

Acupuncture for the relief of cancer-related breathlessness

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The palliation of cancer-related breathlessness is challenging and complex. An open pilot study was conducted, exploring the safety and efficacy of acupuncture in 20 patients who were breathless at rest and whose breathlessness was directly related to primary or secondary malignancy. Sternal and LI4 acupuncture points were used. Outcome measures included pulse, respiratory rate, oxygen saturation and patient-rated visual analogue scales of breathlessness, pain, anxiety and relaxation. At each time point the mean values of the variables were calculated and compared to their pre-treatment levels (Student's *t*-test). Seventy per cent (14/20) of patients reported marked symptomatic benefit from treatment; there were significant changes in VAS scores of breathlessness, relaxation and anxiety at least up to 6 hours post acupuncture which were measured to be maximal at 90 minutes ($p < 0.005$, $p < 0.001$, respectively). There was a significant reduction in respiratory rate, which was sustained for 90 minutes post acupuncture ($p < 0.02$). The therapeutic value of acupuncture in the management of breathlessness requires further evaluation.

Mots-clés: acuponcture; dyspnée; traitement palliatif; néoplasmes

Pallier l'essoufflement dû au cancer est à la fois stimulant et complexe. Un avant-projet ouvert était entrepris pour examiner la sécurité et l'efficacité de l'acuponcture en ce qui concerne 20 patients qui étaient essoufflés au repos et dont l'essoufflement était en relation directe avec une malignité primaire ou secondaire. On s'est servi des points d'acuponcture sternaux et LI4. Les mesures de résultat comprenaient le pouls, la fréquence respiratoire, la saturation en oxygène et les échelles d'analogie visuelle complétées par le patient quant à l'essoufflement, la douleur, l'anxiété et la relaxation. A chaque point dans le temps, les valeurs moyennes des variables ont été calculées et comparées à leurs niveaux de pré-traitement (*t*-test d'étudiant). 70% (14/20) des patients ont signalé un bienfait symptomatique net du traitement. Des modifications significatives ont été constatées dans les scores d'échelles d'analogie visuelle (VAS pour *Visual Analogue Scales*) quant à l'essoufflement, la relaxation et l'anxiété jusqu'à 6 heures au moins après l'acuponcture. Ces scores ont été constatés à leur maximum après 90 minutes ($p < 0.005$, $p < 0.001$, respectivement). On a également constaté une réduction significative de la fréquence respiratoire, réduction soutenue pendant 90 minutes après l'acuponcture ($p < 0.02$). Une évaluation complémentaire de la valeur thérapeutique de l'acuponcture pour la gestion de l'essoufflement est recommandée.

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Introduction

Breathlessness is a relatively common symptom in patients with advanced cancer and, once specific disease-orientated measures are exhausted, it can be very difficult to treat.^{1,2} Symptom relief has been reported during and after acupuncture in breathless patients with non-malignant disease. In a trial of acupuncture, patients with chronic obstructive pulmonary disease were randomized to receive either traditional, individually tailored Chinese acupuncture or placebo acupuncture in the knee.³ There was significant improvement in both mean subjective breathlessness scores and mean six minute walking distance in the group of 12 patients who received traditional Chinese acupuncture, but not in those in the placebo acupuncture group. Acupuncture used empirically, at the Royal Marsden Hospital, in breathless patients with cancer has provided subjective relief for up to two weeks.

Patients and methods

A pilot study has been conducted to assess the objective and subjective effects of acupuncture in 20 patients with cancer-related breathlessness. Patients with breathlessness refractory to stable combinations of medication were eligible. All were aged over 18 years and were breathless at rest due to known primary or secondary malignancy. Patients with thrombocytopenia or significant mechanical obstruction, for example superior vena caval obstruction, were excluded.

Please circle the number that most accurately describes your breathlessness at this particular time.

0	Not at all
0.5	Very, very slight (just noticeable)
1	Very slight
2	Slight
3	Moderate
4	Somewhat severe
5	Severe
6	
7	Very severe
8	
9	Very, very severe (almost maximal)
10	Maximal

Figure 1 Borg scale

Table 1 Visual analogue scale indices

VAS indices	0	10
Breathlessness	Not at all breathless	Worst ever breathlessness
Pain	No pain	Worst ever pain
Anxiety	Not anxious	Worst ever anxiety
Relaxation	Fully relaxed	Not at all relaxed

Ethical Committee approval and written, informed consent were obtained.

Prior to acupuncture, patients completed two dyspnoea scales, namely a 10 centimetre visual analogue scale and the Borg scale⁴ (Figure 1), the Hospital Anxiety and Depression Scale (HAD)⁵ and 10 centimetre visual analogue scales (VAS) of pain, anxiety and relaxation (Table 1). Pulse rate and oxygen saturation were recorded using pulse oximetry, and the respiratory rate (mean of 2 minutes) was measured.

Four fine needles (36g) were inserted by an experienced acupuncturist (JF); two in the upper sternum 1–2 centimetres apart (Figure 2); and one in each hand in the traditional point LI4. The needles were flicked through an introducer and the sternal needles were advanced to touch the periosteum, but no further stimulation was employed. JF then left the patient. All needles were left in situ for 10 minutes, then JF returned and removed the needles. In two patients with marked lymphoedema of the arm point LI4 was avoided in the affected limb; point ST36 in the leg was substituted in one of the two cases.

A nurse observer remained with the patient throughout the first 90 minutes of the study.



Figure 2 Siting of sternal needles

Where possible the study was conducted in a side-room or in a four-bedded bay with the curtains drawn around the patient's bed. To avoid diurnal variation, all patients were treated between 1300 hours and 1400 hours at a time when noise and interruptions were as infrequent as possible. The patients were told that nurse-patient interaction would be minimal. The objective and subjective assessments, with the exception of the HAD, were repeated 10, 15, 30, 60 and 90 minutes after acupuncture. In addition, pulse oximetry and respiratory rate were measured 5 minutes after needle insertion and each patient completed the subjective scales 6 and 24 hours later. At each time point the mean values of the variables were calculated and compared to their pre-treatment levels by means of the Students *t*-test. Changes in the breathlessness VAS and mean respiratory rate (pre-treatment values 12.5–77 and 14.5–37 respectively) were reported as mean percentage changes from pre-treatment values. The absolute fall in these variables was also calculated and showed a similar pattern of improvement.

Results

Most of the patients studied were female (male:female = 7:13) and the median age was 60 years (range 20–80 years). The median length of survival following treatment was 32.5 days (range 1–263 days). Other patient characteristics are shown in Tables 2 and 3.

Minimal nurse-patient interaction was maintained in those cases where patients felt relaxed

Table 2 Patient characteristics (*n* = 20)

Primary diagnoses	Numbers (%)
Carcinoma lung	9 (45%)
Carcinoma breast	7 (35%)
Carcinoma colon	1 (5%)
Testicular teratoma	1 (5%)
Carcinoma ovary	1 (5%)
Unknown primary	1 (5%)
Pulmonary pathology	
Pulmonary mass(es)	8 (40%)
Pulmonary mass + lymphangitis	3 (15%)
Pulmonary mass + pleural effusion	4 (20%)
Pulmonary mass + lobular collapse	2 (10%)
Pleural effusion(s)	2 (10%)
Lymphangitis	1 (5%)

Table 3 Patient medication (*n* = 20)

Medication*	Numbers (%)
Steroids	14 (70%)
Benzodiazepines	5 (25%)
Bronchodilators	6 (30%)
Oxygen	1 (5%)
Opioids	17 (85%)

*Groups are not mutually exclusive

and calm and reported subjective benefit from the treatment (14/20). The remainder of the patients were more likely to discuss their fears and anxieties; one patient became distressed and tearful. For professional and ethical reasons the nurse engaged in conversation with these patients.

The mean absolute scores of the outcome measures over the whole study period are shown in Table 4. Patient-rated changes up to 6 hours post-acupuncture are shown in Figures 3 and 4. There were significant improvements in breathlessness, relaxation and anxiety up to 90 minutes post-acupuncture. The 31% fall in patient rated VAS of breathlessness at 90 minutes ($p < 0.005$) was mirrored by a one point fall in the Borg score ($p < 0.005$) at the same time point. There was significant improvement in levels of relaxation and anxiety at 90 minutes ($p < 0.005$ and < 0.001 respectively). A high correlation between the breathlessness VAS and the anxiety VAS ($r = 0.52$; $p < 0.001$) was identified. When the change from pretreatment scores was considered, the correlation was even stronger ($r = 0.63$; $p < 0.001$).

There was no correlation between the anxiety score on the HAD scale and the effect of acupuncture on breathlessness ($r = -0.14$). Objectively, the most significant finding was reduction in respiratory rate (Figure 5) which was sustained for the 90 minutes during which it was measured ($p < 0.02$ at 90 minutes). Pulse rate and oxygen saturation did not alter appreciably from baseline ($p > 0.1$ and $p > 0.1$ respectively).

In addition to changes in the formal subjective measures, 70% (14/20) of patients reported marked symptomatic relief following acupuncture. Part-way into the study, in an attempt to prolong symptom relief, two indwelling studs were placed in the sternal points alone (Figure 6) of 8/14 patients who reported global relief of breathlessness during the study. Patients were encouraged

Table 4 Mean \pm SD of absolute scores over study period

Measures	Timing (<i>n</i> *)								
	pre	5 min	10 min	15 min	30 min	60 min	90 min	6 h	24 h
<i>Patient-rated</i>									
VAS breathlessness (0–100)	41.8 \pm 27.9	–	23.7 ^a \pm 12.9	24.0 \pm 14.7	23.1 ^a \pm 15.6	25.8 ^b \pm 17.0	24.1 ^b \pm 15.5	27.1 ^d \pm 16.9	39.1 ^c \pm 19.1
Borg (0–10)	2.75 \pm .79	–	1.65 \pm 1.08	1.53 \pm 1.09	1.60 \pm 1.2	1.58 ^a \pm 1.3	1.79 ^a \pm 1.3	2.23 ^c \pm 1.2	2.9 ^c \pm 1.7
VAS relaxation (0–100)	30.6 \pm 27.0	–	21.6 \pm 21.9	20.3 \pm 22.8	20.7 ^a \pm 20.7	21.2 ^a \pm 19.6	19.1 \pm 19.7	21.4 ^c \pm 21.1	30.0 ^c \pm 23.3
VAS pain (0–100)	13.5 \pm 20.3	–	11.7 \pm 17.3	10.9 \pm 16.4	10.1 ^a \pm 14.5	10.6 ^a \pm 15.7	8.7 ^a \pm 13.9	16.0 ^c \pm 21.7	15.4 ^c \pm 22.0
VAS anxiety (0–100)	30.5 \pm 24.8	–	17.5 \pm 21.0	15.9 \pm 19.1	17.0 ^a \pm 19.0	17.7 ^a \pm 20.7	12.3 ^a \pm 14.5	18.4 ^a \pm 19.3	22.1 ^c \pm 21.4
<i>Observer-rated</i>									
Pulse rate (min ⁻¹)	101 \pm 13.3	95.8 \pm 12.7	96.8 \pm 14.6	96.5 \pm 17.3	96.3 \pm 14.7	98.6 \pm 16.0	97.7 \pm 16.0	–	–
O ₂ saturation (%)	91.1 \pm 6.5	90.8 \pm 6.2	90.6 \pm 6.3	90.6 \pm 6.8	91.0 \pm 6.2	91.0 \pm 7.2	91.7 \pm 6.2	–	–
Respiratory rate (min ⁻¹)	22.3 \pm 4.7	18.7 \pm 3.3	19.7 \pm 5.3	19.3 \pm 4.2	18.9 \pm 3.9	20.3 \pm 5.1	19.5 \pm 3.8	–	–

Note: * *n* = 20 unless otherwise stated: a) *n* = 19, b) *n* = 18, c) *n* = 15, d) *n* = 14

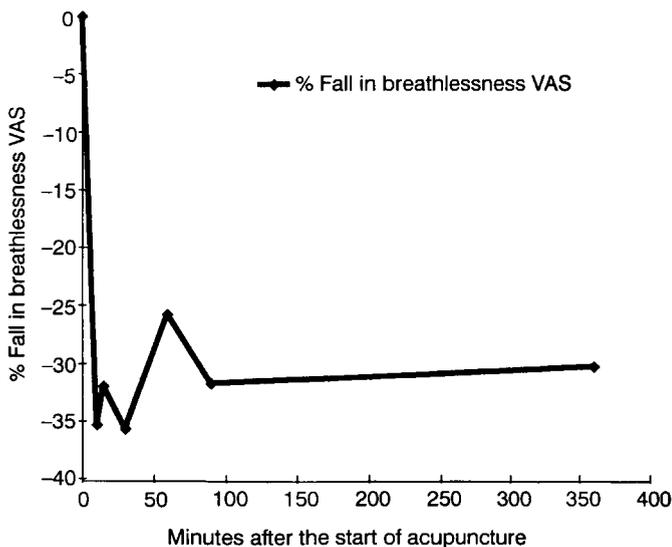


Figure 3 Percentage change in VAS breathlessness over the study period

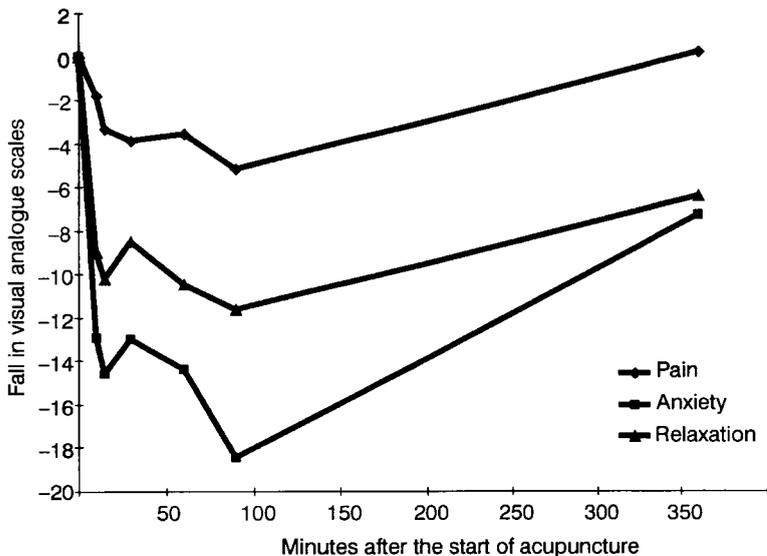


Figure 4 Change in visual analogue scales: pain, anxiety and relaxation over the study period

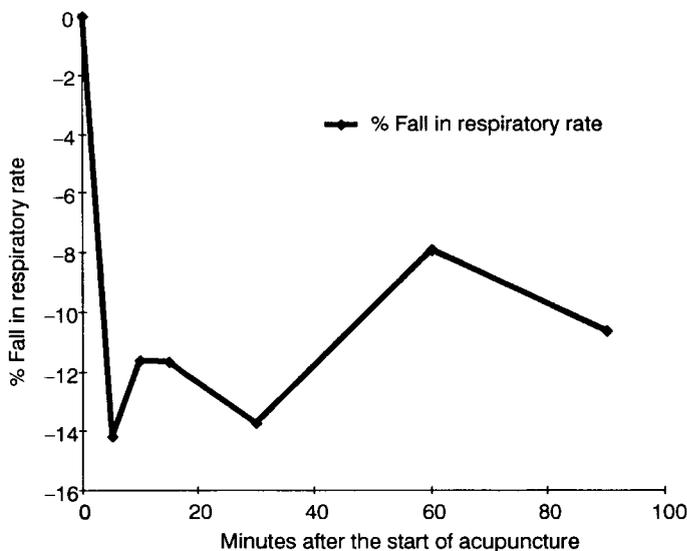


Figure 5 Percentage fall in respiratory rate over the 90 minute objective study period

to massage the studs for 2–3 minutes in the event of a breathless ‘panic attack’ or impending exercise such as going to the toilet. All reported some benefit lasting up to two weeks, but this was not formally assessed.

Discussion

Breathlessness caused by malignant disease can be a distressing symptom which is extremely difficult to palliate. It is only comparatively recently

that any attempt has been made to evaluate the commonly prescribed interventions, namely opioids⁶ and oxygen therapy.⁷ In this pilot study, a simple form of acupuncture gave marked symptomatic relief in 14/20 patients who were breathless at rest, most of whom were receiving opioids.

Acupuncture has been found to be useful in the management of a wide variety of conditions.⁸ It is known to increase levels of both endogenous opioids and 5-hydroxytryptamine, and to have autonomic effects.^{9,10} The mechanisms underlying

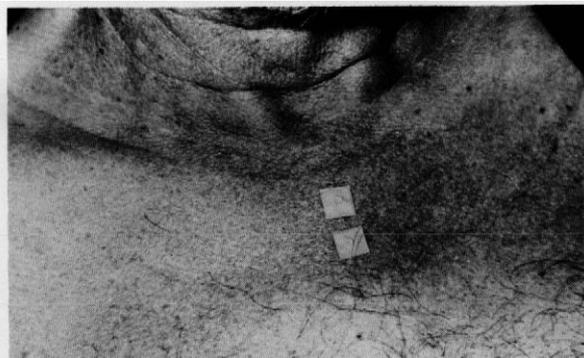


Figure 6 Siting of indwelling studs

the symptom of breathlessness are complicated and ill-understood and the interaction between opioids and respiration is complex. Any therapeutic effect of acupuncture on breathlessness could be due, at least in part, to increased endogenous opioid secretion.

Some of the symptomatic improvement achieved in this pilot study could be due to a placebo effect, particularly since a nurse remained with each patient throughout the procedure and for 90 minutes after. In retrospect, it is unfortunate that data were not collected at intervals between the 90 minute and the 6 hour time points. We think it unlikely that a placebo effect could account for all the objective and subjective changes observed in this study, but acknowledge that this should be investigated in a randomized study.

In this study, a trained nurse spent over one and a half hours with each patient and this has obvious cost implications. Nevertheless, the actual procedure is cheap since each acupuncture needle cost only 12 pence and the procedure is short and thus not expensive in terms of the practitioner's time. The treatment was well tolerated by all the patients studied.

Breathlessness is usually a poor prognostic sign in patients with advanced malignant disease, as reflected by the short median survival of the patients in this study. It is possible that any beneficial effect of acupuncture might be more sustained in patients with less severe breathlessness. This therapeutic intervention requires further evaluation in this patient population and in breathless patients with non-malignant disease.

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