# Comparison of Sphenopalatine Block and Intravenous Paracetamol for the Treatment of Post-Dural Puncture Headache

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## ABSTRACT

***Objective:*** To compare the effect of topical sphenopalatine block and intra venous Paracetamol in the management of post-Dural puncture headache.

***Study Design:*** Quasi-experimental study.

***Place and Duration of Study:*** Combined Military Hospital Peshawar Pakistan, from Jan to Aug 2021.

***Methodology:*** This experimental study was conducted on 153 patients who underwent lumbar puncture for any procedure and then suffered from post-Dural puncture headaches. Patients were randomized into two groups. Group A received the topical sphenopalatine block, while group B received the intravenous Paracetamol three doses 12 hours apart. Headache was recorded on Numeric pain score (NPS) 24 hours after the surgical procedure. Comparison in pain relief was compared in both groups at 1 hour, 12 hours, 24 hours and 48 hours.

***Results:*** Out of 153 patients randomized into two groups, 76 (49.7%) were categorized into Group-A, and 77 (50.3%) were categorized into Group-B. 63 (41.2%) were male, while 90 (58.8%) were female. The mean age of patients included in our study was 34.34 ± 4.33 years. Gynaecological/obstetric procedures 70 (45.7%) were the most common indication for lumbar puncture in our study. At 1, 12, 24 and 48 hours, pain relief was statistically significantly better in Group-A than in Group-B (*p*-value<0.005).

***Conclusion:*** Sphenopalatine ganglionic block emerged as a better option for pain relief among patients suffering from post-Dural puncture headache than intravenous Paracetamol. In addition, immediate and short-term relief was better among patients who used sphenopalatine block.

**Keywords**: Headache, Paracetamol, Post Dural puncture, Sphenopalatine block.

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## INTRODUCTION

Lumbar puncture is a technique used in routine for various diagnostic and therapeutic indications, including spinal anaesthesia.[1] As all medical procedures come with adverse effects, Lumbar puncture is no exception, and multiple adverse effects have been observed in patients undergoing this procedure.[2] Common adverse effects include headache, dysesthesias, back pain, transient radicular irritation, nerve palsies, local infection or bleeding problems.[3] Post-Dural puncture headache has been the commonest side effect in patients undergoing Dural-puncture.[4] Diagnosis is usually clinical, and conservative management is the treatment of choice in most patients.[5] Precise mechanisms of post -Dural puncture headache are unknown. However, it is usually attributed to reduced cerebrospinal fluid (CSF) pressure due to the loss of CSF in the epidural space through the dural puncture site.[6]

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Several strategies have been used to manage the post-Dural puncture headache. Puthenveettil *et al*, in 2018, published a study intending to assess the efficacy of Sphenopalatine ganglion block for the treatment of post-Dural puncture headache. They concluded that sphenopalatine ganglion block was an effective management strategy for the treatment of post-Dural puncture headache.[7] Turiel *et al,* in 2002, studied the role of corticosteroids in the treatment of post-dural-puncture headache. They came with the findings that symptoms of headache in these patients resolved with intravenous Hydrocortisone treatment.[8] A retrospective review was published by Cohen *et al,* in 2018, highlighting that sphenopalatine ganglionic block was a safe, inexpensive, and well-tolerated treatment as compared to epidural blood patch for the treatment of post-Dural puncture headache.[9]

In patients, headaches, especially persistent headaches, lead to compromised overall quality of life. Wadud *et al,* published a study regarding post-Dural puncture headaches in patients undergoing spinal

anaesthesia. They revealed that around 35% of the patients undergoing spinal anaesthesia experienced post-Dural puncture headache.[10] Seeing the magnitude of this problem, limited local data has been available regarding the management of this commonly occurring problem. Therefore, we designed this study to compare the effect of topical sphenopalatine block and intra venous Paracetamol in managing post-Dural puncture headaches.

## METHODOLOGY

This quasi-experimental study was conducted at the Anesthesia Department of Combined Military Hospital Peshawar Pakistan from January to August 2021. The sample size was calculated by WHO Sample Size Calculator using the population prevalence proportion of headache response to sphenopalatine ganglionic block as 88.89%.[6] Non-probability consecutive sampling technique was used to gather the sample, and then all the patients were randomized into two groups via a lottery method.

**Inclusion Criteria:** All patients between the age of 18 and 65 years who underwent lumbar puncture for any reason and then had headaches were included in the study.

**Exclusion Criteria:** Patients with uncontrolled diabetes, hypertension, or any other physical illness, patients with a known history of primary or secondary headaches before lumbar punctures were part of the exclusion criteria. Those undergoing more than one lumbar puncture procedure in the last week were also not included in the study. Patients with known allergies to the local anaesthetic agent or Paracetamol were also excluded.

After ethical approval from the Ethical Review Board Committee (IREB Letter no: 245) and written informed consent from potential participants, patients who underwent lumbar puncture for any reason and then had headaches fulfilling the inclusion as mentioned earlier and exclusion criteria were included in the study, patients were randomly divided into two groups via a lottery method. Both groups received the usual conservative treatment of post-Dural puncture headache.[11] In addition to routine conservative treatment,[7,8] Group-A received the topical sphenopalatine ganglion block while Group-B received the intravenous Paracetamol three doses 12 hours apart. In both groups, a numerical pain score (0-10) was applied to assess the postoperative pain at 1 hour, 12 hours, 24 hours, and 48 hours. For the purpose of blinding, the health professional who assessed the pain and the person who assessed the data did not know the group of the patient and details of which mode was used for the patient they had been assessing for the pain score. Patients also did not know about this information.

In Group-A, 2 ml of Lidocaine 2% and 2ml of 0.5% Bupivacaine were instilled into both anterior nares. Then a cotton-tipped applicator soaked in the medication mixture was passed through both the nares, and the end of the applicator tip was positioned just superior to the middle turbinate and anterior to the pterygopalatine fossa and sphenopalatine ganglion for 5 min with the patient in supine position.[12] In Group-B Paracetamol 1gm was given three doses 12 hours apart.[13] Numeric pain score of 0-10 was used to assess the effectiveness of intervention in reducing headaches.[14] Numeric pain score of <4 for headache was taken as adequate relief.[6]

All statistical analysis was performed using the Statistics Package for Social Sciences version 24.0 (SPSS-24.0). First, frequency and percentages were calculated for qualitative variables, while the mean and standard deviation for quantitative variables. Then, the Pearson chi-square test was applied to look for the statistically significant difference in the headache relief of the two groups at 1 hour, 12 hours, 24 hours and 48 hours. The *p*-value less than or equal to 0.05 was considered significant to establish the difference.

## RESULTS

Out of 153 patients with post-Dural puncture headache randomized into two groups, 76 (49.7%) were categorized into Group-A (sphenopalatine block), and 77 (50.3%) were categorized into Group-B (intravenous Paracetamol). In addition, 63 (41.2%) were male, while 90 (58.8%) were female. The mean age of patients included in our study was 34.34 ± 4.33 years. Table-I showed the general characteristics of patients included in our study. Gynaecological/obstetric procedures 70 (45.7%) were the most common indication for lumbar puncture in our study, followed by perineal 25 (16.4%) and urological surgeries 25 (16.4%). Orthopaedics indications were present in 20 (13.1%) patients, while other minor indications were in 13 (8.4%) patients.

Table-II showed the results of the Pearson chi-square analysis. It was revealed that at 1 hour (*p*-value <0.001), 12 hours (*p*-value <0.001), 24 hours (*p*-value - 0.001) and 48 hours (*p*-value <0.001), pain relief was statistically significantly better in patients who received sphenopalatine block as compared to those who received intravenous Paracetamol.

**Table-I: Characteristics of study participants.**

| Parameters | n(%) |
|---|---|
| **Age (years)** | |
| Mean ± SD | 34.34 ± 4.33 |
| Range (min-max) | 20-59 years |
| **Gender** | |
| Female | 90(58.8%) |
| Male | 63 (41.2%) |
| **Management Options** | |
| Group A (Sphenopalatine ganglion block) | 76 (49.7%) |
| Group B (Intravenous paracetamol) | 77 (50.3%) |
| Indications for lumber puncture | |
| Gynecological/obstetric surgeries | 70 (50.3%) |
| Perineal surgeries | 25 (16.4%) |
| Orthopedic surgeries | 20 (13.1%) |
| Urological surgeries | 25 (16.4%) |
| others | 13 (8.4%) |

**Table-II: Comparison of pain relief at different time intervals in both groups.**

| Time interval | Group A | Group B | *p*-value |
|---|---|---|---|
| **Pain relief at 1 hour** | | | |
| No | 07 (9.2%) | 51 (66.2%) | <0.001 |
| Yes | 69 (90.8%) | 26 (33.8%) | |
| **Pain relief at 12 hours** | | | |
| No | 06 (7.8%) | 24 (31.1%) | <0.001 |
| Y | 70 (92.2%) | 53 (68.9%) | |
| **Pain relief at 24 hours** | | | |
| No | 05 (6.5%) | 20 (25.9%) | 0.001 |
| Yes | 71 (93.5%) | 57 (74.1%) | |
| **Pain relief at 48 hours** | | | |
| No | 03 (3.9%) | 19 (24.7%) | <0.001 |
| Yes | 73 (96.1%) | 58 (75.3%) | |

## DISCUSSION

Sphenopalatine ganglionic block emerged as a better option for pain relief in patients suffering from post-Dural puncture headaches. Management of headaches and craniofacial pains has been challenging for physicians of various specialities across the globe. Sometimes causes of these headaches are iatrogenic, and medications or medical procedures may affect the patients to acute or chronic headaches. Lumbar puncture has been one of the most notorious procedures associated with headaches. Conservative management usually resolves the symptoms, but sometimes aggressive management is required. Multiple methods have been used to alleviate the symptoms of headache in these individuals, but no single method is currently found superior and is part of the guidelines. Therefore, we designed this study to compare the effect of topical sphenopalatine block and intra venous Paracetamol in managing post-Dural puncture headaches.

Cardoso *et al*,[15] published a study in 2017 on a set of patients in Portuguese regarding the role of sphenopalatine ganglion block in persistent headache after Dural puncture. They concluded that sphenopalatine ganglion block has a faster onset than epidural blood patch with a better safety profile. We did not compare sphenopalatine ganglion block with an epidural blood patch, but when compared with intravenous Paracetamol, sphenopalatine ganglion block emerged as a better option for headache relief in our data set.

Kent *et al*,[16] in 2016 targeted obstetric patients for their study and assessed the role of sphenopalatine block for post-Dural puncture headache in these patients. They revealed that patients they included in their trial got statistically significant relief with this intervention, and the need for an epidural patch did not arise in most of the patients. Our results revealed the same, and most of the patients who got sphenopalatine ganglion block at 1, 12, 24 and 48 hours had adequate pain relief and did not require any other intervention for their pain relief.

Jesperson *et al*,[17] in 2020 published RCT comparing sphenopalatine ganglion block with local anaesthetic medication vs saline for pain relief. They concluded that there was no statistically significant difference in both groups regarding pain relief. We compared block with the local anaesthetic agent with intravenous Paracetamol and concluded that sphenopalatine ganglionic block was a better option for pain relief among patients suffering from post-Dural puncture headache than intravenous Paracetamol. Both immediate and short-term relief was better among patients who used sphenopalatine block.

The effect of sphenopalatine ganglion block on post-Dural puncture headache was assessed by Rocha-Romero *et al*,[18] in 2020. They came up with the findings that most patients had adequate relief after nasal block. Therefore, our results supported the results generated by Rocha-Romero *et al,* and the topical sphenopalatine block was an effective option to relieve post-dural puncture headache in our study participants.

Our results were quite encouraging regarding the use of sphenopalatine ganglion block for the relief of post-dural puncture headache compared to the use of intravenous Paracetamol. Our results are also supported by existing literature.

## LIMITATIONS OF STUDY

Everyone has his or her pain threshold; therefore, subjective assessment of pain cannot be used to generate generalizable results for the entire population in this regard. Though a lot of confounding factors were taken care of in the inclusion/exclusion criteria, there were still many other

factors that could affect the pain symptomatology among the study participants. Future studies involving multiple centres with stricter methodology may generate generalizable results.

## CONCLUSION

Sphenopalatine ganglionic block emerged as a better option for pain relief among patients suffering from post-Dural puncture headaches than intravenous Paracetamol. In addition, immediate and short-term relief was better among patients who used sphenopalatine block.

**Conflict of Interest:** None.

**Author's Contribuion**

AK: Principal investigator, conception design, data collection, analysis, interpretation of data. SHF: Supervisor, intellectual contribution, analysis, revising, interpretation, SI: Data analysis, design, interpretation, intellectual contribution, MS:, SM:, WA: Intellectual contribution.

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