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Case Study

Breathing Life Back: A Case Study on Community-Acquired Pneumonia Managed with V-V ECMO Support

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Abstract

Background: *Community-acquired pneumonia (CAP) is a significant cause of morbidity and mortality and may progress to acute respiratory distress syndrome (ARDS) and multi-organ dysfunction syndrome (MODS). In severe cases, extracorporeal membrane oxygenation (ECMO) is used as a life-saving intervention.*

Case Presentation: *A 45-year-old female presented with fever, cough, and respiratory distress that rapidly progressed to severe ARDS, septic shock, and acute kidney injury (AKI). She required invasive ventilation, vasopressors, continuous renal replacement therapy (CRRT), and veno- venous ECMO. Her course was complicated by secondary infection and hemorrhagic shock due to a large hematoma.*

Interventions: *Management included lung-protective ventilation, ECMO, CRRT, antibiotics, transfusions, surgical evacuation of hematoma, tracheotomy, and pleural drainage, along with intensive nursing care.*

Outcome: *The patient gradually improved, was successfully weaned off ECMO and ventilator support, and discharged in stable condition after 34 days.*

Conclusion: *ECMO is an effective rescue therapy in refractory ARDS, and comprehensive nursing care is essential for favorable outcomes.*

Keywords: *Community-acquired pneumonia, Acute respiratory distress syndrome, Extracorporeal membrane oxygenation, Septic shock, Acute kidney injury, Mechanical ventilation*

Introduction

Community-acquired pneumonia remains a major global health burden, especially when complicated by ARDS and septic shock. ARDS is characterized by severe hypoxemia and reduced lung compliance, often requiring mechanical ventilation. When conventional therapy fails, ECMO provides temporary cardiopulmonary support, allowing time for lung recovery.

This case study emphasizes the importance of early recognition, advanced supportive therapies, and the pivotal role of nursing care in managing critically ill patients.

Case Presentation

A 45-year-old female presented with high-grade fever, chills, and cough with scanty expectoration for one day. She reported a similar episode 2–3 weeks earlier and had a chronic non-healing ulcer over the left lateral malleolus.

On admission, she was critically ill with tachycardia (150/min), hypotension (100/60 mmHg on noradrenaline), tachypnea (50/min), and hypoxia (SpO_2 86% on room air). Respiratory examination revealed bilateral crepitations and wheezing, indicating severe pulmonary involvement.

Investigations and Initial Findings

Arterial blood gas analysis revealed severe metabolic acidosis with markedly elevated lactate levels (up to 24 mmol/L), indicating poor tissue perfusion. Chest X-ray showed bilateral lung consolidations consistent with pneumonia and ARDS.

Laboratory investigations demonstrated leukocytosis, thrombocytopenia, and elevated inflammatory markers. Bronchoalveolar lavage confirmed Streptococcus pneumoniae, while subsequent blood cultures revealed Acinetobacter baumannii, indicating secondary infection.

Management and Clinical Course

The patient was initially managed with non-invasive ventilation, but due to worsening respiratory distress, she required intubation and mechanical ventilation with a lung-protective strategy. She received intravenous fluids, vasopressors, broad-spectrum antibiotics, antivirals, and corticosteroids.

Due to severe metabolic acidosis and acute kidney injury, CRRT with a cytokine filter was initiated. However, refractory hypoxemia with a P/F ratio of approximately 70 necessitated the initiation of V-V ECMO on 28/01/2026.

During ECMO support, the patient developed multiple complications including hepatic dysfunction, thrombocytopenia, anemia, electrolyte imbalance, hypoglycemia, and hypoalbuminemia. These were managed with supportive care and close monitoring.

A major complication occurred on day 9 of ECMO when the patient developed acute abdominal pain and a sudden drop in hemoglobin. Imaging revealed a large thoracoabdominal hematoma (~2 liters), leading to hemorrhagic shock. Anticoagulation was stopped, ECMO was discontinued, and surgical evacuation of the hematoma was performed with massive transfusion support.

Table 1: Summary of Clinical Course, Investigations, and Management

Category	Findings / Interventions
Presenting Symptoms	Fever, Cough, Respiratory distress
Vital Signs	HR 150/min, BP 100/60 mm hg (on vasopressor), RR 50/MIN, SpO2, 86%
ABG Findings	Severe metabolic acidosis, lactate 24 mmol/L
Imaging	Bilateral lung Consolidations
Microbiology	Streptococcus pneumonia, Later Acinetobacter baumannii
Initial Treatment	NIV – Intubation, IV Fluids, Vasopressors
Medications	Meropenem, Teicoplanin, Doxycycline, Antivirals, Steroids
Advanced Support	CRRT, V-V ECMO
Major Complication	Thoracoabdominal hematoma(2l), hemorrhagic shock
Interventions	ECMO discontinuation, surgery, transfusion
Additional Procedures	Tracheostomy, Pleural Drainage
Hospital Stay	34 days

Further Interventions and Recovery

Due to prolonged mechanical ventilation, a tracheostomy was performed on 09/02/2026. Persistent lung involvement led to the identification of right-sided pleural effusion, which was managed with ultrasound-guided pigtail drainage.

The patient also developed pressure ulcers during her ICU stay, which were managed with regular repositioning, dressing, and wound care.
Gradually, the patient improved clinically. ECMO and ventilator support were successfully weaned. Tracheostomy decannulation was done on 26/02/2026, and she was maintained on room air with stable hemodynamics.

She was discharged on 02/03/2026 after a total hospital stay of 34 days.

Nursing Perspective

Nursing care played a pivotal role in the successful management of this patient. Continuous monitoring, early identification of complications, and timely interventions were essential in preventing further deterioration.

Nurses were responsible for managing the ECMO circuit, monitoring anticoagulation status, ensuring ventilator care, and preventing infections through strict aseptic techniques. They also played a key role in pressure ulcer prevention, nutritional support, and rehabilitation.

Table 2: Nursing Interventions and Responsibilities

Nursing Domain	Key Responsibilities
Monitoring	Continuous vital signs, ABG Sampling, Oxygenation
ECMO Care	Detection of clotting/bleeding, Anticoagulation checks
Ventilator Care	Airway suctioning, humidification, positioning
Infection control	Aseptic technique, prevention of VAP and sepsis
Skin Care	Pressure ulcer prevention, wound management
Fluid & Electrolyte Balance	Monitoring I/O chart
Nutritional Support	Enteral/Parenteral Feeding
Complication Management	Early detection of bleeding, shock, infection
Rehabilitation suppot	Mobilization, Weaning assistance
Psychological Care	Patient and Family support

Discussion

This case demonstrates how rapidly CAP can progress to severe ARDS and MODS. Despite optimal conventional management, refractory hypoxemia required ECMO support, which proved life-saving.

However, ECMO is associated with significant risks, particularly bleeding and infection. The development of a large hematoma in this patient highlights the importance of vigilant monitoring and timely intervention.

A multidisciplinary approach ensured comprehensive management, but nursing care remained central to patient recovery. Nurses played a critical role in monitoring, early complication detection, and maintaining overall patient stability.

Conclusion

ECMO is an effective rescue therapy for patients with severe ARDS and refractory hypoxemia. However, its success depends on early initiation, careful monitoring, and prompt management of complications.

This case underscores the indispensable role of skilled nursing care in improving patient outcomes. Continuous vigilance, clinical expertise, and a multidisciplinary approach are essential in managing critically ill patients successfully.

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