Acupuncture in headache

T Lundeberg

Departments of Physiology and Pharmacology, and Surgical Sciences and Rehabilitation, Karolinska Institutet/Karolinska Hospital, Stockholm, Sweden

History

Acupuncture as part of Traditional Chinese Medicine (TCM) was first recorded at a time when Europe's "Dark Ages" halted scientific progress. Based on centuries of observation, classification and inductive logic, the Chinese system reached a high state of development. Little interest in it was shown in the west until the 1970s. Even then, medical establishment attitudes relegated it to "alternative" and "complementary" status, thus isolating it from ongoing developments in biomedicine. However, favorable press reports and public interest generated funding for research, and the therapy began to be taken seriously after it was shown that acupuncture releases endogenous peptides and that there is a scientific basis to its use.

Problems and shortcomings in research

Although laboratory studies indicate that acupuncture can have physiological effects (1), clinical studies are often inconclusive. Studies evaluating efficacy need adequate controls, randomization, and descriptive detail for replicability. Problems in clinical acupuncture research include the diversity of forms of therapy, individualized treatments, selection of credible control procedures, and traditional diagnoses (2).

One of the greatest problems is the selection of suitable controls for acupuncture and the lack of consensus of what this entails. Many call for "placebo acupuncture", but the two terms are incompatible, since a placebo should be without specific therapeutic effect, which is impossible to determine when the effects are dependent on invasive techniques. It is pointless to declare that trials using "sham acupuncture" provide more rigorous tests of accuracy when there are so many differing opinions on what a sham technique may consist of, and most remain unacceptable. Indeed, Ernst and White (3) state that almost 100% of all patients treated with sham acupuncture may respond positively. Does this not rather indicate that "sham" acupuncture involving penetration of the skin cannot be considered a placebo at all, but another form of the therapy? Such approaches include an array of treatments, ranging from the ancient delicate "plum blossom" needles, which barely penetrate the skin, to more modern additions like electro-acupuncture and severe "periostial" needling. In a study comparing acupuncture and diazepam and their supposed placebos, only the inert placebo pill caused no significant reduction of pain (4). Patients' responses to any peripheral sensory stimulation (PSS), particularly acupuncture, are influenced by variation in pain etiology, cultural conditioning, emotions, suggestion/bias, and the different parameters of acupuncture stimulation. Naturalistic studies, where patients are offered a choice of sampled treatments, offset and minimize these influences and are less likely to misrepresent outcome. The inclusion of long-term follow-ups could also have some bearing on the perceived results of studies.

Randomization is essential, but has its own pitfalls. For example, in a much debated study by Deyo et al. (cf. 2) in which patients were randomized to four groups, when the pain conditions were retrospectively categorized, patients in the TENS group with neurogenic pain outnumbered those in the TENS placebo group by 37:9, which was certainly reflected in the results. In a pilot study on tension headache (5), randomization resulted in wide differences in the parameters of headache severity and use of analgesics between the treatment and placebo groups.

Mechanics of pain modulation

Analgesia by PSS involves activating neural pathways that modulate pain. Different acupuncture modes and parameters activate different inhibitory mechanisms within this endogenous system. Noxious stimulation activates supraspinal mechanisms, which inhibit neurons of the dorsal horn or trigeminal ganglion excited by pain. Manual stimulation of acupuncture needles evoking "deQi", usually an intense and unpleasant feeling, induces both segmental and descending inhibition of cells that mediate pain via Aδ afferents. Both high and low-frequency electro-acupuncture may reduce pain, but only the latter is reversed by naloxone, a μ opioid antagonist (1).

Treating pain by category

Variability of patients' responses to acupuncture may be one of the reasons for the variety of outcomes in acupuncture treatment and trials. In
addition, acupuncture studies frequently enroll patients with symptoms of pain within broad diagnostic categories without differentiating the pathophysiology (2). Patients diagnosed as suffering from chronic idiopathic pain are comparatively unresponsive to opioid therapy. They have also been found to derive little benefit from acupuncture, or other forms of PSS. Acute nociceptive pain appears to respond well to acupuncture, and this condition is the most frequently treated, especially in physiotherapy. Some improvement is usually gained in chronic nociceptive pain, but it is not always long-lasting, although it has been found to continue for six months or more when electro-acupuncture was used. Cyclic visceral pain, i.e. that of primary dysmenorrhea, may be pre-empted by acupuncture. It is interesting to note that while low-frequency TENS may be used similarly, high-frequency TENS is not effective, but does give relief in dysmenorrhea when there is actual pain (2). The acute pain of surgical dentistry was not pre-emptible (2), although postoperative pain, once developed, may well have been treatable by acupuncture.

Acupuncture is a popular treatment for osteoarthritis, where prolonged administration of analgesics and NSAIDs can lead to gastrointestinal haemorrhage, renal and hepatic toxicity, and increased risk of hypertension. In a review of studies of acupuncture for osteoarthritis (6), the overall conclusion was that acupuncture was not superior to sham needling in obtaining pain reduction. It was uncertain whether sham needling had specific effects similar to acupuncture, or whether the efficacy of both was due to nonspecific (placebo) effects. This would be extremely hard to determine, since the parameters of acupuncture stimulation used in the different studies were even more varied than the types of placebo.

Uncontrolled studies and anecdotal reports favor the use of acupuncture for headache. In an attempt to use acupuncture for migraine prophylaxis, Laitinen (7) reported an excellent initial response with 92% improvement. However, at 6 months, 54% of the patients had lapsed into their pre-acupuncture state. In the treatment of tension headache, acupuncture gave no better results than a variety of other treatments, although the incidence of side effects remains low with acupuncture. Hosenlopp et al. (8) found headaches particularly responsive to placebo treatment. Vincent (9) obtained more than 50% pain reduction with real and "sham" acupuncture, but found no significant difference between the groups.

Most studies observe a greater reduction in the frequency of headache and analgesic consumption rather than in pain severity and duration. However, in comparing acupuncture with physiotherapy, Carlsson and Sjölund (10) found a reduction of pain intensity and muscle tenderness in both groups. In a large study of head and neck pain, Lundeberg et al. (11) found muscle tenderness to be most responsive to acupuncture. In patients with chronic facial pain, acupuncture was compared with occlusal splint therapy and untreated controls (12, 13). Both treatments showed significant improvement over the controls, but there was little difference in effectiveness between them.

Acupuncture treatment has been claimed to bring about improvement in patients with "chronic cervical pain" compared to untreated controls (14), and in an uncontrolled study, 50% of patients attained significant long-term improvement (15). Loy (16) compared electro-acupuncture with physiotherapy, and observed satisfactory improvement in both groups, although response to acupuncture was greater in those with milder than in those with more severe initial symptoms. Thomas et al. (4) compared real and "sham" acupuncture treatments with diazepam and placebo in 44 patients with chronic cervical osteoarthritis, and found that the first three groups experienced pain reduction, with little difference among them.

Economic evaluation
Economic evaluation of treatments is vital in judging optimal use of limited medical resources. It is relevant to acupuncture practitioners working in or alongside health authorities because evidence for economic benefits is essential in persuading such authorities or insurance companies to reimburse practitioners’ fees. Ideally, economic evaluation should be performed alongside randomized controlled trials.

A methodology for analysis has been established. Cost-effectiveness analyses may be used as a basis to compare acupuncture with other treatments. Pain relief by acupuncture may be evaluated against physiotherapy, and blood pressure reduction against that following drug therapy. The question is, “Is a more expensive treatment worth trying, judging by the results?” Cost-utility analysis assesses the quality of life perceived after treatment: “Which treatment is more acceptable to the patients, in money-related terms?” In orthodox medicine, utility is measured by the “Quality Adjusted Life Year”, which multiplies the expected survival in years by the quality of life. Such a score is not appropriate for acupuncture, which, although frequently improving the patient’s sense of well-being, is not thought to influence survival. Adaptations for measuring the utility of complementary medicine are under consideration. (Cost benefit balances the costs of the treatments in monetary terms.)
Risks and adverse events

Acupuncture has become popular to some extent in most western and southeast Asian countries. As an example, there are an estimated 10 million consultations in the US each year. Its use is predominantly in alleviation of pain, but numerous other indications have been proposed (15).

The procedure is often claimed to be totally “harmless”, or at least reasonably safe, but there is a growing recognition that there are risks of adverse events, even death. Improper handling of acupuncture needles or their re-use without adequate sterilization carry the risk of infection. AIDS and hepatitis have been transmitted from patient to patient, and sub-acute bacterial endocarditis and similar infections can result from inflamed needle sites, particularly in ear acupuncture where needles are left in situ for several days. Two fatalities from staphylococcal septicemia were reported by Pierik (17).

An acute asthmatic attack during acupuncture treatment for asthma in Japan resulted in the death of the patient. Although good results are obtained from the use of acupuncture for nausea, patients are warned that in antenatal care acupuncture carries a risk for the fetus in that oxytocin release may be increased, with possible subsequent harmful effects (18).

Serious trauma can result from needle insertion. Pneumothorax is the most common, but several cases of cardiac tamponade have been reported, including one fatality (19). Atlases based on TCM do carry warnings of “dangerous” points and instructions for the depth and angle of needle insertion, which should be scrupulously followed, thus supporting the use of traditional points even when diagnoses are according to biomedical examination. Spinal injury and dermatitis are other reported complications.

Needles may also break in situ, and can migrate to other parts of the body, such as the kidneys, heart, and spinal cord, where they can cause considerable harm. Inadvertent puncture of arterial vessels or nerves can also result in long-term pain problems.

There are few contraindications for the careful use of acupuncture, but patients with a bleeding disorder or on anticoagulants should not be treated, and those with a cardiac pacemaker should not be given electrical stimulation.

A serious and more general concern related to the safety of acupuncture is the competence of the therapist. In several countries acupuncturists are not required to be medically qualified, and since the “philosophy” of acupuncture is not in line with orthodox diagnostic skills, diagnostic categories can be dangerously overlooked. Yet, considering the frequency of treatment, complications and adverse effects appear to be rare, with a low incidence of side effects, especially compared with medical treatment, although there is no solid evidence for assuming that under-reporting is less prevalent than with other therapeutic interventions. Whether or not acupuncture is effective beyond a (powerful) placebo response remains doubtful (20).

Systematic studies to assess the incidence of adverse reactions to acupuncture are essential. Some local surveys have been carried out in Norway and Australia. An international survey to coordinate details of acupuncture treatments is presently being undertaken at Exeter University (21). Identification and analysis of adverse events could reveal predisposing factors and underlying trends that could help determine the safety of future treatments.

References