

Sphenopalatine Ganglion Block in Endoscopic Sinus Surgery

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Abstract

Objectives: The aim of this study was to find the effect of sphenopalatine ganglion block given via greater palatine foramen in managing intraoperative bleeding, postoperative pain and its effect on functional outcome and postoperative adverse effects in Functional Endoscopic Sinus Surgery (FESS).

Methods: In this prospective study, a total of 60 consenting patients posted for FESS for chronic sinusitis were selected and randomised into two groups. Group A received sphenopalatine ganglion block via greater palatine foramen and group B did not. Intraoperative surgical field visibility was measured by Average Category Scale by Fromm and Boezaart. Postoperatively those with pain score more than 4 in VAS were given diclofenac injection. Functional outcome was measured by SNOT 22.

Results: There was no significant difference in age and sex distribution of patients in both groups. Preoperative SNOT scores were comparable in both groups. There was improvement noted in surgical field in block group compared to non-block group. Significantly lesser requirement of postoperative analgesics was noted in this study with p value <.01. Postoperatively functional outcome with SNOT22 scores significantly improved in both groups compared to preoperative SNOT 22 scores. Better improvement was seen in block (A) group. Mean postoperative SNOT22 score in group B (14.3) was significantly higher than that in group A (5.2). Number of adverse effects reported in both groups was comparable.

Conclusion: Intraoperative bleeding which reduces surgical field visibility and postoperative pain which results in excessive use of analgesics are common problems faced by endoscopic sinus surgeons. In this study, addition of sphenopalatine ganglion block to general anesthesia was tried in FESS to overcome these problems and to improve the outcome. This study showed a significantly reduced need for postoperative analgesics with use of SPG block. Patients who received SPG block showed better improvement in functional outcome and comparable occurrence of adverse effects with the no block recipients. Even though there was improvement in surgical field in SPG block group, we couldn't establish a statistically significant outcome.

Keywords: Sphenopalatine; Ganglion Block; Endoscopic.

History

Functional Endoscopic Sinus Surgery (FESS) is an established surgical technique in the management of chronic rhinosinusitis. Although, FESS is a commonly performed procedure, intraoperative bleeding and postoperative pain are two common problems faced during this surgery. Establishing a favorable surgical field is necessary because even slight bleeding may distort the view from the endoscope and result in complications and affect the quality

of life after surgery. General anesthesia is mostly preferred for endoscopic sinus surgery. Combination of a peripheral nerve block to general anesthesia is expected to reduce the bleeding and pain thereby improve surgical outcome.

Sphenopalatine ganglion block (SPG block) has been used in the treatment of acute migraine headache, acute cluster headache, and a variety of facial neuralgias, status migrainosus, chronic cluster headache and in various surgeries including FESS. The

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sphenopalatine ganglion can be blocked by topical application of local anesthetic or by injection by trans nasal or lateral or greater palatine foramen approach. The greater palatine foramen approach to sphenopalatine ganglion block is useful even in patients who have an alteration of the nasal anatomy where trans nasal approach may not be possible (1).

This study was designed to evaluate the effect of sphenopalatine ganglion block by greater palatine foramen approach in endoscopic sinus surgery under general anesthesia. The parameters assessed include intraoperative blood loss and surgical field visibility, need for postoperative analgesics, postoperative adverse effects and functional outcome.

Methodology

This was a one-year prospective randomized control study conducted in a tertiary care institution. The study was conducted after obtaining ethical clearance from institutional ethical committee and informed written consent from patients who participated in the study. Sixty patients with chronic rhinosinusitis of both sexes in the age group of 18 to 70 years who required bilateral FESS were selected for the study. Because of consent issues and ethical issues, we could not enroll larger number of patients. Patients with pre-existing chronic facial pain not related to chronic rhinosinusitis, patients taking antidepressant drugs, on psychiatric treatment, with history of substance / alcohol abuse, with compromised renal / liver function, with h/o arrhythmia/ CAD, and those who were unable to understand questionnaires / VAS scores were excluded from the study.

All patients underwent nasal endoscopic examination and CT scan of paranasal sinuses. The group was randomized into two-group A (intervention group) and group B (the control group). Randomization was done according to random number table. The A group received sphenopalatine ganglion block through greater palatine foramen i.e. 2 mL 2% lignocaine with epinephrine 1:100,000 in addition to the general anesthetics and the group B did not receive the block. The following parameters were compared between the two groups.

1. Surgical field visibility and intra operative blood loss
2. Postoperative analgesia
3. Postoperative adverse effects
4. Functional outcome

Bleeding in the surgical field and the quality of the visibility were assessed subjectively using 6 points scales by Fromm et al. scale adapted by Boezaart et al.

AVERAGE CATEGORY SCALE (2,3) by Fromm & Boezaart

Grade Assessment

0 - No bleeding.

1 - Slight bleeding, no suctioning of blood required.

2 - Slight bleeding, occasional suctioning required. Surgical field not threatened

3 - Slight bleeding, frequent suctioning required. Bleeding threatens surgical field a few seconds after suction is removed

4 - Moderate bleeding, frequent suctioning required. Bleeding

threatens surgical field directly after suction is removed.

5 - Severe bleeding, constant suctioning required. Bleeding appears faster than can be removed by suction. Surgical field severely threatened and surgery usually not possible.

Pain intensity was evaluated with a 10-cm VAS (where 0 is defined as no pain at all and 10 as the worst possible pain) at 2 and 6 hours postoperatively. The time to first rescue pain medication and analgesic requirements were assessed. The patients received injection diclofenac 50 mg via intramuscular route if VAS was more than 4.

Postoperative complications were noted and managed accordingly.

Functional outcome was measured by comparing SNOT 22 scale (4) in both groups.

Statistical methods

1. Sample size for the study is determined by the formula

$$n > z^2 \times p \times q / d^2$$

where z is the confidence coefficient, p is the rate of prevalence in the population q = 1-p and d are the error of estimate. By taking the prevalence rate as 15 % (7) with a confidence of 95% an error of estimate as 9% the minimum sample size worked out for the study is 60.

2. Method of sampling- Simple random sampling method to be used for drawing patients to the study

I. Statistical tests proposed to be used for drawing inferences:

II. ann- whitney U test for comparison of demographic variables

III. Chi square test for testing the significance of association of qualitative variables

IV. Cruskal valleys test for comparison of various parameters under the study

Results

Sixty patients completed the study. The age and sex distribution of patients in both groups were comparable with no significant intergroup differences.

SNOT Scores

Preoperative SNOT in both block and non-block groups were similar. Postoperative SNOT (TABLE I) scores were better than preoperative values in both groups. But the postoperative SNOT values were significantly better in block group compared to no block group.

Table 1: Post-Operative SNOT Scores between Block Group (a) and No Block Group (b)study.

Group	N	Mean	SD	t	p-value
A	30	5.2	1.424	10.867	P<0.001
B	30	14.3	4.360		

Surgical field

Surgical field assessment using Average Category Scale (ACS) showed ACS 2 in 23 cases in group A and 20 cases in group B. ACS 3 was observed in 7 and 10 in group A and B respectively. Group A vs Group B in ACS 2- showed $\chi^2=0.026$, $df = 1$, $p>0.05$. Group A vs Group B in ACS 3- showed $\chi^2=0.048$, $df=1$, $p>0.05$ (TABLE II).

Table 2: Surgical field assessment using Average Category Scale (ACS)

	Group A	Group B
ACS- 2	23	20
ACS- 3	7	10
Total	30	30

Post OP Analgesic

Number of cases with analgesic requirement was significantly higher than those with no analgesic requirement in group B compared to group A (TABLE III). A vs B in ACS 3- No significant difference ($\chi^2=0.048$, $df=1$, $p>0.05$). Group B (Number of cases with analgesic requirement is significantly higher than those with no analgesic requirement ($\chi^2=1.333$, $df=1$, $p<0.001$))

Table 3: Post-Operative Analgesic Requirement (Immediate Post-Operative)

Group	NSAID	NO NSAID	Total
Group A	8	22	30
Group B	25	5	30

This study could not find a significant relation between postoperative SNOT scores and surgical field assessment by average category scale (TABLE IV).

Table 4: Post OP SNOT Scores VS Surgical Field

ACS	N	Mean postoperative SNOT	SD	t	df	P value
2	39	9.95	5.3149	0.363	58	>.05
3	21	9.38	6.04			

Adverse Events

The number of adverse effects reported in both block and no block groups were comparable (TABLE V).

Table 5: Adverse Reactions

Adverse effects	Group A	Group B
Headache	3	5
Nausea/ vomiting	4	6
Dental numbness	4	1
Gastritis	0	1
Urinary retention	1	0
Total	12	13

Discussion

Both groups were comparable preoperatively in age, sex and preoperative SNOT parameters. More patients in the age group of 30-50 years underwent surgery with slight male preponderance of 53.33% against 46.67% females.

There was improvement noted in surgical field in block group compared to non- block group. However, we couldn't establish a statistically significant outcome. This result matches with the results of previous studies. A study conducted by Ismail et al (5) showed decreased bleeding and improved surgical field visibility with sphenopalatine block given through greater palatine foramen. Wormald et al (6) in their landmark study showed that unilateral trans-oral pterygopalatine fossa infiltration with lidocaine improved the surgical conditions on the injected side relative to the other side during FESS. Study done by Hassan et al (7) using endoscopic SPG block showed significantly lesser blood loss and better surgical field visibility during sinonasal surgery. This study showed lesser VAS scores for pain and significantly reduced analgesic consumption with sphenopalatine ganglion block. These results

agree with previous researchers. Friedman et al (8) hypothesized that sphenopalatine ganglion block was associated with prolonged postoperative analgesia in FESS but couldn't show a statistically significant outcome. A study conducted by Elvin Kemisci et al (9) showed significantly decreased pain intensity in sphenopalatine block groups compared to saline. Study by Hassan et al (7) also showed significantly reduced pain scores and postoperative analgesic requirement with SPG block. A study conducted by Cho et al (10) showed lower postoperative pain scores with SPG block, but their results were not statistically significant. A study done by Samuel DeMaria et al (11) showed decreased time to discharge, more readiness for discharge in block group. Block group required less analgesic and had better satisfaction.

In this study both the groups showed significant improvement in postoperative SNOT22 scores compared to preoperative SNOT22 scores. But the improvement in block group was better than the other. This result also agrees with previous studies. The study conducted by Cho et al (10) showed improvement in SNOT 20 scores in both groups with faster improvement in block group. Postoperative functional outcome as per SNOT22 didn't have any significant relation with surgical field visibility.

The occurrences of adverse effects were comparable in both groups. This didn't agree with the study by Hassan et al (7) who found postoperative complications to be more in no block group.

Conclusion

Intraoperative bleeding which reduces surgical field visibility and postoperative pain which results in excessive use of analgesics are common problems faced with endoscopic sinus surgery. In this study, addition of sphenopalatine ganglion block to general anesthesia was tried in FESS to overcome these problems and to improve the outcome. There was improvement noted in surgical field in block group compared to non- block group. However, we couldn't establish a statistically significant outcome. This study showed a significantly reduced need for postoperative analgesics with use of SPG block. Patients who received SPG block showed better improvement in functional outcome and comparable occurrence of adverse effects with the no block recipients.

Ethics Declarations

Conflict of interests

All authors declare that they have no conflict of interest

Funding declarations

Nil received

Ethics approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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