Clinical Effect Analysis of Emergency Treatment for Respiratory Failure Complicated with Severe Asthma

Yuhong Liu [1,2], Lixin Xie [1,2*]

[1] College of Pulmonary & Critical Care Medicine, Chinese People's Liberation Army (PLA) General Hospital, Beijing, China

[2] Medical School of Chinese People's Liberation Army (PLA), Beijing, China

DOI: 10.32629/jcmr.v4i1.1133

Abstract: Objective: To conduct emergency treatment for patients with respiratory failure complicated with severe asthma, and to analyze and analyze the clinical effects. Methods: 50 cases of patients with respiratory failure and severe asthma who were admitted to our hospital were selected as the analysis sample size, and the time was scheduled from February 2019 to February 2022. According to the "computer table method" implementation group arrangement, the reference group (25 cases) implemented the conventional treatment plan, and the analysis group (25 cases) implemented the emergency treatment plan. Results: The physiological index values of the analysis group were better than those of the reference group, and the differences were statistically significant (i.e. $P<0.05$); the total effective rate of the analysis group was greater than that of the reference group, and the differences were statistically significant (i.e. $P<0.05$)); the symptom improvement time of the analysis group was shorter than that of the reference group, and the difference was statistically significant (i.e. $P<0.05$). Conclusion: After emergency treatment for patients with respiratory failure and severe asthma, the physiological indicators, curative effect and symptom improvement time are all improved and improved, and the overall clinical effect is better, which is worth adopting.

***Keywords*:** respiratory failure, severe asthma, emergency treatment, physiological index value, total effective rate value

1. Introduction

Severe asthma is a disease in the respiratory tract, and at the same time it is a relatively common clinical disease. Generally, the progress of this disease is quite fast, and the onset also has the characteristics of suddenness. If patients do not receive effective treatment and intervention in time [1], it is very likely that they will have many complications. Symptoms, such as: a. spontaneous pneumothorax, b. atelectasis. All of them will cause the risk of respiratory failure of patients and pose a threat to their life safety. Therefore, as far as this disease is concerned, it is very important and critical to reasonably implement effective emergency treatment measures [2]. Based on this, our hospital collected 50 patients with respiratory failure and severe asthma (from February 2019 to February 2022) to analyze the sample size. After emergency treatment, the effect is more obvious. The detailed treatment report is as follows:

2. Materials and methods

2.1 Materials

50 cases of patients with respiratory failure and severe asthma who were collected by our hospital were used as the analysis sample size, and the time was scheduled from February 2019 to February 2022. According to the "computer table method" implementation team arrangement, the reference group (25 cases): 15 male samples and 10 female samples, the age parameter values were taken from about 66 to 75 years old, and the mean value was calculated as (67.9±1.9) years old. Analysis group (25 cases): 14 male samples and 11 female samples, the age parameter values were taken from about 67 to 75 years old, and the mean value was calculated as (68.1±1.8) years old. After statistical correlation processing was carried out on the sample data information, it showed a P value > 0.05 (the difference was not statistically significant).

Included samples: (1) The patient's performance was consistent with the relevant criteria for severe asthma complicated by respiratory failure. (2) Can cooperate with mechanical ventilation intervention. (3) No medical history or family history related to mental illness.

Excluded samples: (1) Severe heart, liver and kidney-related functions were abnormal. (2) There are major organic diseases and nervous system diseases.

2.2 Methods

The reference group implemented a conventional treatment plan, namely: first, according to the real condition of the patient, the blood pressure value, heart rate value, 24h fluid intake and output, etc. were given to complete the basic real-time monitoring. Second, anti-asthma + anti-inflammatory treatment. The patients are given methylprednisolone drug intervention, and the drug is administered by intravenous injection. The dose used is maintained at 40 mg each time. Note that during the period of medication, it is kept for 12 hours each time, and three days is a cycle of treatment. In addition, at the same time, ambroxol hydrochloride oral solution should be used to complete the therapeutic intervention of nebulized inhalation [3], the dosage is 10ml each time, and each time is about 20 minutes, maintaining the nebulized state 3 times a day. Implement albuterol aerosol inhalation intervention, keep the dose at 2ml each time, and each time is about 20 minutes, and also complete 3 times a day. Third, implement basic treatment for patients. For example, nasal cannula oxygen therapy will give a dose of 2.0L to 5.0L per minute according to the patient's real condition, so as to fully maintain the patient's pH balance and correct the electrolyte state.

The analysis group implemented the emergency treatment plan. That is, mechanical ventilation is also used to complete the auxiliary treatment intervention, telling the patient to adjust the body position so that it can be rationally coordinated with the treatment, and the working mode of the ventilator is in the S/T state; use 6mmH2O to complete the inhalation, and It is the initial pressure value [4], and then slowly increase the parameter value, 12mmH2O to 17mmH2O is regarded as a reasonable and better range for the inspiratory pressure value. Arrange the optimal value of expiratory pressure to maintain 4mmH2O to 8mmH2O, which can determine the overall comfort level of the patient, set the breathing frequency at 14 to 16 times per minute, and control the oxygen concentration of the ventilator at 35% to 45% in this range.

2.3 Observation indicators

Observe the physiological index value and curative effect (total effective rate) and the improvement time of symptoms in each group.

Contents of physiological index values: (1) respiratory rate; (2) heart rate; (3) PaCO2 (partial pressure of carbon dioxide in arterial blood); (4) PaO2 (partial pressure of oxygen in arterial blood).

Efficacy evaluation: After the implementation of the respective treatment plans, the breathing and heartbeat of the patients returned to the normal range, and the symptoms disappeared, and the records were marked. After the implementation of the respective treatment plans, the symptoms of the patients have improved to a certain extent, and the records are valid. The patient's condition has not been changed accordingly, and the record is invalid.

Total effective rate = 100.00% — invalid value.

2.4 Statistical processing

The treatment data of 50 patients with respiratory failure complicated with severe asthma were input into SPSS23.0. The physiological index value and the improvement time of symptoms were measured data, which were written with mean and standard deviation, and t calculation was implemented. The curative effect (total effective rate) is count data, written in %, and calculated by X2. The statistical result obtained is: P value <0.05 (the difference is statistically significant).

3. Results

3.1 Physiological index values

The physiological index values of the analysis group were better than those of the reference group, and the difference was statistically significant (Table 1: P<0.05).

Table 1. The physiological index values of each group

Group	Respiratory rate	Heart rate	$PaCO_2$ (mmH_2O)	PaO_2 (mmH_2O)
Analysis group (25 cases)	25.41±4.61	113.25±6.94	56.71±6.90	72.40±7.64
Reference group (25 cases)	29.27±6.47	126.37±6.34	64.40±6.10	67.30±7.20
t	2.4293	6.9787	4.1749	2.4290
P	0.0189	0.0000	0.0001	0.0189

3.2 Curative effect

The total effective rate of the analysis group was 96.00% (24/25) higher than that of the reference group 76.00% (19/25), and the difference was statistically significant (Table 2: P<0.05).

Table 2. The curative effect of each group (total effective rate)

Group	Significant value	Effective value	Invalid value	Total effective rate
Analysis group (25 cases)	13/52.00%	11/44.00%	1/4.00%	24/96.00%
Reference group (25 cases)	10/40.00%	9/36.00%	6/24.00%	19/76.00%
X2				4.1528
P				0.0415

3.3 Symptom improvement time

The symptom improvement time of the analysis group was shorter than that of the reference group, and the difference was statistically significant (Table 3: $P<0.05$).

Table 3. The improvement time of symptoms in each group

Group	Cough (d)	Asthma	Difficulty breathing
Analysis group (25 cases)	3.40±0.30	3.01±0.30	2.93±0.04
Reference group (25 cases)	4.57±1.01	3.74±0.35	3.04±0.11
t	5.5523	7.9179	4.6989
P	0.0000	0.0000	0.0000

4. Discussion

Asthma is an airway inflammatory disease with chronic characteristics that is more common in clinical practice. It is caused by the full participation and composition of many kinds of cells. This disease will cause patients to have airway hyperresponsiveness, and then cough Or shortness of breath and chest tightness, etc., repeated uninterrupted effects and manifestations, however, this manifestation will cause more mucus to form inside the airway, which will further trigger acute and suffocating bronchospasm. It will increase the weight of acidosis and carbon dioxide retention [5].

There are four types of bronchial asthma in the acute phase, namely mild, moderate, severe, and critical. However, the severe and critical cases are the scope of severe asthma. This kind of patients will have varying degrees of difficulty in breathing even in a quiet state, and with the continuous deterioration of their condition, they will also develop confusion and lethargy. performance, resulting in respiratory failure, posing a potential threat to their life safety. Severe asthma, most of the manifestations are: a. asthma; b. dyspnea; c. cyanosis. Under normal circumstances, this disease will also be accompanied by respiratory failure, so the patient has a very high case fatality rate. In recent years, the incidence, severity, and fatality rate of asthma have all been increasing. For this reason, clinically, it is believed that the key point of intervention for this disease is to identify its condition in time, and Implement targeted and efficient treatment plan as soon as possible [6]. In the past, the implementation of emergency treatment for patients with severe asthma complicated with respiratory failure was mostly treated with drugs, among which glucocorticoids and aminophylline were used more, even though they can have local anti-inflammatory effects and reduce microvascular The overall permeability and the relaxation of bronchial smooth muscle have changed the symptoms, but the overall curative effect is not satisfactory to patients and medical staff.

Mechanical ventilation is a method that is widely used in emergency work, and it can assist the smooth implementation of treatment work. It has excellent application effects in severe asthma patients with respiratory failure [7]. Some studies have shown that: while implementing basic treatment for patients with respiratory failure complicated with severe asthma, choosing mechanical ventilation as an aid, when completing emergency treatment, various physiological parameters of the patient's body can be fully changed, and the degree of change is greater than that of The analysis of the effectiveness of basic conventional treatment may be due to the fact that mechanical ventilation, an auxiliary form, can reduce the work of the patient's respiratory muscles, thereby relaxing their respiratory muscles. In addition, the intervention form of mechanical ventilation can fully dilate and change the patient's bronchi, aiming at reducing airway resistance. At the same time, it is conducive to the ventilation of the alveoli of patients, and can clearly improve the performance of abnormal respiratory mechanics. In addition, the use of this form of intervention can effectively expand the patient's collapsed alveoli, and finally successfully discharge some secretions in the airway, better changing the overall compliance of the patient's lungs. However, there are still some data studies: the use of mechanical ventilation can fully preserve the airway-related defense functions of patients, thereby reducing the probability of pneumonia in patients [8]. Moreover, the continuous positive pressure aimed at the formation of the airway can affect its alveolar oxygen-related conditions, facilitate its diffusion into the blood, and at the same time correct its hypoxic performance and dyspnea.

This treatment showed that the physiological index values of the analysis group were better than those of the reference group, and the differences were statistically significant (i.e. P<0.05); the total effective rate of the analysis group was 96.00% greater than that of the reference group, 76.00%. Statistically significant (i.e. P<0.05); the symptom improvement time of the analysis group was shorter than that of the reference group, and the difference was statistically significant (i.e. P<0.05). The results of such treatment are similar to those of Shen Fen, Li Zhengmao [9] and others who analyzed the effect of emergency rescue treatment, reflecting the application effect and value of emergency treatment. The use of such treatment measures can change the overall curative effect of patients, obtain better physiological indicators and total effective rate, and on this basis can also reduce the time for symptom improvement, and its clinical treatment value is higher.

To sum up, the application of emergency treatment to respiratory failure complicated with severe asthma can improve its physiological index value and curative effect, shorten the improvement time of symptoms, and the overall effect is better than conventional treatment, because it should be recommended.

References

[1] Wang Yaohui. Clinical effect analysis of emergency treatment for respiratory failure complicated with severe asthma [J]. *Chinese Health Care*, 2020(2): 48-49.

[2] Huo Lili. Efficacy Analysis of Emergency Mechanical Ventilation in the Treatment of Severe Asthma with Respiratory Failure [J]. *Continuing Medical Education*, 2022,36(8):126-129.

[3] Zhang Liwen. Clinical Exploration of the Effectiveness of Emergency Treatment in Rescue of Severe Asthma Complicated with Respiratory Failure [J]. *Friends of Health*, 2021(12): 74.

[4] Zhang Yan. Clinical effect analysis of emergency rescue treatment for patients with severe asthma complicated with respiratory failure [J]. *China Health and Nutrition*, 2021,31(21):69.

[5] Liang Yong. Clinical effect of emergency rescue in patients with severe asthma complicated with respiratory failure [J]. *Medical Equipment*, 2020, 0(4): 114-115.

[6] Yu Lifeng. Observation on the effect of non-invasive positive pressure ventilation on emergency treatment of patients with severe bronchial asthma complicated with respiratory failure [J]. *Zhejiang Clinical Medicine*, 2019, 21(3): 356-357.

[7] Wang Wei, Wu Jinhai, Zhao Juxin. Observation on the Curative Effect of Emergency Non-invasive Positive Pressure Ventilation in the Treatment of Severe Bronchial Asthma Complicated with Respiratory Failure[J]. *Clinical Medicine*, 2022,42(2):59-61.

[8] Li Jing. Value Analysis of Emergency Treatment for Severe Asthma Complicated with Respiratory Failure [J]. *Modern Diagnosis and Treatment*, 2021,32(1):114-115.

[9] Shen Fen, Li Zhengmao. Clinical effect of emergency rescue treatment for patients with severe asthma complicated with respiratory failure [J]. *Chinese and foreign women's health research*, 2021 (11): 28-29.