

New Progress in the Application of Bundle Treatment in Severe Pneumonia Complicated with Septic Shock

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Abstract

Severe pneumonia, also known as shock pneumonia, is also considered to be a kind of severe sepsis with a clear source of infection. It is mainly caused by Gram-positive or Gram-negative bacteria. In severe cases, it can lead to many complications, including shock, and even death. Therefore, increasingly more clinical attention is being paid to the diagnosis and treatment of severe pneumonia complicated with septic shock. In recent years, it has been gradually recognized in medicine that patients with severe pneumonia complicated with septic shock have a high degree of similarity in onset, as well as similar pathological and physiological processes and treatment measures, which has created favorable conditions for the standardized treatment of this disease, namely bundle treatment. This paper reviews the application of bundle treatment in patients with severe pneumonia complicated with septic shock.

Keywords

Bundle Treatment; Severe Pneumonia; Complicated with Septic Shock; Application Progress.

1. INTRODUCTION

Severe pneumonia is a severe infection occurring in human pulmonary parenchyma, which can be subdivided into severe community-acquired pneumonia and severe hospital-acquired pneumonia. It is a relatively rare and severe clinical syndrome, in which the source of infection is in the lungs, but there is systemic inflammatory reaction. According to clinical investigation, severe pneumonia in China is more common in elderly people over 60 years old and children, with a high mortality rate. The mortality rate of patients with severe community-acquired pneumonia is up to 50%, while the mortality rate of patients with severe hospital-acquired pneumonia is up to about 70%, which should be brought to the forefront [1]. Septic shock is a common complication in patients with severe pneumonia and one of the main causes of death among patients. Timely and effective treatment of severe pneumonia complicated with septic shock can greatly reduce the mortality and ensure the life safety of patients. Bundle treatment is the product of new evidence-based medicine, and a manifestation of new progress and new ideas in the treatment of severe pneumonia in clinical practice [2]. This paper reviews the application of bundle treatment in severe pneumonia complicated with septic shock, so as to provide reference for further improving the treatment effect of severe pneumonia complicated with septic shock.

2. SEVERE PNEUMONIA COMPLICATED WITH SEPTIC SHOCK

2.1. Etiology and risk factors of severe pneumonia

At present, it has been medically recognized that bacterial infections of the lungs, sudden colds, and primary diseases are the main factors for the occurrence of severe pneumonia. Common bacteria in lung bacterial infections include streptococcus pneumoniae, staphylococcus aureus, and hemolytic streptococcus. When the human body is stimulated by the cold, the body's immunity will temporarily decline, which creating conditions for the invasion and colonization of pathogenic bacteria. Primary diseases mainly include chronic obstructive pulmonary disease, pleural adhesion and other diseases. Such patients have poor lung immunity due to the disease, so the lung infection symptoms are more serious than normal people, and they are more likely to have shock pneumonia.

In addition, studies have suggested that living conditions such as excessive drinking and overwork can increase the risk of the disease.

2.2. Diagnosis of Severe Pneumonia Complicated with Septic Shock

At present, the diagnostic criteria for severe pneumonia complicated with septic shock in medicine are mostly based on the relevant criteria developed by the Infectious Disease Society of America and American Thoracic Society, including two major criteria and nine minor criteria. If the patient meets two major criteria or three or more minor criteria, the disease can be diagnosed. In addition, the definition of sepsis emphasizes the life-threatening organ failure caused by the patient's uncontrolled response to infection. According to the sequential organ failure score, when the patient's score is ≥ 2 , he can be identified as having organ failure, and when the patient has both organ failure and infection, he can be diagnosed as sepsis [3].

3. BUNDLE TREATMENT

3.1. Bundle Treatment

Bundle treatment is to summarize and standardize all treatment measures for severe pneumonia and septic shock, so as to form a standardized and streamlined diagnosis and treatment for severe pneumonia and septic shock.

3.2. Evolution of Bundle Treatment

As early as 2002, bundle treatment appeared in the campaign to save sepsis, and emphasized that early volume resuscitation, early anti-infective therapy, improvement of blood perfusion to the patient's organs and tissue hypoxia were the key contents of bundle treatment, such as 6h and 24h bundle. In 2012, the SSC guidelines were revised again, changing the 6h and 24h bundle to 3h and 6h bundle, and emphasizing the importance of completing treatment within a specific time frame [4].

3.3. Related Contents of Bundle Treatment

With the development of medical technology, the contents of bundle treatment are also developing toward simplification and efficiency. At present, the common clinical bundle treatment mainly includes the following three contents:

① Initial fluid resuscitation. Studies have shown that the vast majority of patients with severe pneumonia have relatively or absolutely insufficient volumes, and fluid resuscitation treatment should be carried out as soon as possible, especially in patients with septic shock, which is more urgent [5]. At the present stage, the common clinical initial liquid resuscitation therapy is still early goal-oriented therapy, which is also the origin of initial liquid resuscitation therapy and advocates early and sufficient volume resuscitation. It can improve the tissue

perfusion of patients in an early stage and control the fluid volume in the first 72 hours after admission, thus reducing the occurrence of short-term death.

② Anti-infective therapy. At this stage, clinical anti-infective therapy is mainly divided into initial empirical therapy without etiological basis and targeted therapy to determine pathogenic bacteria. In recent years, antibiotics have diversified. Due to factors such as antibiotic abuse and irrational use of drugs, the drug resistance of patients has increased significantly. Therefore, before anti-infective treatment, it is necessary to evaluate the high-risk factors for drug resistance in patients, select appropriate antibiotics based on the relevant information of local drug resistance monitoring and expected effectiveness, observe the clinical response of patients after 2-3 days of application, and then adjust the therapeutic regimen and carry out follow-up targeted treatment after the results of bacterial culture come out. Additionally, 2014 SSC Guidelines clearly pointed out that empirical broad-spectrum antibiotic therapy within 1 hour was particularly important. Therefore, anti-infective therapy should be carried out as early as possible, following the principle of early, sufficient, full dose and full course of medication [6].

③ Use of vasoactive agents. Organ failure is one of the main causes of death in patients with severe pneumonia complicated with septic shock. Vasoactive agents should be used to maintain the patient's blood pressure and ensure the blood perfusion of vital organs to reduce death. At the present stage, the most common vasoactive agents in clinic are dopamine and norepinephrine, both of which have their advantages and disadvantages. However, dopamine is associated with higher possibility of arrhythmia and mortality in hospital, so norepinephrine is recommended to be used first. Nevertheless, in patients who are not at risk for tachycardia or bradycardia, dopamine may be administered first.

4. EFFECTIVENESS OF BUNDLE TREATMENT FOR SEVERE PNEUMONIA COMPLICATED WITH SEPTIC SHOCK

Yang Mei [7] randomly divided 80 patients with severe pneumonia into two groups: one group was treated with bundle treatment for severe infection and the other group was treated with conventional therapy. The results showed that the mortality rate of patients with bundle treatment was lower than that of the conventional therapy group. Chen Canbing et al. [8] randomly divided 60 patients with septic shock into two groups: one group received early bundle treatment, and the other received conventional treatment. The results showed that central venous pressure (CVP) and saturation of central venous oxygen (SCVO₂) of patients with bundle treatment were higher than those treated with conventional therapy; the serum lactic acid content and chronic health (APACHE II) scores were lower than those treated with conventional therapy; the length of stay in ICU was shorter than that of the patients treated with conventional therapy, and the 28d mortality was lower than that of the patients treated with conventional therapy.

5. CONCLUSION

Severe pneumonia complicated with septic shock is relatively rare, but it is more harmful and has a high mortality rate. Therefore, attention should be paid to it with effective diagnosis and treatment. Based on the new evidence-based medical evidence, bundle treatment can effectively improve the clinical symptoms of patients with this disease, ensure the safety of their lives and promote patient recovery. However, at the present stage, economic development in various regions is different in China, so hospitals and patients focus far more on the therapeutic effectiveness and cost-benefit ratio, so the promotion of bundle treatment is strewn with difficulties and obstacles.

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