Original Research Article

Journal of College of Medical Sciences-Nepal, Vol-20, No.4, Oct-Dec 2024

ISSN: 2091-0657 (Print); 2091-0673 (Online) Open Access

DOI: 10.3126/jcmsn.v20i4.71296

Comparison of Intraoperative Bleeding During Bilateral Endoscopic Sinus Surgery with or without Greater Palatine Fossa Block

Apar Pokharel[1], **Basanta Panta**[2]

[1]Department of Otorhinolaryngology & Head and Neck Surgery, College of Medical Sciences Teaching Hospital, Bharatpur, Chitwan, Nepal, [2]Department of Otorhinolaryngology & Head and Neck Surgery, Lamahi Eye Hospital, Dang, Nepal.

ABSTRACT

Background

Functional endoscopic sinus surgery (FESS) is a minimally invasive technique commonly used to restore sinus ventilation and function under direct visualization. A small amount of bleeding can obscure the surgical field. Block of greater palatine fossa (GPF) through the greater palatine foramen via trans-oral approach may be used as technique for controlling bleeding during FESS. The objective of this study is to see the study the effect of GPF block on intraoperative bleeding during endoscopic sinus surgery.

Methods

This was a quasi experimental study was conducted on 34 patients undergoing surgery in COMS-TH, Bharatpur, Chitwan during a period of 1 year. Unilateral Trans Oral infiltration of the GPF with 2 mL of 2% lidocaine and 1:80,000 adrenalin was done, and other side was infiltrated with normal saline.

Results

In our study, the endoscopic surgical field grade between normal saline and 2 mL of 2% lidocaine and 1:80,000 adrenaline suggested that GPF block group has significantly lesser bleed than saline infiltrated side.

Conclusions

In our study, the GPF block group maintained a lower surgical grade during the entire duration of surgery when compared to normal saline.

Keywords: greater palatine fossa; functional endoscopic sinus surgery; lidocaine.

INTRODUCTION

Traditional bleeding control methods are often ineffective in FESS, increasing risks of skull base injuries, CSF leaks, and damage to the orbit. Poor visibility can harm healthy tissue, leading to synechiae. A dry surgical field improves visualization, enhances surgical precision, reduces operation time, and lowers complication rates.[1-4] Common bleeding control methods in FESS include bipolar diathermy, packing, vasoconstrictors, hypotension, and steroids, each with varying success.[1,5,6] The greater palatine fossa (GPF) block, accessed via the greater palatine foramen, reduces blood supply from the maxillary artery via vasoconstriction, minimizing intraoperative bleeding.[7–10] This study examines the GPF block's effectiveness in controlling bleeding and improving the surgical field during FESS. It compares outcomes with and without the block, addressing a research gap in Nepal. A 2018 study in Dharan found better visibility and reduced blood loss with the fossa block.[1]

METHODS

A quasi-experimental study was conducted in the Department of Otorhinolaryngology and Head and Neck Surgery, College of Medical Sciences (CoMS), Chitwan, Nepal from 1st January, 2022 to 31st December, 2022 for a period of one year. A total number of 34 patients were included in the study. Non-probability sampling technique was used in the study. Patients who were diagnosed with chronic sinusitis and nasal polyposis and undergoing Functional endoscopic sinus surgery (FESS) were included in the study. The pathology must be

Correspondence: Dr. Apar Pokharel, Department of Otorhinolaryngology & Head and Neck Surgery, College of Medical Sciences Teaching Hospital, Chitwan, Nepal. Email: aparpokharel@hotmail.com, Phone: +977-9841558234.
Article received: 2024-10-05. **Article accepted**: 2024-12-01. **Article published**: 2024-12-31.

identical on either side of paranasal sinuses and nasal cavity on CT scan based on Lund- Mackay score.[11] Gender, age, and disease severity of paranasal sinuses based on Lund- Mackay scores were noted preoperatively. Patients with concomitant deviated nasal septum where septoplasty was required, patients with anticoagulant therapy were excluded from the study. Informed consent was taken from the patients for the study. The study was approved from the Institutional Review Committee of CoMS-TH (Ref. No. 2021/75). The surgery was done under GA. Unilateral transoral local anaesthesia infiltration of the greater palatine fossa with 2 mL of 2% lidocaine and 1:80,000 adrenaline was done. The primary researcher gave the block and the surgeon was blinded so that he didn't know the side of block and gave the bleeding score. This technique involved introducing a needle into the greater palatine foramen and traversing the greater palatine canal into the pterygopalatine fossa. The greater palatine foramen was located by placing a finger in the mouth and palpating the junction of the hard and soft palate. The finger was drawn anterior to the posterior rim of the hard palate for 3-5 mm, half way between the second molar tooth and midline of the hard palate. In this study 25-g needle was used to perform this injection through the mouth bent at 25 mm from the tip at an angle of 45°. For the control group, normal saline was injected through the greater palatine foramen in the same setting. At the commencement of surgery and at regular 15-minute intervals the surgeon performed surgical field assessment. The side being operated was alternated every 30 minutes. This was done by nasal packing using 2% xylocaine with adrenaline in both nostrils alternately to create a clear surgical field. At each assessment other parameters including mean arterial blood pressure (MAP), heart rate, concentration of end-tidal CO2 was recorded by the anesthetist. The extent of nasal bleeding was evaluated according to the scale adopted by Boezaart (Table 1).[12] The aim of this scale was to quantify the amount of bleeding in the surgical field during endoscopic sinus surgery.

Table 1. Boezaart Surgical Field Grading.[12]

Grades	Surgical Site Assessment
Grade-0	No bleeding (cadaveric conditions)
Grade-1	Slight bleeding, no suctioning required
Grade-2	Slight bleeding, occasional suctioning required
Grade-3	Slight bleeding, frequent suctioning required; bleeding threatens surgical field a few seconds after suction is removed
Grade-4	Moderate bleeding, frequent suctioning required and bleeding threatens surgical field directly after suction is removed
Grade-5	Severe bleeding, constant suctioning required; bleeding appears faster than it can be removed by suction; surgical filed severely threatened and surgery usually is not possible

RESULTS

The current study included 34 patients planned for FESS. Patients aged 15-68 years were included in the study. The maximum number of patients planned for FESS belonged to age group of 30-40 years (n=34). The mean age of presentation was 36.23 years (Figure 1).

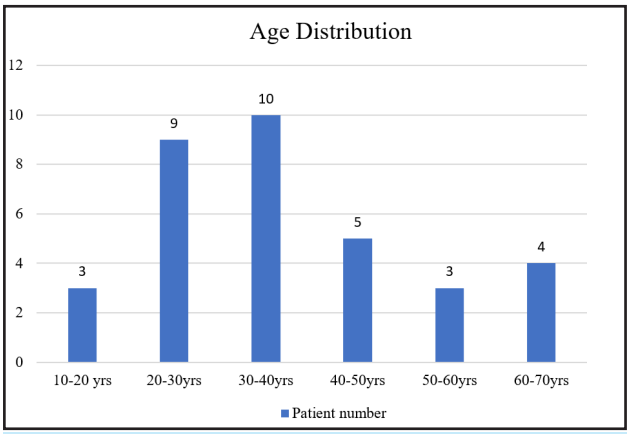

Figure 1. Age Distribution of patient.

In this study there were 21 male patients (61%) and 13 female patients (39%). The mean grade of blood loss in greater palatine fossa (GPF) block side minus control equaled 1.03. 95% confidence interval of this difference ranged from 0.78 to 1.28. The two-tailed p-value equaled 0.0001. By conventional criteria, this difference was considered to be very statistically significant (Table 2).

The average time duration of the surgery was calculated. The mean time duration of surgery on

Table 2. Boezart Grading comparing GPF block site with control side.

Boezart Grading	Number	Mean	SD	Standard Error of Mean	p-value
Block Side	34	2.21	0.48	0.08	0.0001
Control Side	34	3.24	0.55	0.09	

the side of GPF block was 58.24 minutes and on the control side was 68.38 minutes. The mean of GPF minus control equaled 10.15. The 95% confidence interval of this difference ranged from 19.74 to 0.56. The two-tailed p-value equaled 0.0384. By conventional criteria, this difference was considered to be statistically significant (Table 3).

Table 3. Surgery time comparing GPF block site with control side.

Surgery Duration	Number	Mean	SD	Standard Error of Mean	p-value
Block Side	34	58.24	17.92	3.07	0.0384
Control Side	34	68.38	21.52	3.69	

A strong correlation between radiological preoperative disease activity as determined by Lund Mackay score and intraoperative bleeding is found in both cases and controls (Table 4).[12] The results in both cases and controls showed positive correlation between radiological preoperative disease activity and intraoperative bleeding scores. However, the severity of bleeding was significantly less in GPF block cases group as seen in Table 2 and Table 4. The mean Boezaart bleeding score is higher in control group where GPF block is not given.

Table 4. Correlation between preoperative disease score and intraoperative bleeding.

Parameter	GPF block cases	Controls
Number of patients	34	34
Average Lund-Mackay Score	8.5	8.5
Mean Boezaart Bleeding Score	2.21	3.24
Pearson relation coefficient(r)	0.8602	0.8592
p-value relation coefficient (r)	<0.001	<0.001

DISCUSSION

The present study provides strong evidence regarding the effectiveness of the greater palatine fossa (GPF) block in reducing intraoperative bleeding during bilateral endoscopic sinus surgery (FESS). Our findings indicate that the use of the GPF block is associated with a statistically significant reduction in blood loss when compared to the control side, as evidenced by the mean grade of blood loss difference of 1.03 (p-value = 0.0001). This reduction in bleeding can enhance surgical visibility and potentially reduce complications during endoscopic procedures due to hemorrhage and obscured surgical field, aligning with findings by DeConde et al., who noted that effective regional anesthesia techniques can significantly lower intraoperative bleeding in sinus surgeries.[13] Demographically, our study revealed a male predominance (61%) within the age group of 30-40 years, which aligns with literature suggesting that sinus issues and the need for surgical intervention are more common in this demographic.[14,15] The mean age of presentation, 36.23 years, reflects a typical patient profile for FESS, allowing for a focused analysis of the impact of the GPF block in this age group. In addition to reducing intraoperative bleeding, our study found that the GPF block also led to a statistically significant decrease in the duration of surgery, with an average time difference of 10.15 minutes (p-value = 0.0384). This reduction in surgical time may enhance patient throughput and reduce overall resource utilization in the operating room. Similar findings have been reported by Ubale et al., who demonstrated that the use of regional anesthesia techniques could lead to a decrease in surgery duration, thereby improving operational efficiency.[16] Moreover, Eberhart et al. highlighted that effective anesthesia not only shortens procedure times but also enhances patient recovery.[17] The findings of the study highlight a significant correlation between preoperative nasal sinus disease activity, as assessed by the Lund Mackay score and intraoperative bleeding during sinus surgery. This relationship underscores the importance of understanding the baseline disease state in patients undergoing such procedures. Increased disease activity may lead to vascularization and inflammation, which can contribute to heightened intraoperative bleeding.[18] Additionally, the results indicate that the

application of a Greater Palatine Fossa (GPF) block significantly reduces the severity of bleeding during surgery. The mean Boezaart bleeding score was notably lower in patients who received the GPF block compared to those in the control group, suggesting that this technique may be effective in managing intraoperative hemorrhage. The GPF block likely provides effective anesthesia to the palatine region, minimizing vascular response and bleeding risk during the procedure.[19] The clinical implications of these findings are substantial. By minimizing intraoperative bleeding and decreasing surgical time, the GPF block can contribute to improved surgical outcomes and patient safety. These advantages may also translate to reduced postoperative complications, shorter recovery times, and increased patient satisfaction, as noted by Bhattachharya et al., who highlighted the benefits of effective pain management strategies in enhancing patient experiences following sinus surgery.[20] Additionally, studies by Praveen et al. and Zimmer et al. support the idea that effective bleeding control leads to fewer postoperative complications and improved overall outcomes. [21,22] However, some limitations must be acknowledged in this study. The relatively small sample size of 34 patients may limit the generalizability of the findings. Future studies with larger cohorts and multi-center designs would be beneficial to validate these results further. Long-term outcomes related to the use of GPF blocks in FESS, including pain management and postoperative recovery, also warrant further investigation, as highlighted by Cameron et al. and Das et al. [23,24]

CONCLUSIONS

The results of study suggest that the greater palatine fossa block is an effective method for reducing intraoperative bleeding and surgical duration in patients undergoing bilateral endoscopic sinus surgery. Further research is needed to solidify its role in clinical practice and to explore potential long-term benefits associated with its use.

Conflict of interest: None

Funding: None

REFERENCES

1. Paudel D, Chettri ST, Shah SP, Shah BP, Manandhar S, Mishra S. The effect of pterygopalatine fossa block (PPFB) during endoscopic sinus surgery (ESS) on intraoperative bleeding: a randomized control trial. Journal of BP Koirala Institute of Health Sciences. 2018;1(2):35–41. [Link]
2. Zhao YC, Psaltis AJ. Hemostasis in sinus surgery. Curr Opin Otolaryngol Head Neck Surg. 2016 Feb;24(1):26–30. [PubMed]
3. Valdes CJ, Al Badaai Y, Bogado M, Samaha M. Does pterygopalatine canal injection with local anaesthetic and adrenaline decrease bleeding during functional endoscopic sinus surgery? J Laryngol Otol. 2014 Sep;128(9):814–7. [PubMed]
4. Parameswaran A, Ganeshmurthy MV, Ashok Y, Ramanathan M, Markus AF, Sailer HF. Does Sphenopalatine Ganglion Block Improve Pain Control and Intraoperative Hemodynamics in Children Undergoing Palatoplasty? A Randomized Controlled Trial. J Oral Maxillofac Surg. 2018 Sep;76(9):1873–81. [PubMed]
5. Drozdowski A, Sieśkiewicz A, Siemiatkowski A. [Reduction of intraoperative bleeding during functional endoscopic sinus surgery]. Anestezjol Intens Ter. 2011;43(1):45–50. [Link]
6. Srivastava U, Dupargude AB, Kumar D, Joshi K, Gupta A. Controlled hypotension for functional endoscopic sinus surgery: comparison of esmolol and nitroglycerine. Indian J Otolaryngol Head Neck Surg. 2013 Aug;65(Suppl 2):440–4. [PubMed]
7. Shamil E, Rouhani MJ, Basetti S, Bast F, Hopkins C, Surda P. Role of local anaesthetic nerve block in endoscopic sinus surgery: A systematic review and meta-analysis. Clin Otolaryngol. 2018 Oct;43(5):1201–8. [PubMed]
8. Mathew R, Srinivasa C, Sathyanarayana V, Suryanarayana S, Harsha P. Role of Pterygopalatine Fossa Block in achieving Relatively Bloodless Field during Endoscopic Sinus Surgery. An International Journal Clinical Rhinology. 2017 Aug 1;10(2):62–5. [Link]
9. Wormald PJ, Athanasiadis T, Rees G, Robinson

S. An evaluation of effect of pterygopalatine fossa injection with local anesthetic and adrenalin in the control of nasal bleeding during endoscopic sinus surgery. Am J Rhinol. 2005;19(3):288–92. [PubMed]

10. Khanwalkar AR, Welch KC. Updates in techniques for improved visualization in sinus surgery. Curr Opin Otolaryngol Head Neck Surg. 2021 Feb 1;29(1):9–20. [PubMed]
11. Lund VJ, Kennedy DW. Staging for rhinosinusitis. Otolaryngol Head Neck Surg. 1997 Sep;117(3 Pt 2):S35-40. [PubMed]
12. Boezaart AP, van der Merwe J, Coetzee A. Comparison of sodium nitroprusside- and esmolol-induced controlled hypotension for functional endoscopic sinus surgery. Can J Anaesth. 1995 May;42(5 Pt 1):373–6. [PubMed]
13. DeConde AS, Thompson CF, Wu EC, Suh JD. Systematic review and meta-analysis of total intravenous anesthesia and endoscopic sinus surgery. Int Forum Allergy Rhinol. 2013 Oct;3(10):848–54. [PubMed]
14. Nair S, Dutta A, Rajagopalan R, Nambiar S. Endoscopic sinus surgery in chronic rhinosinusitis and nasal polyposis: a comparative study. Indian J Otolaryngol Head Neck Surg. 2011 Jan;63(1):50–5. [PubMed]
15. Smith TL, Schlosser RJ, Mace JC, Alt JA, Beswick DM, DeConde AS, et al. Long-term outcomes of endoscopic sinus surgery in the management of adult chronic rhinosinusitis. Int Forum Allergy Rhinol. 2019 Aug;9(8):831–41. [PubMed]
16. Ubale PV. Anesthetic Considerations in Functional Endoscopic Sinus Surgery. An International Journal of Otorhinolaryngology Clinics. 2015 Apr 1;7(1):22–7. [Link]
17. Eberhart LHJ, Folz BJ, Wulf H, Geldner G. Intravenous anesthesia provides optimal surgical conditions during microscopic and endoscopic sinus surgery. Laryngoscope. 2003 Aug;113(8):1369–73. [PubMed]
18. Yu MS, Kang SH, Kim BH, Lim DJ. Effect of aerosolized fibrin sealant on hemostasis and wound healing after endoscopic sinus surgery: a prospective randomized study. Am J Rhinol Allergy. 2014;28(4):335–40. [PubMed]
19. Husain S, Ramos JA, Karaf JHA, Zahedi FD, Ahmad N, Abdullah B. Efficacy of topical tranexamic acid to reduce bleeding in endoscopic sinus surgery for chronic rhinosinusitis with polyposis. Eur Arch Otorhinolaryngol. 2023 Feb;280(2):737–41. [PubMed]
20. Bhattacharyya S, Tewari MK, Ghosh S, Chakroborty J, Das W, Barman U. Evaluation of the efficacy of bilateral sphenopalatine ganglion block in endoscopic sinus surgery under general anesthesia: a randomized prospective controlled trial. Research and Opinion in Anesthesia & Intensive Care. 2016 Dec;3(4):173. [DOI]
21. Kumar P, Shastri A, Chethanananda TN, Sangeetha SV. A Comparative study of intraoperative infusion of dexmedetomidine vs esmolol for controlled hypotension in functional endoscopic sinus surgeries. European Journal of Cardiovascular Medicine. 2024 Jun 20;14:1149–54. [Link]
22. Zimmer LA, Andaluz N. Incidence of epistaxis after endoscopic pituitary surgery: Proposed treatment algorithm. Ear Nose Throat J. 2018 Mar;97(3):E44–8. [PubMed]
23. Smith CR, Dickinson KJ, Carrazana G, Beyer A, Spana JC, Teixeira FJP, et al. Ultrasound-Guided Suprazygomatic Nerve Blocks to the Pterygopalatine Fossa: A Safe Procedure. Pain Med. 2022 Aug 1;23(8):1366–75. [PubMed]
24. Das A, Biswas H, Mukherjee A, Basunia SR, Chhaule S, Mitra T, et al. Evaluation of Preoperative Flupirtine in Ambulatory Functional Endoscopic Sinus Surgery: A Prospective, Double-Blind, Randomized Controlled Trial. Anesth Essays Res. 2017;11(4):902–8. [PubMed]

Citation: Pokharel A, Panta B. Comparison of Intraoperative Bleeding During Bilateral Endoscopic Sinus Surgery with or without Greater Palatine Fossa Block. JCMS Nepal. 2024; 20(4): 305-09.