Acupuncture Workshop

Introduction

The word acupuncture is derived from the Latin words *acus*, "needle," and *punctura*, "a pricking." The original terminology of acupuncture in Chinese is called "Jin Jiao" which consists with the practice of "acupuncture and moxibustion." Moxibustion, burning of moxa (*artemisia vulgaris*) over the acupuncture points, can be also used for the treatment of various illnesses. The acupuncture treatment is performed by inserting special hair-thin needles into the skin at specific sites, known as acupuncture points, for desired therapeutic and preventive purposes.

The National Institute of Health's consensus development conference on acupuncture concludes that there are promising results support the efficacy of acupuncture in adult postoperative and chemotherapy related nausea and vomiting and in postoperative dental pain. Other situations, such as addiction, stroke rehabilitation, headache, menstrual cramps, tennis elbow, fibromyalgia, myofascial pain, osteoarthritis, low back pain, carpal tunnel syndrome, and asthma, in which acupuncture may be useful as an adjunct treatment or an acceptable alternative or be included in a comprehensive management program.[1]

Theory of Acupuncture

The use of Traditional Chinese Medicine and acupuncture can be traced back to the Neolithic times. "*Huang Di Nei Jing" ("The Yellow Emperor's Internal Classic"),* first complied around 100 B.C., described the practice of Traditional Chinese Medicine and acupuncture as puncturing the body for pain relief.

Illness results from inadequate flow of Qi through the meridians. The flow of Qi may be restored by the insertion of several very fine needles into a combination of points from the 365 classical acupuncture points that exist along the meridians. The manual twirling of these needles produces a sore, heavy, or numb sensation known as "De Qi" ("obtaining Qi"). Practitioners of Traditional Chinese Medicine observed that stimulating specific acupuncture points resulted in predictable responses in patients with a given pattern of signs and symptoms. In Traditional Chinese Medicine, there are six pathological factors that cause disease: wind, cold, heat, dampness, dryness, and fire. The goal of the history and physical is to assess the patient's balance of Yin, Yang, and gain insight into other symptoms. There are eight principal classifications of symptoms, which include Yin or Yang, superficial or deep, cold or hot, and deficient or excess. The aim of therapy is to restore deficiencies or correct excesses in Qi, thus refurbishing the health. Acupuncture, herbs, and moxibustion are frequently used for the preventive as well as therapeutic purposes.

The first European report on Traditional Chinese Medicine and acupuncture came from a sixteenth century Jesuit in Canton, China by Portuguese, Dutch, Danish, and French

missionaries. Earlier reports mentioned the techniques of diagnosis by feeling the pulses and looking at the tongue. Consuming herbs, tea, or inserting needles were reported to promote health and prevent illnesses. The interest in acupuncture in the U.S. started in 1970s when James Reston described in a front page article in *The New York Times* how his postoperative pain from an emergency appendectomy had been alleviated by acupuncture. Since then, stories of the use of acupuncture for anesthesia during major surgery in China have been appearing in the Western press. This popular interest soon led to scientific efforts to test the clinical effectiveness and elucidate the underlying physiologic mechanism of acupuncture for analgesia. In the West, basic scientific and clinical research has focused on the use of acupuncture for the management of pain. Randomized controlled trials have not historically been part of Traditional Chinese Medicine and acupuncture, which was derived empirically through many years of experience.

Scientific Evidence

Basic scientific research has focused on understanding acupuncture from a neurobiological perspective. One possible theory is that acupuncture inhibits the transmission of pain according to the gate-control theory put forth by Wall and Melzack in 1965.[2] In this model, acupuncture may act by stimulating sensory A-beta fibers, directly inhibiting the spinal transmission of pain by a smaller A-delta and C fibers.[3]

The subject of most basic research has been the relationship between acupuncture and the production of endogenous opioid peptides, such as the endorphins, enkephalins, and stimulation of the endogenous descending inhibitory pathways. (Figure 1) In human studies, analysis of cerebrospinal fluid (CSF) showed elevated levels of serotonin, endorphins, and enkephalins following acupuncture treatments. [4] Although the mechanism of acupuncture analgesia is not entirely clear, a growing body of scientific knowledge indicates that, "the essence of acupuncture analgesia is mainly the activation of the endogenous anti-nociceptive system to modulate pain transmission and pain response." [5] Low frequency (2Hz) and high frequency (100 Hz) electrical acupuncture selectively induces the release of enkephalins and dynorphins in both experimental animals and humans.[6] Peripheral stimulation of the skin or deeper structures activates various brain structure and/or spinal cord via specific neural pathways.[7] An early human study by Mayer et al. indicated that acupuncture analgesia may be reversed by naloxone.[8]

Functional magnetic resonance (fMRI) is utilized to investigate the effect of acupuncture in normal volunteers in order to provide the foundation for the understanding of the mechanism of acupuncture. Correlations between the BL 67 (Zhi Yin) acupuncture point with the visual cortex were investigated. [9] Acupuncture needle manipulation on the LI 4 (Hegu) point modulates the activity of the limbic system and subcortical structure revealed in f MRI.[10] There is individual variation of the cortical activation patterns elicited by the electrical acupuncture stimulation. Real acupuncture elicited significantly higher activation than sham acupuncture over the hypothalamus and primary somatosensory-motor cortex and deactivation over the rostral segment of anterior

cingulated cortex. The minimum acupuncture elicits the significantly higher activation over the medial occipital cortex. [11]

The Practice of Acupuncture

Following insertion, stimulation of the acupuncture point may be achieved manually or by use of electro acupuncture. Each acupuncture point has a prescribed depth of insertion. Manual techniques may involve the lifting and thrusting of the needle and/or twisting and twirling of the needle. Electro acupuncture achieves a similar effect by attaching low-voltage electrodes to the needles. The intensity, pulse width, and duration may be varied, much in the same way as in transcutaneous electrical nerve stimulation. Most acupuncturists are quite skilled in the painless insertion of needles. Relatively little pain results in the insertion of the needles, and in our experience, most children can accept acupuncture treatment well. Multiple acupuncture treatment sessions over an extended period of time may be required to demonstrate its effectiveness. Extended follow-up would be required to demonstrate the statistical significance by studying large numbers of patients.

Auricular acupuncture is one of the microsystems of acupuncture. The upper region of the external ear is used to alleviate conditions in the leg and feet. The middle region of the external ear represents chest and back pain. The lower regions are utilized to relieve headache and neurological conditions. Auricular acupuncture can also be utilized for preoperative anxiety control. [12-15]

Potential Risks of Acupuncture

Acupuncture is extremely safe. Occasionally, a patient may have some bruising at an acupuncture site, which is quickly resolved. The principal risk is infection from use of improperly sterilized needles, and cases of hepatitis B [16] HIV infection [17], and fatality [18] have been reported. This can be avoided by using disposable sterile acupuncture needles and proper insertion of the needles.

Research in Acupuncture

Systematic reviews of randomized controlled trials provide the best evidence based approach of gathering information when practicing acupuncture in medicine. This method is least subject to bias assessing the efficacy of the therapy. Several difficulties are inherent in the designing of valid blinded, randomized controlled trials of acupuncture. [19, 20] The studies can be, at best, single blind, as a trained acupuncturist must do the needling. Difficulties also arise in determining an appropriate placebo for the control group. Various studies have used “sham” acupuncture (needles placed at incorrect or non-meridian sites), other devices (such as a non-functional TENS unit), or no treatment at all. This factor is important, since as many as 30% of subjects may respond positively to some placebos. There is little consistency in literature pertaining to the criteria used for acupuncture research. As the meridian systems affect the entire body, the sham acupuncture does have some acupuncture effects. The placebo control implies the

use of true inert intervention. The sham acupuncture is different from pure placebo effects. To try to address this difficulty, a placebo acupuncture needle has been developed. The placebo acupuncture needle retracts back into the handle of the acupuncture needle and does not penetrate the skin.[21]

Acupuncture does not produce unconsciousness, muscle relaxation, or blunting of autonomic reflexes during surgical procedures, However, acupuncture can complement anesthesia and produces analgesia and sedation.[22] Taguchi et. al. studied ten healthy volunteers who were anesthetized with desflurane and randomly assigned to no treatment or acupuncture. Auricular acupuncture was shown to reduce anesthetic requirement by 8.5 ± 7 %.[23] In a randomized, double-blind, crossover trial of twenty volunteers, electrical stimulation of an auricular acupuncture point in the vicinity of the tragus reduced anesthetic requirement to acute noxious stimulation by 11 ± 7%.[24] The reduction of anesthetic requirement under acupuncture was not clinically important. Chu et. al studied acupuncture anesthesia in twenty patients for inguinal hernia repair. Acupuncture reduced the amount of local anesthetic required. It is also effective in pain relief and inhibiting gastrointestinal upset.[25]

In a randomized controlled trial of electroacupuncture on one hundred women undergoing lower abdominal surgery the incidence of nausea and dizziness during the first 24 hours after surgery was significantly reduced in electro-acupuncture group compared with the control and sham groups. Preoperative treatment with low- and high-frequency electro-acupuncture can reduce postoperative analgesic requirements and associated side effects in patients undergoing lower abdominal surgery.[26]

Acupuncture is commonly used for the management of nausea and vomiting. Stimulation of the PC-6 (*Nei Guan acupuncture point; meaning Gate of the Internal Organ in Chinese*) points by acupuncture needles, electrical apparatus, pressure, or magnets are used to treat nausea and vomiting due to sea-sickness, pregnancy, or from the side effects of surgery or chemotherapy. The PC-6 point is located 2 inches above the transverse crease of the wrist, between the tendons of the long palmar muscle and the radial flexor muscle of the wrist. A systematic review was conducted of 33 randomized controlled trials of acupuncture and acupressure. The results of twenty-seven of these trials were positive. [27] In a laboratory study of experimentally induced motion sickness, 64 volunteer were placed in an “optikokinetic drum” (the drum’s inner surface was covered with alternating black and white stripes to increase visual-induced motion sickness). The PC-6 acupressure group showed significantly reduced intensity in subjective and objective symptoms of visual-induced sickness. [28] Acupuncture can be used for the treatment of chemotherapy induced nausea and vomiting. A review of eleven randomized controlled trials studying the effectiveness of acupuncture point stimulation on chemotherapy-induced nausea and vomiting revealed that electroacupuncture reduced chemotherapy-induced acute vomiting. Acupressure at the PC-6 acupuncture point had a protective effect on people experiencing chemotherapy induced nausea.[29]

Acupuncture may be more useful in predictable situations involving acute pain, such as dental procedures and postoperative pain, or in the setting of medical conditions with

recurrent episodes of acute pain, such as sickle-cell crisis and recurrent abdominal pain. Although effective treatment is available in many cases (i.e., local anesthetics for dental procedures, opioids for severe post-op pain), side effects, such as respiratory depression, may be seen. Taub and colleagues used acupuncture for the treatment of dental pain in a single blind, randomized controlled trial in 39 patients undergoing dental restoration for cavities. [30] Patients were randomized between real and sham acupuncture. Seventy percent of the experimental group reported good or excellent pain reduction, fifty-three percent of the control group reported good or excellent pain reduction. The results for the two groups showed no statistical significance. However, systematic review has shown that acupuncture is effective in relieving dental pain.[31] The study of the effect of acupuncture on pain after lower abdominal surgery revealed that preoperative treatment with low or high frequency electro acupuncture can reduce the postoperative analgesic requirement and decreased the side effects of systemic opiates.[32]

Acupuncture therapy for migraine headaches has been reported to be effective in several adult studies. [33, 34] In a randomized controlled trial of 168 women with migraine, acupuncture were proved to be an adequate migraine prophylaxis. Relative to flunarizine, acupuncture treatment exhibited greater efficiency in the first months of therapy and better acceptability A systemic review of 22 trials, including a total of 1042 patients, suggests that acupuncture has a role in the treatment of recurrent headaches.[35] As added benefit, in a randomized controlled trial of 401 patients with chronic migraine headache, it was also shown that, through 12 months of follow up, acupuncture is relatively cost-effective. Compared with the patients in the control groups, patients receiving acupuncture used 15% less medication, made 25% fewer visits to general practitioners, and took 15% fewer sick days from work.[36]

It is important to distinguish the difference between disease and illness. The disease is what the physician can diagnose that the patient has; and the illness is what the patient feels. There is no cure for numerous pediatric diseases; however, acupuncture can be used to treat various illnesses associated with pediatric disorders or to conquer the side effects associated with conventional medical therapies. Over the past several years, the use of Traditional Chinese Medicine has become more common and accepted in the U.S. Some of the Health Maintenance Organization (HMO) insurance plans have begun to cover acupuncture treatments for their patients. If the there is a rise in the number of insurers willing to reimburse for pediatric acupuncture therapies, patient utilization is likely to continue to increase in the future. [37]

The practitioner should discuss with the pediatric patients and their family about the treatment preferences and outcome expectations. It is important to thoroughly review with the patients the process of acupuncture, including its safety and efficacy. Pediatric patients should be referred to qualified acupuncture providers, and follow up appointments scheduled to monitor their treatment response.

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