Acta Scientific Neurology (ISSN: 2582-1121)

Volume 4 Issue 9 September 2021

Research Article

# The Importance of Greater Occipital Nerve Block for Compliance with Prophylaxis Treatment in Chronic Migraine Patients: A Randomized Controlled Trial

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**Received:** July 11, 2021

**Published:** August 30, 2021



## Abstract

**Objectives and Background:** Our study aims to evaluate the effect of the greater occipital nerve (GON) block on chronic migraine patients' successful adaptation to prophylactic therapy.

**Methods:** We included 40 patients with CM. Patients were divided into two groups: group 1 (n = 20) consisted of patients who underwent GON block, and group 2 (n = 20) consisted of patients who did not receive GON block. All patients were followed up for three months. The endpoints of this study were the decrease in visual analog scale score, total number of painful days in a month and the compliance with treatment.

**Results:** At the end of the third month, the mean number of total painful days in a month was found to be significantly lower in group 1 as compared with group 2.

The mean visual analog scale score in the third month was found to be significantly lower in group 1 than in group 2.

After three months of follow-up, the rate of discontinuation of prophylactic treatment was significantly lower in group 1 than in group 2.

**Conclusion:** GON intervention has been shown to significantly reduce pain intensity and frequency in CM. The authors suggest that GON block provides an improvement in patient compliance with prophylactic therapy in CM.

**Keywords:** Chronic Migraine; Greater Occipital Nerve Block

## Introduction

Migraine is one of the common types of primary headache disorders, affecting approximately 6%-8% of men and 18% of women in North America and Europe [1,2]. Chronic migraine is a headache subtype classified by the International Classification of Headache Disorders (ICHD-3 beta) [3]. It is defined as the occurrence of headaches on at least 15 days per month for more than three months, with at least eight headache days per month that fulfill the criteria for migraine headaches [3]. Chronic migraine affects

1%–2% of the general population, and patients with chronic migraine may experience reduced work capacity and social activity as well as impaired quality of life. Treatment of chronic migraine can be challenging for clinicians in headache outpatient clinics because patients commonly fail to comply with preventive therapeutic regimens. Poor compliance has many causes, including misunderstanding, inadequate information from the physician, or poor communication between physician and patient [4]. One common reason for compliance failure is the late-onset effect of many prophylactic treatment agents. Many drugs used in the prophylaxis of chronic migraine have an effect that starts at about 3-4 weeks after regular daily administration. However, because they suffer from severe pain, almost all chronic migraine patients are eager to experience a dramatical healing effect within a very short period of time.

In recent years, peripheral nerve block procedure has become one of the most popular treatment modalities for headache management. The procedure comprises the blockage of the greater and lesser occipital nerves as well as some branches of the trigeminal nerve, such as the supratrochlear, supraorbital, and auriculotemporal nerves [5]. Greater occipital nerve block is one of the most commonly used methods of peripheral nerve block, and this technique is currently used widely for the treatment of the patients with migraine [6,7]. Although clinicians commonly use greater occipital nerve block in migraine patients, the procedure itself is still not standardized, and the most appropriate treatment step at which it is useful is not well established. Reports in the current literature indicate that this procedure can be used for both the acute and prophylactic management of migraine patients. However, there are a lack of studies in the literature on the effect of the greater occipital nerve in maintaining compliance with prophylaxis treatment in chronic migraine patients. The current study aims to evaluate the effect of greater occipital nerve block on chronic migraine patients' successful adaptation to prophylactic therapy.

### Entrance

Our study aims to assess the effect of the GON (Greater Occipital Nerve) block on the successful adaptation of chronic migraine patients to prophylactic therapy.

## Methods

We included 40 patients with chronic migraines in our study. The patients were divided into two groups: group 1 (n = 20) consisted of patients with GON block, and group 2 (n = 20) consisted of patients who did not receive GON block. All patients were followed up for three months. The finishing points of this study were the decrease in visual analog scale score, the total number of painful days in a month and compliance with treatment.

### Sonuçlar

At the end of the third month, the average total number of painful days in a month was significantly lower in group 1 than in group 2.

The average visual analog scale score in the third month was significantly lower in group 1 than in group 2.

After three months of follow-up, the rate of discontilowation of prophylactic therapy was significantly lower in group 1 than in group 2.

### Argument

The GON block has been shown to significantly reduce pain severity and frequency in chronic migraines and provide an improvement in patient compliance with prophylactic therapy.

## Subjects and Methods

### Subjects

We included 40 patients with chronic migraine admitted to the outpatient clinic of Sisli Hamidiye Etfal Training and Research Hospital between January 2019 and June 2019. Patients who fulfilled the diagnostic criteria of chronic migraine based on the ICHD-3 beta classification were enrolled. After a written informed consent was obtained, 40 patients with chronic migraine with bilateral occipital tenderness were enrolled for the study and they were divided into two groups: group 1 (n = 20) consisted of patients who underwent greater occipital nerve block, and group 2 (n = 20) consisted of patients who did not receive greater occipital nerve block. There was no difference between groups in gender or mean age (four men, 37.85 ± 10.32 years of age, in the first group vs five men, 35.45 ± 10.34 years of age, in the second group). Patients were diagnosed with chronic migraine according to the presence of specific clinical headache semiology information consistent with the ICHD-3 beta classification, as assessed by the same physician (B.G.T.) [3]. We performed routine neurologic examinations, biochemical tests, and diagnostic brain neuroimaging investigations in all participants. Patients with abnormal findings in these tests that were not expected in chronic migraine were excluded. All eligible patients

were required to be able to understand the study instructions and maintain a diary record of headache as well as be willing to provide informed consent. Table 1 shows the demographic characteristics of both groups. Patients were excluded from the study if they had infection at the injection sites or were pregnant or breast-feeding. Patients were also excluded if they had suspected hypersensitivity reaction to amitriptyline, methylprednisolone, or lidocaine.

| | Group 1 (n = 20) | Group 2 (n = 20) |
|---|---|---|
| Age (Mean ± SD) | 37.85 ± 10.32 | 35.45 ± 10.34 |
| Gender (F/M) | 15 F/5 M | 16 F/4 M |
| Presence of medication overuse (+/-) | 9/11 | 8/12 |

**Table 1**: Demographic and clinical features of the participants.

## Method

### Study design

This was a randomized study that compared compliance with prophylactic treatment between chronic migraine patients with or without greater occipital nerve block. Group 1 patients underwent bilateral greater occipital nerve block. All patients in both groups had bioccipital tenderness by touch, as confirmed by physical examination. Patients underwent greater occipital nerve block 2 cm laterally and 2 cm below the protuberantia occipitalis externa using a mixture of 2 mL 1% lidocaine and 20 mg methylprednisolone bilaterally. Patients were observed for 30 minutes to monitor possible side effects after the block. After receipt of the greater occipital nerve block, amitriptyline 10 mg/day was initiated. Group 2 patients were administered amitriptyline 10 mg/day without any blockage. All patients were followed up for three months.

Clinical features of all participants were recorded, including the presence of medication overuse, number of migraine attacks per month, total number of painful days in a month, and visual analog scale scores of the most severe migraine attack at the beginning of the treatment.

Subjects were followed monthly by face-to-face examination over the three-month duration of the trial to confirm their active participation. The number of the migraine attacks per month, total number of painful days in a month, and visual analog scale scores of the most severe migraine attack at the end of the third month of treatment were recorded and evaluated. At the end of the third month, the percentage of patients who quit the prophylactic treatment was noted and compared for each group. The endpoints of this study were the decrease in visual analog scale score, number of attacks per month, and total number of painful days in a month.

We confirm that we have read the journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

### Safety measure

Tolerability and safety of the procedures were assessed by patient reports of any adverse effects. Patients were asked to report all unpleasant symptoms and any changes or exacerbations of preexisting medical conditions that occurred after the study.

### Statistical analysis

Shapiro–Wilk test was used for normality control of continuous variables. Accordingly, Student *t* test was used to compare the frequency of pain, visual analog scale scores, and average ages between the groups, and Mann–Whitney U test was used to compare the number of episodes. We used repetitive measured variance analysis to examine changes in time and the time × group interaction in both groups separately. For the analysis of categorical data, chi-square test and Fisher exact test were used according to the situation, for which the expected value less than 5 is greater than 20%. Data analysis was performed using SPSS 21.0 statistical package (SPSS Inc., Chicago, IL). A p-value < 0.05 was accepted as significant.

## Results

There was no significant difference between the groups in terms of mean age (p = 0.467). There was a homogeneous distribution in gender between the groups (p = 1.0 and p = 0.718, respectively).

In group 1, the median initial frequency of migraine attack was 4.75 days/month, whereas it was 5 days/month in group 2. There was no difference between the groups in the median number of migraine attacks within one month at baseline (p = 0.718).

In the third month after treatment, the median frequency of migraine attack in group 1 was 1.25 days/month, whereas it was 3.75 days/month in group 2. At the end of the third month, the median number of migraine attacks within one month was found to be significantly lower in group 1 than in group 2 (p = 0.048).

In group 1, the mean total painful days in a month was 21.50 ± 5.64 at the beginning of the treatment, whereas at end of the third month, it was 7.37 ± 6.95 days. In group 2, the mean total number of painful days in a month was 19.75 ± 6.58 at the beginning of the treatment, which decreased to 14.29 ± 6.75 at the end of the third month of the treatment. The total number of painful days in the initial month did not differ significantly by group (p = 0.372). At the end of the third month, the mean number of total painful days in a month was found to be significantly lower in group 1 as compared with group 2 (p = 0.008).

There was no significant difference in baseline mean visual analog scale scores between the groups (p = 0.24). The mean visual analog scale score in the third month was found to be significantly lower in group 1 than in group 2 (group 1: 3.11 ± 2.75; group 2: 5.14 ± 1.88; p = 0.023).

After three months of follow-up, the rate of discontinuation of prophylactic treatment was significantly lower in group 1 than in group 2 (p = 0.018).

None of the participants reported any adverse effect of the procedure during the follow-up period.

## Discussion and Conclusion

For many years, peripheral nerve blocks have been the focus of physicians who treat headaches. Among these procedures, the most widely used intervention has been the greater occipital nerve block. Studies in the literature have demonstrated the efficacy of the greater occipital nerve block in the treatment of many types of headache, such as migraine, cluster headache, chronic daily headache, cervicogenic headache, and hemicrania continua [8,9]. Although the clinical experience with greater occipital nerve block and migraine has been favorable, there is a lack of controlled and blinded studies providing supporting evidence for the efficacy of greater occipital nerve block in migraine treatment. Two meta-analyses have evaluated greater occipital nerve block for the treatment of migraine, and the researchers concluded that greater occipital nerve block is an important treatment [10,11]. In addition, studies have reported the effectiveness of greater occipital nerve block for both acute and prophylactic treatment of migraine [12].

Our results indicate that greater occipital nerve block intervention, when used with an oral prophylactic agent, can reduce the frequency of headaches and the number days with headache per month by the end of the third month after treatment. In a recent cohort study, the effectiveness of greater occipital nerve block was evaluated in 60 migraine patients [13]. The authors reported that greater occipital nerve block decreased the number of attacks at the end of the first month but not after the second month.

Our study had also showed that patients receiving greater occipital nerve block in addition to oral medication had lower visual analog scale scores after the third month as compared with patients receiving oral medication only. In a randomized controlled study conducted by Gül et al, the authors detected that greater occipital nerve intervention was effective in reducing visual analog scale scores after one month of follow-up [14]. However, they compared the effect of greater occipital nerve block only without the effect of a prophylactic agent.

Greater occipital nerve intervention has been shown to significantly reduce pain intensity and consumption of analgesic medication in patients with migraine [15]. Although there are studies showing the effectiveness of greater occipital nerve block in many steps of migraine treatment, there are no studies in the current literature that have evaluated the effect of this intervention on patient compliance with therapy. To the best of our knowledge, this is the first study to examine the importance of greater occipital nerve block for the compliance with prophylaxis treatment in chronic migraine patients.

Compliance with long-term treatment is a conflicting issue for headache specialists who treat migraineurs. Because of the late-onset effect of prophylactic agents and common occurrence of adverse effects of drugs, many patients tend to abandon their treatment regimens. In our study, greater occipital nerve block was shown to be effective in increasing chronic migraine patients' compliance with long-term therapy. We found two possible reasons for this result. First, this invasive procedure can enhance patients' enthusiasm to pursue the treatment. The second theory is that the acute pain relief that occurs immediately after the injection can create a pain-free window period that enables the patient to more comfortably await the late-occurring effect of the prophylactic agent.

This study has some limitations. First, this trial included only a small number of patients. These results should be studied further using a larger patient group. Second, we did not compare these

results with a placebo group. A placebo group would allow these results to be more statistically meaningful.

In conclusion, the findings of our study suggest that greater occipital nerve block is a safe and easy-to-perform intervention. The authors suggest that the intervention provides an improvement in patient compliance with prophylactic therapy in chronic migraine.

## Funding Support

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Declarations of Interest

None of the authors have potential conflicts of interest to disclose.

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