Retrospective Study

Sphenopalatine Ganglion Block's Effect on Pain Control in Septorhinoplasty Surgeries

Suheda Akbulut, MD[1] and Mesure Gul Nihan Ozden, MD[2]

From: [1]Anaesthesiology and Reanimation Clinic, S.B. Zeynep Kamil Women and Children's Diseases Training and Research Hospital, Istanbul, Republic of Turkey; [2]Anaesthesiology and Reanimation Clinic Istanbul Medeniyet University, Göztepe Prof. Dr. Süleyman Yalçın City Hospital, Istanbul, Republic of Turkey

Address Correspondence: Mesure Gul Nihan Ozden, MD Istanbul Medeniyet University, Göztepe Prof. Dr. Süleyman Yalçın City Hospital, Anaesthesiology and Reanimation Department, Istanbul, Republic of Turkey E-mail: nihanozdenn@gmail.com

Disclaimer: There was no external funding in the preparation of this article.

Authors' contributions: Both authors participated in the conception and design of the study; data acquisition; data analysis and interpretation; and article drafting. Both authors approved the final manuscript.

Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted article.

Ethical consideration: This study was approved by the Institutional Ethics Committee (Istanbul Medeniyet University Göztepe Education and Training Hospital Clinical Research Ethics Committee) (approval number/protocol number 2023/0364). The research was conducted ethically, with all study procedures performed in accordance with the requirements of the World Medical Association's Declaration of Helsinki.

Article received: 10-22-2025
Revised article received: 03-05-2026
Accepted for publication: 03-13-2026

Free full article: www.painphysicianjournal.com

Background: Postsurgical pain and discomfort from septorhinoplasty have been shown to exert a detrimental effect on patients, including their functional recovery, satisfaction levels, and overall quality of life. Although the sphenopalatine ganglion block (SPGB) has been shown to provide effective pain control for rhinoplasty, different application techniques are available. The application of local anesthesia into the sphenopalatine fossa in the form of a drip is a simple technique that is easier and faster to apply than other techniques.

Objectives: Our study investigated the effect of a sphenopalatine ganglion block applied presurgically as a noninvasive pain management method for septorhinoplasty.

Study Design: A retrospective nonrandomized trial.

Setting: Our retrospective study included 100 patients who had a septorhinoplasty who also met specific inclusion criteria.

Methods: The data of patients who had septorhinoplasty were examined. One group of patients had a presurgical SPGB administered via transnasal catheter— an18G intravenous branula—with 2 mL of 0.5% bupivacaine as well as submucosal anesthesia infiltration. The other group only had submucosal anesthesia infiltration. The intrasurgical consumption of remifentanil, hemodynamic parameters, postsurgical pain levels, additional analgesic use, and patient and surgeon satisfaction were compared.

Results: The consumption of remifentanil was found to be lower in the SPGB Group. There was a lower requirement for analgesia and a higher level of patient satisfaction in the SPGB Group. Pain scores in the first 2 postsurgical hours were lower in the SPGB Group, but no differences were observed in later hours.

Limitations: The limitations of this study include the relatively small sample size and the lack of long-term follow-up to evaluate the long-term benefits of an SPGB and its effect on chronic pain developing.

Conclusion: Our study shows the safety and efficacy of a presurgical SPGB administered via transnasal dripping without needle injections in septorhinoplasty surgery. The block had positive results in terms of intrasurgical opioid consumption reduction and beneficial effects on postsurgical pain. It can thus be considered a beneficial adjunct in clinical practice for patients undergoing septorhinoplasty.

Key words: Septorhinoplasty, peripheral nerve blocks, sphenopalatine ganglion block, postoperative pain, postsurgical pain

Trial Registration: Clinicaltrials.gov identifier: NCT06157970

Pain Physician 2026: 29:E429-E435

Septorhinoplasty is a frequently performed surgical procedure intended to address both functional and aesthetic concerns pertaining to the nose. The procedure involves correcting septal deviations and nasal framework structures with the objective of improving nasal airflow as well as achieving desired cosmetic outcomes. Pain management strategies are of paramount importance to ensure optimal postsurgical healing and enhance patient satisfaction (1). Recently, novel alternative methods have been developed, tailored to surgery and patient-specific multimodal analgesia strategies. The sphenopalatine ganglion block (SPGB), a recently identified technique with a range of potential applications, is one such method (2). It has been employed for managing pain in conditions such as migraines, cluster headaches, trigeminal neuralgia, and postdural puncture headaches (3). The beneficial effects of SPGB's transnasal noninvasive application technique has not been studied broadly for intrasurgical and postsurgical pain management in septorhinoplasty.

Our study aimed to contribute to the existing body of knowledge by providing evidence-based guidance on the potential positive effects of an SPGB as part of multimodal analgesia management in septorhinoplasty surgeries.

Methods

Our retrospective nonrandomized clinical study was conducted using the data of patients who underwent septorhinoplasty. We followed the ethical principles outlined in the Declaration of Helsinki. We obtained ethical approval from the Istanbul Medeniyet University Goztepe Education and Research Hospital Clinical Research Ethics Committee (Date: June 7, 2023, Decision Number: 2023/0364) with registration on ClinicalTrials.gov (NCT06157970).

Patient Assignment

The data of patients aged between 18–65 years, with an American Society of Anesthesiologists Physical Status Classification Grade I-II, who underwent septorhinoplasty surgery with osteotomy, were analyzed. Data were extracted from the anesthesia record forms and hospital information systems. Patients excluded from the study were those whose perisurgical data could not be accessed from the anesthesia record forms; those whose postsurgical pain scores and analgesic use were not documented in the ward follow-up forms; those with a history of local anesthetic drug allergy or toxicity; those with advanced organ failure; those with an intellectual or developmental disability; and those who were pregnant.

Performing the Sphenopalatine Ganglion Block

Patients undergoing an SPGB were positioned supine with the head extended 15–20°after anesthesia induction. An 18G angiocatheter without needle was placed in the sphenopalatine fossa via the nasal nostrils and 2 mL of 0.5% bupivacaine was dripped just above the mucosal barrier for one minute. This sequence was then repeated in the contralateral nostril. It is imperative to note that the surgical procedure commenced only after a minimum waiting period of 10 minutes.

Anesthesia Management

Presurgery, all patients had a submucosal infiltration with 4 mL of a 1% lidocaine (100 mg/5 mL ampule) and epinephrine (1:100,000) mixture administered to the septum and nasal soft tissues by the surgeon.

All patients underwent standard monitoring, including electrocardiography, peripheral oxygen saturation, and noninvasive arterial blood pressure measurement, with baseline values recorded. After anesthesia induction, an intravenous mixture of 2 µg/kg of fentanyl and 2 mg/kg of propofol were administered, followed by 0.5 mg/kg of rocuronium for muscle relaxation. Patients were intubated with an appropriately sized endotracheal tube. Mechanical ventilator support was provided to maintain end-tidal carbon dioxide levels between 35 mmHg–45 mmHg with appropriate tidal volume and frequency.

Anesthesia maintenance was provided with a 50% oxygen/air mixture, with 0.8–1 minimum alveolar concentration of sevoflurane and a remifentanil infusion of 0.1–0.5 µg/kg/min. Controlled hypotension was employed during surgery to reduce surgical bleeding and ensure a clear surgical field. Controlled hypotension was defined as lowering mean arterial pressure to 50 mmHg–65 mmHg in patients who were normotensive or a 30% reduction from baseline in patients who were hypertensive (4). To achieve this target pressure, the remifentanil infusion rate was initially increased up to a maximum of 0.5 µg/kg/min. In cases where this was ineffective, esmolol infusion was administered.

As the surgical procedure approached its conclusion, all patients received an intravenous infusion of one gram of acetaminophen. Patients who had adequate spontaneous respiration at the conclusion of

the surgical procedure were administered of 2 mg/kg of sugammadex to reverse neuromuscular blockade; following this they were then extubated.

Surgical Procedure

Patients who underwent septorhinoplasty involving osteotomy performed with an osteotome were included in the study to ensure homogeneity among the groups.

Outcome Evaluation

Each patient's intrasurgical remifentanil consumption and hemodynamic data were obtained from their anesthesia record forms. We also gathered data from the recovery unit's follow-up forms and the hospital's information systems. Data from these 2 sources included postsurgical pain levels at 15 minutes, 30 minutes, one hour, 2 hours, 4 hours, 8 hours, 16 hours, and 24 hours using Numeric Rating Scale (NRS-11) scores and any analgesics administered. Patients experiencing pain—an NRS-11 score ≥ 4—in the recovery unit or ward received an initial treatment with an intramuscular injection of 75 mg of diclofenac sodium; 0.5–1 mg/kg of tramadol was administered intravenously as rescue analgesia if needed, not exceeding 3 doses per day. Furthermore, patients experiencing symptoms of nausea or vomiting received 0.1 mg/kg of intravenous ondansetron.

Opioid-related adverse effects (respiratory depression, sedation, nausea, pruritis, and constipation) and SPGB-related adverse events (temporary nasal congestion, nosebleed, local anesthetic toxicity, nerve injury, infection, and bleeding) were recorded. Surgeon satisfaction was questioned at the end of the surgery and patient satisfaction was questioned at postsurgical hour 24.

Our primary objective was to compare the intrasurgical remifentanil consumption of patients undergoing septorhinoplasty with and without an SPGB.

Secondary objectives were measuring the effects of an SPGB on hemodynamic parameters, postsurgical pain, analgesic consumption, patient-surgeon satisfaction, and opioid-related complications.

Statistical Analysis

A power analysis was conducted using G*Power 3.1 software (Heinrich Heine University), with intrasurgical remifentanil consumption quantities from the study conducted by Degirmenci et al (2) used as a reference. The power analysis determined that 50 patients in each group would be sufficient, assuming a Type I Error rate of 0.05 and a study power of 0.85. All statistical analyses were performed using IBM SPSS Statistics 24.00 (IBM Corporation). Prior to conducting any statistical analyses, the normality of the data was assessed using skewness-kurtosis tests and histogram plots. Independent samples t tests were used for normally distributed variables to ascertain mean differences between groups, while Mann-Whitney U tests or Wilcoxon tests were utilized for nonnormally distributed variables. χ^2 tests or Fisher exact tests were used to assess differences between groups for categorical variables. Continuous variables are presented as mean (SD) or median and interquartile range, while categorical variables are presented as counts and percentages (%). Statistically significant results were defined as those with P values < 0.05.

Results

Our study evaluated data from 112 patients; 12 patients were excluded due to their meeting the exclusion criteria. This resulted in analyzing data from 100 patients, who were divided into 2 groups: the SPGB Group (n = 50) and the Non-SPGB Group (n = 50). No statistically significant differences were observed between the groups in terms of demographic data such as age, gender, American Society of Anesthesiologists Physical Status Classification Grade, height, and weight ($P > 0.05$). Intrasurgical remifentanil consumption was found to be statistically lower in patients in the SPGB Group ($P < 0.05$) (Table 1).

While no statistical differences were observed at other measurement times ($P < 0.05$), statistically significant differences were found between the groups in heart rate values recorded at 10 minutes and at the final measurement ($P = 0.008$ and $P = 0.002$, respectively) during the operation. During intrasurgical monitoring, mean arterial pressure (MAP) measurements were statistically significantly lower in the SPGB Group at 10 minutes, 20 minutes, 40 minutes, 60 minutes, 80 minutes, 100 minutes, and the final measurement ($P = 0.010$, $P < 0.001$, $P = 0.002$, $P = 0.002$, $P = 0.003$, $P = 0.045$, and $P = 0.001$, respectively), while no statistically significant difference was observed at other times ($P > 0.05$). There was no statistically significant difference SpO_2 measurements between the groups ($P > 0.05$). The SPGB Group did not have a statistically significant difference in surgical field bleeding or surgeon satisfaction when compared to the Non-SPGB Group ($P > 0.05$) (Table 2). No patient had to be started on an esmolol infusion for hypotensive anesthesia.

NRS-11 scores at postsurgical minutes 15 and 30 and hours one and 2 were statistically significantly

Table 1. *Patient demographics and perioperative data.*

	SPGB Group (n = 50)	Non-SPGB Group (n = 50)	*P* Value
Age (yrs)	24 (20–27)	26 (21–28)	0.208
Gender (M/W)	16 (32%) / 34 (68%)	22 (44%) / 28 (56%)	0.303
ASA Grade (I-II))	30 (60%) / 20 (40%)	28 (44%) / 22 (56%)	0.804
Height (cm)	170 (160–175)	170 (160–172)	0.647
Weight (kg)	78 (66–85)	77 (65–82)	0.838
Anesthesia Duration (min)	215.6 (37.4)	220.4 (32.9)	0.505
Surgical Duration (min)	195.7 (36.4)	205.6 (32.5)	0.159
Remifentanil Consumption (μg)	165 (33–528)	948 (719–1,281)	$P < 0.05$

Statistical significance was considered as $P < 0.05$.
Continuous variables are presented as mean (SD) or median (interquartile range), and categorical variables as number and percentage (%).
Independent samples t test was used for normally distributed variables, Mann-Whitney U test for non-normally distributed variables, and χ^2 test for comparing groups in categorical variables. ASA, American Society of Anesthesiologists Physical Status Classification

Table 2. *Surgical field bleeding and surgeon satisfaction.*

	SPGB Group (n = 50)	Non-SPGB Group (n = 50)	*P* Value
	Frequency (%)	Frequency (%)	
Surgical Field Bleeding			
None	1 (2%)	0 (0%)	
Very little	20 (40%)	13 (26%)	0.282
Little	19 (38%)	20 (40%)	
Moderate	9 (18%)	14 (28%)	
A lot	1 (2%)	3 (6%)	
Surgeon Satisfaction			
Poor	2 (4%)	5 (10%)	
Good	32 (64%)	30 (60%)	0.490
Very good	16 (32%)	(30%)	

Statistical significance was considered as $P < 0.05$
Categorical variables are presented as number and percentage (%).
The χ^2 test was used to determine differences between groups.

lower in patients in the SPGB Group ($P < 0.001$, $P < 0.001$, $P < 0.001$, and $P = 0.023$, respectively). However, there was no statistical difference at other time points ($P > 0.05$) (Table 3). In addition, there was no statistical difference in opioid-related adverse effects (e.g., nausea, vomiting, pruritus, and sedation) between the groups ($P > 0.05$). The number of patients receiving postsurgical diclofenac sodium and tramadol, as well as the amount of analgesic consumption, was statistically significantly higher in the non-SPGB group ($P < 0.001$) (Table 3). Conversely, patient satisfaction levels were found to be statistically significantly higher in the SPGB Group (Table 4).

Discussion

A subsequent evaluation of our study's results show that the implementing an SPGB within the framework of a multimodal analgesia strategy in septorhinoplasty surgeries assisted in achieving controlled hypotension, thereby reducing intrasurgical remifentanil consumption. Furthermore, a decline in postsurgical analgesic drug consumption among patients was observed. Furthermore, an SPGB enhanced patient comfort and increased patient satisfaction.

Previous studies have shown that the predominant cause of postsurgical pain is nociceptive stimuli due to surgical trauma. However, it is important to note that surgical trauma also induces peripheral sensitization through the peripheral release of inflammatory mediators. It has been shown that partial peripheral nociceptive stimulation can directly lead to central sensitization. Using regional anesthesia techniques via an SPGB has shown to be effective in preventing both peripheral and central sensitization, thereby reducing postsurgical pain perception amplification (5). Additionally, an SPGB has been shown to reduce mucosal blood flow in the nasal sinuses and turbinates by blocking the vasodilator parasympathetic fibers of the SPG.

The SPG exerts its influence on somatosensory effects via the trigeminal and facial nerves, parasympathetic activities, and visceral motor functions through the sympathetic chain. The sensory distribution of the SPG encompasses the nasal cavity, the palate, the buccal mucosa, and the surrounding regions. An SPGB is a beneficial treatment option for various pains involving migraines, cluster headaches, trigeminal neuralgia, atypical facial pain, and various pains related to the sinuses and nose (3,6,7). It has even been suggested as a treatment option for postdural puncture headache (8).

SPGB use has been investigated in conjunction with functional endoscopic sinus surgery. While the extant literature has shown a range of outcomes, a preponderance of evidence suggests that an SPGB facilitates the requisite intrasurgical hypotension for surgical procedures; reduces bleeding; enhances surgical field visibility; mitigates postsurgical edema and ecchymosis; and is efficacious in the management of early postsurgical pain (9-13). However, studies specifically examin-

ing SPGBs during septoplasty and septorhinoplasty are limited (2,14,15). Therefore, in discussing our findings, we find it appropriate to also draw from the findings of studies involving an SPGB during functional endoscopic sinus surgery

An SPGB can be performed using various techniques and drugs. In addition to the transnasal approach, alternative techniques include the transoral approach using a curved needle, and the lateral approach via the infratemporal fossa to reach the pterygopalatine fossa (6,16). The transnasal technique can be performed under endoscopic visualization or blindly (8,13,17). Degirmenci, et al (2) applied an SPGB using the "Mucosal Atomization Device" by spraying local anesthetic around the ganglion. In other studies, an SPGB was administered through an 18G cannula shaft, which was guided endoscopically through the nasal cavity just behind and over the posterior end of the middle turbinate onto the mucosa (10,13). In our clinic, an SPGB is administered with patients placed supine with their heads extended 15°–20°, using the shaft of an 18G angiocatheter as a catheter to blindly administer a local anesthetic solution into the pterygopalatine fossa through both nostrils.

Cho, et al (5) applied SPGBs using a mixture of bupivacaine and epinephrine, while De Maria, et al (11) and Al-Qudah, et al (13) performed the block with lidocaine and epinephrine. Degirmenci, et al applied lidocaine only (2). In addition, Kesimci, et al (10) performed SPGBs with bupivacaine and levobupivacaine; Rezaeian, et al (14) and Ekici, et al (18) injected bupivacaine only. At our clinic, we use a gradual administration of 2 mL of 0.5% bupivacaine per nostril for one minute.

Degirmenci, et al (2) reported lower OAB scores at postsurgical minute 10 in patients who had an SPGB, whereas Kesimci, et al (18) reported lower heart rates and similar OAB scores in their Control and Levobupivacaine Groups, but lower OAB scores in their Bupivacaine Group. In our study, patient data analysis revealed that patients who received an SPGB had lower heart rates at postsurgical minute 10 and lower intrasurgical blood pressure measurements. We interpreted these as an absence of hemodynamic response due to effective intrasurgical pain management.

Koşucu, et al (19) reported reduced intrasurgical bleeding, and postsurgical edema and ecchymosis in 28 patients undergoing open rhinoplasty by administering continuous remifentanil infusion at 0.5 to one µg/kg/min to provide analgesia and controlled hypotension. Kesimci, et al (18) reported that esmolol was used in all patients in the Control Group to maintain target OAB, while in the Levobupivacaine Group, only 2 patients required esmolol, and none in the Bupivacaine Group. (18). Degirmenci, et al (2) performed an SPGB using lidocaine via a transnasal method and reported lower remifentanil consumption compared to patients who did not receive the block. In our clinic, a subsequent review of data from patients having a septorhinoplasty and osteotomy revealed that patients who received an SPGB had reduced remifentanil consumption, with some patients not needing any remifentanil. This finding lends further support to the hypothesis that an SPGB is an effective method for managing intrasurgical pain and hemodynamics.

Research has indicated that patients generally need rigorous postsurgical pain management within the initial 24 hours following a septorhinoplasty procedure

Table 3. *Postoperative Numeric Rating Scale scores.*

	SPGB Group (n = 50)	Non-SPGB Group (n = 50)	*P* Value
15 min	1 (0–2)	4 (3–5)	0.000
30 min	2 (2–3)	3 (3–5)	0.000
One hour	2 (2–)	3 (3–4)	0.001
2 hours	3 (2–3)	3 (2–4)	0.023
4 hours	2 (2–3)	3 (2–3)	0.265
8 hours	2 (2–3)	2 (2–3)	0.105
16 hours	2 (1–2)	2 (1–3)	0.365
24 hours	2 (1–2)	2 (1–2)	0.191

Statistical significance was considered as $P < 0.05$. Data are presented as median (interquartile range).

Table 4. *Opioid-Related Side Effects, Analgesic Requirement, and Patient Satisfaction*

	SPGB Group (n = 50)	Control Group (n = 50)	*P* value
Nausea	2 (4%)	6 (12%)	0.269
Vomiting	2 (4%)	2 (4%)	1
Itching	3 (6%)	4 (8%)	1
Sedation	0 (0%)	0 (0%)	1
NSAID requirement	28 (56%)	50 (100%)	0,000*
Tramadol requirement	10 (20%)	40 (80%)	0,000*
Amount of Tramadol (mg)	25 [0-25]	50 [25-100]	0,000*
Likert-type patient satisfaction score	4 [3-4]	3 [2-4]	0,000*

* *P*-value < 0,05 is considered statistically significant.
** Continuous variables are presented as median [interquartile range].

(20,21). During this postsurgical period, severe pain can emerge due to soft tissue trauma and osteotomies (9). In all cases, NRS-11 scores were ascertained to be < 4 within the first postsurgical 24 hours, signifying that a meticulously formulated postsurgical pain management protocol had been successfully implemented in our clinic.

Kim, et al (9) reported statistically significant reductions in postsurgical pain intensity as well as analgesic consumption frequency and quantity in their Treatment Group compared to their Control Group during the postsurgical period (0–24 hours). Degirmenci, et al. (2) reported significantly lower NRS-11 scores in their Block Group during the first postsurgical 5 hours. In our study, patients who underwent the block demonstrated notably lower recorded NRS-11 scores, especially within the first postsurgical 2 hours, compared to those who did not receive the block. In a study by Ekici, et al (14) postsurgical pain was treated with sodium diclofenac and acetaminophen for 7 days;, pain scores were lower in their Block Group (14). Kesimci, et al (18) and Rezaeian, et al (10) reported a lower incidence of patients requiring rescue analgesics at postsurgical 24 hours in those who received blocks with local anesthetics. Al-Qudah (13) reported that patients who received SPGBs had reduced pain and a decreased reliance on tramadol for rescue analgesia. Degirmenci, et al (2) reported no difference in postsurgical NRS-11 scores, but patients who received SPGBs needed less acetaminophen for postsurgical analgesia compared to patients who did not receive SPGBs. Furthermore, the number of patients requiring rescue analgesia, as well as the amount of tramadol used for this purpose, were found to be lower in their Block Group (2). Kesimci, et al (18) conducted a study comparing bupivacaine, levobupivacaine, and placebo groups for SPGBs and reported both bupivacaine and levobupivacaine to be effective in reducing postsurgical pain compared to placebo. However, no superiority was demonstrated between the 2 drugs when comparing pain scores within the first postsurgical 24 hours (18).

In our hospital, sodium diclofenac is the analgesic of choice for postsurgical pain management in patients undergoing septorhinoplasty. In our study we observed a higher frequency of patients requiring tramadol and a greater consumption of tramadol for rescue analgesia in the Non-SPGB Group.

Sari, et al (15) reported a reduced incidence of periorbital edema and ecchymosis up to postsurgical day 7 in patients who had a hump resection and osteotomy when an SPGB was performed. Furthermore, they observed a reduction in intraoperative blood loss and an enhancement in surgical field visibility (15). In a separate study, Degirmenci, et al (2) reported significant differences in patient satisfaction and surgical satisfaction scores. When asked at discharge, patients who had an SPGB had higher satisfaction scores (2).

Postsurgical administration of nonsteroidal anti-inflammatory drugs has been shown to both augment the incidence of postsurgical bleeding and to induce gastrointestinal, neurological, and hematological adverse effects (13). Similarly, using systemic opioids has been shown to result in a range of undesirable effects, including nausea, vomiting, urinary retention, sedation, ileus, and respiratory depression (21). Postsurgical nausea and vomiting, occurring in approximately 34% to 65% of patients following nasal surgery, are among the most common complications (22,23). Studies have shown that nonsteroidal anti-inflammatory drug treatment can reduce nausea and/or vomiting. Kesimci, et al (18) and DeMaria, et al (11) reported similar outcomes when examining complications associated with opioid use. In our study, opioid-related side effects were similar between patients in both groups.

Although an SPGB is generally considered to be a safe procedure, the following side effects have been reported: temporary nasal congestion, mild epistaxis, symptoms related to local anesthetics, and—albeit rarely—transient ptosis. These side effects are generally transient and do not require intervention (9,10). Degirmenci, et al (2) reported no significant SPGB-related side effects in their study (2). In our study, no complications or side effects attributable to an SPGB were reported in the records.

Conclusions

A review of the literature revealed significant variations in pain scores and analgesic consumption between patients who received an SPGB and those who did not. The duration of follow-up periods across studies has the potential to influence the evaluation of pain outcomes. In addition, the necessity for long-term follow-up studies is needed to evaluate the lasting benefits of an SPGB and its effect on chronic pain developing.

Our study shows an SPGB administered via transnasal dripping without a needle injection in septorhinoplasty surgery is safe and efficacious. The procedure showed positive results by reducing intraoperative opioid consumption and having beneficial effects on postsurgical pain. It can thus be considered a beneficial adjunct in clinical practice for patients undergoing septorhinoplasty.

References

1. Plath M, Sand M, Cavaliere C, Plinkert PK, Baumann I, Zaoui K. How to predict the outcome of septorhinoplasty? A normative study of ROE and FROI-17 scores. *Acta Otorhinolaryngol Ital* 2021; 41:327-335.
2. Degirmenci N, Ozdem A, Uysal H, et al. The effect of sphenopalatine ganglion block on the postoperative pain in patients undergoing septorhinoplasty. *Ann Otol Rhinol Laryngol* 2020; 129:722-726.
3. Schoenen J. Sphenopalatine ganglion stimulation in neurovascular headaches. *Prog Neurol Surg* 2015; 29:106-116.
4. Ghodraty M, Khatibi A, Rokhtabnak F, Maleki M, Parsa F. Comparing labetalol and nitroglycerine on inducing controlled hypotension and intraoperative blood loss in rhinoplasty: A single-blinded clinical trial. *Anesth Pain Med* 2017; 7:e13677.
5. Cho DY, Drover DR, Nekhendzy V, Butwick AJ, Collins J, Hwang PH. The effectiveness of preemptive sphenopalatine ganglion block on postoperative pain and functional outcomes after functional endoscopic sinus surgery. *Int Forum Allergy Rhinol* 2011; 1:212-218.
6. Binfalah M, Alghawi E, Shosha E, Alhilly A, Bakhiet M. Sphenopalatine ganglion block for the treatment of acute migraine headache. *Pain Res Treat* 2018; 2018:2516953.
7. Mojica J, Mo B, Ng A. Sphenopalatine ganglion block in the management of chronic headaches. *Curr Pain Headache Rep* 2017; 21:27.
8. Jespersen MS, Jaeger P, Ægidius KL, et al. Sphenopalatine ganglion block for the treatment of postdural puncture headache: A randomised, blinded, clinical trial. *Br J Anaesth* 2020; 124:739-747.
9. Kim DH, Kang H, Hwang SH. The effect of sphenopalatine block on the postoperative pain of endoscopic sinus surgery: A meta-analysis. *Otolaryngol Head Neck Surg* 2019; 160:223-231.
10. Rezaeian A, Hashemi SM, Dokhanchi ZS. Effect of sphenopalatine ganglion block with bupivacaine on postoperative pain in patients undergoing endoscopic sinus surgery. *Allergy Rhinol (Providence)* 2019; 10:2152656718821282.
11. DeMaria S, Govindaraj S, Chinosorvatana N, Kang S, Levine AI. Bilateral sphenopalatine ganglion blockade improves postoperative analgesia after endoscopic sinus surgery. *Am J Rhinol Allergy* 2012; 26:e23-e27.
12. Sethi S, Mahesh PV, Malhotra SK, Maitra S, Gupta AK. Comparison ropivacaine and bupivacaine in sphenopalatine ganglion block for postoperative analgesia after functional endoscopic sinus surgery: A randomized controlled trial. *Acta Anaesthesiol Belg* 2017; 68:137-142.
13. Al-Qudah M. Endoscopic sphenopalatine ganglion blockade efficacy in pain control after endoscopic sinus surgery. *Int Forum Allergy Rhinol* 2016; 6:334-338.
14. Ekici NY, Alagöz S. The effectiveness of endoscopic sphenopalatine ganglion block in management of postoperative pain after septal surgery. *Int Forum Allergy Rhinol* 2019; 9:1521-1525.
15. Sari N, Uysal E. Endoscopic sphenopalatine ganglion block efficacy in the management of periorbital edema and ecchymosis after septorhinoplasty. *J Craniofac Surg* 2021; 32:983-987.
16. Yang IY, Oraee S. A novel approach to transnasal sphenopalatine ganglion injection. *Pain Physician* 2006; 9:131-134.
17. Candido KD, Massey ST, Sauer R, Darabad RR, Knezevic NN. A novel revision to the classical transnasal topical sphenopalatine ganglion block for the treatment of headache and facial pain. *Pain Physician* 2013; 16:E769-E778.
18. Kesimci E, Öztürk L, Bercin S, Kırış M, Eldem A, Kanbak O. Role of sphenopalatine ganglion block for postoperative analgesia after functional endoscopic sinus surgery. *Eur Arch Otorhinolaryngol* 2012; 269:165-169.
19. Koşucu M, Omur S, Beşir A, Uraloğlu M, Topbaş M, Livaoğlu M. Effects of perioperative remifentanil with controlled hypotension on intraoperative bleeding and postoperative edema and ecchymosis in open rhinoplasty. *J Craniofac Surg* 2014; 25:471-475.
20. Szychta P, Antoszewski B. Assessment of early post-operative pain following septorhinoplasty. *J Laryngol Otol* 2010; 124:1194-1199.
21. Sener M, Yilmazer C, Yilmaz I, Caliskan E, Donmez A, Arslan G. Patient-controlled analgesia with lornoxicam vs. dipyrone for acute postoperative pain relief after septorhinoplasty: A prospective, randomized, double-blind, placebo-controlled study. *Eur J Anaesthesiol* 2008; 25:177-182.
22. Korkut AY, Erkalp K, Erden V, et al. Effect of pharyngeal packing during nasal surgery on postoperative nausea and vomiting. *Otolaryngol Head Neck Surg* 2010; 143:831-836.
23. van den Berg AA. The prophylactic antiemetic efficacy of prochlorperazine and ondansetron in nasal septal surgery: A randomized double-blind comparison. *Anaesth Intensive Care* 1996; 24:538-545.