
MANAGEMENT OF SEPTIC SHOCK DUE TO COMMUNITY-ACQUIRED PNEUMONIA WITH CHRONIC KIDNEY DISEASE: A CASE REPORT**By****Arief Kurniawan^{1*}, Nur Pudyastuti Pratiwi²****¹Department of Anesthesiology and Intensive Therapy Faculty of Medicine Universitas Jenderal Achmad Yani Cimahi, Indonesia****²Department of Hospital Administration Faculty of Medicine Universitas Jenderal Achmad Yani Cimahi, Indonesia****telp:081395101010, fax:(022)66522170****Email: [1konsultanKIC@gmail.com](mailto:konsultanKIC@gmail.com)****Abstract**

Community-acquired pneumonia (CAP) is an infectious disease that causes local and systemic inflammation, resulting in a dysregulation of the body's reaction and life-threatening organ failure, also known as sepsis. Chronic kidney disease is a prevalent, progressive condition that has become a public health problem. Infection is the major cause of death and hospitalization in people with end-stage renal disease. Pneumonia is one of the most common infectious diseases, and it is linked to an increased risk of death and a lower glomerular filtration rate.

A 49-year-old woman was diagnosed with uremic encephalopathy, chronic kidney disease with hyperkalemia, and community-acquired pneumonia. Antibiotics were chosen based on the risk of infection with *Pseudomonas* bacteria exposure, which included the possibility of bronchiectasis infection, corticosteroid treatment >10 mg/day, the use of broad-spectrum antibiotics for more than 7 days in the previous month, as well as the presence of malnutrition. This patient was found to have been infected with *Pseudomonas* bacteria. Ceftazidime and levofloxacin were chosen as antibiotics for this patient, as suggested by the Indonesian Intensive Care Doctors Association. Early identification, effective resuscitation, antibiotic therapy, and positive ventilation support when needed are all critical components of successful care of septic shock caused by community-acquired pneumonia. In individuals with renal failure, proper dosage adjustments will result in optimal therapeutic effects and fewer adverse effects.

Keywords: Antibiotics, community-acquired pneumonia, chronic kidney disease, septic shock, ventilator

INTRODUCTION

Community-acquired pneumonia (CAP) is an infectious disease that produces local and systemic inflammation, resulting in dysregulation of the body's response and life-threatening organ failure commonly known as sepsis. Early detection and diagnosis of sepsis caused by CAP, resuscitation if hypoperfusion is discovered, administration of intravenous antibiotics as soon as possible, and ventilatory support if needed are all part of the successful treatment of sepsis caused by CAP.

Chronic kidney disease (CKD) is a prevalent and progressive condition that has

turned into a public health problem. Infection is the most common cause of death and hospitalization in patients with end-stage renal failure. Pneumonia is one of the most common infectious diseases, and it's linked to a higher risk of death in people who have a decreased glomerular filtration rate. Antibiotics given to patients with CKD are generally excreted through the kidneys. As a result, in the case of impaired kidney function, antibiotic doses must be adjusted.

The management of septic shock patients caused by CAP and accompanied by CKD will be discussed in this case report.

CASE REPORT

A 49-year-old woman came to the Emergency Room with the chief complaint of decreased consciousness. Loss of consciousness 2 days before hospital admission, getting worse. Complaints are accompanied by shortness of breath that gets worse and cough but is not accompanied by fever. There are no complaints of weak limbs. Shortness of breath during activity, Paroxysmal Nocturnal Dyspnea, orthopnea denied. The patient has a history of hypertension, kidney disease, and dialysis twice in the last two months.

She was diagnosed with uremic encephalopathy, chronic kidney disease with hyperkalemia, and community-acquired pneumonia. The accepted therapy is calcium gluconate, insulin, packed red cell transfusion, cito hemodialysis, ceftriaxone, and levofloxacin.



Figure 1. Chest X-ray

On day 3 the patient went into shock, was admitted to intensive care, and received an escalation of antibiotics ceftazidime and levofloxacin after a blood culture examination. Conditions after resuscitation obtained consciousness under the influence of drugs, blood pressure 113/58 mmHg with noradrenaline support 0.05 mcg/kg/minute, pulse 93 x/m, ventilator mode SIMV Frequency 12 VT 350 PS 12 PEEP 6 FiO2 60% with SpO2 97 up to 100%. Chest X-ray showed lung infiltrate and inflammation (figure 1). The results of laboratory

examinations obtained Hb 5.6 g/dl, leucocytes $12.800 \times 10^3/\mu\text{L}$, urea 207 mg/dl, and creatinine 7.9 mg/dl. This condition requires continued hemodialysis in the intensive care unit. The patient was transferred to the ward on intensive care day 5 after weaning from the ventilator.

DISCUSSION

The patient came with symptoms consistent with CAP infection. The diagnosis of CAP can be made based on the clinical signs of cough, fever, sputum production, pleural discomfort, and lung X-rays, according to the Infectious Diseases Society of America/American Thoracic Society (ATS/IDSA) recommendations. The physical examination can be used to detect bronchial rhonchi or sounds, but it is less sensitive than a lung X-ray. In elderly patients, neither the clinical picture nor the physical examination may appear. The microbiological examination can support the diagnosis of pneumonia, but these tests are often false-negative and are often not as specific as in this patient.

According to the 2016 Surviving Sepsis Campaign: International Guidelines for Management of Severe Sepsis and Septic Shock, sepsis was diagnosed with a SOFA score of more than 2 and the presence of an infectious source. While the septic shock is defined as sepsis accompanied by hypotension requiring vasopressors to maintain a MAP > 65 mmHg and a lactate value > 2 mmol/L (18 mg/dl) despite adequate fluid resuscitation. This patient obtained a SOFA score of 14 accompanied by signs of pulmonary infection accompanied by hypotension requiring vasopressor support, so the patient was diagnosed with septic shock caused by CAP. This patient was given 0.4 mcg/kg/m of norepinephrine, which was then titrated down as the patient's condition improved.

The antibiotics were chosen based on the risk of *Pseudomonas* bacterium exposure, including the presence of bronchiectasis, corticosteroid treatment > 10 mg/day, broad-

spectrum antibiotic treatment > 7 days in the previous month, and malnutrition. This patient is considered to have been infected with *Pseudomonas* bacteria. Ceftazidime and levofloxacin were chosen as antibiotics for this patient, as recommended by the Indonesian Intensive Care Doctors Association.

If the average drug concentration in 24 hours exceeds the minimal inhibitory concentration (MIC) with a percentage of time over the MIC > 45–70%, the treatment will be successful. Ceftazidime selected for this patient is a broad-spectrum cephalosporin with strong activity against gram-negative bacteria, including *Pseudomonas aeruginosa*. The administration of ceftazidime in patients receiving hemodialysis is recommended at a dose of 1 g daily. This dose will reach the target MIC of 45 – 70%.

Another antibiotic choice is levofloxacin, a fluoroquinolone class of antibiotics that has a broad spectrum for both gram-negative and gram-positive bacteria, as well as for atypical and anaerobic bacteria. This antibiotic has been used for the treatment of various infections, including CAP, skin and tissue infections, urinary tract infections, acute exacerbations of bronchitis and sinusitis.^{17,18}

The patient's condition improved with ventilatory supportive therapy, hemodialysis, and a combination of antibiotics, as indicated by weaning the ventilator, good consciousness, and the ability to move to the usual care ward.

CONCLUSION

Successful management of cases of septic shock caused by community-acquired pneumonia is highly dependent on early diagnosis, optimal resuscitation, administration of antibiotics, and positive ventilation support when needed. Appropriate adjustment of drug dosage in patients with renal failure will result in optimal drug effects and lower side effects.

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Declaration Of Interests

The authors have no competing interests to declare that are relevant to the content of this article.

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