory. Categorical variables are reported as counts and percentages. Exact Clopper-Pearson 95% confidence intervals were calculated from aggregate counts for protocol-defined analgesic success, rescue-analgesic use, and reported block-related complications to show the imprecision associated with the small cohort. No between-group hypothesis testing was performed because no comparator existed. A formal sample-size calculation was not documented.

Ethics

Written informed consent for research participation was obtained from all participants, and consent documentation is available from the corresponding author upon reasonable request. Formal ethics committee approval or waiver details and an approval identifier were not available in the study documentation. Prospective trial registration was not documented.

RESULTS

Patient flow and cohort characteristics

Of 21 patients scheduled for thyroid surgery during the study period, 12 were included in the analyzed cohort. The available records do not identify why the other 9 patients were not included, so a complete screened-excluded-enrolled flow cannot be reconstructed. The analyzed cohort had an age range of 32-78 years. The largest age stratum was 40-49 years (4/12, 33.3%); 2 patients (16.7%) were 30-39 years, 3 (25.0%) were 50-59 years, and 3 (25.0%) were older than 60 years. All 12 patients were ASA physical status II. Total thyroidectomy was the most common procedure (5/12, 41.7%), followed by nodulectomy (3/12, 25.0%), thyroid lobectomy (3/12, 25.0%), and isthmectomy (1/12, 8.3%). Sex and preoperative diagnosis were planned variables, but their aggregate distributions were not available and were not reconstructed.

Table 1. Cohort characteristics and surgical procedures (n=12)

Characteristic	n (%)
Age 30-39 years	2 (16.7)
Age 40-49 years	4 (33.3)
Age 50-59 years	3 (25.0)
Age >60 years	3 (25.0)
ASA physical status II	12 (100)
Total thyroidectomy	5 (41.7)
Nodulectomy, right/left	3 (25.0)
Thyroid lobectomy, right/left	3 (25.0)
Isthmectomy	1 (8.3)

ASA, American Society of Anesthesiologists physical status classification.

Postoperative pain trajectory

At both 30 minutes and 2 hours, 1 of 12 patients (8.3%) reported no pain and 11 of 12 (91.7%) reported mild pain. At 12 and 24 hours, all 12 patients (100%) were in the mild-pain category. No moderate or severe pain was recorded at any prespecified assessment.

Table 2. Postoperative pain categories across 24 hours

Time point	No pain (0)	Mild (1-3)	Moderate (4-6)	Severe (7-10)
30 minutes	1 (8.3%)	11 (91.7%)	0	0
2 hours	1 (8.3%)	11 (91.7%)	0	0
12 hours	0	12 (100%)	0	0
24 hours	0	12 (100%)	0	0

Pain was assessed using the 0-10 numerical rating scale and category thresholds specified in the source protocol.

Rescue analgesia and complications

No patient reached the predefined analgesic-failure threshold at a scheduled assessment or requested rescue medication during the 24-hour observation period. Protocol-defined analgesic success was observed in 12/12 patients

(100%; exact 95% CI, 73.5%-100%), and rescue ketorolac was not administered (0/12; exact 95% CI, 0%-26.5%). No block-related complication was reported (0/12; exact 95% CI, 0%-26.5%). The zero-event findings should be interpreted as observed counts rather than evidence that the corresponding event risk is zero. Broader postoperative outcomes such as nausea/vomiting, general adverse events, and length of stay were not available in aggregate form and cannot be inferred to have been absent.

Table 3. Analgesic and reported block-related outcomes

Outcome	Observed result	Exact 95% CI
Protocol-defined analgesic success	12/12 (100%)	73.5%-100%
Rescue analgesia required	0/12 (0%)	0%-26.5%
Block-related complication	0/12 (0%)	0%-26.5%

DISCUSSION

This prospective single-center case series describes a favorable 24-hour analgesic profile after a combined general-anesthesia and BSCPB protocol: no moderate or severe pain was reported at the four scheduled assessments, and no patient requested or received rescue ketorolac. No block-related complication was reported. These observations characterize the protocol as implemented in this cohort; they do not isolate the effect of dexamethasone and should not be interpreted as comparative efficacy or safety evidence.

The observed pain trajectory is directionally consistent with the broader BSCPB literature. An updated systematic review and meta-analysis of 31 studies involving 2,273 patients found reduced postoperative opioid consumption and rescue analgesia, longer analgesic duration, and lower pain scores after BSCPB compared with control in thyroid surgery [1]. However, those comparative data evaluate the effect of cervical plexus block under controlled conditions, whereas the present cohort cannot separate the contributions of bupivacaine, dexamethasone, systemic analgesia, or other perioperative factors.

Dexamethasone-specific randomized evidence provides biological and clinical context. Satish Kumar et al. compared 0.25% bupivacaine alone with bupivacaine plus 4 mg dexamethasone and reported longer postoperative analgesia and lower pain scores with dexamethasone [3]. Hamed et al. reported prolonged analgesia and lower postoperative pain after adding dexamethasone to an ultrasound-guided intermediate cervical plexus block [4], while Jain et al. reported effective postoperative analgesia when dexamethasone or dexmedetomidine was combined with ropivacaine for BSCPB [5]. These controlled studies support plausibility but cannot substitute for a comparator within the present cohort.

Several features strengthen the descriptive value of this report. Data were collected prospectively under a defined perioperative protocol; the block technique and drug preparation were standardized; pain was assessed at prespecified intervals through 24 hours; rescue criteria and rescue medication were defined in advance; and exact confidence intervals were used to display uncertainty around all-or-none outcomes. These features make the series useful for feasibility assessment and hypothesis generation despite its inability to support causal inference.

The route of dexamethasone also warrants caution. Systematic reviews comparing perineural with intravenous dexamethasone suggest that any additional prolongation with the perineural route may be modest and route-dependent [2,6]. Perineural dexamethasone is also an off-label route [7]. A future controlled study should therefore prespecify a comparator such as local anesthetic alone and/or intravenous dexamethasone, standardize background analgesia, document the exact injected volume per side, use a complete screening log, and prospectively capture adverse outcomes.

Limitations

The principal limitations are the small single-center cohort, absence of a comparator group, and incomplete patient-flow documentation. Only 12 of 21 scheduled patients were analyzed, and the reasons for non-inclusion of 9 patients were not documented, introducing potential selection bias. All analyzed patients were ASA II, which limits generalizability. Metamizole and fentanyl were coadministered, so postoperative pain cannot be attributed to the regional block or dexamethasone alone. The actual injected block volume and volume per side were not documented, and the assessor role was not specified. Pain was reported by categories rather than patient-level scores, preventing analysis of central tendency or within-patient change. Several planned outcomes, including sex distribution, preoperative diagnosis, postoperative nausea/vomiting, general adverse events, and length of stay, were not available in aggregate form. Finally, zero reported block-related complications in 12 patients remains compatible with

substantial uncertainty (exact 95% CI for an event rate, 0%-26.5%) and therefore does not establish safety. Formal ethics approval or waiver details and prospective trial registration were not documented in the available study records.

CONCLUSION

In this prospective case series of 12 ASA II adults undergoing thyroid surgery, a postoperative ultrasound-guided bilateral superficial cervical plexus block protocol prepared with 0.25% bupivacaine and dexamethasone 4 mg was followed by only absent or mild pain at four scheduled assessments through 24 hours and no use of rescue ketorolac. The findings support the feasibility of the combined perioperative protocol and provide hypothesis-generating data for future study. They do not establish an independent analgesic effect or the safety of perineural dexamethasone. Controlled studies with complete patient-flow documentation, defined injection volumes, standardized coanalgesia, and prespecified safety outcomes are needed before comparative clinical recommendations can be made.

DECLARATIONS

Ethics and informed consent: Written informed consent for research participation was obtained from all participants. Consent documentation and supporting study records are available from the corresponding author upon reasonable request. Formal ethics committee approval or waiver details and an approval identifier were not available in the study documentation.

Consent for publication: Not applicable; this report presents aggregate clinical data without patient-identifying information.

Trial registration: Prospective trial registration was not documented in the available study records.

Funding: The author received no external funding for this study.

Conflicts of interest: The author declares no conflicts of interest.

Data availability: Deidentified data underlying the findings and supporting study documentation are available from the corresponding author upon reasonable request, subject to institutional and ethical requirements.

Author contributions: Rachell C. Machado A. is identified as the investigator and manuscript author. Final CRediT contributor roles should be confirmed before version-of-record publication.

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