



Nursing Care of a Patient with AKI Combined with Pulmonary Infection due to Neocoronary Pneumonia Infection

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Abstract

To summarize the nursing experience of successful treatment and rehabilitation of a patient with acute kidney injury complicated with pulmonary infection caused by COVID-19. The key points of nursing include: Correcting the reversible cause; Multidisciplinary medical team cooperation; Actively fight lung infection; Ventilator support; CRRT; Provide whole-procedure treatment and rehabilitation of a patient with acute kidney injury complicated with pulmonary infection caused by COVID-19. The key points of nursing include: correcting the reversible cause; Multidisciplinary medical team cooperation; Actively fight lung infection; Ventilator support; CRRT; Provide whole-process monitoring care; The urine volume and serum creatinine The urine volume and serum creatinine were closely observed; Prevent the occurrence of serious complications; Psychotherapy; Continuous care; Give nutritional support. Combined with the patient's condition, the patient was treated with a variety of medical devices. Combined with the patient's condition, the patient was actively and effectively nursed as a whole by scientific use of nursing procedures, and discharged after the patient's condition improved. The patient was actively and effectively nursed as a whole by scientific use of nursing procedures, and discharged after the patient's condition improved.

Keywords: Acute kidney injury; Lung infection; Ventilator; Nursing of nephrology department

Introduction

Novel coronavirus pneumonia (Coronavirus Disease 2019, COVID-19) is a disease caused by novel coronavirus (Severe Acute Respiratory Syndrome Coronavirus 2, SARS-CoV-2) infection with acute respiratory lesions as the main manifestation, and may also involve the SARS-CoV-2 infection is an acute infectious disease with acute respiratory disease as its main manifestation, which may also involve organs of multiple systems such as kidney, cardiovascular and blood [1,2]. Acute Kidney Injury (AKI) is one of the most important complications. Several studies have shown that early detection and diagnosis improve the prognosis of AKI patients [3-8]. Studies have shown that the incidence of AKI in China is about 11.6% [9]. Infection is one of the serious complications of AKI and an important cause of death, among which abdominal infection and lung infection are more common [10]. Our department admitted a patient with acute kidney injury combined with lung infection after infection with new coronary pneumonia, with critical condition and multiple complications, which was difficult to treat and difficult to care. After multidisciplinary medical team cooperation, active anti-lung infection, ventilator evacuation and other orderly, combined with the patient's condition, the scientific use of nursing procedures for its active and effective holistic care, patient's condition improved and was discharged from the hospital.

Case Presentation

Clinical information

Patient, female, 53 years old. The patient was admitted to the hospital on an emergency basis due to "sudden onset of fatigue, poor appetite, tightness of breath, shortness of breath, chest pain, nausea, vomiting, vomit of gastric contents, accompanied by profuse sweating, and cold sweating without any obvious triggers 3 days ago. Past history of new crown pneumonia, depression history of 10 years, long-term living alone, the specific history of medication is unknown, laboratory renal function indicators suggesting renal failure, admission patients' consciousness was coma, with tracheal intubation (ventilator continuous assisted breathing), norepinephrine, dopamine meso-hydroxylamine pumped to maintain vital signs, gastric tube, urinary catheter, femoral venous

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Figure 1: Above are pictures of the treatment used: Ventilator Preparation.



Figure 2: Connection of the ventilator humidification tank: one pressure; two pushes; three releases.

catheterization transferred to our department. Physical examination: Body temperature 36°C; blood pressure 93/53 mmHg, pulse 120 times/min; spontaneous respiration 13 times/min, consciousness was comatose, both pupils were equal in size and round, 1.5 mm in diameter, slow reaction to light; auscultation of both lungs, clear breath sounds, wet rales could be detected; cardiac rhythm was unison, and murmurs were not heard in the valves' auscultation area. Auxiliary examination: Blood routine showed leukocytes $35.56 \times 10^9/L$, neutrophils $30.15 \times 10^9/L$, erythrocytes $3.74 \times 10^{12}/L$, hemoglobin 121 g/L, platelets $388 \times 10^9/L$, brain natriuretic peptide 809.00 pg/ml. Admission diagnosis: Acute kidney injury, lung infection, heart failure, sepsis.

Treatment and regression

The patient was admitted to the intensive care unit of nephrology department, and a multidisciplinary medical team was formed to give Continuous Renal Replacement Therapy (CRRT), reasonable use of anti-infective drugs to fight lung infections, ventilator-assisted

support, combined with the whole process of monitoring and nursing care; close observation of blood creatinine, blood potassium indexes, prevention of serious complications, strengthening nutritional support therapy and psychological support, the patient was discharged after his condition improved. The patient was discharged from the hospital after her condition improved.

Nursing

Correcting reversible etiology and multidisciplinary teamwork

After the patient was diagnosed with AKI, it was crucial to analyze the reason why the patient developed acute kidney injury, correct the reversible cause of the patient's condition, and ensure smooth and timely treatment. A multidisciplinary team of specialists consisting of one director of emergency medicine, one director of hemodialysis, two directors of nephrology, and the nursing team met to discuss the reasons for the patient's occurrence of AKI to ensure

Table 1: The patient's Myriad ventilator was used as follows:

1.28-2.2	Sedation (midazolam)	V-A/C	FiO ₂ : 60-100% Tidal volume: 360 ml Respiratory rate: 12-18 bpm PEEP:5
2.2-2.4	Sedation (midazolam)	P-A/C	FiO ₂ : 60% Suction pressure: 15 cmH ₂ O Respiratory rate: 12-18 bpm PEEP:5
2.4-17:24	be clear about	deactivate	
2.5 to date	be clear about	/	

continuation of treatment at a later stage. The plan was implemented by multidisciplinary team disciplines doctors and nurses, nephrology department by 2 N4 nurses to participate in the whole consultation and discussion, fully do the patient treatment, nursing process closely observe the patient's condition changes, and actively communicate with doctors to optimize the nursing program.

Initial nursing program: (1) The patient is conscious and comatose, pupil diameter 1.5 mm, pulse is fast, blood pressure is low, urine decreases, and signs of shock: Actively replenish fluids, elevate blood pressure, correct blood volume insufficiency, and closely monitor urine output and vital signs. (2) The patient is diagnosed with acute renal failure, CRRT treatment is performed, focusing on monitoring the patient's blood creatinine value as well as blood potassium value to prevent the condition from worsening. (3) Patients with vomiting, fatigue, nausea, correct their water and electrolyte disorders, maintain fluid balance, intravenous nutrition. (4) Ventilator-assisted support, focusing on monitoring the patient's blood oxygen value. (5) Patients with pulmonary and urinary infections, use anti-infective drugs, prevent the use of nephrotoxic drugs to aggravate the burden on the patient's kidneys.

Active anti-pulmonary infection, ventilator-assisted care

Acute Kidney Injury (AKI) is a common acute and severe disease in nephrology patients, emphasizing early detection, early management and early treatment. The incidence of AKI in intensive care unit patients is as high as 30%, and pulmonary infection is a serious complication, which can cause deterioration or even death. Therefore, appropriate preventive measures should be taken in time for the relevant risk factors of pulmonary infection [11-13]. The patient has a history of new crown pneumonia, so that the patient to keep the respiratory tract open, to prevent the aggravation of the condition, to provide targeted drug therapy for patients, according to the results of the patient's drug sensitivity test antibiotic treatment, effectively help patients control the rate of infection of the causative organisms, the elderly patients with lung infections, the condition of the disease changes quickly, close observation of the temperature, pulse, respiratory changes, observation of the hypoxia situation, the changes in the value of leukocytes. Choose clindamycin, fluconazole, ornidazole, linezolid drugs; anti-pulmonary and urinary tract infections. Prevent aggravating the patient's renal injury when using drugs, choose drugs with little toxic side effects, and avoid using drugs that aggravate the renal burden.

A ventilator is a device that alters, controls, or replaces a person's normal physiologic respiration, increasing pulmonary ventilation and conserving cardiac reserve energy. Nursing care focuses on (1) close monitoring of the patient's vital signs, focusing on the patient's blood oxygen status. (2) Do a good job of airway care: Pay attention to the change of temperature and humidity in the hospital room and the humidification of the airway to avoid sputum accumulation,

which affects the smoothness of the airway. According to the patient's condition, do positional nursing, elevate the head of the bed about 30°. (3) Prevent infection and injury: Strictly abide by aseptic operation, strengthen the concept of asepsis of nursing staff, change the adhesive tape for fixing the intubation tube every day, so as to avoid ulceration and erosion of the mouth corner caused by long-term compression, and prevent skin damage. Strengthen the restraint to prevent accidents. (4) After removing the ventilator, instruct the patient in breathing training to promote the improvement of the patient's lung function. (5) When using the ventilator, pacify the patient's unadaptable emotions and reduce his psychological burden; after removing the machine, strengthen the communication with the patient to reduce the patient's anxiety and tension (Table 1 and Figure 1, 2).

Renal Continuous Replacement Therapy (RCRT) with full monitoring care provided

Continuous renal replacement therapy is an emerging class of blood purification techniques. Because it provides slow, gentle, continuous renal support, it is emerging as a preferred method for use in hemodynamically unstable patients with severe AKI [14]. The guideline states that continuous blood purification therapy may play a very important role in the resuscitation of patients with severe COVID-19 infections, and this expert consensus is consistent with the recommendations of the National Health Commission's Novel Coronavirus Pneumonia Diagnostic and Treatment Program (Trial Version 6), which states that: The early and aggressive initiation of blood purification therapy for the purpose of cytokine removal may be of great significance in the resuscitation of some critically ill patients, and may relieve renal stress and reduce renal injury, and optimizing the timing of CRRT initiation may positively impact survival by improving fluid balance management [15]. However, it is important to note that CRRT can increase the risk of cardiovascular complications and hypotension, requires anticoagulation during treatment, and is not indicated in patients with bleeding tendencies. The patient's condition is heavy and changing rapidly, requiring healthcare personnel to monitor the patient's progress throughout the process. During CRRT, special person should be arranged for monitoring, blood clotting in the extracorporeal circulation blood pipeline, close observation of the value changes, familiar with the development of the patient's condition, and timely treatment of accidents; Patients' vital signs, CRRT treatment parameters, and extracorporeal circulation volume were observed and recorded every hour, and the total amount of extracorporeal circulation was counted. Comprehensive, systematic and continuous nursing was carried out according to the actual situation of patients.

Closely observe urine output and blood creatinine to prevent serious complications

Acute Kidney Injury (AKI) without timely intervention may cause patients to progress to Chronic Kidney Disease (CKD). CKD or death. Current guidelines from the Kidney Disease Improvement Global Prognosis Organization (KDIGO) recommend the inclusion of urine output and creatinine as the criteria for evaluating renal function [16]. Patients should be put on absolute bed rest to reduce the burden on the kidneys, keep a strict record of 24-h in and out volume, and monitor the changes of electrolytes such as serum potassium, sodium, calcium, etc., in order to prevent the occurrence of complications. If the patient's clinical symptoms are reduced, urine output increases, serum urea nitrogen and serum creatinine gradually decline, suggesting that the treatment is effective.

Strengthening nutritional support and providing psychological support

Critically ill patients who develop AKI are often combined with markedly altered nutritional and metabolic status. Therefore, nutritional support has become an integral part of the therapeutic strategy for patients with AKI as well as those undergoing Continuous Renal Replacement Therapy (CRRT). Accurate assessment of energy and nutritional needs in the early nutritional support of patients with AKI is of great importance in achieving appropriate nutritional supplementation in patients with AKI, and over- and under-nutrition can have a negative impact on the prognosis. The baseline nutritional assessment of patients with AKI is the same as that of critically ill patients, and body weight is a commonly used parameter. As with critically ill patients, body weight is a commonly used parameter, and nutritional surveys have shown that estimating energy and nutritional needs based on body weight or ideal body weight is still the primary method of choice in national and international ICUs. 25 to 30 kcal/(kg-d) is the recommended supplementation amount for nutritional support in patients with AKI or ARF, as recommended by the guidelines for nutritional support of patients with AKI or ARF. The guidelines recommend protein supplementation of 1.2 to 2.0 g/(kg-d) (body weight by actual weight) for critically ill patients undergoing CRRT for AKI or ARF.

The patient has a history of depression for 10 years, the psychological burden itself is too heavy, coupled with the use of ventilator-assisted respiration after tracheal intubation, in the process of using the ventilator treatment, the patient cannot speak after intubation, irritable, the nurse should be more comforting and caring for the patient, to understand the patient's needs. Negative pessimism is not conducive to treatment, research has proved that a positive and optimistic psychological state can completely alleviate some of the physiological symptoms of the disease, and play a role in assisting the recovery of the disease [17-19]. Psychotherapy will help patients to establish the courage to fight against the disease, the long-term care process for patients, to create a relaxed, harmonious nursing atmosphere, respect and protect the privacy of patients, keep the room quiet, reflecting the humanistic care. Enhance the follow-up after the patient's improvement, do a good job of continuity of care, focusing on observing whether the patient's psychological condition has improved [20].

Conclusion

The main points of nursing care for this patient with AKI combined with lung infection caused by neocoronary pneumonia infection can be summarized as the formation of a multidisciplinary rescue team, the early and active initiation of continuous renal replacement therapy, the gradual correction of reversible etiology; the rational use of antimicrobial drugs to actively fight lung infection, ventilator support, psychological support and nutritional support. Nursing staff need to pay close attention to the changes in the condition, the whole process of monitoring care, close observation of urine output, blood creatinine indicators, to prevent the occurrence of serious complications. At the same time with the adoption of appropriate nursing interventions, the patient's status improved, and then strengthen the nursing follow-up, closely observe whether the patient's condition is stable, psychological care as well as humanistic care to carry out the whole treatment process.

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