Acupuncture and related techniques for postoperative pain: a systematic review of randomized controlled trials
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CRD summary
This well-conducted review concluded that acupuncture and related techniques were effective adjuncts for post-operative pain management, but the results would need confirmation in larger well-designed trials. The results should be considered reliable.

Authors’ objectives
To assess the evidence for acupuncture and related techniques for managing postoperative pain in adults.

Searching
MEDLINE, CINAHL, Cochrane Central Register of Controlled Trials and Scopus were searched up to October 2007. The bibliographies of relevant articles were handsearched. Search terms were reported. No language restrictions were applied. Only published studies were considered for inclusion.

Study selection
Eligible studies were randomised controlled trials (RCTs) comparing peri-operative acupuncture with sham or placebo acupuncture for the treatment of post-operative pain in adults (over 18 years). Acupuncture and related techniques were considered, including acupressure, moxibustion and transcutaneous electrical nerve stimulation (TENS) on acupoints. Relevant outcomes were post-operative pain scores and analgesic consumption.

Included studies comprised RCTs that administered acupuncture before or after surgery; one study tested both pre- and post-operative acupuncture. Interventions included manual acupuncture, electro-acupuncture, auricular acupuncture, acupressure and capsicum plasters. The control groups received a variety of sham treatments including sham TENS, mock needle insertion, superficial needling away from known acupoints and light stimulation of non-acupoints. The acupoints used varied among studies according to type of acupuncture and surgical site. Patients were receiving a variety of surgical interventions, most were abdominal surgery and some trials included maxillo-facial surgery, knee surgery, haemorrhoidectomy, back surgery, thoracotomy, hip arthroplasty and molar tooth extraction. The majority of studies used general anaesthetic, a number used local and one study did not specify level of anaesthesia.

Studies were selected by two independent reviewers.

Assessment of study quality
Validity assessment was carried out by two independent reviewers using a modified Oxford Scale. Discrepancies in scoring were resolved by discussion with a third reviewer. The minimum possible score was 0 and the maximum was 7.

Data extraction
Data points were independently extracted by two reviewers for the main outcomes of pain scores and analgesic consumption to calculate a weighted mean difference (WMD) and 95% confidence interval (CI) for each study. Verbal rating pain scores which had been reported as 0-10 scales were converted to 0-100 visual analogue scales (VAS) for analysis. Opioid analgesics were converted to morphine equivalents in milligrams (mg). Data reported as mg/kg was converted to total mg by multiplying the reported dose by the mean weight of the treatment group. Where a trial tested two frequencies for acupoint stimulation and there was no evidence of a significant difference, these data were combined. Authors were contacted for additional data where necessary.

Methods of synthesis
A random-effects model was used to calculate the pooled WMD for continuous outcomes (pain, analgesic consumption) and relative risk ratios (RR) for dichotomous outcomes (side effects: nausea, vomiting, dizziness, pruritis) alongside the associated 95% CIs. Number-needed-to-treat (NNT) was calculated for statistically significant
reductions in opioid-related side effects. Subgroup analysis was performed according to when the acupuncture was
given (pre- or post-operatively). Sensitivity analyses were carried out to explore site of operation, needle use and
including only high quality trials (scoring 5 or more) with adequate blinding.

Results of the review
A total of 15 RCTs were included in this review (n=1,166, of which 668 received acupuncture or related interventions).
All trials used standardised anaesthetic and post-operative analgesia regimes. Ten trials were suitable for meta-analysis;
the remaining five were excluded from numerical analyses due to unsuitable data presentation.

Pain Intensity:
Three trials (n=195) reported significantly lower pain scores at eight hours post-operative assessment in the active
acupuncture group, WMD= -14.57 mm (95% CI: -23.02, -6.13; p=0.00001). The trend continued in the eight trials
(n=529) that reported post-operative pain at 24hrs, but was not statistically significant (although significant
heterogeneity was present, $\Gamma^2$=76.8%, in this group of studies). Three trials (n=139) reported significantly less pain at 72
hours in the acupuncture group, WMD= -9.75 (95% CI: -13.82, -5.68; p=0.00001).

Post operative opioid consumption:
Opioid consumption was significantly lower in the active acupuncture groups at all time points and the morphine-
sparing effect was significantly higher. Three trials (n=195) reported a WMD = -3.14 mg at 8 hrs (95% CI: -5.15, -1.14;
p=0.002), eight trials (n=574) reported a WMD = -8.33 mg at 24 hrs (95% CI: -11.06, -5.61; p=0.00001), and three
trials (n=139) reported a WMD = -9.14 mg at 72 hrs (95% CI: -16.07, -2.22; p=0.010). Again, significant heterogeneity
was present in the eight trials reporting 24 hour data ($\Gamma^2$=49.5%). The morphine sparing effect was 21 per cent at eight
hours, 23 per cent at 24 hours and 29 per cent at 72 hours post-operatively.

Opioid related side effects:
Nausea, pruritis, dizziness, incidence of sedation and urinary retention occurred significantly less often in the active
treatment group. Vomiting occurred less often in the active group, but the difference was not statistically significant.

Other results:
No significant difference in length of recovery room stay was noted between treatment groups. There were no
significant differences in the numbers of side effects reported; all side effects resolved spontaneously. Subgroup and
sensitivity analyses were performed, but did not substantially change the original results.

Authors' conclusions
Acupuncture and related techniques are effective adjuncts for post-operative pain management, but the results should
be interpreted in the light of small sample sizes, variation in intervention and inconsistent reporting of the primary data.

CRD commentary
This review addressed a clear but broad clinical question with relevant inclusion criteria. The searches might have
benefited from including specialist databases, such as AMED, that cover complementary and alternative medicine in
particular. A lack of searches targeting the grey literature may also have contributed to the possible presence of
publication bias. This was not tested for as the authors claimed that tests of publication bias were unreliable. Although
no language restrictions were applied, all of the included studies were published in English suggesting that the Chinese
language databases may not have been searched fully. The methodology of this review was well reported and in general
reviewer error and bias is likely to have been minimised by using independent screening/quality assessment and data
extraction. The thorough meta-analysis took into account methodological quality and surgical site. However, the role of
the varying sham acupuncture treatments did not appear to be explored statistically. In some analyses the presence of
significant heterogeneity appears to have been missed, but this was unlikely to affect the general trend of results.
Overall this was a well-conducted review that drew appropriately cautious conclusions given the small number of
studies and relatively small sample sizes.
Implications of the review for practice and research

Practice: the authors stated that peri-operative acupuncture may be a useful adjunct for post-operative analgesia.

Research: the authors stated that further research should examine pre- versus post-operative acupuncture effects to establish the optimal timing and duration of stimulation. Studies should incorporate longer periods of follow-up to evaluate the efficacy of acupuncture in preventing the development of chronic pain. Trials could also compare different choices of acupuncture points and stimulation techniques, and should report on analgesic efficacy, reduction of opioid-associated side effects and duration of recovery room stay.

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