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The Efficacy of Wet-Cupping in the Treatment of Tension and Migraine Headache

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Abstract: Wet-cupping is an ancient medical technique still used in several contemporary societies, but little empirical study has been devoted to test its efficacy to treat tension and migraine headache. Using a pre-post research design, 70 patients with chronic tension or migraine headache were treated with wet-cupping. Three primary outcome measures were considered at the baseline and 3 months following treatment: headache severity, days of headache per month, and use of medication. Results suggest that, compared to the baseline, mean headache severity decreased by 66% following wet-cupping treatment. Treated patients also experienced the equivalent of 12.6 fewer days of headache per month. We conclude that wet-cupping leads to clinically relevant benefits for primary care patients with headache. Possible mechanisms of wet-cupping's efficacy, as well as directions for future research are discussed.

Keywords: Headache; Wet Cupping; Alternative Medicine; Migraine Headache; Tension Headache.

Introduction

Cupping therapy is one of the oldest documented medical techniques (Kaptchuk *et al.*, 1997). The practice, which involves suctioning the skin through a cupped instrument, has apparently been used since prehistoric times to treat diseases and disorders, with the earliest documented evidence traced to ancient Macedonia, circa 3300 BC (Abele, 1996) and verified documentation of its use in several other early cultures (Chirali and Scott, 1999; Nielsen, 1995).

In the contemporary world, cupping is rarely practiced. In fact, with the exception of a few cultural pockets (e.g., northern Finland; Vaskilampi and Hänninen, 1982) and

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occasional media outbursts (e.g., when actress Gwyneth Paltrow received the treatment in July 2004; Jackson, 2004), cupping is unfamiliar to most Westerners. In other parts of the world, cupping is used somewhat more frequently. Its use is particularly widespread in East Asia and the Middle East.

Two styles of cupping therapy are used today, dry cupping and wet cupping. Dry cupping simply pulls the local underlying tissue up into the suctioning cup. Wet cupping uses the same technique, but adds scarification and bloodletting. Our work focused on wet cupping, and its utility in treating chronic tension and migraine headache disorders. Headache is one of the most prevalent human disorders worldwide; with recent estimates suggesting up to 46% of the world population suffers from an active headache disorder (Stovner *et al.*, 2007).

There is very little published literature on the efficacy of cupping for treating headache. We located 3 studies. The first, published in Farsi, used wet-cupping to treat 85 migraine cases and 65 non-migraine cases and found that 91.8% of migraine patients and 89% of non-migraine cases had positive response to wet-cupping (Azizkhani, 2000). The second treated 100 cases of intractable migraine headache in China with a combination of acupuncture and cupping. Ninety-four percent of patients had positive response to the treatment (Duo, 1999).

The third report treated a small number of mixed-diagnosis pediatric pain patients with a cupping treatment (Kemper *et al.*, 2000); others included in the study were treated with other alternative medicine techniques. Unfortunately, the article does not clarify which diagnosis was paired with which treatment, so it is unclear how many headache patients in the study were treated with cupping. Given the mixture of diagnoses reported among the small sample (the full sample had only $n = 7$ with migraine headache), it is likely that only a very small number were headache patients. Nonetheless, based on the qualitative data, results of the study suggest high satisfaction with the treatments by parents and children (Kemper *et al.*, 2000).

Together, available evidence and historical precedent suggest cupping therapy might be an effective treatment for chronic headache, but rigorous scientific trials are lacking. The present study was designed to contribute to that need.

Materials and Methods

Study Design

Consecutive referrals presenting to a general clinic in Kermanshah, Iran, with chronic migraine or tension headache were eligible for inclusion. All types of headache were considered for eligibility, but patients with other types of headache (i.e., not migraine or tension headache) were excluded. Patients were prescribed a series of 3 staged wet-cupping treatments, placed at 2 week intervals (i.e., 0 days, 14 days, and 28 days). Three measures of efficacy were assessed both at the baseline and at 3-month post-treatment follow-up: headache severity score, days with headache, and medication used to treat acute headache pain. Medication used was scored on the Medication Quantification Scale (MQS; Harden

et al., 2005). Severity of headache was recorded on a 6-point Likert scale. All procedures were approved by appropriate ethical review boards.

Patient Selection

A total of 81 consecutively-referred patients who were diagnosed with migraine or tension headache, following the criteria of the International Headache Society (1988), were considered for enrollment in the study. Eligibility criteria included an age of 12 to 76 years and an average of at least two headaches per month. Patients were excluded for any of the following: onset of headache disorder less than one year before; pregnancy; malignancy; cluster headache (IHS code 3); suspicion that the headache disorder had specific etiology (IHS codes 5–11); cranial neuralgias (IHS code 12); wet-cupping treatment in the previous 12 months; or lack of consent or cooperation with the research procedures.

Of the 81 patients, 70 participants were eligible for the study. Sixty-three completed the full treatment, as prescribed. Seven others completed only the first stage of wet-cupping treatment, but were included in the sample for comparison purposes.

The Wet Cupping Technique

Wet-cupping was performed using vacuum cups with plastic vessels. The recommended site for wet-cupping in chronic headache is between the two scapulas, opposite the T1–T3 scapular spine. Each wet-cupping treatment procedure took about 20 min and was conducted in 5 phases:

1. Primary sucking. The cup is placed on the selected site and the cupper rarefies the air inside the cup by electrical or manual suction. The cup clings to the skin and is left for a period of 3 to 5 minutes.
2. Scarification. Superficial incisions are made on the skin using 15–22 gauge surgical blades.
3. Bloodletting. The cup is placed back on the skin, using the same manner described above, until it is filled with blood from the capillary vessels.
4. Removal. The cup is removed, and the process is repeated 3 times.
5. Dressing.

Statistical Analysis

Data analysis was conducted in 3 steps. First, descriptive statistics were considered. Second, paired t-tests were computed to compare pre-treatment and post-treatment measures of headache severity, days with headache, and use of medication. We also computed correlations between primary measures of interest. Third, 3 repeated measures ANCOVAs (analyses of covariance) were conducted to test the effect of the treatment after controlling for patient sex, age, years of headache chronicity, and type of headache (migraine versus tension).

Results

The sample was 50% male and 50% female, and had a mean age of 38.77 years (SD = 12.91). Participants reported a mean of 9.19 years of chronic headache (S = 9.31). Fifty-seven percent of the sample reported migraine headaches, and the remaining 43% reported tension headaches.

As shown in Table 1, mean headache scores were significantly lower after the wet-cupping treatment. Severity scores fell from a mean of 4.27 prior to the treatment to 1.46 post-treatment, with a mean difference score of 2.81 [95% confidence interval, 2.46 to 3.17; $t(69) = 15.94$, $p < 0.01$]. A similar drop occurred in the days with headache score, from 14.67 to 2.07 [mean difference score = 12.60, 95% confidence interval 10.16 to 15.04; $t(69) = 10.28$, $p < 0.01$]. Use of medication dropped dramatically as well (from 10.64 to 2.13, with a mean difference of 8.51, 95% confidence interval 6.57 to 10.46; $t(69) = 8.74$, $p < 0.01$).

Of the 63 patients who completed the full prescribed course of 3 wet-cupping treatments, 60 (95%) reported improvement in symptoms. Of the 7 patients who completed only the first wet-cupping treatment, 5 (71%) reported improvement in symptoms. Thus, it appears that the full course of wet-cupping was significantly more effective than completing only the first wet-cupping treatment.

Table 1 also illustrates intercorrelations between the efficacy scores. Intercorrelations between severities of headache prior to the treatment were moderate; following treatment, they were much stronger. As expected, pre-post correlations of the same measures were also rather modest.

The final step of analysis was a series of 3 repeated-measures ANCOVA analyses, designed to test the efficacy of the treatment after controlling for extraneous factors such as type of headache, patient age, gender, and chronicity. As shown in Table 2, the within subjects effect of the headache measures was statistically significant and strong in all 3 analyses. In other words, the change in all 3 outcome measures was statistically significant following the treatment. This finding replicates and confirms the results from the paired samples t-tests. No other univariate predictors emerged as statistically significant. These results suggest wet-cupping was equally effective for men and women, for migraine and tension headache patients, and for individuals of all ages and all years of chronic headache.

Two statistically significant interaction effects did emerge from the analyses. First, there was a sex by severity score effect. Women seemed to experience a greater decrease in their headache severity following the treatment (women's scores dropped from 4.49 to 1.20 while men's scores dropped from 4.06 to 1.71). Second, there was a sex by type of headache by medication used 3-way interaction effect. This effect was driven by the female migraine patients, whose medication usage dropped dramatically, from 14.40 to 1.75. The other three groups of patients (the male migraine patients, and male and female tension headache patients) experienced relatively similar drops to each other (from 8.75 to 2.70, 9.53 to 2.13, and 9.27 to 1.87, respectively).

Table 1. Means (Standard Deviations), Paired T-Test Results, and Correlation Matrix for Headache Severity Measures

Measure	Pre-tx	Post-tx	t	1	2	3
1. Headache Severity Score	4.27 (0.85)	1.46 (1.50)	15.94**	0.31**	0.28*	0.34**
2. Days with Headache	14.67 (10.13)	2.07 (3.29)	10.28**	0.68**	0.13	0.18
3. Medication Used	10.64 (8.34)	2.13 (2.96)	8.74**	0.69**	0.60**	0.24*

(N = 70). Tx = Treatment. Bold-faced values designate pre- to post-treatment correlations. Pre-training correlations appear above the diagonal and post-training correlations below the diagonal. *p < 0.05, **p < 0.01.

Table 2. Repeated Measures ANCOVA for Treatment Effects

Source	Severity Score			Days with Headache			Medication Used		
	df	F	η^2	df	F	η^2	df	F	η^2
Between subjects effects									
Age	1	0.00	0.00	1	0.33	0.01	1	0.35	0.01
Years of Chronicity	1	0.20	0.00	1	0.13	0.00	1	0.24	0.00
Sex ¹	1	0.00	0.00	1	0.04	0.00	1	0.91	0.01
Type of Headache ²	1	2.56	0.04	1	0.10	0.00	1	0.56	0.01
Sex X Type	1	0.27	0.00	1	0.18	0.00	1	1.14	0.02
Error	64			64			64		
Within subjects effects									
Headache Measure	1	27.61**	0.30	1	10.73**	0.14	1	12.72**	0.17
Measure X Age	1	0.20	0.00	1	0.08	0.00	1	1.15	0.02
Measure X Yrs Chronicity	1	0.03	0.00	1	0.00	0.00	1	0.46	0.01
Measure X Sex	1	7.15*	0.10	1	0.12	0.00	1	3.42	0.05
Measure X Type	1	0.56	0.10	1	0.07	0.00	1	0.39	0.01
Measure X Sex X Type	1	0.24	0.00	1	0.02	0.00	1	2.61*	0.04
Error	64			64			64		

¹Male = 1; female = 2. ²Migraine = 1; tension = 2. *p < 0.05. **p < 0.01.

Discussion

Headache disorders are reported widely in all cultures, and the combination of migraine and tension-type headache accounts for substantial health, economic, and social costs (Lipton *et al.*, 2003; Solomon, 1997; Stovner *et al.*, 2007). In fact, recent reports suggest headache is among the 10 most disabling conditions overall, and among the 5 most disabling for women (Stovner *et al.*, 2007).

Given these data, empirical support for underutilized treatments might be of great interest. Results from this study suggest wet-cupping results in persisting, clinical-relevant benefits for primary care patients with chronic headache. Following a 28-day course of 3 wet-cupping treatments, we found improvements among almost all patients in mean headache severity, decreases in days with headache, and decreases in use of medication.

Several questions arise. Most prominently, what is the mechanism of wet-cupping? Despite the long history of cupping in many cultures around the world, the mechanisms

through which cupping might prove efficacious as a treatment are unknown. Building off our own experience and the writings of others (Rozegari, 2000), it seems plausible that the mechanism of wet-cupping is dominated by influences in neural, hematological, and immune system functioning.

In the neural system, the main effect is likely regulation of neurotransmitters and hormones such as serotonin (of platelet), dopamine, endorphin, CGRP (Calcitonin-Related Peptide) and acetylcholine. Moreover, it seems that wet-cupping has an effect on the negative charge of neuronal cells. In the hematological system, the main effect is likely via 2 pathways: (a) regulate coagulation and anti-coagulation systems (e.g., decrease the level of hematological element such as fibrinogen), and (b) decrease the HCT (Hematocrit) and then increase the flow of blood and increase the end organ oxygenation.

In the immune system, the main effect is likely via 3 pathways: (a) Irritation of the immune system by making an artificial local inflammation, and then activate the complementary system and increase the level of immune products such as interferon and TNF (Tumor Necrotizing Factor); (b) effect the thymus; and (c) control traffic of lymph and increase the flow of lymph in lymph vessels.

We would be remiss in discussing the possible mechanisms of cupping by omitting the possibility of a placebo effect. The effect of placebos remains controversial in the literature (Hróbjartsson and Gøtzsche, 2001; Turner *et al.*, 1994; Miller and Rosenstien, 2006), but there is consensus at least that placebos may help patients improve, particularly in the domain of headache management (Jhee *et al.*, 1998). We offer two pieces of evidence that the efficacy of cupping is not entirely driven by a placebo effect. First, cupping clearly has a physiological effect on the body. Unlike most placebos, which are noninvasive (e.g., “talk” therapy) or not biologically influencing (e.g., a “sugar pill”), cupping influences the neurological, hematological, circulatory, and immunological systems. Second, the results of our study, as well as previous work, suggest cupping is highly effective, and much more effective than previous tests of placebo influences on headache (Jhee *et al.*, 1998). In our study, 95% of the patients who completed the full course of treatment experienced improvement, a result that matches response rates of over 90% in other studies. Placebo treatment for headache in other research typically yields significant results for only about half of the patients, a much lower level of treatment efficacy than seen in cupping research (Jhee *et al.*, 1998).

In conclusion, cupping is a very old treatment technique, but a very new topic of empirical study. Our results from a pre-post design suggest cupping is a highly effective means to treat headache. Obviously, more work remains to be done; in fact, research in understudied fields such as this one often inspire more questions than they answer. First, there is need for a case-control design to test the efficacy of cupping in comparison to other, more empirically-supported techniques and in comparison to placebo or non-treatment groups. Second, more careful analysis of cupping’s efficacy on the specific types of headache (e.g., migraine vs. tension) is needed.

Third, it remains unclear how cupping works. We have presented hypotheses concerning its effects on various body symptoms, but further research on this topic is needed. Last, there is need for cupping to be tested in other cultures — and, in particular, among subjects

who are not familiar with the technique and therefore perhaps not biased by any long-held cultural or spiritual placebo influences.

Despite these remaining questions, our results suggest that use of wet-cupping treatment in addition to standard care will result in persisting, clinically relevant benefits for primary care patients with chronic migraine or tension headache. We recommend consideration of wet-cupping as an appealing option for treatment of chronic migraine and tension headaches because it is (a) effective and efficient to administer, (b) requires only basic, low-cost technology, (c) offers an inexpensive remedy, (d) has no significant side-effects, and (e) harnesses the power of *vis medicatrix naturae* (the body's natural ability to heal itself).

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