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ORIGINAL ARTICLE / ОРИГИНАЛНИ РАД

Effect of auricular point acupressure combined with three-step analgesic therapy on cancer pain

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SUMMARY

Introduction/Objective The objective was to evaluate the effect of auricular point pressing with beans combined with three-step analgesic therapy on cancer pain.

Methods Sixty patients with cancer admitted to the Ganzhou Cancer Hospital from January to December 2021 were selected and randomly divided into experimental and control groups. The control group received three-step pain relief and routine care, while the experimental group was treated with auricular point acupressure combined with three-step analgesic therapy. The pain intensity was assessed by a numerical rating scale (NRS) at 0, 24, 48, and 72 h after treatment, and the incidence of adverse reactions was recorded.

Results The NRS score of the experimental group was lower than that of the control group ($F_{treatment} = 105.521$, $p = 0.001$). The difference in NRS scores before and 24, 48, and 72 h after treatment was statistically significant ($F_{time} = 335.521$, $p = 0.001$). The number of eruption pain cases in the experimental group and the control group was found to be statistically significant ($\chi^2 = 10.767$, $p = 0.001$), and the occurrence of eruption pain in the control group was more severe than that in the experimental group ($Z = -4.472$, $p = 0.001$). The incidence of adverse reactions in the experimental and control groups was 3.33% and 30%, respectively, and the difference was statistically significant ($\chi^2 = 12.738$, $p = 0.001$).

Conclusion The combination of auricular point pressing and three-step ladder analgesic therapy can significantly improve the pain of cancer patients.

Keywords: cancer pain; pain relief; auricular point pressing; three-step analgesic therapy

INTRODUCTION

Cancer pain is pain caused by cancer, cancer-related lesions, and anticancer treatment; it can occur at all tumor stages [1]. According to statistics, half of the 10 million new patients with cancer worldwide each year will experience painful reactions. Also, up to 70% of patients in advanced stages will experience painful symptoms [2, 3]. As one of the most common symptoms in these patients with cancer, pain leads to various physical and psychological problems, seriously affecting the quality of life [4]. Currently, the treatment of cancer pain is based on the 'three-step analgesic therapy' (TSAT) recommended by the World Health Organization, in which strong opioids are the main drugs used to treat moderate to severe cancer pain. Although the pain can be controlled to a certain extent, analgesics can produce obvious adverse reactions, drug resistance, or addiction that can sometimes necessitate discontinuation or adjustment of the original therapy [5, 6].

It has been shown that the incidence of constipation in patients receiving oral opioids for chronic cancer pain ranges 40–70%, with two-thirds of patients experiencing nausea and vomiting [7]. Therefore, taking appropriate nursing measures to effectively relieve the pain of patients with cancer is the focus of our attention.

Ear acupoint embedding is a traditional Chinese medicine (TCM) technique that stimulates ear acupoints, unblocks meridians, and regulates the qi and blood of the internal organs [8]. As one of the common techniques in TCM, it is easy to operate, inexpensive, noninvasive, and popular with the public [9]. Auricular point acupressure has positive effects in controlling multiple mechanisms of pain [10, 11]. A study demonstrated that integrating auricular point acupressure into nursing care for patients with cancer-related pain led to a 38% reduction in pain, as well as improvements in fatigue and sleep disturbance [10]. Stimulation of ear points may cause a broad spectrum of systemic effects, such as modulation of inflammatory cytokine levels, which may explain pain relief [12]. Stimulating auricular acupoints can regulate the secretion of central neurotransmitters, thereby activating the analgesic system in vivo [13]. In other words, it exerts a pain-relieving effect by activating the downward pain inhibitory pathway and thus inhibiting the upward pain pathway in the brainstem [14]. The effectiveness of auricular point pressing in preventing symptoms caused by opioid drugs remains unclear. However, auricular point acupressure has demonstrated efficacy, leading to a 24% reduction in any type of pain medication usage and a 19% decrease in opioid usage [10].

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Because it is simple, inexpensive, and has no negative side effects, auricular point acupressure can be widely disseminated as an alternative to opioids. Therefore, this study aimed to evaluate the effect of auricular point pressing with beans combined with TSAT on cancer-related pain.

METHODS

Study subjects

Sixty patients who met the criteria as inpatients of the Ganzhou Cancer Hospital from January to December 2021 were selected as study subjects. This study used a simple randomization method. Participants were divided into 30 cases each in a control group and an experimental group, according to the random number table method.

Inclusion criteria: (1) patients who were clinically diagnosed with malignancy and met the diagnosis of cancer pain; (2) patients who were able to cooperate with pain scoring; (3) age ≥ 18 years and ≤ 70 years; (4) patients with a survival period of ≥ 3 months; (5) those with tumor staging system stage III–IV; (6) the study subjects and their families gave their informed consent to participate in this study and signed an informed consent form.

Exclusion criteria: (1) pain not caused by cancer after examination; (2) allergy or other serious adverse reactions to analgesic drugs; (3) gastrointestinal bleeding, pregnancy, acute abdominal conditions, and individuals with severe cardiovascular disease; (4) non-cooperative individuals, such as patients with psychiatric conditions and those with communication difficulties.

Withdrawal criteria: (1) patients with cancer pain who were unwilling or unable to continue to cooperate with the study for various reasons; (2) patients with unexpected death unrelated to their condition.

Study tools

A numerical rating scale (NRS) was used to assess the pain intensity of patients before and after treatment. The NRS is a method of assessing pain by dividing a straight line into 10 equal parts, each with a number of 0 to 10 indicating the degree of pain in increasing order; 0 was classified as no pain and 10 as the most severe pain imaginable. The pain level was classified as follows: 1–3 as mild pain, 4–6 as moderate pain, and 7–10 as severe pain. Breakthrough cancer pain was determined by referring to the diagnostic criteria in the Experts' Consensus on Breakthrough Cancer Pain in 2019 [15], and patients were considered to have had a single episode of explosive pain when their pain score exceeded 4.

Treatment methods

Control group

Patients received TSAT and routine care according to WHO Guidelines [16]. Patients were classified into mild (1–3), moderate (4–6), and severe (7–10) pain according to the pain assessment at the time of admission, and a three-step analgesic principle was adopted. Patients with mild pain were mainly given non-steroidal anti-inflammatory drugs, such as ibuprofen and acetaminophen. Patients with moderate pain were given weak opioids, mainly oral tramadol hydrochloride or oxycodone tablets. Patients with severe pain were given strong opioids, mainly morphine hydrochloride extended-release tablets, and the application of painkillers was increased from weak to strong.

Experimental group

Under the guidance of the TCM physician and on the basis of the TSAT combined with the auricular acupuncture-point bean burial method, a nurse performed auricular acupuncture-point bean burial on the patients. The main acupuncture points were Shenmen and Jiaoshen, and the supporting acupuncture point was the Ashi point, which is the mapping position of the painful area in the ear's acupuncture point. Once the patient was placed in a comfortable position, the nurse held a probe, found the corresponding sensitive point in one ear, and located the acupuncture point; then, they selected the Jiaoshen, Shenmen, and Ashi point, disinfected the skin of the auricle with 75% ethanol and used forceps to uncover Vaccariae Semen seed, which they pasted onto the corresponding acupuncture point. Using the thumb and index finger to pinch and rotate the seed, it was pressed for 5–10 minutes each time so that there was localized soreness and swelling or slight pain. It was pressed 3–5 times a day for three days. If the patient felt increased pain, the number of presses was increased.

Observation indicators

Pain level: Immediately after admission, the responsible nurse conducted pain assessments for all patients, assessing whether the patients were in pain, the nature, location, and intensity of pain and whether pain medication was applied. The nurse in charge assessed and recorded the pain 0, 24, 48, and 72 h after admission.

Patients with breakthrough pain

Breakthrough cancer pain typically refers to a transitory flare of pain in the setting of chronic pain managed with opioid drugs [17]. Pain management was given once according to the location and nature of the pain, and pain medication was reassessed, including oral pain medication for 60 min, intramuscular or subcutaneous pain medication for 30 minutes, and intravenous pain medication for 15 minutes. The number of breakthrough pains 72 hours after admission was recorded using a patient's diary card.

Occurrence of adverse reactions

The occurrence of adverse reactions, including drowsiness, constipation, vomiting, and dizziness, was recorded for both groups. The incidence of adverse reactions = the

number of cases of adverse reactions / total cases × 100%. The occurrence of adverse reactions 72 hours after admission was recorded using a patient's diary card.

Statistical analysis

Data were statistically analyzed using IBM SPSS Statistics, Version 22.0 (IBM Corp., Armonk, NY, USA). The measurement data were expressed as x ± s, and an independent-samples t-test was used to compare the two groups. Repeated-measures data were analyzed using a repeated-measures variance analysis (ANOVA). Count data were expressed as the number of cases and percentages, and a χ^2 test and a rank-sum test were used for comparisons between the groups. All differences were considered statistically significant at $p < 0.05$.

This study was conducted in accordance with the Declaration of Helsinki and approved by the ethics committee of Ganzhou Cancer Hospital. The ethical number is (2023) kelunshen (No. 8). Written informed consent was obtained from all participants.

RESULTS

General information

There were 30 cases in the control group, of which 12 were male, and 18 were female, aged 54.87 ± 8.5; and 30 cases in the experimental group, of which 14 were male, and 16 were female, with a mean age of 52.53 ± 9.9 years. The differences in age (t = 1.086, p = 0.286), sex (Z = -0.471, p = 0.637), tumor site (Z = -0.000, p = 1.000), tumor staging (Z = -0.805, p = 0.421), and usage of analgesics (Z = -0.753, p = 0.451) between the two groups were not statistically significant and were comparable (see Table 1).

Comparison of pain scores between the two groups of patients 24, 48, and 72 hours after treatment

A one-way repeated-measures ANOVA was used to determine the effect of applying auricular acupuncture bean burial combined with TSAT on the NRS scores of patients with cancer pain after three days. In summary, there was no interaction effect between the treatment and time factors ($F_{interaction} = 2.231$, $p = 0.450$), so the main effect was analyzed directly. Different treatments had different effects on the NRS scores of the patients with cancer pain, and the NRS scores of the experimental group were lower than those of the control group ($F_{treatment} = 105.521$, $p = 0.001$). The differences in NRS scores before treatment and at 24, 48, and 72 h after treatment were statistically significant ($F_{time} = 335.521$, $p = 0.001$). The NRS scores in the experimental group were (4.7 ± 1.7) before treatment and (2 ± 0.26) 24 hours after treatment, with a statistically significant difference of 2.33 (95% CI: 2.15–2.61) points lower than before treatment (t = 5.596, p = 0.000). The NRS score at 48 and 72 hours post-treatment was (1.9 ± 0.3), 2.76 (95% CI: 2.54–2.88) points lower than before treatment and 0.13 (95% CI: 1.86–2.07) points lower than 24 hours post-treatment; both values showed statistically significant differences (t = 1.884, p = 0.045) (see Table 2).

Comparison of the number of pain episodes between the two groups

The results showed that the cases of pain episodes in the experimental group were significantly less than those of the control group ($\chi^2 = 10.767$, $p = 0.001$). Additionally, the number of pain episodes in the control group was significantly more than in the experimental group (Z = -4.472, p = 0.001), indicating that auricular point pressing combined with TSAT could effectively relieve the pain levels of patients with cancer pain (see Table 3).

Table 1. General comparison of patients in both groups (x ± s)

Group		Control group	Experimental group	t/Z value	p-value
Case		30	30		
Age		54.87 ± 8.5	52.53 ± 9.9	t = 1.086	0.286
Sex	Male	12	14	Z = -0.471	0.637
	Female	18	16		
Tumor site	Head and neck	4	4	Z = 0.000	1.000
	Chest	6	10		
	Abdomen	19	11		
	Other	1	5		
Tumor staging	III	9	12	Z = -0.805	0.421
	IV	21	18		
Analgesics	Yes	27	25	Z = -0.753	0.451
	No	3	5		

Table 3. Comparison of breakthrough cancer pain in the two groups (n)

Group	No. of breakthrough pain	Occurrence of breakthrough cancer pain (time)		
		1	2–3	> 4
Control group	3	6	11	10
Experimental group	23	4	2	1
χ^2 value	10.767			
p-value	0.001			
Z-value	-4.472			
p-value	0.001			

Table 2. Comparison of pain scores between the two groups (x ± s)

Group	Pre-treatment	Post-treatment			$F_{interaction}$	p	F_{time}	P	$F_{treatment}$	p
		24 h	48 h	72 h						
Control group	3.6 ± 1.6	2 ± 0.4	2.3 ± 0.8	2.2 ± 0.7	2.231	0.450	335.521	0.001	105.521	0.001
Experimental group	4.7 ± 1.7	2 ± 0.26	1.9 ± 0.3	1.9 ± 0.3						

Table 4. Comparison of the occurrence of adverse reactions during the treatment of cancer pain patients in the two groups

Group	Case	Sleepiness	Constipation	Vomiting	Dizziness
Control group	30	3	3	2	1
Experimental group	30	1	0	0	0
χ^2 value		12.738			
p-value		0.001			

Comparative analysis of the occurrence of adverse reactions in the treatment process between the two groups of patients

The incidence of adverse reactions in the experimental group and the control group was 3.33% and 30%, respectively, and the difference was statistically significant ($\chi^2 = 12.738$, $p = 0.001$) (see Table 4).

DISCUSSION

Cancer pain is one of the main causes of suffering for patients with mid- to late-stage cancer. Most of the pain is caused by the continuous pressure of the tumor on the surrounding organs and nerves, and some of the pain is caused by the adverse effects of cancer treatment [18]. Currently, the use of TSAT for cancer pain relief is a medical consensus at home and abroad. Still, strong opioids are prone to adverse effects, such as dizziness, constipation, nausea and vomiting. Additionally, 50% of patients with cancer pain are not treated [19]. Ear acupuncture is a TCM acupuncture-point therapy that stimulates the ear points corresponding to the internal organs to unblock the meridians, thus balancing yin and yang, regulating the internal organs, activating blood, and relieving pain. It has positive effects in controlling the pain of multiple mechanisms [20, 21]. Auricular point acupressure showed great promise to reverse chronic pain through an inflammatory mechanism, i.e., it exhibits anti-inflammatory efficacy by blocking pro-inflammatory cytokines or releasing anti-inflammatory cytokines or β-endorphins [14]. It was an ideal tool for training healthcare professionals to provide treatments for patients with pain [10].

Therefore, in this study, the patients were given analgesia using the auricular acupuncture method on the basis of TSAT. By comparing the pain intensity of the two groups at different times after treatment, it was found that the NRS scores of the experimental group were lower than those of the control group at different times after intervention. The patients' pain scores were more stable, and the number of cases and times of breakthrough pain were significantly reduced. This indicates that auricular bean burial can effectively relieve patients' pain. The results of this study demonstrate the potential of auricular point acupressure in pain management, which is consistent with previous research findings, which showed that auricular point acupressure was a feasible and effective self-management tool [22].

Our findings are consistent with the findings of Li et al. [23], whose intervention with systematic nursing combined with auricular bean for cancer pain significantly reduces the sense of pain, relieves negative emotions and improved quality of life in patients with advanced gastric cancer.

Auricular point acupressure has certain potential in alleviating medication side effects such as gastrointestinal reactions and fatigue [24]. Research has confirmed that auricular point acupressure regulates digestive system function and can regulate constipation and diarrhea through different acupoint combinations [25]. Auricular point acupressure has an improving effect on the side effects of chemotherapy [26]. This is consistent with the results of this study. In this study, the incidence of adverse reactions in the experimental group was better than in the control group. The reason for this is that the non-pharmacological analgesic method can relieve both pain and the discomfort reactions brought about by oral analgesics, which can enable patients to reduce the number of times they take medication, avoid irregularities in the use of medication, prevent situations where medication fails to relieve pain or the overflow of medication, and effectively control pain [27]. On the basis of TCM theory, auricular point acupressure has the potential to regulate the balance of qi and blood. This regulation enhances physiological function, modulates neurotransmitter production, and decreases nerve sensitivity [28]. Numerous studies have proved that TCM can expedite the secretion of diverse mediators and opioid peptides from peripheral nerves to the central nervous system, collectively constituting an "anti-pain system" [29].

When looking at the changes in pain scores before and after the intervention, it was found that the location of the pain varied from patient to patient, depending on the location of the tumor. Also, the presence of distant metastases had an impact on the cancer pain scores. However, this study did not examine multiple sites of pain. Cancer pain is mostly chronic pain with a long duration of illness, and different levels of pain can affect patients' comfort and influence their prognosis and quality of life [30]. Considering the limitations, such as small sample size, single-center design, and potential observer bias in this study, further research is necessary.

Additionally, due to various limitations, such as human and material resources, this study initially compared only the analgesic effects of auricular acupuncture bean burial combined with TSAT for patients in a tertiary hospital without comparing drug dosage, economics, or drug combinations. As each person's degree of pain perception is different, this has certain limitations in the study and needs to be further explored. Hence, further research is needed in future studies to provide better ideas for clinical work.

CONCLUSION

The combination of TSAT and auricular point acupressure in cancer pain can effectively reduce patients' pain and reduce the occurrence of adverse reactions, such as nausea, vomiting, and constipation, caused by opioids. Thus, it improves the quality of life of patients with cancer pain and is worth promoting in subsequent clinical care.

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Conflict of interest: None declared.

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Ефекат комбинације акупресуре аурикуларних тачака и тростепене аналгетске терапије на бол код оболелих од карцинома

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САЖЕТАК

Увод/Циљ Циљ овог истраживања је био да се процени ефекат акупресуре аурикуларних тачака уз примену зрна, у комбинацији са тростепеном аналгетском терапијом, на бол код болесника оболелих од карцинома.

Методе Шездесет болесника са карциномом, примљених у Болницу за лечење рака у Ганџоуу од јануара до децембра 2021. године, насумично је распоређено у експерименталну и контролну групу. Контролна група добијала је тростепену аналгезију и уобичајену негу, док је експериментална група лечена акупресуром аурикуларних тачака у комбинацији са тростепеном аналгетском терапијом. Интензитет бола процењиван је нумеричком скалом за оцену бола (*NRS*) 0, 24, 48 и 72 сата након почетка лечења, а бележена је и учесталост нежељених реакција.

Резултати *NRS* скор у експерименталној групи био је нижи него у контролној групи ($F_{treatment}$ = 105,521; p = 0,001). Разлика у *NRS* скору пре и 24, 48 и 72 сата након третмана била је статистички значајна (F_{time} = 335,521; p = 0,001). Број случајева тзв. еруптираног бола (енг. *eruption pain*) био је статистички значајно различит између експерименталне и контролне групе (χ^2 = 10,767; p = 0,001), а појава еруптираног бола била је већа у контролној групи него у експерименталној (Z = –4,472; p = 0,001). Учесталост нежељених реакција износила је 3,33% у експерименталној групи и 30% у контролној групи, што представља статистички значајну разлику (χ^2 = 12,738; p = 0,001).

Закључак Комбинација акупресуре аурикуларних тачака и тростепене аналгетске терапије може значајно побољшати контролу бола код болесника са карциномом.

Кључне речи: карциномски бол; ублажавање бола; акупресура аурикуларних тачака; тростепена аналгетска терапија