



The Effect of Methylprednisolone Acetate Injection at Cervical Trigger Points in Chronic as well as Drug Resistant Headache

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Keywords

Headache; Methylprednisolone; Injection

Abstract

Background: Most adults have experienced a headache at least once. A high percentage of these headaches originate in cervical structures, such as neck muscles, known as cervicogenic headache (CGH). This study aimed to assess the efficacy of injection of methylprednisolone acetate at the Gallbladder 20 (GB-20) acupuncture points in muscle originated, chronic, and drug resistant headaches.

Methods: In this randomized clinical trial conducted at Shiraz University of Medical Sciences, Shiraz, Iran, in 2009-2010, 25 patients with both chronic and drug resistant CGH and cervical muscle tender points underwent methylprednisolone acetate injection. To evaluate the severity of these patients' headache, the visual analogue scale (VAS) was used. The collected data were analyzed using Wilcoxon test in SPSS software.

Results: The patients' mean headache intensity on the VAS before the injection was 7.76 ± 2.30 . This value was 2.60 ± 2.90 , 30 days after the injection. The values at 1 and 3 months post-procedure were 3.52 ± 3.30 and 3.48 ± 3.50 , respectively. In other words, a

statistically significant reduction was observed in the pain score ($P < 0.001$). The frequency of headache attacks 1 and 3 months after the injection decreased 72% and 76% among patients, respectively. Average duration of headache attacks, 1 month and 3 months after the injection, decreased in 72% of patients.

Conclusion: Injection of methylprednisolone acetate at the GB-20 acupuncture points in muscle originated CGH could be used as an appropriate therapy with significant therapeutic efficacy only when injected once.

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Introduction

Headache is one of the most commonly occurring clinical symptoms associated with many diseases. Headaches can be divided into two groups of acute and chronic headaches. Chronic headaches are most frequently of cervical origin.

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Previous studies have shown that about 17.8% of headaches have cervical origin.¹

Cervicogenic headache (CGH) has been generally defined as a headache originating from cervical structures and classified as a headache caused by involvement of the upper three nerves of the cervical spine, headache caused by malfunction in the joints including atlanto-occipital joint, atlanto-axial joint, zygapophyseal joints, second and third cervical vertebrae, intervertebral disc between the second and third cervical vertebrae, compression and entrapment of the occipital nerves, upper spinal cord dura mater, and vertebral artery, and headache caused by cervical muscles.²

One of the most common CGH types is that of muscle origin. Headaches of cervical muscle origin often occur due to the presence of tender and trigger points in the suboccipital muscles, particularly obliquus capitis superior muscle, and are associated with tenderness at the Gallbladder 20 (GB-20) acupuncture point called fengchi.

The location of this point is at the back of the head and below the external occipital protuberance, at the posterior of the mastoid bone, between the tendons of the sternocleidomastoid muscles, and trapezius.³

The CGH can be unilateral or bilateral, is exacerbated by moving the neck or placing pressure on the painful spots, and is associated with limitation in the range of motion of the cervical spine. This type of headache is usually non-pulsatile, originates in the neck and radiates to the areas around the eyes, forehead, and temple.⁴

Inappropriate head and neck posture can instigate CGH with cervical muscle origin. These headaches are also triggered by the cold, or climatic, nutritional, or psychological factors.⁵ CGH may have symptoms like nausea, vomiting, dizziness, photophobia, and blurred vision.⁶

In addition to drug treatment, non-medical treatments are also used to treat headaches with cervical origin, including manipulation therapy, acupuncture,

physiotherapy, and exercise therapy.⁷ Clinical experience has shown that most of these methods, while costly and time-consuming, are ineffective or do not have long-term effect in treating headaches originating in cervical muscles, especially the GB-20 acupuncture point. Injection at painful points and trigger points is one of the therapeutic methods employed in physical medicine.⁸ The present study was carried out with the aim to evaluate the effect of methylprednisolone acetate injection in the GB-20 acupuncture point among patients with chronic CGH and resistance to drug treatment.

Methods

This clinical trial was carried out at Shiraz University of Medical Sciences, Shiraz, Iran, after approval by the ethics committee. From among 435 patients with chronic headache referring to the internal neurology and physical medicine and rehabilitation clinics of Shahid Faghihi Hospital, Motahari Clinic, and Shahid Chamran Hospital of Shiraz, from January 2009 to June 2010, 43 patients diagnosed with CGH were selected. The study was registered in Iranian Registry of Clinical Trials under the code of IRCT138810082922N1.

The study inclusion criteria were normal neurological examination (lack of central and peripheral nervous system disease), normal computed tomography scan (CT-Scan) or magnetic resonance imaging (MRI) of the brain, a history of headache for more than 3 months, a history of at least 1 month of unsuccessful medication, and unilateral or bilateral tenderness at the GB-20 acupuncture points.

In addition, the study exclusion criteria included history of seizure or sinusitis, severe osteoporosis, and the presence of ulcers or infections in the head and neck areas.

A control group was not used in this study, as the patients themselves were in fact the control group. The patients included in the study had already received multiple treatments, and before entering the study,

they had received medications with the misdiagnosis of migraine headache or tension headache for at least 1 month without improvement. Moreover, the main objective of the present study was to compare the therapeutic effects of medical treatment and local injection of methylprednisolone acetate at GB-20 acupuncture points.

Of the 43 patients selected, 25 patients completed the study, and the remaining did not accept the intervention or dropped out during the study.

First, the selected patients completed the informed consent form and data collection form, including age, sex, rate of headache attacks per month, mean duration of headache per attack, and severity of headache. Then, they were subjected to injection at tender or trigger points. The severity of headache was recorded on the basis of the visual analogue scale (VAS) before injection, and 3 days, 1 month, and 3 months after injection. In this method, a special ruler with a marker was used. The ruler was numbered from 0 to 10, and each patient was asked to select a number based on the severity of his/her headache. The most severe headache and the painless state corresponded to 10 and 0, respectively.

To perform the injection, each patient was placed on the bed in a prone position and a pillow was placed below the patient's breast to allow his/her neck to curve forward. The GB-20 points were accurately identified through careful examination and palpation of the patient's nape. The points specified for injection were marked and disinfected with Betadine and alcohol. A 2 cc syringe containing 1 ml (40 mg) of methylprednisolone acetate and 1 ml of lidocaine 2% and 23-gauge needle were used for injection at the marked points. The angle of penetration of the needle was 90 degrees relative to the skin surface and the needle entry depth varied from 1 to 2 cm depending on the patient's body size. At first, the needle was inserted, aspirating, and making sure that the needle did not enter the vessels of the

injection site, some of the liquid was injected. Next, the needle was withdrawn under the skin, angle of insertion changed for about 15 to 20 degrees relative to the skin surface and toward midline some liquid was injected. After that, 45 degrees laterally.

The amount of liquid prepared for injection (1 ml of methyl prednisolone acetate + 1 ml of lidocaine) was equally divided taking into account unilateral or bilateral painful points of the GB-20 and injected at each point. Finally, the injection site was pressed with dry cotton for 2-3 minutes after injection, and the patient was monitored for up to half an hour after the injection, before being discharged. In addition, it was recommended that the injection site be massaged and compressed with a bag of ice within the first few hours after injection. The injection was performed only once and only with an ampoule of methylprednisolone acetate 40 mg.

Patients were followed up to 3 months after injection and visited on the third day and 1 month and 3 months after the injection. In each visit, the patients were asked about the severity of headache based on VAS, mean duration of headache attacks, and rate of headache attacks; in addition, the presence of complications like ecchymosis and infection at the injection site was considered. All the patients participating in the study were asked to discontinue any treatment or drug used even acetaminophen 24 hours before and up to 3 months after the injection.

The collected data were analyzed using Wilcoxon statistical test in SPSS software (SPSS Inc., Chicago, IL, USA).

Results

The mean age of the patients participating in the study was 24.45 years. Moreover, 20 (80%) and 5 (20%) of the subjects were women and men, respectively.

Before injection, the mean severity of headache among the subjects was 7.76 ± 2.30 ; this rate reached 2.60 ± 2.90 , 3.52 ± 3.30 , and 3.48 ± 3.50 three days, one month, and three months after injection, respectively,

indicating a significant reduction in headache severity among the patients ($P < 0.001$).

The rate of patients among whom the severity of headache decreased by more than 50% based on the VAS was 90.9%, 77.2%, and 68.1%, respectively, 3 days, 1 month, and 3 months after the injection. Complete headache relief was achieved among 31.8% of the patients after 3 months.

The rate of headache attacks decreased among 72% and 76% of the patients 1 month and 3 months after injection, respectively. The duration of headache attacks decreased among an average of 72% of patients 1 month and 3 months after the injection.

In 4 patients, itching and burning sensations were reported at the injection site, which were resolved within 2 to 3 days. Furthermore, 2 patients fainted during the injection and recovered after they were turned to the supine position and their legs were elevated. One of the patients complained about drowsiness after the injection, which was resolved without any special action.

Discussion

One of the most common causes of CGH is the presence of tender and trigger points in the neck muscles. Muscle trigger points are very sensitive areas within the muscle that are palpable in the form of tight muscular bands and cause local and spreading pain.⁸ One of the hypotheses presented regarding the pathophysiology of trigger points is the excessive secretion of acetylcholine by abnormal motor nerve endings.⁹⁻¹¹ Abnormal secretion of acetylcholine at motor nerve endings causes continuous contraction of the muscle unit and the creation of local ischemia. Subsequently, ischemia causes the release of substances to which the pain receptors are sensitive and create pain. In a positive feedback circle, the pain causes an increase in acetylcholine secretion and this circle is repeated.⁶ Based on this hypothesis, one of the approaches which can end this vicious circle is to inject steroids at the painful and inflammatory points. The objective of this

study was to evaluate the effect of injecting methylprednisolone acetate in the GB-20 acupuncture points among patients with chronic CGH and resistance to drug therapy.

The results of this study showed a significant decrease in mean headache intensity based on VAS and also a reduction in the rate of headache attacks and a decrease in the mean duration of headache attacks until 3 months of follow-up after the injection. In addition to the satisfactory treatment results, no significant local and general complications occurred during follow-up. This treatment is economical and low cost.

In a study conducted by Biondi and Bajwa, the trigger points of the neck were an important factor in the development of CGH.¹² In a study carried out by Fernandez-de-las-Penas et al. on the painful areas caused by muscle trigger points in the head, neck, and shoulder muscles among patients with chronic CGH, it was concluded that the sub occipital area was the most common site for trigger points.¹³ These points correspond to the injection points of the present study.

In a study performed by Mikamo et al., 18 patients with neurological headache and drug-resistant migraine without aura were selected and injected with Mecobalamin at the GB-20 acupuncture point; investigation of the pain measurement criterion indicated response to treatment among all of the patients.¹⁴ In books regarding acupuncture, needling this point is recommended for the treatment of headaches, especially headaches spreading to the forehead, dizziness, and headaches associated with hypertension.³

Moreover, the first, second, and third occipital nerve block method has been used in several studies, since the distribution of the sensory branches of these nerves in the occipital and the area of spread of headache caused by trigger points in the occipital muscles coincide. One of these studies is a study by Narouze et al.²

In this study, the effect of injection of steroids into the atlantoaxial lateral joint (the location of exit of the first and second

occipital nerves) was observed among 32 patients with CGH. In 82.2% of patients, the pain score after injection was reduced by 50% or more, and the headache was completely relieved among 46.8% of the patients. The results of this study are in line with the findings of the present study. Evidently, this method of intra-articular injection and nerve block requires fluoroscopic guidance, but in the method used in our study, no fluoroscopy was required and very similar results were obtained.

The most critical problem with this treatment was the fear of having to inject at the mentioned point; Of the 43 patients eligible to enter the study, only 25 patients were willing to undergo treatment. Of course, reassuring patients will be helpful in reducing their fear and increasing their desire to perform the treatment. Regarding the possibility of a shock caused by fear and injection pain, it is recommended that the patient not to be injected in sitting position. The precise examination of the patient and marking the painful point is important, as the area being covered by hair sometimes causes mistakes. However, given the anatomical location of this point, the therapist should have adequate precision regarding the depth and angle of insertion of the needle in order to prevent the risk of needle entry and injection of the drug into the medulla oblongata or cerebrospinal fluid (CSF).

In addition, care should be taken to prevent the entry of the needle into the neck vessels. To ensure avoidance of complications followed by injection, such as ecchymosis, the patient must be monitored for at least half an hour after the injection. Due to the hyperemia of the site and the properties of the tissue of the neck region, there is a potential for ecchymosis after injection at this point, which can be prevented compressing the injection site for a few minutes after the injection. Fortunately,

serious secondary complications did not emerge in this study; therefore, it can be argued that complications can be prevented through accurately performing the injection method.

Conclusion

It can be established that among the patients with headache, considering the neck and exact examination of the neck are essential. In this examination, it is necessary to pay attention to the painful acupuncture points of GB-20 on both sides. In the case of a precise examination of the neck, the majority of patients treated as patients with migraine headaches will be recognized as patients with headache of cervical muscle origin. The use of injection therapy in these patients, due to the fact that it is performed only once, is economical and reduces the secondary complications of medical treatments inducing anxiety and concerns regarding the mandatory long term use of medication.

However, it is essential to accurately find the injection site and perform the injection method, and if performed accurately, it will not have secondary complications. It is recommended that patients who have not responded to migraine or tension headache medications be examined again in the neck region, since some of them have a CGH which has not been diagnosed. It is suggested that further studies be performed on a higher number of subjects in order to obtain more accurate results.

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Conflict of Interest

Authors have no conflict of interest.

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