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Meta analysis of the clinical effect of traditional Chinese medicine and antibiotics in the treatment of acute appendicitis

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Keywords: Meta-analysis; Acute appendicitis; Traditional Chinese medicine; Dahuang mudan decoction; Zini qin-gchang xiaoyong decoction.

Introduction

AA is a common and frequent abdominal disease that often affects young adults, adolescents, and children [1]. AA is a mixed abdominal infection, enterobacter and bacteroides are the main pathogenic bacteria. Western medicine usually adopts anti-infection and surgical treatment. The third generation cephalosporins combined with metronidazole have the effect of effectively reducing gram-negative bacteria and anaerobic bacteria. The treatment of AA with antibiotics alone can alleviate the patient's condition, but the recurrence rate is high, the therapeutic effect is different, and the adverse reactions are

Abstract

Objective: To evaluate the clinical efficacy of traditional Chinese medicine (TCM) combined with antibiotics in the treatment of acute appendicitis (AA) through meta-analysis of literature comparison between the treatment of AA with antibiotics alone.

Methods: The comparative literatures on the efficacy of TCM combined with antibiotics and antibiotics alone in the treatment of AA were searched from China National Knowledge Network (CKNI), Wanfang Database, VIP database, Pubmed and Cochrane from the establishment of the database to June 2023. Meta-analysis was performed on the data of total effective rate, recurrence rate, length of stay and so on. Revman5.4.1 software was used for data analysis.

Results: A total of 18 randomized controlled literatures were included in this study, and a total of 1676 patients were included in this meta analysis, including 839 patients who were treated with Chinese medicine combined with antibiotics and 837 patients who were treated with antibiotics alone. The TCM combined with antibiotics group had higher treatment response rate (RR=1.18, CI:1.14~1.23, P<0.01), lower recurrence rate (RR=0.17, CI:0.07~0.40, P<0.01) and shorter hospital stay (MD=-2.48, CI:-3.04~-1.92, respectively) P<0.01).

Conclusions: TCM combined with antibiotics in the treatment of AA is more effective than simply using antibiotics, and is worthy of clinical promotion.

many. The trauma of abdominal surgery, the use of analgesic pumps and anesthetics lead to partial innervation block, gastrointestinal neurohormone secretion disorder, water and electrolyte disturbance and other changes in the internal environment, as well as the patient's long-term bed rest after surgery, resulting in reduced gastrointestinal peristalsis function, which seriously affects the postoperative recovery of patients. With the prominence of the advantages of integrated Chinese and Western medicine treatment, more and more diseases have been treated with integrated Chinese and Western medicine and achieved certain results [2]. This study conducted a meta-analysis of randomized controlled trials of TCM combined with

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antibiotics in the treatment of AA, in an attempt to provide reliable evidence-based medical evidence for the efficacy of TCM combined with antibiotics in the treatment of AA patients.

Data and methods

Information retrieval: The objects of literature search were the controlled studies on the clinical efficacy of TCM combined with antibiotics in the treatment of AA published from the establishment of the database to June 2023. The search databases included: China National Knowledge Network (CNKI), Wanfang Database, VIP database, Pubmed and Cochrane. Keywords for search were “急性阑尾炎” and “抗生素” in Chinese, “acute appendicitis” and “antibiotics” in English.

The search type was “急性阑尾炎” and “抗生素” in Chinese; English is “acute appendicitis” and “antibiotics”.

Inclusion criteria

1. Randomized controlled clinical study of TCM combined with antibiotics in treatment of AA;
2. Observation of the efficacy of TCM combined with antibiotics in the treatment group of patients with AA;
3. The control group was the observation of the curative effect of treating AA with antibiotics alone;
4. The original data provided in this article included at least one of the following outcome measures: treatment response rate, recurrence rate, length of stay.

Exclusion criteria

1. Review or conference literature;
2. Non-randomized controlled studies;
3. Literature with experimental group but no control group;
4. In the treatment group, there were other intervention measures besides TCM combined with antibiotics;
5. Literature that could not extract the original data.

Literature screening and data extraction: The three authors independently screened, extracted and cross-checked the literature. Read the title and abstract of the literature, and read the full text after excluding obviously irrelevant literature. Extraction contents include:

[1] General information: First author, title, reference, publication time.

[2] Study characteristics: Type of study, specific details of intervention, and sample size for each group.

[3] Data recording: Outcome indicators and outcome data of the study.

Statistical analysis: Meta analysis was performed with Revman 5.4.1. The outcome indicators of this meta-analysis included bicategorical variables and continuous variables. Relative risk (RR) and 95% CI were calculated. $P < 0.05$ was considered statistically significant. First, heterogeneity analysis was performed on the included studies, and the size of heterogeneity was determined according to I^2 -value and P-value. If $I^2 < 50\%$, $P > 0.10$, and there was no heterogeneity among the studies, fixed-effect

model was used. If heterogeneity existed among the studies ($I^2 > 50\%$, $P < 0.10$), the sources of heterogeneity were analyzed first, and the factors that might lead to heterogeneity were subgroup analyzed. If the effect indicators had statistical heterogeneity but no clinical heterogeneity, the random effects model was used for analysis. Sensitivity analysis was performed by removing individual studies one by one. A funnel plot was used to detect publication bias.

Results

Results of literature search: A preliminary search was conducted for 962 relevant literatures, including 314 from China National Knowledge Network (CNKI), 144 from Wanfang Medical Science, 134 from VIP database, 77 from Pubmed and 293 from Cochrane. 928 literatures that did not meet the inclusion criteria were excluded, and 34 literatures were remained. 15 literatures with duplicates in each database were excluded, 19 literatures were remained, and 1 that could not extract data was excluded. Finally, 18 literatures were included in this study, and a total of 1676 patients were included in this meta-analysis, including 839 patients treated with TCM combined with antibiotics and 837 patients treated with antibiotics alone.

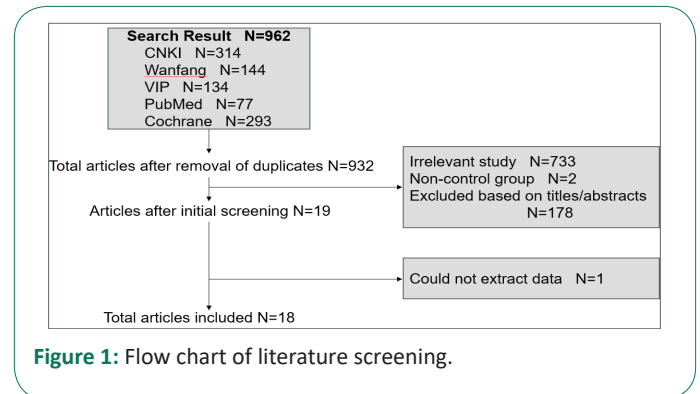


Figure 1: Flow chart of literature screening.

Meta-analysis results of included references

Total effective rate of TCM combined with antibiotics: There were 18 literatures reporting [3-20] the comparison of total effective rate of TCM combined with antibiotics in the treatment of AA and antibiotics alone in the treatment of AA, with little heterogeneity among studies ($I^2 = 34\%$, $P > 0.05$). Fixed-effect model was used for analysis. The results of meta-analysis showed that the effective rate of TCM combined with antibiotics in the treatment of AA was higher than that of antibiotics alone, with statistical significance ($RR = 1.18$, $CI: 1.14-1.23$, $P < 0.01$), as shown in Figure 2.

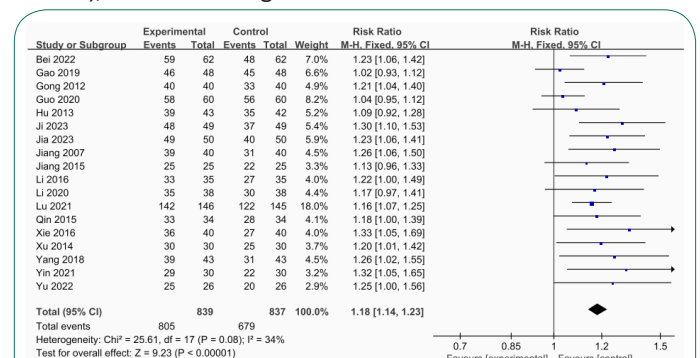


Figure 2: Meta analysis of total effective rate of TCM combined with antibiotics in the treatment of AA.



Figure 3: Meta analysis of the recurrence rate of AA treated with TCM combined with antibiotics.

The recurrence rate of AA treated with TCM combined with antibiotics: There were 4 literatures that reported the comparison of the recurrence rate of AA treated with TCM combined with antibiotics and that treated with antibiotics alone, and there was no heterogeneity among the studies ($I^2=0$, $P>0.05$). Fixed-effect model was used for analysis. The results of meta-analysis showed that the recurrence rate of AA treated with TCM combined with antibiotics was smaller than that treated with antibiotics alone, with statistical significance ($RR=0.17$, $CI: 0.07-0.40$, $P<0.01$), as shown in Figure 3.

Meta analysis of the length of stay of AA treated with TCM combined with antibiotics: There were 3 literatures reporting the comparison of the length of stay between the treatment of AA with TCM combined with antibiotics and the treatment of AA with antibiotics alone, and there was no heterogeneity among the studies ($I^2=0$, $P>0.05$). Fixed-effect model was used for analysis. The results of meta-analysis showed that the length of hospital stay in the treatment of acute appendicitis with TCM combined with antibiotics was shorter than that with antibiotics alone, with statistical significance ($MD=-2.48$, $CI:-3.04\sim-1.92$, $P<0.01$), as shown in Figure 4.

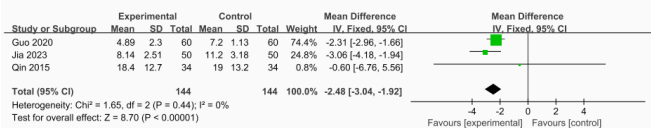


Figure 4: Meta analysis of postoperative hospital stay (h) of TCM combined with antibiotics in the treatment of AA.

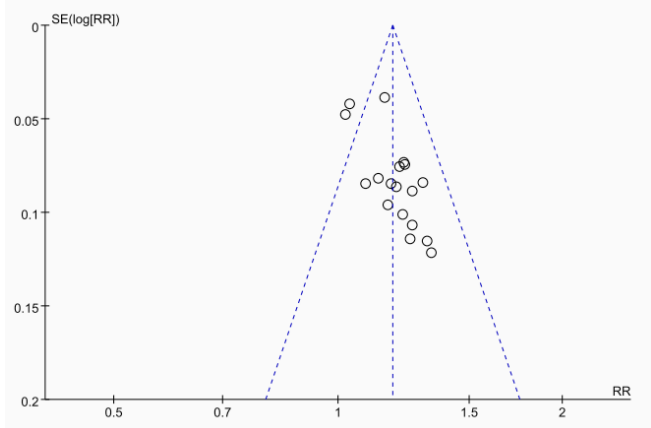


Figure 5: Funnel plot of total treatment response rate.

Sensitivity analysis: The studies in the random effects model and the fixed efficiency model were excluded for analysis one by one, and the results showed that the conclusions of the meta-analysis did not change.

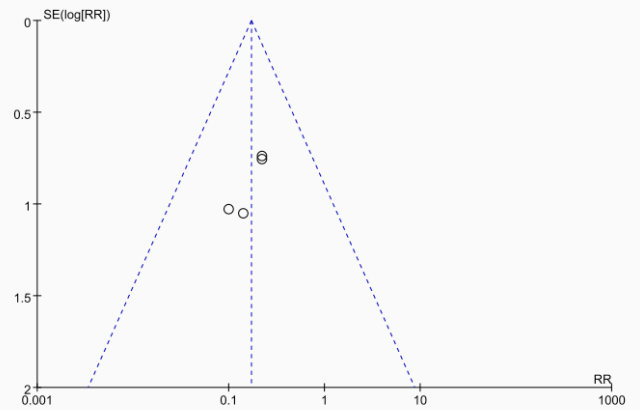


Figure 6: Funnel plot of recurrence rate.

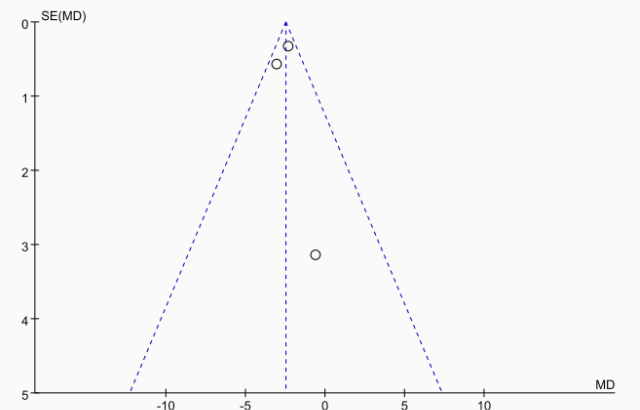


Figure 7: Funnel plot of length of stay (h).

Analysis of publication bias: Funnel plot analysis of the included studies found that the funnel plot had good symmetry and the scatter points in the plot were basically distributed in the funnel, indicating that publication bias had little impact on the results of meta analysis, as shown in Figures 5-7.

Discussion

Related clinical studies have shown that the main function of the appendix is to provide intestinal immune cells, which has a positive significance in reducing the incidence of colorectal cancer, and cecal resection may increase the risk of colorectal cancer [21]. Some patients cannot tolerate surgery and should be treated conservatively in a timely manner. Clinical practice has shown that early use of antibiotics can quickly absorb inflammation and promote the structure and function of the appendix to return to normal [22]. Because acute simple appendicitis is mostly mixed infection, the application of antibiotics can effectively reduce and avoid complications such as incision infection and intestinal obstruction. The third-generation cephalosporin antibiotics composed of ceftriaxone with broad spectrum antibacterial and bactericidal ability have long half-life, quick effect and short course of treatment, which are accepted by most patients. However, the large dose and long time of antibiotics will have some impact on the intestinal flora and physical condition of patients. It is not only difficult to have a good effect, but also will affect the normal physiological state of patients and cause certain damage to the gastric mucosa, which is not conducive to rehabilitation [23].

Chinese medicine pointed out that AA lesions in the gut, for the heat demonstration, its cause is more complex, mood is not smooth, unclean diet and other reasons can cause intestinal loss of transformation, qi imbalance, blood stasis, damp heat stagnation, blood corruption, and the formation of intestinal carbuncle. The purpose of taking TCM is to eliminate carbuncle, remove blood stasis, regulate the spleen and stomach qi mechanism. Dahuang Mudan Decoction can exert antibacterial effect on gram positive and negative bacteria by dispersing stasis, clearing heat and detoxifying, and can cooperate with antibiotics to inhibit inflammation in abdominal cavity; It can effectively promote intestinal peristalsis, promote local blood circulation, improve blood circulation in the wall of the appendix, and eliminate inflammatory fluid in the cavity, thus significantly improving the clinical cure rate. The main ingredients of Zini Qingchang Xiaoyong decoction are dandelion, honeysuckle, burdock seed, bupleurum, loofah, Yuanhu, red vine, licorice, forsythia, Angelica, tangerine peel and radix angelicae etc. Among them, dandelion, honeysuckle and loofah have the effect of relieving swelling, dissipating stasis and relieving pain, clearing heat and expelling pus; Bupleurum has the effect of tonifying fu-organs and reducing turbidity; Red vine, forsythia and angelica have the effect of promoting blood circulation and removing blood stasis; Licorice, as an auxiliary medicine, can harmonize other traditional Chinese medicine ingredients, and play the effect of clearing heat and detoxifying; The combination of these drugs can be used for the pathogenesis of AA to play the effect of relieving fu-organ heat, clearing heat and detoxification, dispersing blood stasis and relieving pain [6].

In this study, the total effective rate of the observation group was significantly higher than that of the control group ($P < 0.05$), suggesting that Dahuang Mudan Decoction, Zini Qingchang Xiaoyong decoction and other TCM combined with antibiotics can significantly improve the clinical therapeutic effect. The recurrence rate of the observation group was significantly lower than that of the control group ($P < 0.05$), indicating that the above combined therapy can promote the decline of the recurrence rate. The duration of hospitalization in the observation group was significantly shorter than that in the control group ($P < 0.05$), indicating that the combination therapy can quickly exert its curative effect, alleviate and cure the symptoms of AA, and reduce the length of stay.

Limitations of the included literatures: [1] randomized controlled trials (RCT) were the best subjects for meta-analysis. Although randomized controlled trials (RCTs) were all described in the 18 included literatures, the method of randomized grouping was not mentioned; [2] It is well known that the literature with positive results is more likely to be published. In addition, the inclusion of articles in the search may also lead to the bias of the included literature; [3] No subgroup analysis was performed.

To sum up, the results of this meta-analysis showed that TCM combined with antibiotics in patients with AA could achieve ideal efficacy with a low risk of recurrence, which is worthy of extensive clinical practice and promotion. However, the efficacy and quality evaluation still need to be verified by multi-center, large-sample and high-quality randomized controlled trials.

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