https://doi.org/ 10.33472/AFJBS.6.9.2024.3408-3415

African Journal of Biological Sciences

Journal homepage: http://www.afjbs.com

Research Paper Open Access

Efficacy of Transnasal Sphenopalatine Ganglion Block by Drip Method for Post-Operative Pain Relief in Patients Undergoing Head & Neck Cancer Surgeries

Dr. Mohd A Rasheed[1], Dr. Sharad Singh[2], Dr. Gaurav Singh[3], Dr. Indubala Maurya[4], Dr. Ruchi Saxena[5], Dr. Ayush Lohia[6], Dr. Raj B Singh[7], Dr. Shikha Mishra[8], Dr. Afreen Hasan[9]

[1]MD (Anaesthesiology), Additional Professor, Department of Anaesthesiology, Kalyan Singh Superspeciality Cancer Institute, Lucknow, Uttar Pradesh, India

[2]MD (Radiation Oncology), Additional Professor, Department of Radiation Oncology, Kalyan Singh Superspeciality Cancer Institute, Lucknow, Uttar Pradesh, India

[3]MDS (OMFS), Fellow (Head & Neck Oncology), Additional Professor, Department of Head & Neck (OMFS), Kalyan Singh Superspeciality Cancer Institute, Lucknow, Uttar Pradesh, India

[4]MD (Anaesthesiology), Associate Professor, Department of Anaesthesiology, Kalyan Singh Superspeciality Cancer Institute, Lucknow, Uttar Pradesh, India

[5]DNB (Anaesthesiology), Assistant Professor Department of Anaesthesiology, Kalyan Singh Superspeciality Cancer Institute, Lucknow, Uttar Pradesh, India

[6]MD (Public Health), Associate Professor, Department of Public Health, Kalyan Singh Superspeciality Cancer Institute, Lucknow, Uttar Pradesh, India

[7]Associate Professor, Department of Emergency Medicine, IGIMS, Patna, Bihar, India

[8]Senior Resident, Department of Anaesthesiology, Kalyan Singh Superspeciality Cancer Institute, Lucknow, Uttar Pradesh, India

[9]MD (Biochemistry), Associate Professor, Department of Biochemistry, KMC Medical College, Maharajganj, Uttar Pradesh, India

Corresponding Author

Dr. Gaurav Singh, Additional Professor, Department of Head & Neck (OMFS), Kalyan Singh Super Speciality Cancer Institute, Lucknow, India, Email ID: drgaurav2@gmail.com

Article History

Volume 6,Issue 9, 2024

Received: 11 Apr 2024

Accepted : 28 May 2024

doi: 10.33472/AFJBS.6.9.2024.3408-3415

Abstract

Aim: To evaluate the efficacy of Transnasal Sphenopalatine Ganglion Block by Drip Method for Post-Operative Pain Relief in Patients Undergoing Head & Neck Cancer Surgeries

Background: A sphenopalatine ganglion block (SPGB) is an interventional procedure to treat chronic head and neck pain. Post-operative pain is a major concern after head & neck cancer surgeries. The primary objective of this study was to find a novel method to decrease post-operative pain and post-operative opioid requirement after head & neck cancer surgeries.

Methods: This randomised controlled study divided 100 patients into two groups. Group A received 5 ml of 4 % Lignocaine with 4 mg Dexamethasone and Group B received placebo 5 ml of normal saline. Post-operatively, time from the SPGB to the first rescue analgesia, visual analog scale (VAS) score at 15, 30, 45, 60 & 120 minutes after surgery and difference in total dose of rescue opioid given in 24 hours in both groups were observed and recorded.

Results: The time for first rescue analgesia was statistically higher in group A than in group B (P=0.014). Mean VAS score at 15, 30, 45 & 60 minutes were statistically lower in group A than in group B (P=0.001), whereas mean VAS score measured at 120 min, was statistically insignificant. Total opioid dose given during 24 hours in the post-operative period was statistically significant between group A & B (P = 0.004). Duration of surgery and the incidence of complications were statistically insignificant between the two groups. (P = 0.485)

Conclusion: SPGB done through the trans-nasal route by drip method provides adequate analgesia in the post-operative period after head & neck surgeries.

Keywords: Sphenopalatine Ganglion Block, Visual Analog Scale, Lignocaine, Dexamethasone, Recue Analgesia.

Introduction

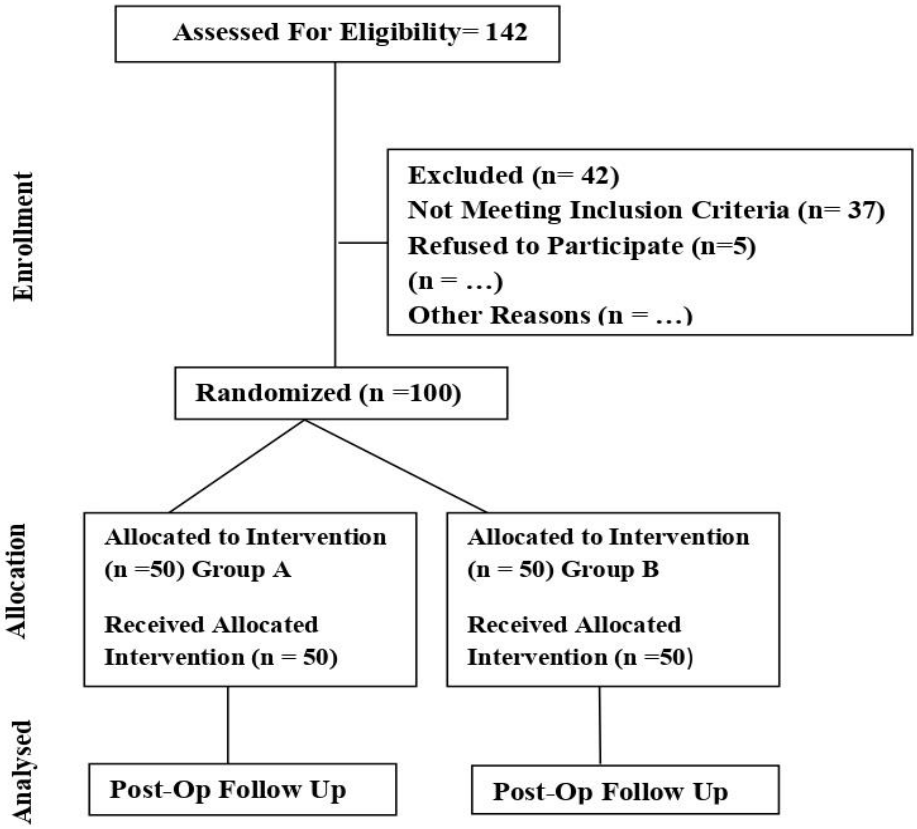
The sphenopalatine ganglion is situated in the pterygomaxillary fissure which is surrounded by the palatine bone.[1] A sphenopalatine ganglion block (SPGB) is an interventional procedure which is commonly used these days to treat chronic head and neck pain.[2] Transnasal SPGB has been widely used as a relatively non-invasive treatment for head and neck pain.[3] Sympathetic block is the dominant mechanism in the drip method as local anaesthetic fall into the pharynx, leading to blockage of the cervical sympathetic chain.[4] Post-operative pain is a major concern after head & neck cancer surgeries. 48% of patients present pain intensity greater than 4 at visual analog scale (VAS) in the post-operative period.[5] It can lead to delay in discharge and hence achieving pain free period is one of the major aims of an anaesthesiologist. The primary objective of this study was to find a novel method to decrease post-operative pain and post-operative opioid requirement after head & neck cancer surgeries.

Methods

This double blinded randomised controlled study was conducted from July 2023 to February 2024 after obtaining approval from the Institutional Ethical Committee (vide approval number KSSSCI/IEC/11/47/2023, dated 15 June 2023). Written informed consent was taken from all participants for study participation and patient data use for research and educational purposes. Patients of the American Society of Anaesthesiologists (ASA) physical status I–II who were scheduled for elective head and neck cancer surgery (involving dissection in area of maxilla, palate, retromolar trigone) under general anaesthesia were included in the present study. Patients with neurological disorders, renal or hepatic impairment, inability to understand visual analogue scale (VAS), history of substance abuse, contraindications to study drugs, chronic pain conditions, neurodegenerative or autoimmune disorders, abnormal cardiac conduction, diabetes or congestive heart failure were excluded from the study. Baseline haemodynamic data were recorded in the operating room using a multichannel monitor (Model: BeneView T8 Mindray, China). Patients were randomly divided into two groups of 50 each. Simple randomization was done using computer based random number generator and the allocation concealed was done by sealed envelope technique. The allocation sequence was generated by the statistician and was assigned by a nurse. Both statistician and nurse were not part of the team providing intervention to the patient. Group A received a total of 5 ml of 4 % Lignocaine with 4 mg Dexamethasone and Group B received placebo, 5 ml of normal saline. The patient and the anaesthesiologist who assessed the outcome were not aware of the drug that was administered. All the drug delivery was done by consultant anaesthesiologists with more than 3 years experience in the field of anaesthesiology. All patients in both the groups were uniformly pre-medicated as per the institutional protocol with inj. Midazolam 0.03 mg/kg IV, inj. Ondansetron 0.10 mg/kg IV and inj. Fentanyl 2ug/kg IV. A standard technique of GA using IV Propofol 2–3 mg/kg, Vecuronium 0.1 mg/kg, Sevoflurane 1%–2% and nitrous oxide with oxygen (60:40) was followed to maintain a minimum alveolar concentration (MAC) of 1.0. Haemodynamic were kept within 20% of baseline with balanced anaesthesia, fluid and vasopressors as required. For intraoperative analgesia, patients were given inj. Paracetamol in the dose of 20mg/kg. A total 5 ml of 4 % Lignocaine with 4 mg Dexamethasone was administered posterior to the middle turbinate (around 1-2 cm) for 2 minutes drop by drop through a 16 G angiocath with the patient lying supine placed after the completion of surgery in group A and 5 ml of normal saline (placebo) was injected by the same technique in group B, 2 minutes before reversal of residual neuromuscular blockade and extubation of trachea. In the post-operative period, inj Paracetamol in the dose of 20mg/kg was given eight hourly to all the patients. A VAS score greater than 3 was managed with Inj. Tramadol in the dose of 2mg/kg. No additional analgesia was given in the post-operative period. The study ended when the desired sample size was achieved. There were no changes in the methods or outcomes after the trial commencement. In the post-operative period, time taken from the SPGB to the first rescue analgesia in both groups, pain assessment with VAS at 15, 30, 45, 60 & 120 minutes after completion of surgery in both SPGB and placebo groups and the difference in total dose of rescue opioid given in 24 hours in both the SPGB and placebo groups were observed and recorded. Postoperative side effects such as nausea and vomiting (PONV), headache, visual disturbances were observed and recorded.

Statistics

Assuming standard deviation of difference in VAS score as 1.3 [https://doi.org/10.3390/jpm12050830], 0.3 error, 80% power 5% alpha error and 20% response rate, final sample size was 92.[6] However, to have a margin of safety and round the figure, 50 patients in each group were included for the study. Intention-to-treat analysis was done for all the outcome variables. Categorical variables are presented as proportions or percentages. Continuous variables are presented as mean (SD) and median (IQR). Normality of data was assessed using Shapiro-Wilk test. Difference in proportions between two or more groups was compared using Chi-square test. To compare medians, Independent- Samples Mann-Whitney U test was used. P-value of less than 0.05 was considered as significant



Results

Demographic profile was comparable in the two groups (P > 0.05) [Table 1 and Figure 1 a and 1 b]. Mean VAS score at 15 minutes was statistically lower (1.64±0.921) in group A as compared to (2.42±1.090) in group B (P =0.001). Mean VAS score at 30 minutes was statistically lower in group A (1.98±0.795) as compared to group B (2.70±1.199). Mean VAS score at 45 minutes was statistically lower in group A (2.80±.904) as compared to (3.46±1.199) in group B (P =0.007). Mean VAS score when measured at 60 minutes was found to be (3.2±0.926) in group A and (4.02±1.301) in group B which was statistically significant (P = 0.001), whereas mean VAS score measured at 120 min, was statistically insignificant between group A (4.28±1.144) and B (4.78±1.404) P = 0.129. [Table 1 and figure 1c]. The time for rescue analgesia was statistically higher in group A (4.710±2.36 hr) as compared to (3.820±1.64 hr) in group B (P=0.014) (Figure 1 d). We compared the total

opioid dose given to the patient during 24 hours in the post-operative period and found it to be mean 117 mg. tramadol in group A and 159 mg. tramadol in group B the difference of which was found to be statistically significant (P = 0.004) (Figure 1e). Duration of surgery in both the groups was statistically insignificant (P = 0.485) Figure 1f. The incidence of complication was observed and measured. Nausea was noted in 10 patients in group A and 9 patients in group B (P= 0.4) and vomiting occurred in 4 patients in group A and 9 patients in group B (P= 0.799). None of the patients in any group had any visual disturbance [Table 2].

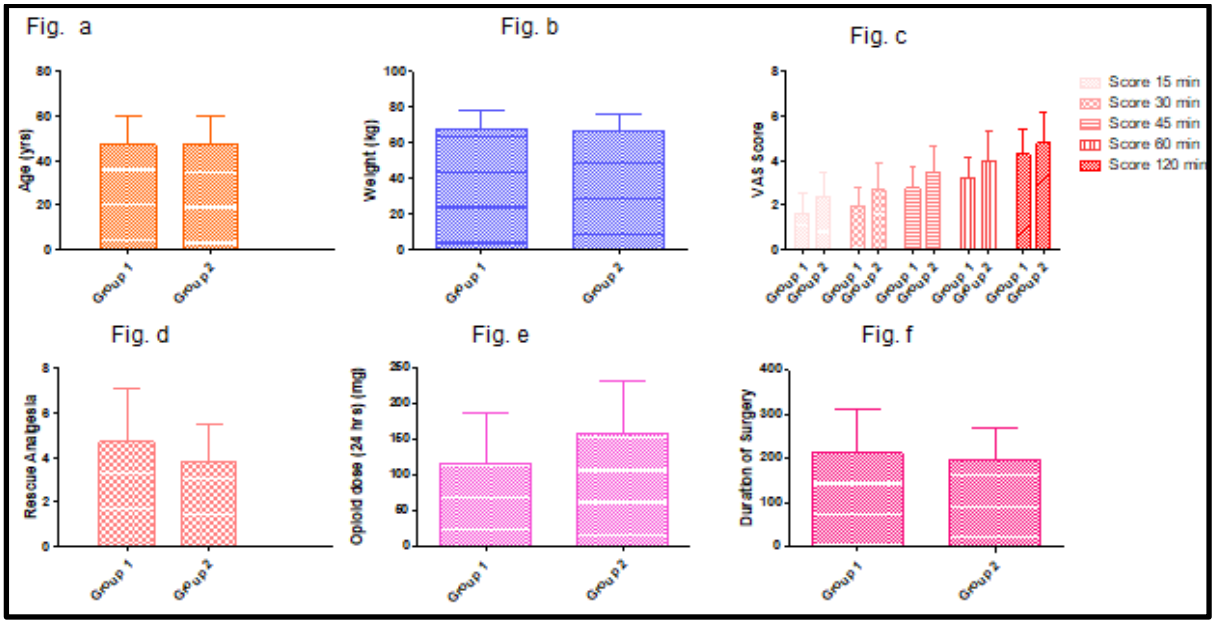
Table 1: Association of demographic and clinical variables between Group 1 and 2

Factor	GROUP 1				GROUP 2				P-value
	MEAN	(SD)	MEDIAN	(IQR)	MEAN	(SD)	MEDIAN	(IQR)	
Age (yrs.)	47.22	12.574	46.50	51	47.14	12.924	48.00	52	0.898
Weight (kg)	67.96	10.593	68.00	41	66.22	9.921	65.00	38	0.272
Rescue Analgesia	4.710	2.3692	5.00	10	3.820	1.6499	4.00	7.0	0.014*
Score at 15 min	1.64	0.921	2.00	3	2.42	1.090	2.00	5	0.001*
Score at 30 min	1.98	0.795	2.00	3	2.70	1.199	2.00	5	0.003*
Score at 45 min	2.80	0.904	3.00	4	3.46	1.199	3.00	5	0.007*
Score at 60 min	3.20	0.926	3.00	4	4.02	1.301	4.00	6	0.001*
Score at 120 min	4.28	1.144	4.00	5	4.78	1.404	4.00	5	0.129
Opioid dose(24hrs)	117.00	69.701	100.00	300	159.00	71.920	175.00	300	0.004*
Duration of surgery	212.30	98.536	200.00	375	197.10	71.615	190.00	320	0.485
Note: *Denotes Statistically Significant Variable									

Table 2: Gender & Incidence of complication between Group 1 and 2

Factor		Group 1		Group 2		P- value
		N	%	N	%	
Gender	Male	39	47	44	53	0.183
	Female	11	64.7	6	35.3	
Nausea	Yes	10	52.6	9	47.4	0.799
	No	40	49.4	41	50.6	
Vomiting	Yes	4	66.7	2	33.6	0.400
	No	46	48.9	48	51.1	

Figure 1: Demographic Profile and Clinical Parameters (a-comparison of age; b-comparison of weight; c-comparison of VAS score; d-comparison of rescue analgesia; e-comparison of total opioid dose given; f-comparison of duration of surgery)



Discussion

The role of SPGB is well established in the management of headache disorders, facial pain syndromes, post dural puncture headaches and other facial neuralgias.[7,8] It has also been used for postoperative pain relief in ophthalmological surgeries.[9] The sensory and autonomic fibres that pass through the SPG provided the anatomical rationale for blocking the sphenopalatine ganglion.[10] Amongst the various invasive and non-invasive approaches, transnasal route is an easy method for SPGB. Our aim was to assess the efficacy of SPGB in acute post-operative setting so that analgesia can be delivered in a simple, safe and effective way. We found that there is a significant effect of local anaesthetic administration, by transnasal drip method, on postoperative pain relief as found in previous studies.[11,12] The difference in VAS score at 15, 30, 45 and 60 min. between the two groups was statistically significant implying the fact that the local anaesthetic diffused well into the Spheno-palatine ganglion when administered through the transnasal route by drip method. The absence of any significant difference at 120 min. between the two groups was probably due to wearing off the effect SPGB due to short acting local anaesthetic agent. The novelty of the present study is the fact that the transnasal sphenopalatine ganglion block (SPGB) administered by a simple drip method can produce a significant level of post-operative analgesia and additionally reduce the opioid requirement without any significant adverse effect on the patient. The analgesic effect of IV lignocaine is a well-established fact because it decreases the influx of macrophages and neutrophils at the site of inflammation, thereby decreasing the postoperative serum LDH and lactate levels, leading to adequate pain relief.[13] Transnasal drip method avoids the procedure of leaving the cotton applicator soaked in local anaesthetic inside the nostril, as done in topical method,[14] which can be inconvenient to the patient in the immediate post-operative period. Our study was designed to assess the efficacy of drip method in blocking the Spheno-palatine ganglion because it is a simple, cheap, reproducible method which can be done easily, does not require training and is devoid of any complications. The major limitation of this method for postoperative pain relief is that it is limited to facial pain and additional analgesia will be required for pain in the area of flap

reconstructions. Furthermore, the present study was a single-centre study and included only patients with ASA physical status I and II. Multicentric studies or studies with larger sample sizes including patients of ASA physical status III and IV will be desired to fill the knowledge gaps and to access its efficacy in high risk patients. Since the effect of SPGB by drip method is well proven by our study, further studies can be done by different local anaesthetic agent so that a longer duration of analgesia can be achieved in the postoperative period and the total dose of opioid given can be reduced.

Conclusion

SPGB done by a simple, safe & effective technique of drip method through the trans-nasal route provide adequate analgesia in the post-operative period after head & neck cancer surgeries. It is a simple procedure which can be performed in the immediate post-operative period. SPGB reduces the opioid requirement and provides a significant amount of pain free period. All post-operative patients who undergo operation in the area of face (area of maxilla, palate, retromolar trigone) will benefit from this technique.

References

1. Piagkou M, Demesticha T, Troupis, T, Vlasis K, Skandalakis P, Makri A, Mazarakis A, Lappas D, Piagkos G, Johnson EO. The pterygopalatine ganglion and its role in various pain syndromes. From anatomy to clinical practice: Pain Pract; 2012. P. 12,399–412.
2. Robbins MS, Robertson CE, Kaplan E, Ailani J, Charleston, LT, Kuruvilla D, Blumenfeld, A, Berliner R, Rosen NL, Duarte R, et al. The sphenopalatine ganglion: Anatomy, pathophysiology, and therapeutic targeting in headache. Headache. 2016;56:240–258.
3. Kent S, Mehaffey G. Transnasal sphenopalatine ganglion block for the treatment of postdural puncture headache in obstetric patients. J Clin Anesth. 2016;34:194-6.
4. Sanatkar M, Bazvand F. Transnasal sphenopalatine ganglion block for pain relief during panretinal photocoagulation laser for diabetic retinopathy: a pre and post interventional study: Sci Rep 2022;12:10964.
5. Sommer M, Geurts JW, Stessel B, et al. Prevalence and predictors of postoperative pain after ear, nose and throat surgery. Arch Otolaryngol Head Neck Surg. 2009;135:124–130.
6. Kim NE, Kim JE, Lee SY, Gil HY, Min SK, Park B, Kim SI, Cho RY, Koh JC, Choi YH, et al. Comparison of Temperature and Pain Changes between the Drip and Topical Methods of Administering the Transnasal Sphenopalatine Ganglion Block. J. Pers. Med. 2022;12:830.
7. Mojica J, Mo B, Ng A. Sphenopalatine Ganglion Block in the Management of Chronic Headaches. Curr Pain Headache Rep. 2017;21(6):27.
8. Alexander CE, Dua A. Sphenopalatine Ganglion Block. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024.
9. Shapira IL. Neuromuscular dentistry and the role of the autonomic nervous system: Sphenopalatine ganglion blocks and neuromodulation. An International College of Cranio Mandibular Orthopedics (ICCMO) position paper. Cranio. 2019;37(3):201-206.
10. Nair AS, Rayani BK. Sphenopalatine ganglion block for relieving postdural puncture headache: technique and mechanism of action of block with a narrative review of efficacy. Korean J Pain. 2017;30(2):93-97.

11. Mantovani G, Sgarbanti L, Indaimo A, Cavallo MA, De Bonis P, Flacco ME, Scerrati A. Effects of a sphenopalatine ganglion block on postcraniotomy pain management: a randomized, double-blind, clinical trial. Neurosurg Focus. 2023;55(6):E13.
12. Gayathri GA, Karthik K, Saravanan R, Meshach MD, Pushparani A. A randomized control study to assess the efficacy of the sphenopalatine ganglion block in patients with post dural puncture headache. Saudi J Anaesth. 2022;16(4):401-405.
13. Ahuja V, Singh K, Thapa D, Mitra S, Attri AK, Kaur J. Effect of lignocaine on postoperative serum lactate dehydrogenase and lactate levels in patients undergoing bowel surgery: A randomised controlled trial. Indian J Anaesth. 2024;68(3):293-297.
14. Smita S, Dubey PK, Singh K. Intranasal sphenopalatine ganglion block by lignocaine spray for postdural puncture headache following spinal anesthesia: a randomized clinical trial. Anaesthesiol Intensive Ther. 2023;55(4):285-290.