Acupuncture for Chronic Pain: Individual Patient Data Meta-Analysis
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ABSTRACT

INTRODUCTION: *Despite wide use in clinical practice, acupuncture remains a controversial treatment for chronic pain. The objective of this endeavour was to update an individual patient data meta-analysis to determine the effect size of acupuncture for 4 chronic pain conditions.*

METHODS: *A search was done on MEDLINE and the Cochrane Central Registry of Controlled Trials randomized trials published up until December 31, 2015. Randomised trials of acupuncture needling were included versus either sham acupuncture or no acupuncture control for nonspecific musculoskeletal pain, osteoarthritis, chronic headache, or shoulder pain. Trials were only included if allocation concealment was unambiguously determined to be adequate. Raw data were obtained from study authors and entered into an individual patient data meta-analysis. The main outcome measures were pain and function. An additional 13 trials were identified, with data received for a total of 20,827 patients from 39 trials.*

RESULTS: *Acupuncture was superior to sham as well as no acupuncture control for each pain condition (all P < .001) with differences between groups close to .5 SDs compared with no acupuncture control and close to .2 SDs compared with sham. We also found clear evidence that the effects of acupuncture persist over time with only a small decrease, approximately 15%, in treatment effect at 1 year. In secondary analyses, we found no obvious association between trial outcome and characteristics of acupuncture treatment, but effect sizes of acupuncture were associated with the type of control group, with smaller effects sizes for sham controlled trials that used a penetrating needle for sham, and for trials that had high intensity of intervention in the control arm.*

CONCLUSION*: Acupuncture is effective for the treatment of chronic pain, with treatment effects persisting over time. Although factors in addition to the specific effects of needling at correct acupuncture point locations are important contributors to the treatment effect, decreases in pain after acupuncture cannot be explained solely in terms of placebo effects. Variations in the effect size of acupuncture in different trials are driven predominantly by differences in treatments received by the control group rather than by differences in the characteristics of acupuncture treatment.*

ANALYSIS

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Background Information

The use of acupuncture in the treatment of chronic pain remains controversial. While there are several short-term physiological effects of acupuncture that are relevant to pain (1), there is no explanation of how these effects could persist.

In a previous individual patient data meta-analysis article by these same authors (2), clinically and statistically significant differences were found between acupuncture and control in trials without sham (placebo), with acupuncture found to be significantly superior to sham controls. Although the differences were modest, this suggests the effects of acupuncture are not solely explicable in terms of placebo.

The objective of this paper was to update the findings from a prior individual patient data meta-analysis to determine the effect size of acupuncture for four chronic pain conditions: 1) non-specific musculoskeletal pain; 2) osteoarthritis; 3) chronic headache; and 4) shoulder pain.

Pertinent Results:

With data from the original review and the 13 new RCTs identified, a total of 39 trials, with 20 827 patients, were available. The majority of the studies utilized had an eligibility criteria of 3-6 months minimum pain duration with an average pain duration of pain of 4 years. This data was used to update previously reported analyses of whether the characteristics of acupuncture treatment modified the effect of acupuncture relative to controls. No obvious

association was found between trial outcome and characteristics such as the style of acupuncture, use of fixed versus individualized point selection, or the use of electrical stimulation. There was a dose-response effect, with an increase in effect size of 0.10 per 5 acupuncture treatments in trials with a no acupuncture control group.

In trials comparing acupuncture and sham acupuncture, the largest difference was seen in trials using non-penetrating sham, while the smallest difference was seen in trials using needle penetration as a sham. In trials comparing acupuncture to no acupuncture controls, the authors categorized trials as having a high-intensity, usual care, or low-intensity control group. High-intensity controls included trials where patients received a specified course of treatment guided by a specific protocol. Usual care included trials where patients were able to access whatever care they might be expected to reasonably receive outside of the study. Finally, low-intensity trials included those where patients were not allowed to receive certain treatments that might otherwise be available to them. In trials with high-intensity controls, acupuncture tended to show a smaller effect size than in trials with low-intensity controls, and in trials with usual care controls, acupuncture showed smaller effect sizes than trials with low-intensity control groups.

In studies comparing acupuncture to no acupuncture controls, there was an approximate 15% decrease in acupuncture effect relative to controls at 1-year after randomization (usually 9-10 months after the end of treatment). In studies comparing acupuncture to sham acupuncture, there was an approximate 25% decrease in acupuncture effect 1-year after randomization. It is noteworthy that most of the decreases in acupuncture effects in the analysis seemed to be attributable to the neck pain trials.

CLINICAL APPLICATION & CONCLUSIONS

The results of this study confirm and strengthen previous findings that acupuncture has clinically relevant effects compared with no acupuncture controls. As well, the effects of acupuncture appear to persist over a period of at least 12 months (this is an important take home for clinicians, patients AND third-party payers!). No obvious differences were found in results depending on treatment characteristics such as style of acupuncture, duration of treatment sessions, or training of the acupuncturists.

There was evidence that the effect sizes of acupuncture were smaller for trials using penetrating needles as a sham control or no acupuncture controls where patients also received high-intensity care (for example, acupuncture plus physical therapy versus physical therapy alone). Acupuncture was also found to have higher than average effects on upper body musculoskeletal pain, with the effect sizes for shoulder and neck pain found to be much larger than for low back pain, osteoarthritis, and headache. However, there was also evidence that treatment benefits did not persist as well for neck pain – the reasons why require further study.

The authors contend that the clinical relevance and value of this literature should be determined by studies comparing acupuncture with no acupuncture controls, rather than comparison to sham, as in a clinical setting, the treatment decision is between acupuncture and no acupuncture, not acupuncture and sham. Therefore, they conclude: "Acupuncture is effective for the treatment of chronic musculoskeletal, headache, and osteoarthritis pain. Treatment effects of acupuncture persist over time and cannot be explained solely in terms of placebo effects. Referral for a course of acupuncture treatment is a reasonable option for a patient with chronic pain." (quote from the paper's abstract)

STUDY METHODS

Results from the first study (2) were utilized and combined with data collected from a literature search for eligible RCTs published between December 2008 and December 2015. 13 studies were identified, including 4 trials. Studies were eligible if they:

- included patients with non-specific back or neck pain, shoulder pain, chronic headache, or osteoarthritis;

- used a pain duration of at least 4 weeks;

- included at least one group receiving acupuncture needling and one group receiving either sham acupuncture or a no acupuncture control group; and

- included allocation concealment that was deemed to be adequate.

Principal investigators from included studies were contacted and asked to provide their raw data for use in replicating all analyses to ensure data accuracy. All data was analysed for efficacy of acupuncture versus control and to determine if characteristics of the acupuncture treatment (such as depth of needle penetration, style of acupuncture, etc.) modified treatment effects. Finally, data was analyzed to determine the effect of acupuncture relative to the different types of sham acupuncture via three comparisons: 1) penetrating needle versus non-penetrating needle and non-needle sham; 2) non-penetrating needle versus non-needle sham; and 3) true acupuncture points versus non-acupuncture points among trials using non-penetrating and non-needle sham. A comparison was also performed between the use of deep and shallow needle penetration.

STUDY STRENGTHS/WEAKNESSES

Strengths:

- By combining original data from prior studies the authors were able to perform their meta-analysis on a very large data pool (individual patient data meta-analysis is considered the highest quality evidence).

Weaknesses:

- The data included showed significant heterogeneity, which may affect the applicability of their results.

Additional References:

1. Baeumler PI, Fleckenstein J, Takayama S, et al. Effects of acupuncture on sensory perception: A systematic review and meta-analysis. PLoS One 2014; 9: e113731.
2. Vickers AJ, Cronin AM, Maschino AC, et al. Acupuncture for chronic pain: Individual patient data meta-analysis. Arch Intern Med 2012; 172: 1444-1453.