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Original Research Article

Role of Pain Interventions in Treatment of Chronic Headache: A Holistic Approach

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Abstract:

Background: Chronic headache, including migraine and tension-type variants, remains a major cause of disability and impaired quality of life. Pharmacological therapies often provide incomplete relief and may induce drug overuse. Peripheral nerve blocks and lifestyle interventions have emerged as effective adjuncts in pain management.

Aim and Objective: To evaluate and compare the effectiveness of combined occipital and sphenopalatine nerve block along with pharmacological and lifestyle modification versus pharmacological and lifestyle management in chronic headache patients.

Materials and Methods: A prospective, randomized interventional study was conducted on 60 patients (18–60 years) diagnosed with chronic headache as per ICHD-3 criteria. Participants were divided into two groups: Group A received pharmacological management with lifestyle measures, and Group B received the same along with occipital and sphenopalatine nerve blocks. Outcomes—headache frequency (days/month), pain intensity (VAS), and Headache Impact Test-6 (HIT-6) scores were assessed at baseline, 4 weeks, and 12 weeks. Data was analyzed using SPSS v26; $p < 0.05$ was considered statistically significant.

Results: Patients in Group B requested less medications and NSAID alone was adequate in most cases, very less patients needed sumatriptan along with NSAIDs.

Conclusion: Combination of occipital and sphenopalatine blocks along with pharmacological and lifestyle modification provides better and sustained pain relief in comparison with pharmacological and life-style modification alone.

Keywords: Chronic Headache, Occipital Nerve Block, Sphenopalatine Ganglion Block, Lifestyle Modification, Migraine, Pain Management.

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Introduction

Chronic headaches represent a major neurological disorder that significantly affects productivity and quality of life. It encompasses migraine, tension-type headache, and mixed variants that persist for more than fifteen days per month for at least three months, leading to medication overuse and disability [1]. The global prevalence of chronic headache is estimated to be between 1.7% and 4% of the adult population, with migraine being a leading cause of years lived with disability in individuals under fifty years of age [2].

Conventional pharmacological therapy—including analgesics, triptans, and prophylactic agents such as beta-blockers and antiepileptics—often provides incomplete relief and may cause adverse effects or drug dependency [3]. Consequently, peripheral nerve blocks have gained attention as minimally invasive alternatives offering effective and rapid pain control by interrupting nociceptive transmission at the peripheral level [4]. Among these, the greater occipital nerve block (GONB) and sphenopalatine ganglion block (SPGB) have demonstrated better efficacy in reducing headache frequency and severity in chronic headache patients compared to conventional pharmacological therapy alone [5,6].

Similar benefits have also been reported in Indian patients, where sphenopalatine and occipital nerve blocks were found to provide rapid and sustained pain relief in acute and chronic headache settings [7,8].

The occipital nerve block targets the convergence of cervical and trigeminal afferents in the trigeminocervical complex, modulating central sensitization and cortical hyperexcitability [9]. The sphenopalatine ganglion, a major parasympathetic relay in the pterygopalatine fossa, mediates cranial vasodilation and nociceptive activation; its blockade provides relief in headaches with autonomic components [10].

Emerging evidence supports a multimodal approach combining interventional therapy with lifestyle modification, which includes adequate sleep, hydration, diet regulation, and stress management. Lifestyle factors such as sleep deprivation, irregular meals, and emotional stress act as common migraine triggers [11]. Studies suggest that combining pharmacological or interventional treatments with behavioral strategies improves overall outcomes [12].

Hence, this study was undertaken to evaluate the combined effect of occipital and sphenopalatine nerve blocks with pharmacological and lifestyle modification as a holistic strategy for chronic headache management.

Materials And Methods

Study Design and Setting: This prospective, randomized interventional clinical study was conducted in the Department of Anesthesiology and Pain Medicine at a tertiary care teaching hospital from January 2023 to June 2024. The study protocol was approved by the Institutional Ethics Committee, and written informed consent was obtained from all participants prior to inclusion.

Study Population: A total of sixty patients aged 18–60 years diagnosed with chronic headache according to the ICHD-3 criteria [1] were enrolled. Participants were recruited from neurology and pain medicine outpatient departments.

Inclusion and Exclusion Criteria: Patients with age between 18 to 60 years, both sexes and chronic headache (>3 months duration) were included. Exclusion criteria included secondary headaches due to intracranial pathology, coagulopathy, infection at the injection site, pregnancy or lactation, allergy to local anesthetics, and psychiatric comorbidities.

Randomization and Group Allocation: Patients were randomly allocated into two equal groups (n = 30 each) using a computer-generated randomization table to ensure unbiased distribution.

Group A (Conventional Management Group): Received standard pharmacological therapy comprising NSAID (Naproxen 500 mg), antiemetic (Domperidone 10 mg), antacid (Pantoprazole 40 mg), and rescue medication (Sumatriptan 30 mg SOS). In addition, patients were counseled regarding yoga, meditation, diet regulation, and hydration.

Group B (Holistic Intervention Group): Received the same pharmacological therapy and lifestyle modification as Group A, along with occipital and sphenopalatine ganglion nerve blocks.

This design enabled comparison between combined occipital and sphenopalatine nerve block along with pharmacological and lifestyle modification versus pharmacological and lifestyle management in chronic headache patients.

Procedure Technique: All procedures were performed under aseptic precautions by an experienced anesthesiologist.

For GONB, patients were seated with the neck flexed. A 25-gauge needle was inserted 2 cm lateral and 2 cm inferior to the external occipital protuberance, and 2 mL of 0.5% bupivacaine with 20 mg triamcinolone was injected on the side of headache after negative aspiration [5].

For SPGB, a transnasal approach was used with sterile cotton-tipped applicators (Q-tips) soaked with one spray of 10% lidocaine. The applicators were advanced along the nasal floor until they contacted the posterior nasopharyngeal wall, keeping the patient's head slightly elevated. The swabs were left in place for 10 minutes on the side of headache.

Patients were taught to use Q-tips soaked with 10% lidocaine spray at the onset of headache for home usage along with pharmacological agents. Sumatriptan 50 mg was reserved for severe headache as rescue medication if headache does not get relieved with naproxen in Group A and if not get relieved with naproxen and SPGB with lidocaine spray in Group B. All patients were monitored for 30 minutes following the in-hospital procedure for any adverse reactions.

Lifestyle Modification Protocol: Both the groups received structured counseling on sleep hygiene, hydration (≥2 L/day), regular meals, avoidance of caffeine and alcohol, daily exercise or yoga for 30 minutes, and stress management through breathing and meditation. Compliance was monitored via patient diaries and telephonic follow-ups.

Outcome Measures: Patients were assessed at baseline, four weeks, and twelve weeks. The primary outcomes included headache frequency (days/month) and pain intensity (VAS, 0–10). Secondary outcomes comprised the HIT-6 score, frequency of analgesic use, and overall patient satisfaction.

Statistical Analysis: Data was analyzed using SPSS v26. Continuous data were expressed as mean ± SD and compared using Student's t-test, while

categorical data were analyzed using Chi-square test. A p-value < 0.05 was considered statistically significant.

Results

A total of 60 patients completed the study, with 30 participants each in Group A (pharmacological and lifestyle management) and Group B (holistic management including pharmacological therapy, lifestyle modification, and interventional nerve blocks). All patients were followed up for 12 weeks, and no dropouts or major adverse events were reported. The results are presented under four main categories: socio-demographic characteristics, baseline clinical profile, changes in headache parameters, and inter-group comparisons.

Socio-Demographic Characteristics: Both groups were comparable in terms of age, gender, education, occupation, socioeconomic status, and residence. Most participants were female, married, and from semi-urban or rural backgrounds. No statistically significant difference was observed between the groups (p > 0.05).

Table 1: Socio-demographic profile of study participants in both groups

Variable	Category	Group A n (%)	Group B n (%)
Sex	Male	10 (33.3)	11 (36.7)
	Female	20 (66.7)	19 (63.3)
Marital status	Married	22 (73.3)	21 (70.0)
Education	Up to high school	13 (43.3)	12 (40.0)
	Graduate and above	17 (56.7)	18 (60.0)
Occupation	Employed	19 (63.3)	20 (66.7)
Socioeconomic status	Middle	17 (56.7)	17 (56.7)
Residence	Rural/Semi-urban	21 (70.0)	20 (66.7)

Footnote: Group A – Pharmacological and lifestyle management; Group B – Holistic management (pharmacological + interventional + lifestyle).

Baseline Clinical Profile

At baseline, both groups demonstrated comparable VAS, HIT-6, and duration of headache values (p > 0.05), confirming adequate randomization.

Table 2: Baseline clinical characteristics of participants

Parameter	Group A (Mean ± SD)	Group B (Mean ± SD)	p-value
Duration of headache (years)	3.92 ± 2.11	4.11 ± 1.89	0.721
Baseline VAS	7.96 ± 0.85	8.03 ± 0.77	0.658
Baseline HIT-6	64.87 ± 5.12	65.34 ± 5.46	0.742

No significant difference at baseline (p > 0.05).

Changes in Headache Parameters: Both groups showed significant improvement in 12 weeks (p < 0.001). However, Group B (holistic management) demonstrated greater mean reductions in headache frequency, pain intensity (VAS), and disability (HIT-6) scores compared to Group A (pharmacological and lifestyle management) (p < 0.05).

Patients in Group B required fewer analgesic doses overall, and most achieved adequate relief with Naproxen alone, whereas Sumatriptan was needed only occasionally for breakthrough headaches. No major adverse events occurred in either group.

Table 3: Pre- and post-treatment comparison of headache parameters

Parameter	**Group A (pharmacological agent, lifestyle modification)**		**p-value**	**Group B (pharmacological agent, lifestyle modification, Intervention) Baseline**		**p-value**
	At baseline	**At 12 months**		**At baseline**	**At 12 months**	
Headache frequency (days/ month)	16.9 ± 4.3	7.2 ± 3.9	<0.001	17.1 ± 4.1	4.8 ± 2.7	<0.001
VAS	7.9 ± 0.8	3.1 ± 1.2	<0.001	8.0 ± 0.7	2.1 ± 0.9	<0.001
HIT-6	64.9 ± 5.1	53.2 ± 4.8	<0.001	65.3 ± 5.4	48.1 ± 4.1	<0.001

Footnote: Both groups improved significantly; greater reduction observed in Group B (holistic management).

Inter-Group Comparison: Overall, Group B (holistic management) showed significantly greater improvement than Group A (pharmacological and

lifestyle management) in all evaluated parameters, including headache frequency (p = 0.038), VAS (p = 0.022), and HIT-6 (p = 0.019). Patients in Group B also reported fewer headache episodes, better functional recovery, and reduced dependence on rescue medications.

Table 4: Comparative improvement (from baseline to 12 months) in pain and functional scores between both groups

Parameter	Mean Reduction Group A	Mean Reduction Group B	p-value
Headache frequency (days/month)	9.7±3.24	12.3±2.21	0.038
VAS	4.8±1.26	5.9±1.83	0.022
HIT-6	11.7±3.86	17.2±4.12	0.019

Group B demonstrated greater overall improvement compared with Group A.

Discussion

The present study demonstrated that combining occipital and sphenopalatine nerve blocks with standard pharmacological and lifestyle management resulted in greater clinical improvement in patients with chronic headache compared to pharmacological and lifestyle therapy alone. Both treatment groups showed significant reductions in disability scores at twelve months; however, patients receiving the additional interventional therapy achieved superior and more sustained outcomes. These findings support the integration of interventional nerve blocks into conventional multimodal management for chronic headaches.

Findings from Indian studies echo these results. Kumrawat et al. demonstrated that transnasal sphenopalatine ganglion block provided faster pain relief than conservative therapy in Indian patients with post-dural puncture headache [6]. Likewise, Erande et al. highlighted that greater occipital nerve blocks, when used alongside standard pharmacological therapy, significantly reduced headache frequency and intensity [7]. These studies reinforce the practical feasibility of nerve block–based multimodal therapy within Indian clinical settings.

Mustafa et al. reported a significant reduction in headache frequency and pain intensity following greater occipital nerve block (GONB) in a randomized controlled trial, confirming its efficacy in chronic migraine [13]. Andreou et al. observed similar improvement and attributed the effect to modulation of nociceptive transmission within the trigeminocervical complex [14]. Láinez et al. explained that the sphenopalatine ganglion (SPG) plays a crucial role in cranial vasodilation and parasympathetic activation and blocking it can effectively relieve primary headaches [15]. Cady et al. demonstrated in a double-blind controlled study that repetitive transnasal SPG blockade provided significant pain reduction and improved functional outcomes in chronic migraine [16]. Likewise, Binfalah et al. found that SPG blockade achieved rapid and sustained pain relief in more than 70% of chronic headache patients [17].

Lifestyle modification remains an essential adjunct in headache prevention and management. Legesse et al. identified irregular sleep, dehydration, and missed meals as major migraine triggers and emphasized that maintaining consistent daily habits helps reduce attack frequency [18]. Bendtsen et al. highlighted the role of physiotherapy, relaxation training, and non-pharmacological measures in reducing headache burden and improving patient quality of life [19]. In the present study, all participants followed standardized lifestyle guidance; however, the addition of occipital and sphenopalatine nerve blocks provided superior symptom relief, suggesting that these interventional procedures further enhance the benefits of conventional pharmacological and behavioral therapy.

The synergistic benefit of this combined approach may be attributed to complementary mechanisms. Bartsch et al. described how the occipital nerve converges with trigeminal afferents in the trigeminocervical complex, and its blockade reduces central sensitization and hyperexcitability [20]. The SPG, located in the pterygopalatine fossa, mediates parasympathetic output and vascular tone; its blockade interrupts autonomic and vascular pain pathways, providing additional relief [21]. When reinforced by behavioral and lifestyle interventions that lower stress and enhance vascular stability, these mechanisms contribute to sustained therapeutic benefit.

A notable finding of the present study was the reduced dependence on rescue medications among patients in the holistic intervention group. Most patients achieved adequate pain relief with Naproxen alone, and only a few required Sumatriptan for breakthrough attacks. This observation emphasizes that combining interventional nerve blocks with pharmacological and lifestyle strategies not only improves pain control but also minimizes drug overuse and potential medication-related side effects.

No major adverse effects were reported, consistent with Mustafa et al., who confirmed the safety and tolerability of occipital nerve blocks for chronic migraine [13]. Only mild and transient symptoms were observed. The findings of the present study thus reaffirm that peripheral nerve blocks are safe,

effective, and further enhanced by structured pharmacological and lifestyle modification.

This study, however, had certain limitations, including modest sample size and a follow-up period restricted to twelve weeks, limiting assessment of long-term efficacy. In addition, blinding was not feasible due to the nature of the intervention, which may introduce observer bias. Future multicentric studies with larger cohorts, extended follow-up, and objective neurophysiological or imaging assessments are recommended to validate these results and explore underlying mechanisms more comprehensively. Thus, occipital and sphenopalatine nerve blocks can serve as valuable interventional tools.

Conclusion

The present study concludes that the combination of occipital and sphenopalatine nerve blocks with standard pharmacological and lifestyle management provides superior and sustained therapeutic benefit in patients with chronic headache compared to pharmacological and lifestyle therapy alone. The holistic approach adopted in this study aligns with the multidisciplinary pain management principles recommended by the International Association for the Study of Pain (IASP) for headache disorders [22]. This holistic approach significantly reduces headache frequency, pain intensity, functional disability, and dependence on rescue medications. Given its safety, simplicity, and cost-effectiveness, integrating interventional nerve blocks within conventional treatment regimens can serve as a comprehensive and patient-centred strategy for long-term management of chronic headache.

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