

The clinical efficacy of integrated traditional Chinese and Western medicine treatment of Hospital-acquired pneumonia.

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Abstract

Objective: To investigate the clinical efficacy of combination of piperacillin-tazobactam and Tanreqing injection in the treatment of Hospital-Acquired Pneumonia (HAP).

Methods: Sixty-four cases of patients with hospital-acquired pneumonia were randomly divided into control and treatment groups. These groups were treated with piperacillin-tazobactam and piperacillin-tazobactam+Tanreqing injection respectively. Clinical symptoms and laboratory parameters of these patients were observed and compared.

Results: The clinical and bacteriological assessment efficacy of the two groups was significantly different. The attenuation of clinical symptoms in treatment groups were was better than that in control group. After treatment, the White Blood Cell (WBC) count and C-reaction protein level in the two groups were significantly different.

Conclusion: Utilizing the combination of piperacillin-tazobactam and Tanreqing injection to cure acute hospital-acquired pneumonia showed a better clinical efficacy.

Keywords: Piperacillin-tazobactam, Tanreqing injection, Hospital-acquired pneumonia.

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Introduction

Pneumonia, caused by various facts, is a major threat to the health of people and. Hospital Acquired Pneumonia (HAP) is an important pneumonia subtype, which can be defined as pneumonia in a patient who admitted to the hospital after more than or equal to 48 h. Compared to other types of pneumonia, HAP has a higher death rate. In China, the mortality rate is about 33.3% among total patients with hospital infections who require hospitalization, which showed a serious condition [1]. The majority of pathogens causing HAP related to were *Klebsiella pneumoniae*, *Pseudomonas aeruginosa* and other pathogenic bacteria. Recently, the problem of antimicrobial resistance is widespread, and a large number of resistant strains emergency have shown up for the overuse of traditional antibacterial. Therefore, it's significant to way for learn how to reasonably use antibacterial.

It may be more beneficial to the treatment of HAP using the combination of Western medicine and traditional Chinese medicine. Piperacillin-tazobactam, a compounded preparation of piperacillin and tazobactam, has a good antimicrobial effect. Additionally, Tanreqing Injection is a kind of herbal injection medicine the main effect is which used for relieving inflammatory-related cough, fever and other symptoms, and can be used as adjunctive therapy for pneumonia. This study was therefore aimed at determining the efficacy of piperacillin-tazobactam combined with Tanreqing injection to HAP.

Materials and Methods

Baseline characteristics

During In the present study, a total of 64 cases of hospital patients were admitted to in our hospital from May 2014 to November 2015 were included. They all were from the respiratory department of internal medicine, the department of respiratory medicine, gastroenterology and ICU ward. Thirty-eight patients were cases of male and 26 were female with the mean age of 53.45 ± 15.81 years (range from 45-70 years).

Selection of participants

Patients were selected according to the Chinese medical association respiratory disease branch that developed HAP diagnostic criteria, based on the clinical manifestations, chest X-ray examination and blood indicators [1]. The diagnostic criteria for HAP included the following: (1) cough emerging after admission (including sputum), with or without chest pain. (2) Pulmonary rales. (3) Chest radiographic examination reveals a new shadow or pleural effusion. (4) White blood cell WBC count (WBC) is greater than 10×10^9 .

We excluded the following patients: (1) patients with poor compliance. (2) Patients who were allergic to any ingredient in the treatment of drugs. (3) Liver and kidney dysfunction. (4) Women in pregnancy or lactation.

Treatment

The 64 patients were randomly divided into two groups, each group of 32 cases. Patients in control group received intravenous injection of droperidol plus piperacillin sodium and tazobactam sodium (trade name istazocin, Wyeth pharmaceuticals, and specifications: a bottle containing Pipemidicpiperacillin 4.0 g and tazobactam 0.5 g). Using one bottle of the drug with addition of 250 ml normal saline, the administration is intravenous for once every 8 h. Patients in the treatment group were treated with a combination of Tanreqing Injection (Shanghai Kaibao pharmaceutical, 10 ml/Branch) based on the usage of piperacillin-tazobactam. Extraction of 20 ml of the combination drugs, adding 250 ml of 5% glucose injection, we apply it by intravenous drip once a day. Patients in both of the two groups were treated continuously for 10 days.

Observation of disease degree and adverse drug reaction

Two groups of patients were closely monitored about their symptoms before and after treatment, such as cough, sputum, chest pain, etc. And pay attention to the signs, such as fever, pulmonary rales, breathing, etc. Patients in the accept before and after treatment response in patients with liver and kidney function, blood routine, C reactive protein and chest X-rays were detected, to evaluate the efficacy and adverse reactions.

Before and after treatment, great attention was paid to the symptoms of two groups, such as cough, sputum, chest pain, etc. Moreover, other signs, such as fever, pulmonary rales, breathing etc. were also concerned. To evaluate the efficacy and drug adverse reactions, patients with liver and kidney function, blood routine, C reactive protein and chest X-rays were detected before and after treatment.

Clinical therapeutic outcome definitions

Evident-effective group: The symptoms of fever, cough, sputum, shortness of breath and lung wet rales were disappeared and WBC count returned to normal. Lesion recovery was showed by the chest X-ray.

Effective group: Disappearance of fever or reducing of cough (sputum) and respiratory sluggish than the status before

Table 1. The clinical efficiency of the treatment in two groups (%).

Groups	n	Evidence effect (%)	Effect (%)	No effect (%)	Effective rate (%)
Treatment group	32	23 (71.9)	7 (21.9)	2 (6.2)	30 (93.7)
Control group	32	18 (56.3)	9 (28.1)	5 (15.6)	27 (84.4)

Bacteriology therapeutic effective evaluation

Before treatment, 56 and 54 strains of pathogenic bacteria were isolated from the treatment group and control group in sputum, respectively. No significant difference was found in the number

treatment. The pulmonary rate was reduced. The symptoms were improved compared to pretreatment in the results of chest X-ray.

No effect group: The symptoms of fever, cough, sputum, shortness of breath and the others were still existed or aggravated. The lung wet rates did not reduce. Compared to the pretreatment, no improvement or more serious symptoms were detected by the chest X-ray films. Evident-effective and effective percentage of the total was defined as effective rate.

Bacteriology outcome measures

Patient's sputum bacterial were cultured after using of rinsed with hydrogen peroxide and pure water. Bacteriological outcome measures: Remove: all of the original pathogenic bacteria were disappeared completely after treatment. Partially removed: the original pathogenic bacteria were not completely disappeared after treatment. Not cleared: The original pathogenic bacteria did not disappear or increased after treatment. Clearance rate was the value that calculated by the number of cleared pathogens divided to total number of pathogenic bacteria before treatment.

Statistical analysis

Data were analysed by SPSS 19.0. Categorical variables were analysed by χ^2 test with the appearance of rates and quantitative data using t test, data were showed by mean \pm standard deviation. N is on behalf of the number of patients. The value of $P < 0.05$ means a significant statistical difference between the two groups.

Results

Clinical outcome results

The total effective rate of treatment group (piperacillin-tazobactam+Tanreqing) was 93.7%, compared to 84.4% in the control group (piperacillin-tazobactam) (Table 1). Significantly difference was found between the effective rates of the two groups ($P < 0.05$).

of bacteria trees before treatment ($P > 0.05$). After treatment, 50 strains were removed in the total of 56 pathogenic bacteria in the treatment group, while 45 strains in the total of 54 pathogenic bacteria were eliminated in control group. And the removal rate was 89.3% in the treatment group and 83.3% in

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control group, respectively. In addition, the removing rate was significantly different ($P < 0.05$) (Table 2).

Table 2. Comparison of bacteriological efficacy before and after treatment in two groups (%).

Pathogens	Treatment group			Control group		
	Strains of bacteria	of total	Strains removed of Removing rate (%)	Strains of bacteria	of total	Strains removed of Removing rate (%)
<i>Klebsiella pneumoniae</i>	19		18 94.7	18		16 88.9
<i>Pseudomonas aeruginosa</i>	16		14 87.5	17		15 88.2
<i>Staphylococcus aureus</i>	11		10 90.1	12		10 83.3
<i>Escherichia coli</i>	6		5 83.3	5		3 60
<i>Enterobacter cloacae</i>	4		3 75	2		1 50
Total	56		50 89.3	54		45 83.3

Index of WBC count, C reactive protein and liver and renal function of two groups before and after treatment

There was no significant difference in WBC count and C reactive protein level between the two groups in pretreatment ($P < 0.05$). However, after the treatment, the WBC count and C reactive protein level in the treatment group and control group

were significantly lower than pretreatment ($P < 0.05$). The treatment group was significantly lower than the control group ($P < 0.05$). No significant changes were found in the main indicators of liver and kidney function in the two groups of before and after treatment ($P > 0.05$), and there was no difference between the groups ($P > 0.05$). The results were shown in Table 3.

Table 3. Comparison of hematology indexes of two groups before and after treatment.

Indexes	Treatment group		Control group	
	Before treatment	After treatment	Before treatment	After treatment
White blood cell count ($\times 10^9$)	14.28 \pm 5.45	7.34 \pm 2.34*	14.59 \pm 5.23	8.95 \pm 3.41#
C-reactive protein (mg/L)	27.47 \pm 7.25	8.26 \pm 3.28*	28.22 \pm 7.89	10.32 \pm 3.55#
AST (U/L)	32.33 \pm 8.67	30.64 \pm 7.54	33.27 \pm 7.29	32.45 \pm 6.42
ALT (U/L)	25.76 \pm 5.47	24.89 \pm 6.70	26.43 \pm 6.38	26.52 \pm 6.59
Creatinine (μ mol/L)	79.57 \pm 15.39	77.28 \pm 14.90	77.49 \pm 12.33	77.54 \pm 16.32
Urea nitrogen (mmol/L)	5.02 \pm 1.06	5.24 \pm 1.29	5.41 \pm 1.68	5.44 \pm 1.60

* $P < 0.05$, vs. the corresponding data in pretreatment. # $P < 0.05$, vs. the corresponding data in treatment group after treatment.

Adverse effect

Before and after treatment, there was no significant difference in liver and kidney function of the two groups ($P > 0.05$, Table 3). During the study period, there was no serious adverse effect and both of the groups were tolerated, though there was one patient (3.1%) had a symptom of mild rash in the treatment group and one (3.1%) had nausea in the control group.

Discussion

Hospital-acquired pneumonia is the infection of lungs that occurs during the hospital stay in 48 h, and before admitted to hospital, the patient had no symptoms of infections or latent state of infection [2]. This type of pneumonia can be very severe with a high mortality rate, and the incidence of HAP

disease in hospital is about 1%. Both of the morbidity and mortality rate of HAP patients are the highest in total hospital infection.

In the hospital, the patient's exposure to pathogens is greatly increased. If the patient has a weak immune system or the pathogenicity of the bacteria is strong, it will be easy to acquire HAP [3,4]. It is mainly caused by bacteria and Gram negative bacteria, such as *Klebsiella pneumoniae*, *Escherichia coli* are the main pathogenic bacteria of HAP. In addition, some gram positive bacteria, such as *Staphylococcus aureus*, etc. can also be induced by HAP [5,6].

Due to bacterial infection is the main factor related to the occurrence of HAP, so the current clinical treatment is the key to HAP diagnosis and treatment of the key. (???) Worldwide

antimicrobial resistance is common in the world. Penicillin, a kind of antibiotic with broad antibacterial spectrum, has good killing effect of the main pathogenic bacteria of HAP. Tazobactam is a derivative of sulbactam, as a beta lactamase inhibitor which effectively relieves drug resistance [7]. So the effect of piperacillin-tazobactam compound is better than single piperacillin antibacterial. Previous research has also shown that piperacillin-tazobactam can get effective treatment of pneumonia in hospital [8].

The key to HAP diagnosis and treatment is prompt antibiotic treatment in clinical for the main reason of the occurrence of HAP is bacterial infection. However, the situation of antimicrobial resistance in the worldwide is severe. The result was in line with the previous study which showed that piperacillin-tazobactam can get good prognosis of HAP [8].

Considering to the frequent multidrug resistant around the world [9,10], although the advantage of antibiotics in the treatment of HAP is obvious, the use of antibiotics in clinical work should be with caution. The combination of traditional Chinese and Western medicine treatment of disease is a hot field in clinical practice. The main method of therapy of HAP is antimicrobial, but some other symptoms, such as fever, cough, sputum, shortness of breath and others couldn't be relieved only rely on Western medicine treatment effect. Therefore, the combination of traditional Chinese and Western medicine for HAP patients may be a better choice [11].

The main component of Tanreqing injection is baicalin, goat horn, honeysuckle, bear gall powder and forsythia. The effect of baicalin is diminishing inflammation. Bear gall powder has a role of spasmolysis and anti-inflammatory. Goat horn is antipyretic drug. Honeysuckle has a function of antibacterial and antitussive and Forsythia can detoxify. Previous studies have shown that Tanreqing injection may inhibit inflammatory reaction [12], and has a good antipyretic effect [13,14]. In addition, the effectiveness study confirmed that it has the role of inhibition and killing of bacteria such as *Streptococcus pneumoniae*, *Streptococcus pneumonia* and *Staphylococcus aureus* [15]. Except for using antibiotics, the antibacterial effect was enhanced by the addition of Tanreqing injection, and the patient with fever, cough and other symptoms was effectively alleviated.

In this study, satisfactory efficacy was achieved for the combination of traditional Chinese and Western medicine for the treatment of HAP. The evaluation parameters including clinical efficacy, bacteriology efficacy, haematological index and image examination comprehensively indicated that the treatment group (traditional Chinese and Western medicine combined) in patients with a comprehensive recovery is better than that of control group (Western Medicine). Moreover, from the study we know that the use of piperacillin-tazobactam combined with Tanreqing injection scheme for HAP was more effective than the treatment with single piperacillin-tazobactam. In brief, the results of our study suggested that the integrated Traditional Chinese and Western Medicine treatment for HAP is better than the single use of antibiotics.

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