Journal of Society Medicine
Research & Review Articles on Diseases
Journal of Society Medicine. 2025; 4 (7)

Management of Sepsis Patients Due to Community-Acquired Pneumonia in the Intensive Care Unit

Ardiayuman [1*], Dhany Budipratama [2]

[1] *Intensive Care Trainee, Faculty of Medicine Padjadjaran University / Hasan Sadikin General Hospital Bandung, Indonesia*
[2] *Intensive Care Consultant, Faculty of Medicine Padjadjaran University / Hasan Sadikin General Hospital Bandung, Indonesia*

***Corresponding Author**: Ardiayuman, Email: d128iuz@gmail.com

ARTICLE INFO

Article history:
Received
13 May 2025

Revised
14 June 2025

Accepted
31 July 2025

Manuscript ID:
JSOCMED-020425-47-5

Checked for Plagiarism: Yes

Language Editor: Rebecca

Editor-Chief:
Prof. AznanLelo, PhD

ABSTRACT

Introduction: Sepsis, a life-threatening response to infection, remains a critical global health issue, often triggered by community-acquired pneumonia (CAP) in vulnerable populations such as the elderly. This condition frequently requires intensive care unit (ICU) admission, necessitating adherence to evidence-based guidelines like the 2021 Surviving Sepsis Campaign (SSC) and Infectious Diseases Society of America (IDSA) recommendations. This case report highlights the application of these protocols in managing a complex sepsis case, emphasizing the role of early intervention and multidisciplinary care in improving outcomes.

Case Description: A 67-year-old male, Mr. U, presented with a 3-day history of dyspnea and 1-day history of altered consciousness. Initial assessment revealed respiratory distress (respiratory rate 32/min, oxygen saturation 88% on room air, Glasgow Coma Scale 10), with chest radiography confirming CAP. Laboratory results showed a lactate level of 4.2 mmol/L and leukocytosis (18,000/mm³), indicating sepsis. In the ICU, the patient received oxygen therapy, followed by intubation due to worsening respiratory failure. Blood cultures were obtained, and empirical antibiotics (meropenem) were initiated within 1 hour per SSC guidelines. Fluid resuscitation (30 mL/kg crystalloids) and norepinephrine were administered for persistent hypotension. Bronchoscopy revealed purulent secretions, aiding diagnosis and management. After 5 days of ventilatory support and adjusted antibiotics, the patient stabilized and was transferred to a general ward.

Conclusion: This case illustrates successful sepsis management due to CAP using SSC 2021 and IDSA guidelines. The integration of early antibiotics, fluid resuscitation, vasopressors, ventilation, and bronchoscopy underscores the efficacy of a multidisciplinary approach. Timely intervention in the ICU significantly improved survival and recovery, highlighting the need for further research to optimize protocols for such critical cases.

Keywords

Sepsis, Community-Acquired Pneumonia (CAP), Bronchoscopy, Surviving Sepsis Campaign

How to cite: Ardiayuman, Budipratama D. Management of Sepsis Patients Due to Community-Acquired Pneumonia in the Intensive Care Unit. *Journal of Society Medicine*. 2025; 4 (7): 232-237. **DOI: https://doi.org/10.71197/jsocmed.v4i7.226**

INTRODUCTION

Sepsis, a life-threatening condition resulting from the body's dysregulated response to infection, poses a significant global health challenge, particularly in patients with severe pulmonary infection. The incidence of sepsis has risen dramatically, with estimates in the United States increasing from 164,000 cases annually in the late 1970s to 650,000 cases per year, and approximately 75% of intensive care unit (ICU) patients are affected, with mortality rates ranging from 20% to 50% [1]. Despite improvements in hospital survival rates owing to medical advancements, the rising prevalence of sepsis is linked to an aging population, increasing chronic diseases, and growing antibiotic resistance [2]. Among community-acquired sepsis cases, pneumonia

stands out as one of the most severe etiologies, with ICU mortality rates reaching 50% [3]. The Surviving Sepsis Campaign (SSC) introduced a 1-hour bundle, comprising lactate measurement, blood cultures, appropriate antimicrobials, fluid resuscitation, and vasopressors, to standardize early management [3]. However, some studies suggest that this approach may constitute overtreatment, sparking ongoing debate [4,5].

Fiberoptic bronchoscopy (FBS), a safe and widely utilized procedure in the ICU, serves multiple purposes, including airway management, monitoring, and diagnosis of parenchymal lung abnormalities [6,7]. Nevertheless, its application in high-risk ICU settings raises concerns about cross-infection risks, necessitating stringent sterilization protocols to prevent transmission between patients [8]. This case report aims to explore the application of these evidence-based strategies, including the SSC 1-hour bundle and FBS, in managing a critically ill patient with sepsis secondary to community-acquired pneumonia, highlighting the importance of tailored multidisciplinary care in improving outcomes.

CASE DESCRIPTION

A 67-year-old man presented to the emergency department (ED) with progressive shortness of breath and altered consciousness. These symptoms had been ongoing for five days before admission, accompanied by a productive cough, chills, generalised weakness, and difficulty in eating. The patient's medical history was significant for hypertension. Upon arrival at the ED, the patient had a Glasgow Coma Scale (GCS) score of E3M6V5 and was in severe respiratory distress, requiring immediate endotracheal intubation to secure the airway. His vital signs were as follows: blood pressure, 148/79 mmHg; heart rate, 110 bpm; respiratory rate, 38 breaths/min; and temperature, 38.1°C. Initial blood gas analysis indicated respiratory failure with pH 7.49, PO2 94.5 mmHg, and PCO2 26.9 mmHg values. Chest radiography revealed right-sided pneumonia without evidence of cardiomegaly.

In the intensive care unit (ICU), the patient was started on mechanical ventilation with initial settings of 12 L/min. Due to hypotension, fluid resuscitation was performed with 200 cc IV fluid over 10 min, followed by norepinephrine support (0.05 mcg/kg/min) to achieve a target mean arterial pressure (MAP) of 65 mmHg. Antibiotic therapy was initiated with meropenem (1 g IV every 8 h) and levofloxacin (750 mg IV every 24 h), while platelet transfusion was required due to severe thrombocytopenia (platelets 15,000/µL). Laboratory results showed anaemia (Hb, 10.4 g/dL) and mild renal dysfunction (urea, 55 mg/dL; creatinine, 1.11 mg/dL).

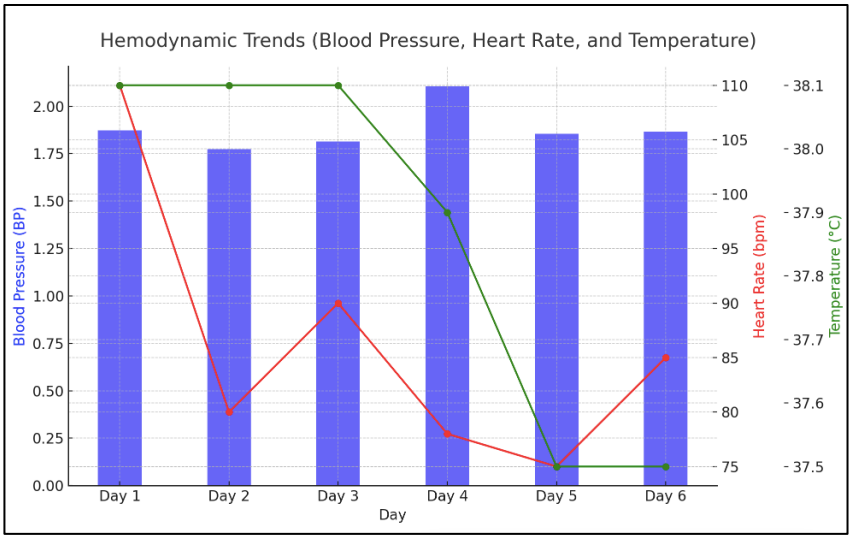

Figure 1. Hemodynamic trends

Despite ongoing ventilation, the patient's condition remained critical for the next few days. On Day 2 (13 October 2024), the patient was sedated with midazolam (3 mg/h) and remained on mechanical ventilation. Chest radiography revealed bilateral pleural effusion, and pneumonia did not improve. Sputum culture identified *Candida tropicalis*, prompting the initiation of antifungal therapy. Over the following days, the

patient remained on ventilator support with attempts to reduce sedation and gradually adjust the ventilator settings. The patient's platelet count gradually improved, reaching 28,000/µL on day 5.

On Day 6 (18 October 2024), bronchoscopy was performed to assess airway obstruction or secretion buildup. The procedure revealed hypersecretion in the bilateral bronchial segments, but no significant obstruction. The patient's clinical status continued to stabilise with the introduction of additional antifungal therapy and ongoing, supportive antibiotic treatment. By Day 7 (19 October 2024), attempts to reduce ventilator support and initiate weaning were made, although the patient showed signs of increased work of breathing (WOB). Chest radiography showed slight improvement in pneumonia, although full recovery was not yet evident.

After two weeks in the ICU, by Day 15 (27 October 2024), the patient showed significant progress in respiratory function. His GCS score improved to E4M6Vtt, and he was transferred to a step-down unit for further observation. The ventilator settings were adjusted to CPAP (Continuous Positive Airway Pressure) mode, with FiO2 reduced to 40%. Final bronchoscopy revealed mucosal irregularities around the right bronchus but no further evidence of infection. The patient's clinical recovery continued, and by 1 November 2024 he had been successfully extubated.

This case highlights the challenges in managing severe community-acquired pneumonia (CAP) complicated by respiratory failure, which necessitates prolonged mechanical ventilation and intensive care. The patient’s recovery was delayed, particularly in weaning from the ventilator, which was attributed to persistent infection and secondary complications. The use of bronchoscopy and antifungal therapy was crucial for the patient's recovery. Close monitoring, timely intervention, and multidisciplinary care were integral to the successful management of this complex case.

Table 1. Patient's Daily Management and Laboratory Findings

Day	Respiratory Status	Laboratory Findings	Therapy
1	Intubated, NRM 12 L/min	Hb: 10.4 g/dL, WBC: 6,660/µL, Platelets: 15,000/µL	Meropenem 3g IV, Levofloxacin 750mg IV, Platelet transfusion
2	Ventilator support PSV	Hb: 10.1 g/dL, WBC: 11,740/µL, Platelets: 28,000/µL	Meropenem 3g IV, Levofloxacin 750mg IV, NAC 400mg PO
3	Ventilator support PSV	Hb: 9.0 g/dL, WBC: 8,060/µL, Platelets: 61,000/µL	Meropenem 3g IV, Levofloxacin 750mg IV, Nebulizer 3% NaCl
4	Ventilator support PSV	Hb: 9.4 g/dL, WBC: 7,330/µL, Platelets: 54,000/µL	Meropenem 3g IV, Levofloxacin 750mg IV, NAC 400mg PO
5	Ventilator support PSV	Hb: 9.0 g/dL, WBC: 8,630/µL, Platelets: 96,000/µL	Meropenem 3g IV, Levofloxacin 750mg IV, Flukonazol 400mg IV
6	Ventilator support PSV	Hb: 9.0 g/dL, WBC: 10,540/µL, Platelets: 155,000/µL	Meropenem 3g IV, Levofloxacin 750mg IV, Flukonazol 400mg IV

The management of severe community-acquired pneumonia complicated by acute respiratory failure requires comprehensive care, including early identification of complications, appropriate ventilatory support, and timely antimicrobial therapy. The gradual improvement in the patient's condition was aided by bronchoscopy, careful fluid and electrolyte management, and the addition of antifungal therapy. This case serves as an important reminder of the complexity of critical care in elderly patients with comorbidities and the importance of a multidisciplinary approach to ensure successful recovery in such patients.

DISCUSSION

Sepsis is a critical medical emergency characterised by life-threatening organ dysfunction due to a dysregulated host response to infection, with its definition evolving to emphasise systemic inflammation and organ failure [8,9]. This case report highlights a 67-year-old man with sepsis secondary to community-acquired pneumonia (CAP), a leading cause of ICU admission, with mortality rates reaching up to 50% in severe cases [5]. The complexity of sepsis management is compounded by diverse aetiologies, including bacterial, viral,

and fungal pathogens. In this instance, the patient's condition was initially driven by CAP, with subsequent identification of Candida tropicalis and multidrug-resistant bacteria (Acinetobacter baumannii, Klebsiella pneumoniae, Stenotrophomonas maltophilia), reflecting the third most common ICU sepsis aetiology —fungal infections—where colonisation rates have escalated from 5-15% to 50-80%, although invasive candidiasis occurs in only 5-30% of cases [10].

CAP pathogenesis involves pathogen inhalation or aspiration, colonisation of the nasopharynx, and reaching the alveoli, where immune disruption triggers inflammation and infection [11]. Common bacterial pathogens include Streptococcus pneumoniae and Haemophilus influenzae, whereas atypical agents such as Legionella and fungal species such as Histoplasma capsulatum or Cryptococcus neoformans may contribute [12]. In this patient, initial chest radiography confirmed bilateral infiltrates, and clinical signs (fever, purulent sputum, and hypoxaemia) supported the CAP diagnosis, in accordance with guidelines requiring new infiltrates with infectious evidence [5]. Elevated lactate (2.5 mmol/L) and leukocytosis further corroborated sepsis, prompting adherence to the 2021 Surviving Sepsis Campaign (SSC) 1-hour bundle, including early antibiotics (meropenem and levofloxacin) and fluid resuscitation [3].

Empirical antibiotic therapy with beta-lactams (meropenem) and fluoroquinolones (levofloxacin) followed the Infectious Diseases Society of America (IDSA) recommendations for severe CAP, adjusted post-culture to target identified pathogens [13]. However, the emergence of fungal infection necessitated antifungal therapy (fluconazole), underscoring the need for de-escalation based on the microbiological data [11]. Fluid management, a cornerstone of sepsis care, requires precision to avoid fluid overload, which can exacerbate capillary leakage and splanchnic hypoperfusion, worsening the sepsis cascade [14]. This patient received a 200 mL bolus and norepinephrine, with subsequent fluid balance monitored to prevent positive fluid balance linked to worse outcomes [15]. The four-phase fluid strategy—resuscitation, optimisation, stabilisation, and de-escalation—was employed, with diuresis considered as fluid overload (>10%) [16].

Nutritional support, initiated within 24-48 hours per ASPEN/SCCM guidelines, targeted 6×200 kcal with 1.3 g/kg/day protein, addressing the patient's high malnutrition risk (NRS 2002 ≥3) [17]. Head-of-bed elevation at 30° and chlorhexidine mouthwash reduced the risk of aspiration pneumonia during enteral feeding [18]. Sedation with dexmedetomidine, replacing midazolam, minimised the delirium risk, with CPOT and RASS scores (0-1 and -2, respectively) indicating adequate analgesia and sedation [35]. Omeprazole (40 mg/day) prevents stress ulcers, justified by mechanical ventilation and septic shock criteria, although long-term use warrants caution for Clostridium difficile risk [19]. Thromboprophylaxis was omitted due to low Padua/IMPROVE scores, though daily VTE risk reassessment is recommended [20-22].

Bronchoscopy on day 13 identified hypersecretion and mucosal abnormalities, aiding diagnosis and guiding therapy, although persistent pneumonia delayed weaning [6]. This case exemplifies the efficacy of multidisciplinary, guideline-driven care in managing complex sepsis, with outcomes improved by timely interventions despite challenges posed by multidrug-resistant pathogens and ventilator dependence.

CONCLUSION

This case illustrates successful sepsis management due to CAP using SSC 2021 and IDSA guidelines. The integration of early antibiotics, fluid resuscitation, vasopressors, ventilation, and bronchoscopy underscores the efficacy of a multidisciplinary approach. Timely intervention in the ICU significantly improved survival and recovery, highlighting the need for further research to optimize protocols for such critical cases.

DECLARATIONS

None

CONSENT FOR PUBLICATION

The Authors agree to be published in the Journal of Society Medicine.

FUNDING
None

COMPETING INTERESTS
The authors declare no conflicts of interest in this case report.

AUTHORS' CONTRIBUTIONS
All authors made substantial contributions to the case report. All authors were responsible for patient management, data collection, and the initial drafting of the manuscript. All authors reviewed and approved the final version of the manuscript, ensuring its accuracy and integrity and being accountable for all aspects of the work.

ACKNOWLEDGMENTS
None

REFERENCE
1. van der Slikke EC, Beumeler LFE, Holmqvist M, Linder A, Mankowski RT, Bouma HR. Understanding post-sepsis syndrome: How can clinicians help? Infect Drug Resist. 2023; 16:6493-6511.
2. Tancharoen L, Pairattanakorn P, Thamlikitkul V, Angkasekwinai N. Epidemiological burden of sepsis at Thailand's largest university national tertiary referral center during 2019. Antibiotics (Basel). 2022;11(7):899.
3. Singer M, Deutschman CS, Seymour C, Shankar-Hari M, Annane D, Bauer M, et al. The third international consensus definitions for sepsis and septic shock (sepsis-3). JAMA. 2016;315(8):801-10.
4. Pangalila FJV, Soepandi PZ, Albandjar CA, Sukesih L, Enty. Pedoman Antibiotik Empirik di Unit Rawat Intensif. Jakarta: Perhimpunan Dokter Intensive Care Indonesia (PERDICI); 2019.
5. Evans L, Rhodes A, Alhazzani W, Antonelli M, Coopersmith CM, French C, et al. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. Intensive Care Med. 2021;47(11):1181-247.
6. Sartelli M, Coccolini F, Kluger Y, Agastra E, Abu-Zidan FM, Abbas AES, et al. WSES/GAIS/SIS-E/WSIS/AAST global clinical pathways for patients with intra-abdominal infections. World J Emerg Surg. 2021;16(1):49.
7. Moenadjat Y, Lalisang TJ, Saunar RS, Usman N, Handaya AY, Iswanto J, et al. Epidemiology of microorganisms in intraabdominal infection/complicated intraabdominal infections in six centers of surgical care in Indonesia: a preliminary study. The New Ropanasuri Journal of Surgery. 2017 Oct 30;2(2):46-53.
8. Pangalila FJV. Penatalaksanaan Infeksi pada Penderita Penyakit Kritis. Jakarta: Perhimpunan Dokter Intensive Care Indonesia (PERDICI); 2013.
9. Melzer M. Sepsis—recognition, diagnosis, management in adult patients. In: Tutor Topics in Infection Control Combined Infection Training Programme. Oxford: Oxford University Press; 2019.
10. Wolfertz N, Böhm L, Keitel V, Hannappel O, Kümpers P, Bernhard M, et al. Epidemiology, management, and outcome of infectious sepsis and septic shock at a German emergency department (EpiSEP study). Front Med (Lausanne). 2022; 9:997992.
11. Friedrich AKU, Cahan M. Intraabdominal infections in the intensive care unit. J Intensive Care Med. 2014;29(5):257-66.
12. Sartelli M, Catena F, di Saverio S, Ansaloni L, Malangoni M, Moore EE, et al. Current concept of abdominal sepsis: WSES position paper. World J Emerg Surg. 2014; 9:22.
13. Emmi V, Sganga G. [Diagnosis of intra-abdominal infections: clinical findings and imaging]. Infezioni in Medicina. 2008;16 Suppl 1:10-8.

14. LaRosa SP. Sepsis: menu of new approaches replaces one therapy for all. Cleve Clin J Med. 2002;69(1):62-74.
15. Hecker A, Reichert M, Reuß CJ, Schmoch T, Riedel JG, Schneck E, et al. Intra-abdominal sepsis: new definitions and current clinical standards. Langenbecks Arch Surg. 2019;404(4):439-47.
16. Kuttab HI, Lykins JD, Hughes MD, Wroblewski K, Keast EP, Kukoyi O, et al. Evaluation and predictors of fluid resuscitation in patients with severe sepsis and septic shock. Crit Care Med. 2019;47(11):1589-97.
17. Cherpanath TGV, Hirsch A, Geerts BF, Lagrand WK, Leeflang MM, Schultz MJ, et al. Predicting fluid responsiveness by passive leg raising: a systematic review and meta-analysis of 23 clinical trials. Crit Care Med. 2016;44(5):981-91.
18. Misango D, Pattnaik R, Baker T, Dünser MW, Dondorp AM, Schultz MJ. Haemodynamic assessment and support in sepsis and septic shock in resource-limited settings. Trans R Soc Trop Med Hyg. 2017;111(11):483-91.
19. Levy B. Lactate and shock state: the metabolic view. Curr Opin Crit Care. 2006;12(4):315-21.
20. Delaney A, Finnis M, Bellomo R, Udy A, Jones D, Keijzers G, et al. Initiation of vasopressor infusions via peripheral versus central access in patients with early septic shock: a retrospective cohort study. Emerg Med Australas. 2020;32(2):210-9.
21. Lara B, Enberg L, Ortega M, Leon P, Kripper C, Aguilera P, et al. Capillary refill time during fluid resuscitation in patients with sepsis-related hyperlactatemia at the emergency department is related to mortality. PLoS One. 2017;12(11):e0188048.
22. Cecconi M, Hernandez G, Dunser M, Antonelli M, Baker T, Bakker J, et al. Fluid administration for acute circulatory dysfunction using basic monitoring: narrative review and expert panel recommendations from an ESICM task force. Intensive Care Med. 2019;45(9):1299-317.