Acupuncture for migraine prophylaxis

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الخلاصة: الوخز بالإبر هو أقدم وسيلة معروفة للعلاج وقد مورس في الصين لما يزيد عن ثلاثة آلاف عام. وتعرف نقاط الوخز بالإبر الصينية في العلاج ب"نقاط الدلالة" وهي نقاط موجودة على جسم الإنسان بدرجات متفاوتة من العمق ، ومرتبطة بمدارات للطاقة وتتميز هذه النقاط بكونها تؤلم إذا ضغطنا عليها ، مقارنة بالمناطق الأخرى من جسم الإنسان التي لا يوجد فيها نقاط للوخز بالإبر ، كما أنها تشتد ألما إذا مرض العضو الذي تقع النقطة على مساره وترتكز هذه النظرية على اعتقاد إن الطاقة الطبيعية أو ما يسمى "كي" والتي تُنطق "تشي" تمر عبر ١٤ مداراً بالجسم حتى تحفاظ على الجسد ممتلئاً بالحيوية، وترتبط هذه المدارات بأعضاء معينة ووظائف بدنية، وعندما تنسد الطرق أمام الطاقة الطبيعية أو تتعرض للاختلال في التوازن، تقع الأمراض أو الأعراض المرضية.
الهدف من الدراسة: تقييم فعالية العلاج بالوخز بالبار الصينية للوقاية من داء الشقيقة.
المرضى والطرق: دراسة عدد النوبات وشدة الوجع لأربعين مريضا مصابين بداء الشقيقة من كلا الجنسين حيث تتراوح اعمارهم بين ٢٠-٥٠ سنة تم تقسيمهم الى مجموعتين، ٢٠ مريض لكل مجموعة، مثلت الاولى (مجموعة السيطرة) عولجت هذه المجموعة بأخذ عقار الانديرال ٤٠ملغ ٣x١، وعولجت المجموعة الثانية بالوخز بالابر الصينية حيث خضع كل مريض إلى ١٥ جلسة خلال ١٢ أسبوع، وقد تم العلاج في مستشفى الإمام الرضا(A) والعيادة الخاصة للدكتور مجتبوي في مدينة مشهد المقدسة في إيران للفترة من كانون أول ٢٠١١ ولغاية آذار ٢٠١٢. تم استخدام برنامج SPSS لإجراء التحليل الإحصائي للنتائج المستخلصة.
النتائج: عند المقارنة بين فعالية العلاج بين المجموعتين من حيث عدد النوبات وشدة الوجع وجد ان هنالك نقصان معنوي في عدد النوبات وكذلك شدة الوجع خلال فترة العلاج بالوخز بالإبر الصينية مقارنة بالعلاج بعقار الانديرال.
الاستنتاج:ان العلاج بالوخز بالإبر الصينية فعالا، من حيث تقليل عدد النوبات وشدة الألم مقارنة بالعقاقير الطبية للوقاية من داء الشقيقة.

Abstract:
Acupuncture is a portion of traditional Chinese medicine and has been used for Health care over 3,000 years in China. A migraine is a relatively common medical condition that can severely affect the quality of life of the sufferer and his or her family. Migraine is ranked by the World Health Organization as the 19th disease world-wide to cause disability; epidemiological studies of headache in Asia reported consistent findings that the prevalence ranged from 8.4% to 12.7%.
Objective: To assess the efficacy of acupuncture in migraine prophylaxis.
Patients and method: This study was carried out on 40 known case of migraineurs from both genders, aged 20-50 years. Migraineurs were randomly divided into 2 groups, 20 cases in each group, first group (control group) received medical treatment i.e. propranolol 40mg tid while 2nd group (acupuncture group) received 15 sessions of real acupuncture for 12 weeks, These forty migraineurs were treated in Emam Reza Hospital in Mashhad city in Iran and in private clinic of Dr. Mojtabavi over a period from December 2011 till March 2012. Statistical analysis was done by using SPSS in which independent t-test was used to compute significance.
Result: There were significant differences between the acupuncture and control groups throughout the treatment periods on numbers of attacks and intensity of pain i.e. there is significant decrease, in numbers of migraine attacks and intensity of pain, more in patients treated with acupuncture than those treated with the medical therapy (propranolol).
Conclusion: acupuncture is more effective, in reducing the frequency of attacks and intensity of the pain, than medical treatment for migraine prophylaxis.

Introduction:

Acupuncture (AP) is the insertion of very fine needles, (sometimes in conjunction with electrical stimulus), on the body's surface, in order to influence physiological functioning of body. AP is a portion of traditional Chinese medicine and has been used for Health care over 3,000 years in China; ancient Chinese medicine philosophers presume that there are two Natural forces: Yin and Yang in nature which interact to balance everything in the world. Yin and Yang also regulate the flow of "vital energy" known as Qi (pronounced Chee) in Human body. They believed that Qi flows through a body circulation system, known as network of channels called Meridians to circulate in body from the internal Organs to body surface. When Qi pathway is open and Qi flow is smooth, the body is in "good health ". However, when Qi pathway is blockage and Qi flow is retarded, the body is in pain or disease. There are a number of acupuncture points (acupoint) on body surface. An acupuncturist can use a needle to unblock the blocked Qi pathway to cease pain or restore the body's health (1, 2).Diagnosis in acupuncture incorporates not just a review of the patient's complaints but also a close inspection of skin color, pulse and coating of the tongue. From clues gathered during this inspection, the practitioner makes a determination as to whether the patient is "hot" or "cold," "damp" or "dry"—the relative hotness and dryness of the patient helping determine which Qi channels require adjustment(3).The traditional theory of acupuncture—that needles can change the path of Qi flowing inside the body—has no scientific validity. Because this hypothesis relies upon the existence of an energy force that cannot be seen or measured, it cannot be tested and is entirely speculative (3). Therefore this hypothesis has been challenged in the West, most notably by Mann in the UK (4) and Ulett in the USA (5) so that developed what is called "western medical acupuncture" (6). It is an adaptation of Chinese acupuncture using current knowledge of anatomy, physiology and pathology, and the principles of evidence based medicine. While Western medical acupuncture has evolved from Chinese acupuncture, its practitioners no longer adhere to concepts such as Yin/Yang and circulation of qi, and regard acupuncture as part of conventional medicine rather than a complete "alternative medical system". It acts mainly by stimulating the nervous system, and its known modes of action include local antidromic axon reflexes, segmental and extrasegmental neuromodulation, and other central nervous system effects (6).

Acupuncture mechanisms

Three categories of acupuncture mechanisms have been described; peripheral, spinal, and supraspinal (7, 8, 9).

Firstly, on needling, nociceptive afferents are stimulated and release vasodilatory neuropeptides into the muscle and skin they innervate, forming the basis of the ***local*** or ***peripheral effects*** of acupuncture (10). This phenomenon, an axon reflex, releases neuropeptides into human skin such as calcitonin gene-related peptide (CGRP) and substance P (11). Sensory neuropeptides modulate immune responses and hence will assist in tissue healing (12).

Secondly, acupuncture will act within the spinal cord, known as ***spinal effects*** or ***segmental effects***. To initiate spinal effects, the sensory stimulus must be applied to tissues that share innervations with the appropriate spinal cord level. Dorsal horn neurons activated by painful inputs may be inhibited by acupuncture via a gate control mechanism, producing a spinally mediated analgesic response.

Neurons of the ANS efferent fibers can be influenced and both sympathetic and parasympathetic activity may be affected, depending on the position of the needles.

- High-intensity (HI) needling may immediately increase sympathetic outflow to tissues supplied by the segment, which is then followed by a decrease in outflow.
- Low-intensity (LI) or non-painful input could reduce sympathetic outflow in the segment (13).

Supraspinal effects

Acupuncture can influence neuronal structures within the brain (14) and these are known as supraspinal effects. Analgesic pathways such as diffuse noxious inhibitory controls (DNIC) and beta-endorphin mediated descending pain inhibitory pathways from the hypothalamus will be activated with appropriate needling (14). Autonomic outflow is also under central control via the medullary vasomotor centre and can be influenced by the acupuncture stimulus. Further supraspinal mechanism is neurohormonal responses affecting the immune, endocrine, and reproductive systems of the body can be affected by acupuncture (14, 15, 16). Recent advances in brain imaging technologies such as functional magnetic imaging (fMRI) and positron emission tomography (PET) have allowed investigations of the brain and have elucidated the effect of acupuncture on the CNS. Several analgesic points in the extremities will stimulate blood flow to cortical and subcortical brain regions (7). Activation is relatively non-specific and closely related to areas activated by painful stimuli, through what is known as the pain matrix (17). Studies show an increase in blood flow in the hypothalamus and a decrease in the limbic system, a brain region where affective and emotional responses to pain are integrated with sensory experience. However, most of the brain regions activated by acupuncture are closely related to those areas mediating placebo analgesia and expectation (17), and it is unclear how much of the change is due to the acupuncture stimulus and how much is due to non-specific effects.

Migraine:

Migraine, a chronic neurovascular disorder, is characterized by recurring severe headaches and a series of autonomic and neurological symptoms such as vomiting, nausea, light sensitivity and sound sensitivity (18). Migraine is ranked by the World Health Organization as the 19th disease world-wide to cause disability (19); epidemiological studies of headache in Asia reported consistent findings that the prevalence ranged from 8.4% to 12.7% (20).

Causes of migraine:

The precise cause of migraines remains unknown, but there are many theories that discuss the causes of migraine. The cortical spreading depression (CSD) theory suggests that migraine is a disease of the brain such as angina is a disease of the heart (21). Disruption of normal brain functioning is believed to be the underlying cause of the migraine pain and aura (21). Another theory is the vascular theory introduced by Wolff (22) which suggests that migraines result from the widening of blood vessels surrounding the brain. The chemical serotonin is also thought to play an important role in migraine development (23).third one the neurovascular hypothesis support that both neural and vascular elements contribute to migraine (24).

Mechanism of beta-blocker:

Propranolol is the most widely used for migraine prevention at a daily dose of 120 to 240 mg; several mechanisms of action are responsible for its effectiveness as a preventive medication (25, 26):

- It inhibits norepinephrine release through alpha-2 agonism, thus reducing central catecholaminergic activity.
- It antagonizes 5-HT_{1A} and 5-HT_{2B}receptors, reducing neuronal excitability.

- It inhibits nitric oxide production by blocking inducible nitric oxide synthase, through alpha$_2$-agonist action. Nitric oxide is believed to be the common final pathway for vasodilation in migraine.
- It inhibits excitatory glutamate receptors, decreasing neuronal activity.
- It has membrane-stabilizing properties.

Mechanism of acupuncture in migraine therapy

Acupuncture can help in the treatment of migraine by:

- Providing pain relief - by stimulating nerves located in muscles and other tissues, acupuncture leads to release of endorphins and other neurochumoral factors and changes the processing of pain in the brain and spinal cord (27, 28, 29)
- Reducing inflammation - by promoting release of vascular and immunomodulatory factors (30, 31, 28).
- Reducing the degree of cortical spreading depression (an electrical wave in the brain associated with migraine) and plasma levels of calcitonin gene-related peptide and substance P (both implicated in the pathophysiology of migraine) (32).
- Modulating extracranial and intracranial blood flow (33).
- Affecting serotonin (5-hydroxytriptamine) levels in the brain (34).

Patients and method:

This study was carried out on 40 known cases of migraine from both genders, aged 20-50 years. Migraineurs were randomly divided into 2 groups, 20 cases in each group, first group (control group) received medical treatment i.e. propranolol 40mg t.i.d while 2nd group (acupuncture group) received 15 sessions of real acupuncture for 12 weeks, two sessions per week in first three weeks then one session per week. There were several common approaches including: bilateral points; usage of disposable, sterile steel needles (0.25mmX40 mm); skin disinfection with 70% alcohol; needles in place for 30 minutes and no moxa or electrical stimulation. Real acupuncture treatment was individualized based on the principles of Traditional Chinese Medicine (TCM). A maximum of 20 needles were inserted. The needles were manipulated by rotation methods to produce a characteristic sensation known as De Qi, sensation of numbness, strange aching or tingling radiating from the point of needling. These forty migraineurs were treated in Emam Reza Hospital in Mashhad city in Iran and in private clinic of Dr. Mojtabavi over a period from December 2011 till March 2012; the patients learned to record, numbers and intensity of migraine attacks, in the diaries of the treatment periods, every 4 weeks i.e. (1-4, 5-8, 9-12 weeks), in both groups for comparing between them to evaluate effectiveness of acupuncture versus medical treatments during the course of the therapy. Intensity of pain is measured on an 11-points pain intensity numerical rating scale (PI-NRS), where 0=no pain, 1-3=mild pain, 4-6= moderate pain and 7-10= severe pain. Statistical analysis was done by using SPSS in which independent t-test was used to compute significance (P-value < 0.05 regarded as significant).

Results:

1-*Effect of medical versus acupuncture treatment on the reduction of frequency or numbers of migraine attacks:*

Frequency of migraine: in the headache diary, patients were required to indicate whether they had migraine or not every day. The numbers of days having migraine

every 4-week were calculated. During the period of therapy, the AP group was significantly decreasing the numbers of migraine attacks when compared with the control group throughout the treatment periods, i.e. (1-4, 5-8, 9-12 weeks).
Table (1) and figure (1)

Table (1): A comparison, in frequency or numbers of migraine attacks and intensity of pain, between medical and acupuncture (AP) groups.

parameters	groups	Mean	Std. Deviation	Std. Error Mean	P - value
Frequency or numbers of migraine attacks(1-4weeks)	Medical(n=20)	4.8500	.87509	.19568	**<0.05**
	AP (n=20)	3.1500	.87509	.19568	
Frequency or numbers of migraine attacks(5-8weeks)	Medical(n=20)	3.5000	.82717	.18496	**<0.05**
	AP (n=20)	1.9000	.64072	.14327	
Frequency or numbers of migraine attacks(9-12weeks)	Medical(n=20)	2.1000	.78807	.17622	**<0.05**
	AP (n=20)	1.2000	.61559	.13765	
Intensity of pain of migraine NRS 0-10 score(1-4weeks)	Medical(n=20)	6.9000	.96791	.21643	**<0.05**
	AP (n=20)	5.4000	.82078	.18353	
Intensity of pain of migraine NRS 0-10 score(5-8weeks)	Medical(n=20)	4.8500	.98809	.22094	**<0.05**
	AP (n=20)	3.3500	.81273	.18173	
Intensity of pain of migraine NRS 0-10 score(9-12weeks)	Medical(n=20)	3.2500	.91047	.20359	**<0.05**
	AP (n=20)	1.6000	.82078	.18353	

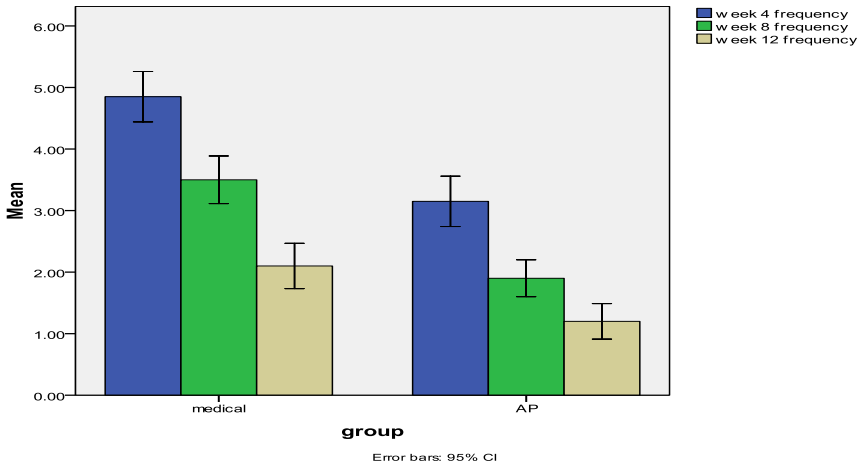

Figure (1): Medical versus Acupuncture groups treatment in the frequency or numbers of migraine attacks.

2- *Effect of medical versus acupuncture treatment on the reduction of intensity of migraine pain:*
Intensity mean severity of average migraine per four weeks (assessed with headache diaries by PI-NRS). There were significant differences between the AP and control groups throughout the treatment periods. In the AP group, the level of pain on PI-NRS

was significantly decreased during the all treatment periods, i.e. (1-4, 5-8, 9-12 weeks), when compared with the medical treatment. Table (1) and Figure (2)

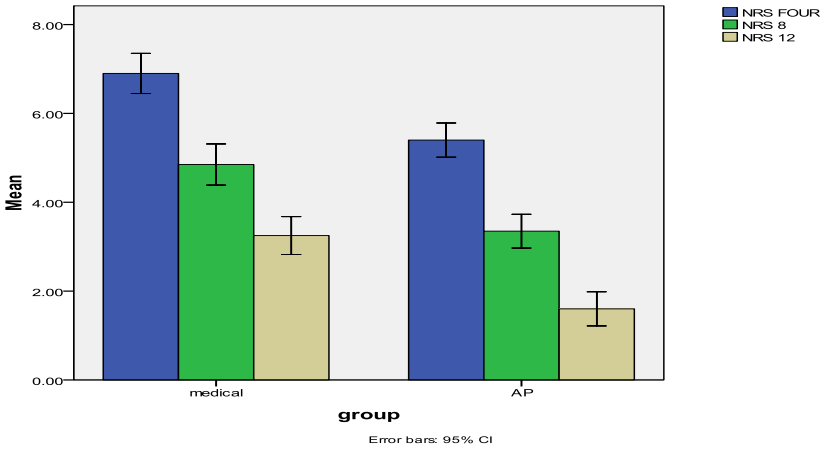

Figure (2): Medical versus Acupuncture groups' treatment in the intensity of the migraine pain.

Discussion:

Effect of acupuncture treatment on the reduction of frequency of migraine attacks:

The frequency of migraine attacks were significantly decreased more in acupuncture than medical groups along the treatment periods. This result agrees with Lei Zhao et.al. 2011(35) found significant difference between the acupuncture therapy and Western medicine therapy indicating an obvious superior effect of the acupuncture therapy, also Wang, Yanyi et. al.2008 (36) found there is moderate evidence that acupuncture is more effective than western pharmacotherapy. Allais et.al.2002 (37) and Streng et.al. 2006(38) found acupuncture was superior to Western medication in preventing migraine attacks

Sun Y, Gan TJ, 2008 (39) and Scott, S. W., Deare, J. C. (2006)(40) found real acupuncture was superior to medication for the treatment and prevention of migraine. Diener HC et.al.2006 (41) and Linde et.al.2009 (42) found the real acupuncture slightly better but not significant than medical therapy for migraine prophylaxis in reduction of migraine days. Pintove et.al.1997 (43), Linde et.al 2004(44), Linde et.al.2005 (45) and Zhang Y, 2009(46) found the real acupuncture more effective than sham acupuncture in reducing migraine frequency.

Effect of acupuncture treatment on the reduction of intensity of pain:

The intensity of pain was significantly decreased more in acupuncture than medical groups along the treatment periods. This result agrees with Vickers et al 2004 (47),Diener et al 2006(41), Streng et al 2006(38) found acupuncture was significantly superior to Western medication in reducing the intensity of pain. Pintove et.al.1997 (43), Linde et.al 2004(44), Linde et.al.2005 (45) found the real acupuncture more effective than sham acupuncture in reducing intensity of pain. Sun Y, Gan TJ 2008(39) concludes real acupuncture was found to be superior to medication in improving headache intensity and frequency. Scott and Deare, 2006(40), Griggs and Jensen, 2006b (48), Germán Salamanca 2011(49) and Paola Sarchielli 2012(50) shown that acupuncture is an effective alternative treatment for migraine prophylaxis. In 1997, the NIH held its first consensus conference in acupuncture and published a guideline to clinicians summarizing the evidence to date on the use and effectiveness of acupuncture in a variety of medical conditions including migraine headaches (51). The conclusion of

the NIH has been endorsed by the World Health Organization (WHO) (52), in addition to The National Headache Foundation also endorses acupuncture as alternative therapies for migraine headaches (53).

Conclusion:

Acupuncture is significantly more effective, in reducing the frequency of attacks and intensity of the pain, than medical treatment for migraine prophylaxis.

Recommendations:

1-In Iraq, the acupuncture should be used in the treatment or prevention of migraine headache.

2-A comparison of the long-term follow up of migraineurs treated by acupuncture versus medical treatment.

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