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Influences of de-escalation antibiotic therapy on clinical cure rate, adverse reaction, and endotracheal intubation rate of severe pneumonia patients.

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Abstract

Purpose: To study the effects of de-escalation antibiotic therapy on clinical cure rate, adverse reaction, and endotracheal intubation rate of severe pneumonia patients.
Methods: A total of 92 severe pneumonia patients who visited doctors in our hospital from January 2015 to January 2016 were randomly selected, and they were randomly divided into observation group (n=46) and control group (n=46). Patients in control group were given escalation antibiotic therapy, whereas those in observation group were given with de-escalation antibiotic therapy. Then, clinical efficacies of the two groups were compared.
Results: Clinical efficacy of patients in the observation group was significantly superior to that of control group (P<0.05). The occurrence rate of adverse reactions of patients in the observation group was significantly lower than that in the control group (P<0.05). Furthermore, both endotracheal incubation and death rates of patients in the observation group were significantly lower than those in the control group (P<0.05).
Conclusion: De-escalation antibiotic therapy for severe pneumonia patients could significantly improve clinical cure rate of patients, lower endotracheal incubation rate, and effectively shorten length of stay and duration of antibiotic use. Moreover, occurrence rate of adverse reactions decreased. Thus, this therapy was safe and reliable and worthy of clinical promotion.

Keywords: Antibiotic, De-escalation therapy, Severe pneumonia, Adverse reaction.

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Introduction

Severe pneumonia refers to a condition in which besides the symptoms of respiratory system disorders, the patient also suffers respiratory failure and symptoms of disorders in other systems. Severe pneumonia, which has extremely high fatality rate, seriously threatens the life of a patient. In addition, antibiotic is the main drug used to treat severe pneumonia at an earlier stage, but misuse of antibiotics in early-stage treatment cannot improve the survival rate of the patient [1]. Therefore, clinical efficacy and safety of de-escalation antibiotic therapy in treating 92 severe pneumonia patients were examined in this paper. Results would provide reference for clinical treatment.

General Data and Method

General data

A total of 92 severe pneumonia patients who visited doctors in our hospital from January 2015 to January 2016 were randomly selected. All patients were diagnosed with severe pneumonia through laboratory index detection, chest radiography examination, and judgment of clinical symptoms. Patients with cerebral hemorrhage, myocardial infarction, mental disorder, chronic obstructive pulmonary disease, and hepatorenal dysfunction were excluded. These patients were randomly divided into observation and control groups with 46 cases in each group. In the observation group, there were 24 male patients and 22 female patients (21-76 years old; average age, 57.14 ± 13.28 years old). In the control group, there were 25 male patients and 21 female patients (22-78 years old; average age, 57.14 ± 13.28 years old). Difference between the two groups in general data was not significant, and patients in the two groups were comparable (P>0.05).

Therapeutic methods

Patients in the control group were administered escalation antibiotic therapy, as follows: intravenous drip of cefotaxime sodium (NCPC Hebei Huamin Pharmaceutical Co., Ltd., Huamin Company; national pharmaceutical approval No. H10980277; specification: 1 g × 10 ea/box), 2 g once, 3 times per day; and intravenous drip of oxacillin (Northeast Pharm,

Shenyang First Pharmaceutical Co., Ltd.: national pharmaceutical approval No. H21022415; specification: 1.0 g), 1 g once, 4 g per day. For patients with severe states, dosage was increased to 8 g/day. Patients in the observation group were given intravenous drip of de-escalation antibiotic therapy (CSPC; national pharmaceutical approval No. H20065284, specification: 0.25 g) at 500 mg/8 h after the state of illness was alleviated; then, 500 g was given every 12 h.

Observation indexes

Clinical efficacy, length of stay, antibiotic use time, endotracheal incubation rate, occurrence rate of adverse reactions, and death rate of patients in the two groups were recorded.

Evaluation of curative effect

Clinical efficacy was divided into the following: recovery, effectual, effective, and ineffective [2]. The criteria were as follows. Recovery: clinical symptoms disappear and body character indexes return to normal. Effectual: clinical symptoms markedly disappeared, and body character indexes returned to normal. Effective: clinical symptoms somewhat improved, and body character indexes have somewhat recovered. Ineffective: state of illness did not improved at all or was aggravated. Clinical cure rate = cases of recovery/total cases × 100%. Total effective rate of therapy=(cases of recovery+effectual cases+effective cases)/total cases × 100%.

Statistical analysis

SPSS 22.0 was used for data analysis in this paper. "($\bar{x} \pm S$)" represented measurement data. Intergroup t test was implemented, "%" was enumeration data, and intergroup χ^2 test was conducted; $P<0.05$. Data comparison showed differences in terms of statistical significance [3].

Results

Comparison between the two groups in curative effect

Cure rate of patients in observation group was 52.17%, and total effective rate of therapy was 93.48%. On the other hand, clinical cure rate of the control group was 28.26%, and total effective rate of therapy was 78.26%. Both clinical cure rate and total effective rate of therapy of observation group were significantly higher than those of the control group ($P<0.05$). Details are given in Table 1.

Table 1. Comparison between two groups in clinical curative effect.

Group	Recovery	Effectual	Effective	Ineffective	Cure rate	Effective rate
Observation group (46)	24 (52.17%)	16 (34.78%)	3 (6.52%)	3 (6.52%)	24 (52.17%)	43 (93.48%)
Control group (46)	13 (28.26%)	17 (36.95%)	4 (8.69%)	10 (21.74%)	13 (28.26%)	36 (78.26%)
χ^2	11.889	0.102	0.431	9.967	11.889	9.967
P	0.000	0.749	0.512	0.001	0.000	0.001

Comparison between the two groups in relevant indexes in patient treatment

Both average length of stay and average antibiotic use time of patients in the observation group were significantly shorter than those of the control group ($P<0.05$). Both endotracheal incubation rate and death rate of patients in observation group were significantly lower than those of patients in the control group ($P<0.05$). Details are given in Table 2.

Table 2. Comparison between two groups in relevant indexes.

Group	Average length of stay (d)	Antibiotic use time (d)	Endotracheal incubation rate	Death rate
Observation group (46)	13.67 ± 3.23	11.32 ± 2.89	7 (15.22%)	1 (2.17%)
Control group (46)	20.23 ± 4.19	16.78 ± 3.77	14 (30.43%)	8 (17.39%)
χ^2	6.688	7.796	6.566	13.128
P	0.000	0.000	0.000	0.000

Adverse reactions of patients in two groups

In the observation group, one patient suffered from nausea, one from insomnia, and one from dizziness. Thus, the occurrence rate of adverse reactions in the observation group was 6.52%. In the control group, two patients suffered from nausea, one suffered from emesis, three had rash, one had reduced leucopenia, and two had headache. Thus, the occurrence rate of adverse reactions in the control group was 19.56%. The occurrence rate of adverse reactions in the observation group

was significantly lower than in the control group (P<0.05) (Table 3).

Table 3. *Comparison between two groups in adverse reactions.*

Group	Nausea	Insomnia	Dizziness	Emesis	Rash	Reduced leucopenia	Headache	Occurrence rate of adverse reactions
Observation group (46)	1	1	1	0	0	0	0	6.52%
Control group (46)	2	0	0	1	3	1	2	19.56%
χ^2								8.276
P								0.000

Discussion

Severe pneumonia, a unique pneumonia syndrome of high case fatality rate, requires a special therapeutic method. Severe pneumonia, in the general sense, includes Serious Community Acquired Pneumonia (SCAP) and Serious Hospital Acquired Pneumonia (SHAP). Both of these are caused by bacterial infection with acute onset and rapid disease development, and clinical symptoms are as follows: cough, expectoration, coldness of forelimbs, and sudden shock. Severe pneumonia will give rise to encephaledema, gastric ulcer, general shock, and other serious complications. Untimely diagnosis and treatment will seriously endanger the life of the patient [4]. As there are few prospective studies on SHAP, SCAP is used as a reference in diagnosis and treatment. Drug selection of initial empirical therapy is performed. If initial antibiotic therapy is not given within 8 h after the doctor visit, case fatality rate of the patient in the subsequent 30 days will obviously increase; if antibiotic is given timely within 4 h after the doctor visit, case fatality rate of pneumonia can be lowered [5]. Hence, once diagnosis is established, empirical antibiotic therapy should be immediately given, and microbiological examinations of specimens should be performed.

Bacterial resistance has become a worldwide issue, and microbial drug resistance is especially serious in China. No matter how wide the coverage of broad-spectrum cephalosporin or quinolones antibacterial agents, drug-resistant bacteria will be generated when these antibacterial agents are excessively used [6]. Under serious infection, it is necessary to conduct timely de-escalation therapy according to bacterial culture status and infection control status in order to avoid antimicrobial resistance caused by excessive use of antibiotics. By doing this, case fatality rate be lowered, and generation of drug resistance can be reduced. In serious infection cases, de-escalation therapy with carbapenems at an early stage will decrease antimicrobial resistance rate [7]. De-escalation therapy means going through two different phases of an integral therapy, namely, “empiric therapy” and “target therapy”; both of which should be unified and under organic relations [8]. De-escalation therapy can not only provide patients with high risk factors of drug-resistant bacterial infection with appropriate initial therapy but also enables the patients to avoid unnecessary use of antibacterial drugs [9]. In the initial therapy of serious infection, practitioners should abide by broad coverage principles. If antibiotics are inappropriately selected at the early stage of pneumonia, the survival rate of the patient would not improve [10]. A previous study states that de-escalation antibiotic therapy used at an early stage of pneumonia can effectively prevent further development of illness in a patient with a favourable prognosis. Hence, de-escalation antibiotic therapy is given to patients with severe diseases in this paper, and clinical efficacy was observed. Clinical efficacy of de-escalation antibiotic therapy was significantly superior to escalation antibiotic therapy (P<0.05), and occurrence rate of adverse reactions, average length of stay, antibiotic use time, endotracheal incubation rate, and death rate of de-escalation antibiotic therapy were significantly superior to those of escalation antibiotic therapy (P<0.05).

Conclusion

Therefore, de-escalation antibiotic therapy for severe pneumonia patients could significantly improve the clinical cure rate of patients, lower endotracheal incubation rate, and effectively shorten the length of stay and duration of antibiotic usage. Moreover, occurrence rate of adverse reactions decreased. Thus, this therapy is safe, reliable, and worthy of clinical promotion.

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