Comparison of the effectiveness of ultrasound-guided greater occipital nerve block and pulsed radiofrequency therapy in patients with chronic migraine

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Study Population

This prospective study was approved by the Eskisehir Osmangazi University Faculty of Medicine institutional review board. Informed written consent was obtained from all participants prior to randomization. The participants were informed about procedures and side effects. The study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki as revised in 2000 (the protocol number E.27336). From April 2019 to April 2020, 32 patients with chronic migraine were recruited sequentially at the Headache Unit of the XXXXX University. The selection of patients to treatment was made by randomization with a computer random number generator.

Inclusion and exclusion criteria were as follows:

Inclusion Criteria

- Age 18–65;
- ICHD-3 defined chronic migraine [10]

Exclusion Criteria

- Patients who had been started on an effective preventive medication within the past three months;
- Medication-overuse headache;
- Treatment with peripheral nerve blocks, trigger point injections or botulinum toxin injections within the past three months;
- Known allergic reaction to local anaesthetics;
- Pregnancy or nursing;
- History of another headaches;
- History of chronic medical conditions (e.g. cardiovascular, hepatic, renal, endocrine);
- History of other chronic pain syndromes (e.g. low back pain and fibromyalgia).

The clinical data were collected from the headache diary. All participants were asked to record the number of the attack, severity of pain and analgesics consumption in this headache diary. A blind researcher made evaluation of these before the start of treatment and throughout the study. A visual analogue scale (VAS) from 0 (no pain) to 10 (intense pain) was used for the assessment of the pain intensity.

The study consisted of 2 groups: GON block (group GONB) and GON block + pulsed RF (group GONB+PRF). Each group had 16 patients.

Intervention

In the operating room, an electrocardiogram, noninvasive blood pressure, and percutaneous oxygen saturation were monitored routinely for all patients. Patients were placed in the prone position. Ultrasound-guided GONB was performed to locate the nerve more accurately for all patients (Figure 1). All procedures were performed using a hockey stick probe. With 0.5 Hz sensorial stimulation, a 5-cm-long radiofrequency needle with a 0.5 cm active tip was advanced under ultrasound guidance in both pulsed PRF and nerve block groups. USG probe was located to medial one-third of the superior nuchal line between the occipital tubercle and mastoid process under sterile conditions. Finally, the placement of the needle was verified by Doppler imaging of the occipital artery. A 0.3-0.5 Hz sensory stimulus was given with the RF device, and the paresthesia sensation in the patient's occipital nerve dermatome was questioned, and location verification was performed. Then, GON block was performed in all patients by administering 5mg bupivacaine through a PRF needle. After the GON block, the PRF neuromodulation was applied at 42 degrees for 4 minutes in the GONB-PRF group. In the GONB group, the PRF generator was set for 4 minutes, and the time was waited, but no pulse was given.

Follow up

The patients were examined for follow-ups at the 1st, 2nd, 3rd, and 6th months after the procedure. The severity and the number of migraine attacks, and the number of analgesic drugs were noted. The procedure's name performed on the patient was not written in the follow-up files. The blindness was broken after the study period was terminated, and the procedures were added to patients' files.

Statistical Analysis

The SPSS Statistics for Windows, version 22.0 (SPSS Inc., Chicago, Ill., USA) was used as the statistical analysis program. Descriptive statistics (mean, standard deviation, frequency, and percentage) were used for the demographic and clinical characteristics. Histograms and the Shapiro-Wilk tests of normality were used to assess the normal distribution of means. The student's t-test was used for comparing two groups of continuous data, which are both normally distributed. Comparison of the VAS scores, number of headache attacks and analgesics before and after treatment was analyzed by Repeated Measures Analysis of Variance (ANOVA). For the Analysis of Variance, Greenhouse-Geisser F statistics were used in cases where the sphericity assumption was not met. A p-value of $p<0.05$ was statistically significant.