

## **What is the difference of effectiveness of wet cupping therapy in migraine types?**

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### **Abstract**

**Introduction:** Wet-Cupping Therapy (WCT) is an ancient method used in several indications, particularly for incurable disorders such as migraine. The aim of this study was to investigate the impact of WCT on migraine.

**Materials and methods:** The study included 78 patients diagnosed with migraine headache, and evaluations were made before and after WCT. Each patient underwent WCT three times at approximately 30 d intervals. The migraine disability assessment questionnaire for migraine and visual analog scale for pain severity were applied before treatment and after 90 d. Data were analysed with the Wilcoxon Signed Rank Test and Kruskal-Wallis Test using R software.

**Results:** 62 of 78 patients completed the study. Patients were separated according to migraine types as migraine without aura (n=33, group I), aura (n=18, group II) and other (n=11, group III). Following WCT, a significant reduction was determined in all groups in the MIDAS and VAS scores. While the number of attacks significantly decreased in groups I and II, no significant improvement was determined in group III.

**Conclusion:** The findings of this research indicate that WCT is effective on decreasing pain severity and attack number in migraine headache.

**Keywords:** Wet cupping therapy, Migraine headache, MIDAS scale. **Abbreviations:** WCT: Wet Cupping Therapy; MIDAS: Migraine Disability Scores; VAS: Visual Analogue Scale.

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### **Introduction**

Migraine is a chronic, paroxysmal and neurovascular disease that begins before 30 years of age with a rate of 80% [1]. Migraine, which is a frequent headache type, has been highlighted as a cause of disability during attacks [2]. Headache and migraine reduce Quality of Life (QoL) and lead to a social and financial burden [3]. The prevalence of migraine for Western countries varies between 5%-9% for males and between 12%-25% for females. Another study has reported the estimated prevalence as 9.1% in the Far East [4-6]. In Turkey, the estimated incidence of migraine is 2.38% (2.98% in females and 1.93% in males) [2]. Migraine prevalence in adult population is 12-24% in females and 5-12% in males [7]. In migraine, symptoms, attack frequency and severity of headache can vary according to individual different medications are used to control migraine headache and to reduce the intervals of migraine attacks (e.g. 5-HT<sub>3</sub> antagonists, non-steroidal anti-inflammatory drugs, beta blockers, serotonin re-uptake inhibitors, topiramate, ergotamine and antiepileptic drugs) [8]. In addition to drugs, alternative medicine methods are widely used throughout the

world. For example, acupuncture has been demonstrated to be effective in the treatment of migraine [9].

Wet-Cupping Therapy (WCT) is an ancient, treatment technique used in East Asia and Middle East with a wide range of use for several symptoms such as pain control, edema, and anxiety [10,11]. Cupping practice has seven types but usually dry and wet types are used. Dry cupping type is a basic suction method cups are clipped with negative pressure on the selected area [11]. Wet cupping type (bleeding cupping), called Al-hijamah in Muslim countries, has three steps; primary suction-bloodletting or scarification-secondary suction (S technique) [12]. It has recently been used in the management of some chronic diseases (e.g. diabetes mellitus, hypertension) and to reduce severe headaches [13]. In additionally, it uses for ulcers due to Behcet disease and chronic obstructive pulmonary disease [14]. Although lots of studies about WCT in several diseases but a few studies in migraine. Two studies among them are WCT was found effective in chronic low back pain and migraine headache, and acupuncture combined WCT was reported effective in migraine [10,15]. However, as far as we know there is not any study in solely migraine among all headaches by WCT. Therefore, the aim of this study was to

evaluate the efficacy of WCT on migraine types with migraine disability scores.

## Material and Methods

### Study design

This study was conducted at Karabuk University Training and Research Hospital. Patients enrolled in the study were those who had been followed up for at least two years in the Neurology Department because of migraine. All types of migraine headache were considered for eligibility. Patients were divided by the neurologist into three groups of migraine types as with aura, without aura and others migraine. All patients, accepted to apply WCT, were given extensive information about WCT and written consent was obtained from all study participants.

### Patient selection

Patients who were diagnosed with migraine and fulfilled the International Classification of Headache Disorders-beta version (ICHD-II) diagnostic criteria for migraine were included in the study [16]. Eligibility criteria included age of 18-55 years and an average of at least two headaches per month. Patients were excluded for any of the following: other types of headache (e.g. cervical disc hernia, hypertension, sinusitis or tension headache), isochronous of psychiatric disorders, cranial trauma or operation, onset of headache disorder less than two years previously, pregnancy, malignancy, cluster headache, psychiatric disorders, suspicion that the headache disorder had specific etiology, cranial neuralgia, WCT treatment within the previous 12 months, lack of consent or non-cooperation with the research procedures.

### Assessment tools

A questionnaire was administered including demographic characteristics, migraine attack frequencies, period of diagnosis time and trigger factors of patients. Pharmacotherapy of the patients was recorded and not changed during the study.

The Migraine Disability Assessment Questionnaire (MIDAS) developed and tested by Stewart and Lipton was used to assess the severity of headache-related disability [17]. It is a simple and easy to implement method to assess disability and has been previously performed and found usable among Turkish migraine sufferers [18]. This simple, self-administered, 7-item questionnaire focuses on disability in three areas (school or work life, everyday household chores, and family, social, or leisure activities) in the first 5 items of the questionnaire. The 6<sup>th</sup> item asks about the number of days with headache in the last three months and the last item is about Visual Analog Scale (VAS) for pain level [17]. The scales were applied before and 3 month after the final WCT session.

### Wet cupping technique

Patients underwent 3 staged WCTs consecutively, at 1-month intervals (i.e., 0 days, 30 d, and 60 d). WCT was performed

using disposable vacuum cups on five accupoint locations; DU 14 (Dazhui) point on the posterior median line, in the depression below the processus spinosus of the 7<sup>th</sup> cervical vertebra, BL 42 (Pohu) points bilaterally on the back, 3.0 cun lateral to the lower border of the spinous process of the 3<sup>rd</sup> thoracic vertebra interscapular region, BL 46 (Geguan) points bilaterally on the back, 3.0 cun lateral to the lower border of the spinous process of the 7<sup>th</sup> thoracic vertebra (Figure 1). Each WCT procedure took about 20 min and was conducted in 5 phases.

**1. Sterilization:** Selected regions were disinfected with povidone iodine before the procedure.

**2. Primary sucking:** The cup is placed on the selected sites and the air is expelled from inside the cup by manual suction. The cups are placed on the skin and left for a period of 3 to 5 min.

**3. Scarification:** Superficial incisions, 2-3 mm in depth and 3-5 mm in length are made on the skin using a number 15 sterile surgical blade.

**4. Bloodletting by secondary sucking:** The cups are placed back on the skin, in the same manner as described above, until they are filled with blood from the capillary.

**5. Disconnect and dressing:** The cups filled with blood are removed and disposed of as medical waste and dressings of sterile sponges are applied.

### Statistical analysis

Before the statistical analysis, the Anderson-Darling normality test was applied to obtain the distributional properties of the phenotypes. The descriptive statistics of phenotypes with normal distribution were presented as mean  $\pm$  SD while those without normal distribution were presented as median (min-max). The Wilcoxon signed-rank test was employed in the pre and post treatment measurement comparisons and Kruskal-Wallis Test was used as post-hoc test. The Chi-Square test was used to check independence in two-way categorical tables and Fisher exact test was used as post-hoc test. A value of  $p < 0.05$  was considered statistically significant. All analyses were carried out using R software (version 3.2.2).

Approval for the study was granted by the Ethics Committee of Turgut Ozal University (decision no: 99950669/236, dated 30.06.2014).

## Results

Seventy eight patients were included in the study and were classified according to migraine type as group I (n=40) without aura, group II (n=23) with aura, and group III (n=15) other migraine, but 14 patients did not continue with the study for various personal reasons. A further 2 patients were excluded because of hypotension during wet-cupping and thus, the study was completed with 62 patients (Group I; n=33, group II; n=18, group III; n=11) (Figure 2).

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Figure 1. WCT performed using disposable vacuum cups.

Mean age of patients was  $39.8 \pm 9.4$  y (Group I= $39.54 \pm 9.28$ , group II= $37.77 \pm 9.95$ , group III= $44.00 \pm 8.41$ ) and 53.2% (n=33) of them were female and 46.8% (n=29) of them were male. There was no statistically significantly difference between the groups in respect of age ( $p=0.222$ ). Stress was determined to be the most common trigger factor of migraine pain in 47 patients with other trigger factors reported as light, sleeplessness and fatigue, respectively. The mean diagnosis time, the pain frequency and the duration of attacks were shown in Table 1. The mean pain duration for the groups was  $12.84 \pm 7.79$  h,  $7.88 \pm 5.91$  h and  $17.27 \pm 8.37$  h, respectively. A statistically significant difference was determined in the duration of pain between groups I and II, groups I-III and

Table 1. Duration of pain attacks, the mean diagnosis time and pain frequencies of the groups.

	Group I	Group II	Group III	P value
Mean age (year)	$39.54 \pm 9.28$	$37.77 \pm 9.95$	$44.00 \pm 8.41$	0.222

groups II and III ( $p=0.005$  and  $p<0.001$ ,  $p=0.001$  respectively). In the comparison of the mean diagnosis times of groups, statistically significant difference was determined between groups I-III, groups II and III and groups I and II ( $p<0.001$ ,  $p<0.001$ ,  $p=0.001$  respectively) (Table 1).

MIDAS, VAS scores and the number of pain attacks of the groups before and after WCT were shown in Table 2. The total median MIDAS scores of the whole group, before and after treatment, were 51.5 (27.50-85.50) and 32.0 (18-47.75), respectively. While the MIDAS scores before and after WCT showed a significant improvement in groups I and II ( $p<0.001$ ,  $p=0.002$ ), no significant difference was determined in group III ( $p=0.205$ ). The VAS scores of all groups were decreased significantly after WCT ( $p=0.008$ ,  $p=0.001$ ,  $p=0.018$  respectively). The number of attacks were significantly decreased after WCT in all groups ( $p<0.001$ ,  $p=0.001$ ,  $p=0.041$ , respectively) (Table 2).

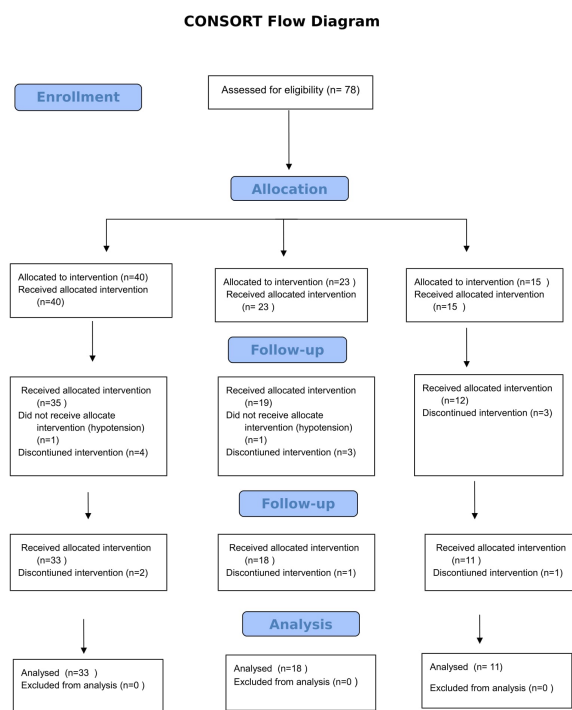


Figure 2. Consort flow diagram.

The changes in MIDAS, VAS scores and number of pain attacks of the groups after WCT were shown in Table 3. In the whole study group a decrease of 88.7% was determined in MIDAS scores, 74.1% in VAS scores and 79.0% in attack frequencies.

Gender F/M (n)	19/14	8/10	6/5	0.676	
Education (Primary/Middle/High/University)	2/5/8/18	1/-/6/11	2/-/3/6	0.765	
Marital status (Single/Married)	9/24 <sup>a</sup>	4/14 <sup>a</sup>	-/11 <sup>b</sup>	0.04	
Monthly income (\$)	1419	1296	1454	0.252	
Frequency pain per month (n)	<3 d	4	5	1	0.095
	4-10 d	13	6	1	
	10-20 d	10	4	5	
	20-30 d	6	3	4	
Duration of attack (h)	12.84 ± 7.79 <sup>a</sup>	7.88 ± 5.91 <sup>b</sup>	17.27 ± 8.37 <sup>c</sup>	0.005	
Diagnosis time (y)	12.27 ± 8.07 <sup>x</sup>	7.61 ± 5.62 <sup>y</sup>	18.21 ± 8.56 <sup>z</sup>	0.001	

**Table 2.** MIDAS, VAS scores and number of pain attacks of groups before and after WCT.

	Group I	Group II	Group III
	Median (min-max)	Median (min-max)	Median (min-max)
PA1	40.00 (5-100)	22.50 (6-80)	9.00 (6-60)
PA2	20.00 (3-100)	12.50 (3-75)	12.00 (3-45)
P*	<0.001	0.002	0.205
VAS1	8.00 (4.00-10.00)	7.50 (5-10)	7.00 (4-10)
VAS2	5.00 (3.00-9.00)	7.00 (4-8)	6.00 (2-8)
P*	0.008	0.001	0.018
M1	55 (19-234)	31 (9-160)	100 (13-155)
M2	32 (3-132)	19 (8-110)	71 (6-132)
P*	<0.001	0.001	0.041

\*Wilcoxon signed rank test; PA1: Number of pain attacks before WCT; PA2: Number of pain attacks after WCT; VAS1: Value of VAS scale before WCT; VAS2: Value of VAS scale after WCT; M1: Value of MIDAS scale before WCT; M2: Value of MIDAS scale after WCT

**Table 3.** Changes in MIDAS, VAS and number of pain attacks after WCT.

	MIDAS (n)			Number of Pain Attacks (n)			VAS (n)		
	Increase	Decrease	Same	Increase	Decrease	Same	Increase	Decrease	Same
Group I (n=33)	3	30	0	2	30	1	1	29	3
Group II (n=18)	2	16	0	1	14	3	1	15	2
Group III (n=11)	2	9	0	2	5	4	8	2	1
Total	7	55	0	5	49	8	10	46	6

## Discussion

The results of this study have showed that WCT is effective on VAS scores and number of attacks in all three types of migraine (without aura, aura and other) while it has a significant effect on MIDAS scores of the groups of with and without aura but not on other migraine.

Almost half of the worldwide adult population have complaints of one or more types of headache at least once during their

lifetime. In the treatment of migraine, in addition to medications (5-HT<sub>3</sub> antagonists, non-steroidal anti-inflammatory drugs, serotonin re-uptake inhibitors, topiramate), alternative methods are in widespread use throughout the world [19]. It is known that WCT has been applied for some disorders for several centuries. This ancient method has also been used in different cultures for the maintenance of well-being, especially for pain [17]. In a systematic review of 285 articles, Kim et al. [20] reported that

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WCT is effective in back pain, cancer pain, trigeminal, parasthetica nocturna and herpes zoster. In a study by Duo et al. [15] a combination of acupuncture and cupping was used on migraine patients, and positive response to treatment was reported in 94% of patients. That study differed from the current study in that acupuncture and dry cupping were applied together. In our study positive response rate was 88.7% by WCT without acupuncture. Ahmadi et al. [10] applied WCT to patients with migraine and tension type headache and reported that it was equally effective in all age groups (66%), in both genders and for both migraine and tension type headaches. The evaluation criteria used in that study were the headache severity score, days with headache and the Medication Quantification Scale. In the current study, a more objective scale of the Migraine Disability Assessment Questionnaire (MIDAS) was used and it was determined that WCT reduced the loss of workforce by 88.7%, pain severity by 74.2% and the number of migraine attacks by 79.0%. In the comparisons of the migraine subgroups according to the MIDAS scale, the quality of life of all the groups was observed to have improved with WCT. Although the number of attacks decreased in patients with and without aura, there was no significant difference for those with other types of migraine. The reason for this may be due to the unbearable and prolonged pain in episodic and basilar migraine. According to the VAS scores, WCT significantly reduced the pain intensity in all groups.

Different from the current study, in the study of Ahmadi et al. [10] WCT was applied 3 times at 2 w intervals. The feedbacks from patients were indicated that patients would prefer WCT at monthly intervals, so the current study was planned with the treatment on a monthly basis. Our results have suggested that WCT can be effectively applied on a monthly basis instead of at 2 w intervals.

Although the results of this study showed WCT is effective in migraine treatment, the mechanism of the action is unknown. Several theories have been proposed related to the effects of WCT on pain. The most significant of these is the theory of Salah, known as the Taibah theory (named after the city of Taibah). According to this theory, WCT creates superficial skin scarifications to open the skin barrier and create a pressure gradient and traction force across the skin and underlying capillaries to drain interstitial fluids with cups and enhance blood clearance and waste excretion through the skin, thus increasing the release of endogenous opioids [21]. Recently, serum IL-6 levels have been reported to be high in migraine patients so the positive effects of WCT in migraine may be due to the WCT-induced plasma clearance effect through the removal of excess fluids, chemical mediators, IL-6, vasoactive substances, and neuropeptides which have caused the headache [22].

One the other hand, oxidative stress index was found higher in migraine patients [23]. Tagil et al. [24] reported WCT decreases oxidative stress. In additionally, total cholesterol and low density lipoprotein levels was also found higher in migraine patients and WCT is effective to improve cholesterol parameters as decreasing of low density lipoprotein [25,26].

Reduction severity and frequency of migraine headache may be due to decreasing of oxidation and cholesterol levels.

A systematic review made by Meissner et al. [27] 102 studies regarding to the placebo treatment of migraine were assessed and sham acupuncture and sham surgery were found more effective than placebo drugs and were found to decrease attack number and migraine days with a rate of 50%. This means placebo intervention like sham surgery, is effective in 50% of migraine patients and the disease may has a psychological pattern. Another factor that supports this theory is the stress as the most powerful trigger factor. In current study as WCT may has a placebo effect like sham surgery but a decrease rate of 78% in attack frequency and a rate of 88% in life quality suggest another effect except placebo.

Despite the valuable results the study had some limitations. First the levels of some pain mediators might be evaluated additionally. Second we do not know long term effects of WCT as there is no follow up in the study.

The results of current study indicate that adding WCT to the treatment of migraine reduces the pain and number of attacks and can be considered a treatment option for patients willing to undergo this treatment.

### **Conflicts of Interest**

No conflict of interest. The study was presented as poster in WONCA 2015 Europe Conference in Istanbul.

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