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Multidrug-resistant pneumonia in hospital settings: Strategies for effective management.

Lucas Mokoena*

Department of Pulmonary Research, Amsterdam UMC, Netherlands

***Correspondence to:** Lucas Mokoena, Department of Pulmonary Research, Amsterdam UMC, Netherlands. E-mail: lucas.m@amsterdamumc.nl

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Introduction

Multidrug-resistant (MDR) pneumonia represents a growing challenge in hospital settings worldwide, particularly in intensive care units (ICUs). Caused by pathogens resistant to multiple antibiotics, MDR pneumonia complicates treatment, prolongs hospital stays, increases healthcare costs, and contributes to high morbidity and mortality. This article explores the epidemiology, risk factors, and causative organisms of MDR pneumonia and highlights current and emerging strategies for its effective prevention and management [1].

Pneumonia is one of the most common hospital-acquired infections, with multidrug-resistant strains becoming increasingly prevalent due to antibiotic overuse and the selection pressure of hospital environments. Hospital-acquired pneumonia (HAP), including ventilator-associated pneumonia (VAP), is especially susceptible to MDR pathogens such as Pseudomonas aeruginosa, Acinetobacter baumannii, and methicillin-resistant Staphylococcus aureus (MRSA). The rise of such pathogens underscores the urgency of robust diagnostic and therapeutic strategies [2].

MDR pneumonia is most commonly encountered in critically ill patients, especially those on mechanical ventilation, immunocompromised individuals, and those with prolonged hospital stays or recent antibiotic exposure. Risk factors include advanced age, chronic diseases, invasive procedures, prior hospitalizations, and inadequate infection control practices. Identifying these risks early is crucial for effective patient stratification and timely intervention [3].

Diagnosing MDR pneumonia is complex, often relying on a combination of clinical signs, imaging (e.g., chest radiographs), and microbiological analysis of respiratory secretions. Delays in pathogen identification can lead to inappropriate empiric therapy, underscoring the need for rapid diagnostics such as polymerase chain reaction (PCR), next-generation sequencing (NGS), and matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectrometry [4].

One of the cornerstones of managing MDR pneumonia is antibiotic stewardship—ensuring the appropriate selection, dosing, route, and duration of antimicrobial therapy. Broad-spectrum empiric therapy should be started promptly in high-risk patients but de-escalated based on culture results. Avoiding unnecessary antibiotic exposure reduces resistance pressure and improves outcomes [5].

Conclusion

Multidrug-resistant pneumonia remains a formidable threat in hospital settings, driven by the complex interplay of patient factors, resistant organisms, and healthcare practices. Effective management hinges on timely diagnosis, rational antibiotic use, innovative therapies, and rigorous infection prevention protocols. As antimicrobial resistance continues to evolve, a global, coordinated effort is essential to reduce its burden and improve patient outcomes.

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