

Clinical observation of auricular acupoint therapy for pain in early-stage extremity trauma

耳穴疗法治疗四肢创伤早期疼痛的临床观察

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Abstract

Objective: To observe the efficacy of auricular acupoint sticking based on conventional treatment in treating pain in early-stage extremity trauma.

Methods: A hundred eligible patients with acute soft tissue injury or acute closed fracture were randomized into an observation group and a control group by their admission sequence, 50 cases in each group. The two groups both received routine management including routine checking, external fixing, traction, raising up the affected limb, etc., as well as cold compress with Chinese medication (*Xiao Zhong Zhi Tong Powder*). In addition to the routine management, the control group was given oral administration of amidopyrine and phenacetin compound tablet, 1 tablet per dose, twice a day, which was then taken only when necessary or terminated after pain subsided. The observation group was given auricular acupoint sticking in addition to the routine management. The two groups were compared in terms of numerical rating scale (NRS) score, therapeutic efficacy and adverse reactions after pain was relieved.

Results: After the intervention, the NRS scores dropped significantly in both groups ($P < 0.01$); the NRS score in the observation group was significantly lower than that in the control group ($P < 0.05$). The total effective rate in the observation group was superior to that in the control group ($P < 0.05$). There were no severe adverse reactions in the two groups.

Conclusion: Based on routine management, auricular acupoint sticking can produce a more significant efficacy in treating pain in early-stage extremity trauma compared to amidopyrine and phenacetin compound tablet; it can effectively reduce pain of the affected limb and prevent complications; it's easy-to-operate and safe; patients can learn and understand it easily; its efficacy is confirmed; it enhances the satisfaction degree of the inpatients. Therefore, this method is worth promoting in clinic.

Keywords: Auricular Acupoint Sticking; Extremities; Pain; Pain Measurement; Soft Tissue Injuries; Fractures, Bone

【摘要】目的：观察在常规治疗基础上运用耳穴贴压疗法治疗四肢创伤早期疼痛的效果。**方法：**将符合纳入标准的100例急性软组织损伤或急性闭合性骨折的患者按入院先后随机分为观察组和对照组，每组50例。两组均予常规治疗，包括病情观察、按需外固定、牵引、抬高患肢等，并给予中药(消肿止痛散)冷敷。对照组在常规治疗基础上口服去痛片，每次1片，2次/d，疼痛减轻后改必要时服用或停服。观察组在常规治疗基础上予以耳穴贴压。患者疼痛缓解后，比较两组患者的疼痛程度数字量表(NRS)，疗效和不良反应。**结果：**治疗后，两组NRS评分均较本组治疗前明显降低，组内差异均有统计学意义(均 $P < 0.01$)；观察组NRS评分低于对照组，组间差异有统计学意义($P < 0.05$)。观察组总有效率优于对照组($P < 0.05$)。两组均未发生严重不良反应。**结论：**在常规治疗基础上运用耳穴贴压疗法治疗四肢创伤早期疼痛效果优于加服去痛片，能有效减轻患肢疼痛症状，减少并发症，且方法操作简单、安全，患者易学易懂，疗效确切，有效提高住院患者满意度，值得临床推广应用。

【关键词】耳穴贴压；四肢；疼痛；疼痛测评；软组织损伤；骨折

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Acute soft tissue injury or acute closed fracture are mostly caused by improper gesture in physical exertion or exercise, inducing topical muscular and fascia injury, rupture of blood vessels, blood stagnation and pain. Without proper treatment or if it happens in old or weak people, external pathogens will intrude and aggravate qi-blood stagnation, resulting in blocked

meridians and vessels, swelling and severer pain^[1]. The aggravation of pain usually happens in 24-72 h after the injury. The duration and severity of pain greatly affect patient's rest and prolong the recovery^[2-3]. There are various methods to treat the pain in early-stage extremity trauma, including elevation, ice^[4-8] and compression. During recent years, auricular acupuncture and auricular acupoint sticking have been reported to successfully treat many kinds of diseases^[9-14]. We applied auricular acupoint sticking to

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treat early-stage extremity trauma for reducing pain. The report is given as follows.

1 Clinical Materials

1.1 Inclusion criteria

Acute soft tissue injury or closed fracture of unilateral limb followed by mild or moderate pain; time from the injury to hospital admission <12 h; age >18 years old, and able to express his own will; willing to participate in the study and having signed the informed consent form.

1.2 Exclusion criteria

Mental disorder or dysgnosia, unable to comprehend the pain degree; severe dysaudia or communication barrier; coupled with old injuries or severe heart, lung or kidney dysfunction; allergic to fabric plaster.

1.3 Statistical method

The SPSS 15.0 version statistics software was adopted for data analysis. The normally distributed measurement data were expressed by mean \pm standard deviation ($\bar{x} \pm s$) and analyzed by *t*-test; those not in normal distribution were analyzed by rank-sum test. The enumeration data were processed by rank-sum test. $P < 0.05$ indicated a statistical significance.

1.4 General data

A hundred subjects were recruited from the trauma patients admitted to our hospital from January 2016 to September 2016. They were randomized into an observation group and a control group by their admission sequence, 50 cases in each group. There were no significant differences in comparing the general data between the two groups (all $P > 0.05$), indicating the comparability (Table 1).

Table 1. Comparison of the general data between the two groups

Group	<i>n</i>	Gender (case)		Average age ($\bar{x} \pm s$, year)	Injury duration ($\bar{x} \pm s$, h)	Affected extremity (case)	
		Male	Female			Upper	Lower
Observation	50	26	24	41.6 \pm 3.8	10.6 \pm 5.4	18	32
Control	50	19	31	43.1 \pm 5.1	9.2 \pm 6.6	21	29

2 Treatment Methods

The two groups of patients all received the same routine treatment, including external fixing, traction, raising up the affected limb, and cold compress with Chinese medication for releasing swelling and pain [the prescription consisted of *Da Huang* (*Radix et Rhizoma Rhei*) 100 g, *Huang Bai* (*Cortex Phellodendri*) 20 g, *Zi Jin Pi* (*Radix Tripterygium Hypoglaucom*) 20 g, *Zhi Zi* (*Fructus Gardeniae*) 20 g, *Sang Bai Pi* (*Cortex Mori*) 20 g, *Tian Nan Xing* (*Rhizoma Arisaematis*) 20 g, *Chong Lou* (*Rhizoma Paridis*) 20 g, *Hong Hua* (*Flos Carthami*) 20 g, *Chai Hu* (*Radix Bupleuri*) 20 g, *Ge Gen* (*Radix Puerariae*) 20 g, *Xuan Ming Fen* (*Matrii Sulfas Exsiccatus*) 20 g, etc.^[15]. The Chinese medication was decocted by specific machine and packed under strict aseptic processing (280 mL each pack). The medication packs were stored in 10 °C fridge in summer and autumn and kept at natural temperature in winter and spring. For application, the medication was first unpacked to pour onto a piece of disposable cotton pad. The pad was then placed on the swelling area. The application was performed twice a day, 20-30 min each time, and terminated when the swelling and pain were gone.

2.1 Control group

Besides the routine management, patients in the control group were prescribed with amidopyrine and phenacetin compound tablet (lot number: 20150595, produced by Huazhong Pharmaceutical Co., Ltd., China)

via oral administration, 1 tablet each time, twice a day. The drug was taken only when necessary or thoroughly terminated when the pain subsided.

2.2 Observation group

In addition to the routine intervention, patients in the observation group were given auricular acupoint sticking instead of amidopyrine and phenacetin compound tablet.

Major acupoints: Shenmen (TF₄), Subcortex (AT₄), Kidney (CO₁₀), and Liver (CO₁₂)^[16].

Adjunct acupoints: Shoulder (SF_{4,5}), Elbow (SF₃) and Wrist (SF₂) were added for those with upper-limb trauma; Knee (AH₄), Ankle (AH₃) and Toe (AH₂) were added for those with lower-limb trauma^[17].

Operation: The auricle was sterilized by using 75% alcohol cotton and then slowly gently and evenly pressed with a probe to detect the sensitive points. The *Wang Bu Liu Xing* (*Semen Vaccariae*) plasters were applied to the selected points and pressed with thumb and index finger till the auricle became distending and hot. Each point was supposed to be pressed 3-6 rounds every day, 30-50 times each round at a frequency of 60-80 times/min, 2 d as a treatment course, better to produce a numb and distending sensation. Patients with sleep disorders were suggested to add one more round before going to bed. The treatment was conducted for 2-3 courses in total and terminated when the pain subsided to a mild degree or totally disappeared.

3 Observation of Therapeutic Efficacy

3.1 Numerical rating scale (NRS)

The degree of pain was expressed by numbers from 0-10 instead of words. 0 stood for painless and 10 stood for intensive pain, the higher the number the severer the pain. Intensive pain (8-10 points): severe pain that greatly interrupted sleep, and sedative was necessary; moderate pain (4-7 points): obvious pain that impeded sleep, and sedative was required; mild pain (1-3 points): tolerable pain that didn't interrupt sleep; painless (0 point).

3.2 Criteria of therapeutic efficacy

Markedly effective: The time taken for the pain of the affected limb decreased by 1 level ≤ 2 d.

Effective: The time taken for the pain of the affected limb decreased by 1 level > 2 d but < 6 d.

Invalid: The time taken for the pain of the affected limb decreased by 1 level > 6 d.

3.3 Results

3.3.1 Comparison of NRS score

The 100 enrolled subjects all finished the required treatment without any dropouts. After the intervention, the NRS scores dropped significantly in both groups ($P < 0.01$); the NRS score in the observation group was significantly lower than that in the control group ($P < 0.05$), (Table 2).

Table 2. Comparison of the NRS score ($\bar{x} \pm s$, point)

Group	n	Pre-treatment	Post-treatment
Observation	50	7.35 \pm 1.09	2.15 \pm 0.76 ¹⁾²⁾
Control	50	7.44 \pm 1.02	4.17 \pm 1.25 ¹⁾

Note: Intra-group comparison, 1) $P < 0.01$; compared with the control group after the intervention, 2) $P < 0.05$

3.3.2 Comparison of the therapeutic efficacy

After the intervention, the total effective rate was 76.0% in the observation group, significantly higher than 54.0% in the control group ($P < 0.05$), indicating that the observation group produced a more significant efficacy than the control group (Table 3).

Table 3. Comparison of the analgesic efficacy (case)

Group	n	Markedly effective	Effective	Invalid	Total effective rate (%)
Observation	50	16	22	12	76.0 ¹⁾
Control	50	11	16	23	54.0

Note: Compared with the control group, 1) $P < 0.05$

3.3.3 Adverse reactions

During the study, 3 subjects had mild discomfort in upper abdomen, 3 had nausea, and 1 case presented mild asthma and urticaria in the control group. The observation group had 2 subjects present skin rash. The adverse reactions were gone after symptomatic management which didn't affect the therapeutic efficacy. Other severe adverse reactions, such as addiction, hypocytosis, liver injury, or kidney disorders, didn't occur in the two groups.

4 Discussion

Traditional Chinese medicine (TCM) holds that extremity trauma will cause damage to meridians and collaterals, qi blocking and blood stagnation, and result in pain. It should be treated by unblocking the stagnation and releasing swelling to cease the pain. The intensive pain makes it difficult for the patients to fall asleep, along with irritability and hypertension, which may increase the risk of cardiovascular accidents, impair immunity, and prolong the recovery. Besides, the pain of the patients also brings negative stimulation to the family members. Currently, the commonly used analgesic methods, oral administration or injection of analgesics, have possibility to cause adverse reactions

such as nausea, vomiting, urinary retention, or respiratory inhibition, and even drug addiction. Moreover, the drug absorption and metabolism differ in individuals, which leads to different effects in different patients by same dose of drugs.

TCM has a long history in treating pain, and acupuncture analgesia has already been proved in clinic. The twelve meridians directly or indirectly pass the ear, suggesting a close relationship between the auricle and the whole meridian and visceral system^[18]. Each organ and each part of the body can find its corresponding area on auricle^[19]. Via stimulating or pressing the relevant points, auricular acupoint therapy can regulate and dredge the meridians and collaterals, and adjust qi and blood. Shenmen (TF₄) is an essential point for sedating and killing pain^[20]. Subcortex (AT₄) works to ease pain, anti-inflammation, awaken brain and open orifices^[21]. The kidney is in charge of bones and the liver is in charge of tendons. Therefore, pressing their corresponding points on the ear can modulate and enhance the function of kidney and liver, modulate the nerves, and cease pain^[22]; it can also promote sleep, improve topical blood circulation, and enhance the healing of wounds and the general rehabilitation. Auricular acupoint pressing is easy to master, with no need for specific equipment; *Wang Bu Liu Xing* (Semen

Vaccariae) adopted in this study is smooth on the surface and proper in the hardness, not to mention its low price^[23].

This study showed that auricular acupoint pressing can produce a better analgesic effect than oral administration of amidopyrine and phenacetin compound tablets, without any adverse reactions brought by the drug but with a good compliance. This method is highly recommended in clinic for early-stage extremity trauma, since we believe that auricular acupoint therapy can effectively reduce the pain, shorten the duration of the pain, promote the healing of wounds, and prevent the complications, and it's easy-to-operate and safe.

Conflict of Interest

The authors declared that there was no potential conflict of interest in this article.

Statement of Informed Consent

Informed consent was obtained from all individual participants included in this study.

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