Acupuncture for cancer-induced bone pain: a pilot study

INTRODUCTION
Metastatic bone pain in cancer is often severe, unremitting and poorly controlled, and the drugs used to control the pain can have unpleasant side effects. Patients may survive months or years after diagnosis and therefore it is important for them to enjoy as high a quality of life as possible. Acupuncture represents a potential adjunctive treatment for cancer-induced bone pain (CIBP) and yet a recent Cochrane Review and an earlier systematic review found no studies investigating its use in CIBP. There is also a lack of information about the suitability of acupuncture for these patients. The primary aim of this pilot study was to investigate tolerability, safety and patient satisfaction with a single acupuncture treatment on patients with CIBP in order to inform the design of a larger feasibility trial.

METHODS
A non-randomised design was used with a convenience sample of 10 patients with CIBP. Ethics approval was obtained from Leeds Central Research Ethics Committee (ref: 08/H1313/65) and NHS permission was given to recruit cancer outpatients within Airedale NHS Foundation Trust.

Patients were identified by consultants as experiencing significant pain from bony metastases with global average pain intensity of ≥3 on a Numerical Rating Scale (NRS). This level corresponds closely with findings that patients quantify severe pain as being ≤35 mm on a Visual Analogue Scale. Patients were screened to ensure that they met additional eligibility criteria of having a prognosis of 3 months or more, no prior experience of acupuncture and an Eastern Cooperative Oncology Group (ECOG) status of 1 or 2.

Eligible patients were approached during routine clinic visits and were given an information sheet. After 2 days they were telephoned to confirm their participation. Signed, informed consent was obtained at a study appointment and a baseline assessment was carried out. Present pain intensity (PPI) at rest and during the performance of a self-selected painful movement was measured using NRS.

Patients were assessed for acupuncture and were positioned so that comfort, support and safety could be
Letters

Acupunct Med March 2011 Vol 29 No 1

maintained. One treatment of acupuncture was given using a minimum of four points and lasting approximately 20 min. Decisions on point selection were made according to the site of the painful bony metastases, the segmental distribution of pain and the presence of myofascial trigger points. Ten minutes after needle insertion the NRS for resting pain was repeated and scores on the Treatment Satisfaction Questionnaire (TSQ) adapted from the Pain Treatment Satisfaction Scale8 were collected. After removal of the needles the pain and TSQ scores were repeated. After 48 h, telephone follow-up was made to record pain scores on rest and movement.

RESULTS

Only 12 patients were screened over a period of 16 months. Reasons for the low screening rate included patients not meeting the eligibility criteria, being missed in clinic, not meeting the pain eligibility criteria or becoming too ill. Of the patients screened, six did not enter the study for reasons including medical complications and hospital admission. Of the six patients entering the study, one deteriorated and had to withdraw. Five patients, three males and two females, completed the study. The age of patients was 57–81 years. The primary cancer sites were breast (n=2), prostate (n=3) and colon (n=1). The sites of bony metastases were widespread but included the spine, pelvis and ribs.

All five patients responded that they were either ‘very satisfied’ or ‘satisfied’ to all questions on the TSQ both during and after treatment, which included questions on comfort, positioning and treatment duration. No adverse events were reported.

All patients preferred side-lying or elevated side-lying. Needle placement and selection of needle thickness and length was recorded using STRICTA guidelines.9 The area immediately over and adjacent to the spine was avoided where spinal metastases were present in case of vertebral instability, but otherwise points were selected according to pain patterns and segmental distribution.

Global average resting pain scores over the previous week were recorded at screening (baseline) and PPI at rest recorded before, during, immediately after and at 48 h as shown in figure 1. Mean resting pain intensity immediately before treatment was 4.3 and this reduced to 0.8 during and post-treatment. When resting pain intensity was recorded 48 h following treatment the mean intensity was 3.2.

Three patients said they experienced movement-related pain. Pain intensity scores recorded during their selected painful movement pre and post-treatment and at 48 h are shown below (table 1).

At 48 h follow-up one patient reported an improvement in sleep quality and another reported pain relief for approximately 2 h post-treatment. Three patients requested a course of acupuncture and were referred to their general practitioner.

DISCUSSION

All CIBP patients tolerated a single acupuncture treatment with no adverse effects and indicated that they were satisfied with the treatment. This study was not designed to investigate intervention effect, although it was observed that patients reported a reduction in resting and movement-related pain during and immediately after acupuncture. The pain results are consistent with anecdotal evidence that acupuncture analgesia is short-lived in this patient group and regular treatments are necessary to maintain effective pain relief.10 As the sample was small and patients were willing volunteers we cannot discount the possibility of a placebo effect.

Individualised point selection was used because it reflects normal clinical practice. Acupuncture dose was guided by minimum criteria for intervention adequacy developed by White et al as needling for at least 20 min using at least four points.11 Needles were rotated multi-directionally every 5 min during treatment to maintain stimulation. Some patients verbally reported needle sensations (de qi), but these were not formally recorded. So-called ‘strong’ points, such as LI4, were not used because these patients had not experienced acupuncture before and it was not known whether they would be strong

![Figure 1](image-url) Global average resting pain scores over the previous week recorded at screening (baseline) and PPI at rest recorded before, during, immediately after treatment and at 48 h post-treatment.

<table>
<thead>
<tr>
<th>Table 1 Movement-related pain</th>
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<tbody>
<tr>
<td>N=3</td>
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<tr>
<td>Patient 1</td>
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<td>Mean</td>
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Acup, acupuncture; PPI, present pain intensity.
reactors. Normally, patients would receive a course of treatment and evidence indicates that regular ‘top-ups’ are more effective in achieving sustained analgesia via low-frequency stimulation of Aδ fibres.12 13

Animal studies suggest that CIBP is a unique pain state, resulting from hyper-excitable dorsal horn cells and involving both inflammatory and neuropathic mechanisms.14–18 Acupuncture may produce rapid short-term analgesia via inhibition of central nociceptive transmission and reduction in central sensitisation,18 19 or sustained analgesia via upregulation of opioid receptors and release of inhibitory neuromodulators in the dorsal horn, which reduces activity in wide-dynamic range and nociceptive-specific neurons.18 20 Analgesia may also be maintained by a positive feedback loop in the meso-limbic system21 22 and a via a placebo response resulting from treatment expectancy and patient-therapist interactions.23–25

The slow recruitment rate and resultant small sample size limits generalisation of the findings. Similar difficulties were experienced in a study investigating the use of transcutaneous electrical nerve stimulation for CIBP.26 Patients must be well enough to undergo acupuncture treatment and psychologically able to cope with another intervention on top of extensive regimes of oral drug therapy, chemotherapy and radiotherapy. The use of additional recruitment sites, such as specialist palliative care services and improving patient screening, might increase recruitment rates in future studies.

CONCLUSIONS

This study indicates that acupuncture is well tolerated and safe in a small group of patients suffering from CIBP. Patients reported decreases in their pain both at rest and on movement during and immediately after treatment, although the sample size was too small to draw any conclusions from the results and a placebo effect cannot be discounted. In future studies, considerations should be given to improving recruitment rate by increasing the number of research sites and improving identification of eligible patients.

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