

A Case Study Report on Severe Influenza A (H1N1) Infection Complicated by Acute Respiratory Distress Syndrome, Prolonged Mechanical Ventilation, Multidrug-Resistant Secondary Infection, and Successful Recovery of an Adult Patient

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Abstract: **Background:** Influenza A (H1N1) remains a significant cause of severe viral pneumonia and acute respiratory distress syndrome (ARDS), particularly among critically ill patients. Although most patients recover with supportive treatment, some develop life-threatening respiratory failure requiring prolonged intensive care. My case highlights the multidisciplinary management and the pivotal role of critical care nursing in achieving a successful outcome. A 43-year-old male presented to the emergency department with an 8-day history of cough, 7-day history of fever, and progressive shortness of breath for 3 days. On admission, he had severe hypoxemia (SpO₂ 50% on room air), hypotension (88/50 mmHg), tachypnea (34 breaths/min), and fever (101.2°F). Respiratory multiplex PCR confirmed Influenza A (H1N1). Arterial blood gas analysis demonstrated severe Type I respiratory failure. Despite non-invasive ventilation, worsening respiratory distress required endotracheal intubation and invasive mechanical ventilation. Repeated prone positioning, vasopressor support, lung-protective ventilation, and broad-spectrum antimicrobial therapy were instituted. During ICU stay, the patient developed secondary multidrug-resistant *Klebsiella pneumoniae* infection and *Candida albicans* colonization, necessitating targeted antimicrobial therapy. Prolonged ventilatory dependence required tracheostomy. Subsequent imaging revealed bilateral pulmonary fibrosis. Through comprehensive multidisciplinary management, including meticulous nursing care, ventilator-associated pneumonia prevention strategies, physiotherapy, nutritional support, and gradual ventilator weaning, the patient's condition improved. He was successfully decannulated and transferred to the general ward in stable condition. **Conclusion:** This case demonstrates that early diagnosis, aggressive respiratory support, timely management of secondary infections, and evidence-based critical care nursing can significantly improve outcomes in severe H1N1-associated ARDS despite prolonged ICU admission and multiple complications.

Keywords: Influenza A (H1N1), Acute Respiratory Distress Syndrome, Mechanical Ventilation, Critical Care Nursing, Prone Positioning, Tracheostomy, Multidrug-Resistant Organisms, Case Report

1. Introduction

Influenza is an acute viral respiratory illness caused primarily by influenza A and influenza B viruses. Influenza A (H1N1) has emerged as one of the most important causes of severe viral pneumonia worldwide following the 2009 pandemic. While the majority of infections remain self-limiting, a subset of patients rapidly progress to severe pneumonia, acute respiratory distress syndrome (ARDS), respiratory failure, septic shock, and death.

Severe H1N1 infection frequently requires intensive care admission, invasive mechanical ventilation, prolonged respiratory support, and multidisciplinary management. Secondary bacterial infections, prolonged ventilator dependency, multidrug-resistant organisms, and pulmonary fibrosis further increase morbidity and mortality.

Critical care nurses play a central role throughout the patient's hospitalization by maintaining airway patency, preventing healthcare-associated infections, monitoring hemodynamic status, providing nutritional and psychological support, implementing ventilator care bundles, preventing pressure injuries, and facilitating rehabilitation.

This report describes the successful management of a

critically ill patient with severe Influenza A (H1N1) infection complicated by ARDS, prolonged mechanical ventilation, multidrug-resistant secondary bacterial infection, pulmonary fibrosis, and eventual recovery following intensive multidisciplinary care.

2. Case Presentation

A 43-year-old male presented to the Emergency Department of Apollo Hospitals, Bhubaneswar, on 7 May 2026 with complaints of severe cough for eight days, fever for seven days, progressive shortness of breath for three days, generalized weakness, vomiting, decreased urine output, and dehydration.

On admission, the patient was conscious and oriented but appeared critically ill. His blood pressure was 88/50 mmHg, pulse rate 94 beats/minute, respiratory rate 34 breaths/minute, temperature 101.2°F, and oxygen saturation was only 50% on room air, indicating profound hypoxemic respiratory failure.

The patient was immediately shifted to the Medical Intensive Care Unit (MICU). Non-invasive ventilation was initiated along with intravenous fluid resuscitation, oxygen therapy, empirical broad-spectrum antibiotics, and urgent laboratory investigations.

Arterial blood gas analysis demonstrated severe hypoxemia with PaO₂ of 59.9 mmHg and respiratory alkalosis. Respiratory multiplex PCR subsequently confirmed Influenza A (H1N1) infection. Chest radiography showed bilateral bronchitic changes.

Despite aggressive supportive management, the patient's respiratory status deteriorated rapidly. On the third hospital day, worsening respiratory distress necessitated endotracheal intubation and invasive mechanical ventilation. Lung-protective ventilation and repeated prone positioning sessions were initiated to improve oxygenation.

During the ICU stay, sputum culture demonstrated *Streptococcus* species colonization, followed later by multidrug-resistant *Klebsiella pneumoniae* isolated from endotracheal aspirate. Antimicrobial therapy was modified according to culture sensitivity reports. Subsequent tracheal secretion cultures also demonstrated *Candida albicans* colonization.

Because of prolonged ventilator dependence, a tracheostomy was performed on the eleventh day of admission. Intensive physiotherapy, pulmonary rehabilitation, nutritional support, and meticulous airway care were continued throughout hospitalization.

Later imaging revealed bilateral pulmonary fibrosis secondary to severe viral pneumonia and ARDS. Although lung transplantation was considered, the patient's respiratory status gradually improved with continued multidisciplinary treatment.

After prolonged intensive care management, ventilator weaning was successful. Tracheostomy decannulation was performed on hospital day 42. The patient continued to improve clinically and was transferred from the intensive care unit to the general ward on 19 June 2026 in stable condition for further rehabilitation and recovery.

2.1 Medical Management

The patient received immediate intensive care management upon admission because of profound hypoxemia and impending respiratory failure. Non-invasive ventilation (NIV) was initiated along with intravenous crystalloid resuscitation and continuous hemodynamic monitoring.

Empirical broad-spectrum antimicrobial therapy with intravenous Meropenem–Sulbactam was commenced after appropriate microbiological specimens were obtained. Vasopressor support with norepinephrine was initiated to maintain adequate mean arterial pressure in view of hypotension.

On the second day of hospitalization, respiratory multiplex PCR (RP2) confirmed Influenza A (H1N1) infection. Teicoplanin and thromboprophylaxis with low-molecular-weight heparin were added according to the patient's clinical condition.

Despite maximal non-invasive respiratory support, worsening hypoxemia required endotracheal intubation on the third hospital day. Lung-protective mechanical ventilation with

low tidal volume strategy was initiated. Repeated prone positioning sessions were performed to improve oxygenation and ventilation-perfusion matching.

Serial microbiological investigations identified secondary respiratory infections. Sputum culture demonstrated *Streptococcus* species, while endotracheal aspirate culture subsequently isolated multidrug-resistant *Klebsiella pneumoniae*. Antimicrobial therapy was escalated according to culture sensitivity using Cefepime–Tazobactam, Ceftazidime–Avibactam, Aztreonam, Polymyxin-B, Vancomycin, and later Meropenem as clinically indicated. Tracheal secretion cultures also revealed *Candida albicans* colonization, which was managed appropriately according to microbiological findings and clinical assessment. Because of prolonged ventilator dependence, tracheostomy was performed on the eleventh day of admission. Progressive ventilator weaning was achieved through gradual reduction in FiO₂ and positive end-expiratory pressure while maintaining acceptable oxygenation.

Supportive therapy included adequate analgesia and sedation, nutritional supplementation, deep vein thrombosis prophylaxis, stress ulcer prophylaxis, electrolyte correction, glycemic control, chest physiotherapy, pulmonary rehabilitation, and regular multidisciplinary review.

Near the fifth week of hospitalization, high-resolution computed tomography demonstrated bilateral pulmonary fibrosis secondary to severe viral pneumonia and ARDS. Although lung transplantation was considered, continued conservative management resulted in gradual respiratory improvement. Successful decannulation was performed on Day 42, and the patient was transferred to the general ward in stable condition.

2.2 Nursing Management

Comprehensive nursing care played a vital role throughout the patient's critical illness and recovery.

Continuous monitoring of respiratory status included hourly assessment of respiratory rate, oxygen saturation, ventilator parameters, arterial blood gas values, breath sounds, airway pressures, and signs of respiratory deterioration. Endotracheal tube position and cuff pressure were checked regularly to prevent complications.

Strict ventilator-associated pneumonia (VAP) prevention measures were implemented, including elevation of the head of the bed to 30–45 degrees, oral hygiene with chlorhexidine, aseptic endotracheal suctioning, maintenance of cuff pressure, daily assessment for sedation reduction, and readiness for ventilator weaning.

Repeated prone positioning required coordinated nursing care to protect the airway, prevent accidental dislodgement of invasive devices, reduce pressure injuries, and monitor facial edema, eye care, skin integrity, and hemodynamic stability throughout each proning session.

Infection prevention practices included meticulous hand hygiene, aseptic technique during all invasive procedures,

central line care bundles, urinary catheter care, and strict compliance with hospital infection control protocols.

Skin integrity was maintained through regular Braden Scale assessment, two-hourly repositioning, pressure-relieving mattress use, moisture control, nutritional optimization, and early mobilization whenever clinically feasible.

Hemodynamic parameters, urine output, fluid balance, electrolyte status, and neurological status were monitored continuously. Early recognition of clinical deterioration allowed timely medical intervention.

Nutritional management included enteral feeding through appropriate feeding access, monitoring feeding tolerance, aspiration precautions, and collaboration with dietitians to meet caloric and protein requirements.

Psychological support was provided to both the patient and family members through continuous communication, education regarding disease progression, reassurance, and participation in care planning.

Following tracheostomy, specialized tracheostomy care included humidification, suctioning, stoma care, monitoring for infection or bleeding, communication support, and gradual preparation for decannulation.

Chest physiotherapy, breathing exercises, incentive spirometry after ventilator liberation, and progressive mobilization were continued to improve pulmonary function and accelerate recovery.

3. Patient Outcome

After 44 days of multidisciplinary intensive care management, the patient's respiratory function improved significantly. He was successfully liberated from mechanical ventilation, underwent tracheostomy decannulation, maintained adequate oxygenation without advanced respiratory support, and was transferred to the general ward in stable clinical condition for continued rehabilitation. The patient and family received detailed discharge education regarding pulmonary rehabilitation, medication adherence, infection prevention, nutritional support, breathing exercises, and follow-up with pulmonology and critical care specialists.

4. Discussion

Influenza A (H1N1) remains an important cause of severe viral pneumonia and acute respiratory distress syndrome (ARDS), particularly among patients requiring intensive care. Although antiviral therapy and supportive management have significantly reduced mortality, severe cases continue to pose substantial challenges because of respiratory failure, prolonged mechanical ventilation, secondary infections, and long-term pulmonary complications.

The present case demonstrates several features associated with severe H1N1 infection. The patient presented with profound hypoxemia (SpO₂ 50% on room air) and rapidly progressed to Type I respiratory failure requiring invasive mechanical ventilation despite initial non-invasive respiratory

support. This clinical course is consistent with previous reports describing diffuse alveolar damage and severe impairment of gas exchange in H1N1-associated ARDS.

Prone positioning played a crucial role in improving oxygenation during the acute phase of respiratory failure. Current international ARDS guidelines recommend prolonged prone ventilation in patients with severe hypoxemia because it improves ventilation-perfusion matching, recruits dependent lung regions, and reduces ventilator-induced lung injury. In this patient, repeated prone positioning sessions contributed to gradual improvement in oxygenation.

Secondary bacterial infection remains one of the major causes of morbidity among critically ill influenza patients. The development of multidrug-resistant *Klebsiella pneumoniae* infection during prolonged mechanical ventilation required escalation to culture-directed antimicrobial therapy. Appropriate microbiological surveillance and antimicrobial stewardship were essential for successful infection control. Isolation of *Candida albicans* from tracheal secretions further emphasized the importance of careful interpretation of microbiological findings and individualized treatment decisions.

Another significant aspect of this case was the prolonged requirement for invasive ventilation, which ultimately necessitated tracheostomy. Early tracheostomy facilitated airway management, pulmonary hygiene, gradual ventilator weaning, improved patient comfort, and initiation of rehabilitation.

The patient subsequently developed bilateral pulmonary fibrosis following severe viral pneumonia and ARDS, highlighting the potential long-term pulmonary sequelae of severe H1N1 infection. Despite consideration for lung transplantation, continued multidisciplinary management resulted in gradual clinical recovery and successful decannulation.

From a nursing perspective, this case emphasizes the indispensable contribution of critical care nurses. Continuous monitoring, implementation of ventilator-associated pneumonia prevention bundles, infection prevention measures, pressure injury prevention, airway management, nutritional support, psychological counselling, physiotherapy, and family education collectively contributed to the patient's successful recovery.

5. Conclusion

This case illustrates the successful multidisciplinary management of severe Influenza A (H1N1) infection complicated by acute respiratory distress syndrome, prolonged mechanical ventilation, multidrug-resistant secondary bacterial infection, tracheostomy, and pulmonary fibrosis. Early recognition, prompt respiratory support, evidence-based critical care practices, timely culture-directed antimicrobial therapy, and comprehensive nursing care were instrumental in achieving a favorable clinical outcome despite prolonged intensive care hospitalization.

Learning Points

- Severe H1N1 infection may rapidly progress to life-threatening ARDS requiring intensive care.
- Early diagnosis and prompt respiratory support improve survival.
- Lung-protective mechanical ventilation and prone positioning remain essential strategies in severe ARDS.
- Secondary multidrug-resistant bacterial infections should be identified early through regular microbiological surveillance.
- Comprehensive critical care nursing plays a pivotal role in preventing complications and improving patient outcomes.
- Multidisciplinary collaboration is essential for successful recovery following prolonged ICU admission.

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Patient Perspective

The patient and family expressed satisfaction with the multidisciplinary care received throughout the prolonged ICU stay. Continuous communication, psychological support, and education provided by the healthcare team improved their understanding of the illness and enhanced their confidence during recovery.

Declarations

Patient Consent: Appropriate written informed consent for publication should be obtained from the patient or the patient's legally authorized representative before manuscript submission.

Ethical Approval: Ethical approval was not required for this single-patient case report according to institutional policy. Institutional requirements should be verified before submission.

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Author Contributions:

Sangeeta Patra: Conceptualization, data collection, literature review, manuscript preparation, and nursing care documentation.

Sucharita Das - Supervising: Clinical management, case review, and manuscript supervision.

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