



Research Article

Case Series of Acute Ankle Sprain Treated by Fumigation and External Application of Chinese Medicine

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Abstract

Objective: To study the clinical effect of fumigation with Chinese medicine combined with external application of Chinese medicine on acute ankle sprain. **Methods:** Fifteen patients with acute ankle sprain treated in our hospital were retrospectively studied. The onset of the disease was within 24 hours. All patients were treated with moxa herb boiling water fumigation and Shuangbai San external application for 3 days, once a day. **Results:** After fumigation combined with external application of traditional Chinese medicine, 13 patients' swelling subsided obviously after the first treatment, and there was no obvious pain, 2 patients' pain disappeared after the second treatment, and the cure rate was 100.00%. **Conclusion:** Fumigation with Chinese medicine combined with external application of Chinese medicine has a significant effect on acute ankle sprain, which is worthy of further randomized controlled trial and potential clinical promotion.

Key words: Acute Ankle Sprain; Fumigation with Chinese Medicine; External application of Chinese Medicine

Introduction

Acute sprain and contusion of the ankle joint is common in clinic, which occurs at any age, but it is more common in young adults. There are many reasons for ankle sprain, most of them are generated during exercise, especially lateral ankle sprain. Ankle sprains may result in pain, swelling, and subcutaneous ecchymosis, ankle pain increases with movement. There are many methods available to treat ankle joint sprain and contusion, but the conventional methods in the acute phase are bracing, ice compress, elevation of the affected limb, etc. The traditional idea is that cold therapy should be used in the acute phase (1), but we found in clinical practice that the curative effect of traditional Chinese medicine fumigation combined with external application of traditional Chinese medicine has significant therapeutic effect, and our case series report is as follows.

Materials and methods

The general data

All patients in this group were the first-time diagnosed patients, including 12 males and 3 females, at the minimum age of 21 years old and the maximum age of 49 years old. The patients had a history of significant sprain, swelling, pain and tenderness of the ankle. No fracture was found on X-ray. Patients had no diabetes, hypertension, and other associated diseases. Injuries were treated within 24 hours, and no open wounds were found.

Methods

Water was boiled with wormwood. When boiled, water was poured it into a kettle in a fumigation bucket. Steam is passed through a tube into the bucket. Patient's feet were placed in the fumigation bucket for 30 min, and the heat was tolerated by patients. Shuangbai San consists of the following: 1 part of cortex phellodendri, 2 parts of rhubarb, 2 parts of biota orientalis, 1 part of mint and 1 part of zeeland. The above traditional

Chinese medicine was grounded into powder and mixed evenly. The Shuangbai San mixture was mixed with boiled water and a small amount of honey, then applied externally for 12 hours after the fumigation treatment. The treatment was stopped after several hours when patients felt uncomfortable. All patients were treated for 3 consecutive days once a day. After treatment, patients keep rest at home and properly move the ankle joint under the premise of non-load bearing. The efficacy was evaluated after two weeks.

Therapeutic evaluation

Referring to 《The Standards for The Diagnosis and Efficacy of Diseases and Syndromes in TCM》 (2). Invalid: After treatment, ankle swelling and pain were not improved, joint was not stable and has limited movement; Effective: After treatment, ankle swelling and pain were significantly reduced with only mild swelling, joint activity was only slightly limited, and swelling may be found after exercise; Obvious effect: After the treatment, the swelling and pain of the ankle joint disappeared basically, the joint was stable, the ankle joint was normal, but the pain and discomfort occasionally happen; Cure: After treatment, the swelling and pain of the ankle joint disappeared, the joint was stable, and the ankle joint function was normal.

Results

After fumigation combined with external application of traditional Chinese medicine, 13 patients' swelling subsided obviously after the first treatment, and there was no obvious pain, 2 patients' pain disappeared after the second treatment. In this group, 15 cases were reexamined two weeks after treatment for efficacy evaluation, and 15 cases were all cured with a cure rate of 100.00%.

Discussion

Ankle joint sprain occurs frequently in orthopedics, often when walking on uneven road surface, running, jumping, or going downhill, going downstairs. It happens when ankle metatarsal is bent suddenly to inside or outside as overturn, causing inside or lateral collateral ligament to get powerful tension and injury. As the lateral collateral ligament is relatively weak, injuries to the lateral collateral ligament are most common clinically, accounting for about 77% of ankle sprain (3). Ankle sprain often occurs after swelling, pain, and limited activity. If not dealt with in time, it is easy to lead to instability of the ankle joint, the occurrence of habitual sprain, causing long-term pain and discomfort, and great limitation to the patient's activities.

There are many methods to treat ankle sprain, such as medicine, acupuncture and moxibustion, massage, physiotherapy, etc. The principle of "RICE" in the treatment of acute ankle sprain in Western medicine generally includes rest, ice compress (ice), compression and elevation of the affected limb (1). The conventional opinion is that cold compresses should be used in the acute phase of ankle sprain to reduce bleeding and inflammatory exudation at the injury site, which can help reduce local swelling and pain. At the same time, foreign studies have also pointed out that there is no difference between cryotherapy and low-frequency or high-frequency electrical stimulation on swelling, pain, and range of motion (4). Secondly, cryotherapy may have an adverse effect on the mechanical properties of muscles, reducing the extensibility of muscles and the dynamic postural stability of lower limbs (5-6). Moreover, the early cold compress and the brake often make the patients to miss the best treatment time because of the treatment time window limit. Studies have reported that the effect of treatment within 12 hours after ankle injury is better than post 12 hours after injury (7).

In this study, 15 patients were treated with traditional Chinese medicine (TCM) fumigation combined with external application of TCM within

24 hours after injury. As one of the external treatment methods of TCM, fumigation therapy has the functions of inducing diaphoresis, dispelling cold to relieve pain and promoting blood circulation, etc. Clinically, there are reports on the treatment of ankle joint sprain by TCM fumigation, but most of them are applied 24 hours after injury (8-9). Shuangbai San can promote blood circulation and remove blood stasis, eliminate local inflammation and edema, and achieve rapid analgesic effect (10). After the first day of treatment with TCM fumigation combined with TCM external application, the swelling of 13 patients was significantly subsided and there was no obvious pain. After the first treatment, the pain of the two patients was significantly reduced, and the pain disappeared after the second treatment. A week later, all patients complained of no obvious special discomfort and had good activities. The cure rate was 100.00% and the effect was significant.

The early treatment may promote the dissipation and absorption of local inflammatory substances and metabolites to achieve better therapeutic effects. In the later stage, inflammatory substances and metabolites accumulate continuously, so the efficacy is somewhat weakened (7). Therefore, patients with acute ankle sprain should be treated as soon as possible.

Traditional Chinese medicine fumigation, as a kind of heat therapy, may lead to increased bleeding and inflammatory exudation during the acute stage of soft tissue injury, but it can also promote the dissipation and absorption of inflammatory substances and metabolites by improving local blood circulation. At the same time, the action of heat may accelerate the local absorption of drugs, which is conducive to the repairment of damaged tissues.

To sum up, this method is simple, convenient, and effective in the treatment of acute ankle sprain, which can break the limitation of the treatment time window and is worthy of clinical application. However, its molecular mechanism is still not clear and needs further study. Our next step will be to

compare cold therapy with heat therapy, focusing on which period of the acute phase might be more effective.

Declarations

1) *Consent to publication*

We declare that all authors agreed to publish the manuscript at this journal based on the signed Copyright Transfer Agreement and followed publication ethics.

2) *Ethical approval and consent to participants*

This research got institutional ethical approval and informed consent to participants.

3) *Disclosure of conflict of interests*

We declare that no conflict of interest exists.

4) *Funding*

None

5) *Availability of data and material*

We declare that the data supporting the results reported in the article are available in the published article.

6) *Authors' Contributions*

Authors contributed to this paper with the design (ZZM and YDH), literature search (YDH), drafting (YDH), revision (ZZM and GX), editing (GX) and final approval (ZZM).

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None

8) *Authors' biography*

None

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