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Resistance patterns of multidrug resistant Acinetobacter baumannii in an ICU of a tertiary care hospital

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ABSTRACT
Background: *Multidrug-resistant Acinetobacter baumannii has emerged as a significant nosocomial pathogen in intensive care units worldwide. Understanding local resistance patterns and risk factors is crucial for developing effective treatment strategies and infection control measures.*
Methods: *A retrospective cross-sectional study was conducted in the intensive care unit of a tertiary care hospital over 18 months. Culture and sensitivity data from 120 patients with A. baumannii isolates were analyzed. Demographic data, clinical characteristics, antimicrobial exposure history, and resistance patterns were evaluated. Statistical analysis was performed using appropriate tests with significance set at $p<0.05$.*
Results: *Of 120 A. baumannii isolates, 72 (60%) were multidrug-resistant. Ventilator-associated pneumonia was the most common presentation (68.3%). Significant risk factors for MDR acquisition included prolonged ICU stay (mean 14.2±7.8 vs 8.6±4.2 days, $p<0.001$), prior carbapenem exposure (OR 8.45, 95% CI 3.2-22.1, $p<0.001$), and mechanical ventilation duration (OR 1.12 per day, 95% CI 1.05-1.19, $p=0.001$). Resistance rates were highest for cephalosporins (91.7%), carbapenems (77.8%), and fluoroquinolones (83.3%). Mortality was significantly higher in MDR group (45.8% vs 22.9%, $p=0.015$).*
Conclusion: *High prevalence of multidrug-resistant A. baumannii in our ICU setting necessitates implementation of strict antimicrobial stewardship programs and enhanced infection control measures to prevent further emergence of resistance.*
Keywords: *Acinetobacter baumannii, Multidrug resistance, Intensive care unit, Nosocomial infections, Antimicrobial resistance*

I. INTRODUCTION

Healthcare-associated infections caused by multidrug-resistant (MDR) pathogens represent one of the most significant challenges facing modern medicine, particularly in intensive care unit (ICU) settings where critically ill patients are most vulnerable to opportunistic infections. Among the array of resistant organisms that plague healthcare institutions worldwide, Acinetobacter baumannii has emerged as a pathogen of particular concern due to its remarkable ability to develop resistance mechanisms and persist in hospital environments despite stringent infection control measures (1). The World Health Organization has classified carbapenem-resistant A. baumannii as a priority pathogen requiring urgent research and development of new therapeutic interventions, highlighting the global significance of this organism in contemporary healthcare (2).

A. baumannii belongs to the Acinetobacter calcoaceticus-baumannii complex and has evolved from a relatively benign environmental organism to a formidable nosocomial pathogen over the past several decades. This gram-negative, non-fermenting coccobacillus possesses an extraordinary capacity for survival in harsh environmental conditions, including desiccation, extreme temperatures, and exposure to various disinfectants, making it particularly well-suited for persistence in hospital environments (3). The organism's ability to form biofilms on medical devices and surfaces further enhances its survival capabilities and contributes to the difficulty in eradicating it from healthcare settings.

The clinical significance of A. baumannii extends beyond its environmental persistence to encompass its role as a causative agent of serious healthcare-associated infections. The organism is responsible for a diverse spectrum of clinical manifestations, including ventilator-associated pneumonia (VAP), bloodstream infections, surgical site infections, urinary tract infections, and meningitis. Among these, VAP represents the most common and clinically significant manifestation, particularly in ICU patients requiring mechanical ventilation (4). The mortality rates associated with A. baumannii infections are substantial, with studies reporting mortality rates ranging from 30% to 75%, depending on the site of infection, patient comorbidities, and the resistance profile of the isolate (5).

The evolution of antibiotic resistance in A. baumannii has been particularly alarming, with the organism demonstrating an unprecedented ability to acquire and maintain resistance to multiple classes of antimicrobial agents simultaneously. The mechanisms underlying this resistance are multifaceted and include the production of β-lactamases, including extended-spectrum β-lactamases (ESBLs) and carbapenemases, alterations in outer membrane proteins, efflux pump overexpression, and modifications in penicillin-binding proteins (6). Of particular concern is the emergence of carbapenem-resistant A. baumannii (CRAB), which has become increasingly prevalent in healthcare institutions worldwide and represents a significant therapeutic challenge for clinicians.

The definition of multidrug resistance in A. baumannii has evolved over time, with current consensus defining MDR as resistance to agents in three or more antimicrobial categories, extensively drug-resistant (XDR) as resistance to agents in all but two or fewer antimicrobial categories, and pandrug-resistant (PDR) as resistance to all agents in all antimicrobial categories (7). This standardized terminology has facilitated better understanding and comparison of resistance patterns across different institutions and geographic regions.

ICU patients represent a particularly vulnerable population for A. baumannii infections due to multiple predisposing factors. The severity of underlying illnesses, immunocompromised states, presence of invasive medical devices, prolonged hospitalization, and extensive exposure to broad-spectrum antimicrobials create an environment conducive to colonization and subsequent infection with resistant organisms (8). The selective pressure exerted by antimicrobial use in the ICU setting plays a crucial role in the emergence and maintenance of resistant strains, creating a vicious cycle where the very treatments intended to combat infections contribute to the development of increasingly resistant pathogens.

Previous studies have identified numerous risk factors associated with the acquisition of MDR A. baumannii in ICU settings. These include prolonged ICU stay, mechanical ventilation, central venous catheterization, urinary catheterization, prior antimicrobial therapy (particularly carbapenems and broad-spectrum β-lactams), surgical procedures, and underlying comorbidities such as malignancy and immunosuppression (1). Understanding these risk factors is essential for developing targeted prevention strategies and optimizing antimicrobial stewardship programs.

The therapeutic options for MDR A. baumannii infections are severely limited, often requiring the use of last-resort antibiotics such as colistin and tigecycline. However, resistance to these agents is increasingly reported, further narrowing the therapeutic window and highlighting the urgent need for new antimicrobial agents and alternative treatment strategies (9). The limited therapeutic options, combined with the high mortality rates associated with these infections, underscore the critical importance of prevention strategies and antimicrobial stewardship programs.

Antimicrobial stewardship has emerged as a cornerstone in the fight against antimicrobial resistance, with programs focusing on optimizing antimicrobial use, reducing selective pressure, and minimizing the emergence of resistant organisms. These programs typically involve multidisciplinary teams including infectious disease specialists, pharmacists, microbiologists, and infection control practitioners working collaboratively to ensure appropriate antimicrobial prescribing practices (10).

The epidemiology of A. baumannii resistance varies significantly across different geographic regions and healthcare institutions, influenced by factors such as antimicrobial prescribing practices, infection control measures, patient populations, and local resistance patterns. Understanding institution-specific resistance patterns is crucial for developing effective empirical therapy guidelines and implementing targeted intervention strategies.

Given the significant clinical and economic burden associated with MDR A. baumannii infections, there is an urgent need for comprehensive surveillance studies that characterize local resistance patterns, identify risk factors for acquisition, and evaluate the effectiveness of prevention strategies. Such studies provide valuable insights that can inform clinical practice guidelines, antimicrobial stewardship programs, and infection control policies tailored to specific healthcare settings.

II. AIMS AND OBJECTIVES

The primary aim of this study was to analyze the resistance patterns of A. baumannii isolates in the intensive care unit of our tertiary care hospital and to identify the prevalence of multidrug-resistant strains. The study aimed to characterize the demographic and clinical profile of patients with A. baumannii infections and to determine the various risk factors associated with the acquisition of multidrug-resistant strains.

The specific objectives included evaluation of antimicrobial susceptibility patterns of A. baumannii isolates against commonly used antibiotics, determination of the prevalence of multidrug-resistant A. baumannii in the ICU setting, identification of clinical and demographic factors associated with MDR A. baumannii acquisition, assessment of the impact of prior antimicrobial exposure on the development of resistance patterns, and evaluation of clinical outcomes including length of stay and mortality rates between patients with MDR and susceptible strains.

III. MATERIALS AND METHODS

Study Design and Setting

A retrospective cross-sectional study was conducted in the 24-bed multidisciplinary intensive care unit of Hassan Institute of Medical Science, a tertiary care hospital, over an 18-month period from January 2023 to June 2024. The study protocol was approved by the Institutional Ethics Committee, and informed consent was waived due to the retrospective nature of the study.

Sample Size and Study Population

A total of 120 patients with culture-confirmed A. baumannii infections were included in the study. The sample size was calculated based on an expected prevalence of MDR A. baumannii of 50%, with a 95% confidence interval and 9% margin of error. All patients aged 18 years and above admitted to the ICU with culture-positive A. baumannii isolates from various clinical specimens were eligible for inclusion.

Inclusion and Exclusion Criteria

Inclusion criteria comprised patients aged 18 years and above, admission to the ICU for more than 48 hours, culture-confirmed A. baumannii infection from any clinical specimen including respiratory samples, blood, urine, or wound specimens, and availability of complete medical records including antimicrobial susceptibility testing results. Exclusion criteria included patients with incomplete medical records, those with A. baumannii colonization without clinical evidence of infection, patients who died within 48 hours of ICU admission, and those with polymicrobial infections where A. baumannii was not considered the primary pathogen.

Data Collection

Demographic data including age, gender, and underlying comorbidities were extracted from medical records. Clinical variables included reason for ICU admission, severity of illness scores (APACHE II), presence of invasive devices, duration of mechanical ventilation, length of ICU stay, and clinical outcomes. Microbiological data encompassed specimen type, antimicrobial susceptibility patterns, and resistance profiles. Prior antimicrobial exposure was documented including the class of antibiotics, duration of therapy, and timing relative to A. baumannii isolation.

Microbiological Methods

All clinical specimens were processed in the hospital microbiology laboratory according to standard protocols. Identification of A. baumannii was performed using conventional biochemical tests and confirmed by automated identification systems. Antimicrobial susceptibility testing was performed using the disk diffusion method according to Clinical and Laboratory Standards Institute (CLSI) guidelines. The antibiotics tested included ampicillin-sulbactam, piperacillin-tazobactam, ceftazidime, cefepime, imipenem, meropenem, amikacin, gentamicin, ciprofloxacin, levofloxacin, tigecycline, and colistin.

Definition of Multidrug Resistance

Multidrug resistance was defined as resistance to agents in three or more of the following antimicrobial categories: antipseudomonal cephalosporins, antipseudomonal carbapenems, β-lactam/β-lactamase inhibitor combinations, fluoroquinolones, and aminoglycosides. This definition was based on established international criteria and was consistent with previous studies in the literature.

Statistical Analysis

Statistical analysis was performed using SPSS version 25.0. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as means with standard deviations. Chi-square test or Fisher's exact test was used for comparison of categorical variables, and Student's t-test or Mann-Whitney U test was employed for continuous variables as appropriate. Binary logistic regression analysis was performed to identify independent risk factors for MDR A. baumannii acquisition. Odds ratios with 95% confidence intervals were calculated, and a p-value of less than 0.05 was considered statistically significant.

IV. RESULTS

During the study period, 120 patients with culture-confirmed A. baumannii infections were included in the analysis. The mean age of patients was 58.4 ± 16.7 years, with a male predominance of 68.3% (82 patients). The most common underlying comorbidities were diabetes mellitus (42.5%), hypertension (38.3%), chronic kidney disease (23.3%), and malignancy (15.8%). The majority of patients were admitted to the ICU for respiratory failure (45.8%), followed by sepsis (23.3%) and post-operative complications (18.3%).

Of the 120 A. baumannii isolates analyzed, 72 (60%) were classified as multidrug-resistant based on the established criteria. The most common source of isolation was respiratory specimens (68.3%), followed by blood

cultures (15.8%), urine cultures (10%), and wound specimens (5.9%). Ventilator-associated pneumonia was the most frequent clinical presentation, accounting for 82 cases (68.3%), while bloodstream infections occurred in 19 cases (15.8%).

The demographic and clinical characteristics comparison between patients with MDR and susceptible A. baumannii infections revealed several significant differences. Patients with MDR strains had a significantly longer mean ICU stay prior to infection (14.2 ± 7.8 days vs 8.6 ± 4.2 days, p<0.001) and a longer total ICU stay (22.8 ± 12.4 days vs 15.3 ± 8.7 days, p=0.002). The duration of mechanical ventilation was also significantly prolonged in the MDR group (18.7 ± 10.3 days vs 11.4 ± 6.8 days, p<0.001).

Prior antimicrobial exposure analysis demonstrated that patients with MDR A. baumannii had significantly higher rates of previous carbapenem use (77.8% vs 20.8%, p<0.001), third-generation cephalosporin exposure (69.4% vs 35.4%, p<0.001), and fluoroquinolone use (58.3% vs 27.1%, p=0.002). The mean duration of prior antimicrobial therapy was significantly longer in the MDR group (12.8 ± 6.4 days vs 7.2 ± 4.1 days, p<0.001).

Binary logistic regression analysis identified several independent risk factors for MDR A. baumannii acquisition. Prior carbapenem exposure was the strongest predictor with an odds ratio of 8.45 (95% CI 3.2-22.1, p<0.001). Other significant risk factors included duration of mechanical ventilation (OR 1.12 per day, 95% CI 1.05-1.19, p=0.001), ICU stay duration prior to infection (OR 1.08 per day, 95% CI 1.03-1.14, p=0.003), and prior third-generation cephalosporin use (OR 3.76, 95% CI 1.8-7.9, p<0.001).

The antimicrobial resistance patterns revealed alarmingly high resistance rates across multiple drug classes. Among MDR isolates, resistance rates were 91.7% for ceftazidime, 88.9% for cefepime, 77.8% for imipenem, 80.6% for meropenem, 83.3% for ciprofloxacin, 79.2% for levofloxacin, 72.2% for amikacin, and 68.1% for gentamicin. Colistin remained the most active agent with only 8.3% resistance among MDR strains, while tigecycline showed 23.6% resistance.

Clinical outcomes analysis revealed significantly worse outcomes in patients with MDR A. baumannii infections. The overall mortality rate was 45.8% in the MDR group compared to 22.9% in the susceptible group (p=0.015). The mean length of hospital stay was significantly longer in patients with MDR infections (35.6 ± 18.2 days vs 24.7 ± 12.3 days, p=0.001). ICU readmission rates were also higher in the MDR group (19.4% vs 8.3%, p=0.089), although this difference did not reach statistical significance.

Subgroup analysis based on specimen type showed that respiratory isolates had the highest rate of multidrug resistance (65.9%), followed by blood isolates (57.9%) and urine isolates (50%). The resistance patterns varied slightly between different specimen types, with respiratory isolates showing higher resistance rates to carbapenems compared to other sources.

Temporal analysis of resistance patterns over the study period revealed a concerning trend of increasing resistance rates. The proportion of MDR isolates increased from 52.6% in the first six months to 71.4% in the final six months of the study period (p=0.048), indicating a significant upward trend in resistance development.

The impact of antimicrobial stewardship interventions implemented during the latter part of the study period showed some promising results. Following the introduction of mandatory infectious disease consultation for carbapenem prescriptions and implementation of de-escalation protocols, there was a modest reduction in the rate of new MDR A. baumannii acquisitions, although longer follow-up periods are needed to assess the sustained impact of these interventions.

Table 1: Demographic and Clinical Characteristics of Study Population

Characteristic	MDR A. baumannii (n=72)	Susceptible A. baumannii (n=48)	p-value
Age (years), mean ± SD	59.8 ± 17.2	56.2 ± 15.9	0.244
Male gender, n (%)	51 (70.8)	31 (64.6)	0.474
Diabetes mellitus, n (%)	32 (44.4)	19 (39.6)	0.594
Hypertension, n (%)	29 (40.3)	17 (35.4)	0.591
Chronic kidney disease, n (%)	18 (25.0)	10 (20.8)	0.598
APACHE II score, mean ± SD	18.7 ± 6.4	16.2 ± 5.8	0.032
ICU stay prior to infection (days)	14.2 ± 7.8	8.6 ± 4.2	<0.001
Total ICU stay (days)	22.8 ± 12.4	15.3 ± 8.7	0.002
Mechanical ventilation duration (days)	18.7 ± 10.3	11.4 ± 6.8	<0.001

Table 2: Prior Antimicrobial Exposure

Antimicrobial Class	MDR A. baumannii (n=72)	Susceptible A. baumannii (n=48)	p-value
Carbapenems, n (%)	56 (77.8)	10 (20.8)	<0.001
Third-generation cephalosporins, n (%)	50 (69.4)	17 (35.4)	<0.001

Antimicrobial Class	MDR A. baumannii (n=72)	Susceptible A. baumannii (n=48)	p-value
Fluoroquinolones, n (%)	42 (58.3)	13 (27.1)	0.002
Aminoglycosides, n (%)	28 (38.9)	12 (25.0)	0.128
β-lactam/β-lactamase inhibitors, n (%)	38 (52.8)	19 (39.6)	0.169
Duration of prior antibiotics (days)	12.8 ± 6.4	7.2 ± 4.1	<0.001

Table 3: Antimicrobial Resistance Patterns

Antimicrobial Agent	MDR A. baumannii (n=72)	Susceptible A. baumannii (n=48)	Overall Resistance (n=120)
Ampicillin-sulbactam	62 (86.1%)	8 (16.7%)	70 (58.3%)
Piperacillin-tazobactam	64 (88.9%)	6 (12.5%)	70 (58.3%)
Ceftazidime	66 (91.7%)	4 (8.3%)	70 (58.3%)
Cefepime	64 (88.9%)	5 (10.4%)	69 (57.5%)
Imipenem	56 (77.8%)	0 (0%)	56 (46.7%)
Meropenem	58 (80.6%)	0 (0%)	58 (48.3%)
Amikacin	52 (72.2%)	3 (6.3%)	55 (45.8%)
Gentamicin	49 (68.1%)	4 (8.3%)	53 (44.2%)
Ciprofloxacin	60 (83.3%)	2 (4.2%)	62 (51.7%)
Levofloxacin	57 (79.2%)	3 (6.3%)	60 (50.0%)
Tigecycline	17 (23.6%)	1 (2.1%)	18 (15.0%)
Colistin	6 (8.3%)	0 (0%)	6 (5.0%)

Table 4: Risk Factors for MDR A. baumannii Acquisition (Logistic Regression)

Risk Factor	Odds Ratio	95% Confidence Interval	p-value
Prior carbapenem exposure	8.45	3.2-22.1	<0.001
Duration of mechanical ventilation (per day)	1.12	1.05-1.19	0.001
ICU stay prior to infection (per day)	1.08	1.03-1.14	0.003
Prior third-generation cephalosporin use	3.76	1.8-7.9	<0.001
APACHE II score (per point)	1.06	1.01-1.12	0.028
Prior fluoroquinolone use	2.34	1.2-4.6	0.012

Table 5: Clinical Outcomes

Outcome	MDR A. baumannii (n=72)	Susceptible A. baumannii (n=48)	p-value
In-hospital mortality, n (%)	33 (45.8)	11 (22.9)	0.015
Length of hospital stay (days)	35.6 ± 18.2	24.7 ± 12.3	0.001
ICU readmission, n (%)	14 (19.4)	4 (8.3)	0.089
Successful treatment, n (%)	28 (38.9)	31 (64.6)	0.008
Time to clinical improvement (days)	8.4 ± 4.2	5.8 ± 3.1	0.001

Table 6: Specimen Type and Resistance Patterns

Specimen Type	Total Isolates	MDR Isolates	MDR Percentage	Carbapenem Resistance
Respiratory specimens	82	54	65.9%	48 (58.5%)
Blood cultures	19	11	57.9%	8 (42.1%)
Urine cultures	12	6	50.0%	5 (41.7%)
Wound specimens	7	1	14.3%	1 (14.3%)

V. DISCUSSION

The present study reveals a concerning prevalence of multidrug-resistant A. baumannii in our ICU setting, with 60% of isolates demonstrating resistance to three or more antimicrobial classes. This finding is consistent with global trends showing increasing rates of MDR A. baumannii in healthcare institutions worldwide, particularly in ICU environments where selective pressure from antimicrobial use and patient vulnerability create optimal conditions for resistance development (11).

The predominance of respiratory specimens as the source of A. baumannii isolation, accounting for 68.3% of cases, aligns with previous studies identifying ventilator-associated pneumonia as the most common

manifestation of A. baumannii infection in ICU patients (12). The association between mechanical ventilation and A. baumannii acquisition has been well-established, with the organism's ability to colonize respiratory equipment and form biofilms contributing to its persistence in the ICU environment (1).

Our findings regarding risk factors for MDR A. baumannii acquisition are largely consistent with existing literature, with prior carbapenem exposure emerging as the strongest predictor (OR 8.45). This finding corroborates previous studies demonstrating the role of carbapenem use in selecting for resistant A. baumannii strains (13). The mechanism underlying this association involves the selective pressure exerted by broad-spectrum antimicrobials, which eliminates susceptible bacterial populations while allowing resistant strains to proliferate.

The prolonged ICU stay observed in patients with MDR A. baumannii infections reflects both the severity of underlying illness in these patients and the challenges associated with treating resistant infections. The significantly longer duration of mechanical ventilation in the MDR group (18.7 vs 11.4 days) may represent both a risk factor for acquisition and a consequence of more severe illness and treatment difficulties (14).

The antimicrobial resistance patterns observed in our study demonstrate alarming rates of resistance to commonly used antibiotics. The high resistance rates to carbapenems (77.8% for imipenem, 80.6% for meropenem) are particularly concerning given these agents' role as last-resort treatments for serious gram-negative infections. The emergence of carbapenem-resistant A. baumannii has been linked to the production of carbapenemases, particularly OXA-type enzymes, which have become increasingly prevalent worldwide (15).

The relatively preserved activity of colistin, with only 8.3% resistance among MDR strains, provides some therapeutic options for treating these infections. However, the nephrotoxicity associated with colistin use and the emergence of colistin resistance in some settings highlight the urgent need for new therapeutic approaches (16). Tigecycline showed moderate activity with 23.6% resistance, but its bacteriostatic nature and potential for resistance development limit its utility as monotherapy for serious infections.

The clinical outcomes analysis revealing significantly higher mortality rates in patients with MDR A. baumannii infections (45.8% vs 22.9%) underscores the clinical significance of antimicrobial resistance. This mortality difference may reflect both the limited therapeutic options available for MDR infections and the association between resistance and more severe underlying illness (17). The delayed time to clinical improvement in the MDR group further emphasizes the challenges in treating these infections effectively.

The temporal trend showing increasing MDR rates during the study period (from 52.6% to 71.4%) is particularly alarming and suggests ongoing selection pressure within our ICU environment. This trend highlights the dynamic nature of antimicrobial resistance and the need for continuous surveillance and intervention strategies (18).

Several limitations of our study should be acknowledged. The retrospective design may have introduced selection bias and limited the availability of certain clinical variables. The single-center nature of the study may limit the generalizability of findings to other healthcare settings with different patient populations and antimicrobial prescribing practices. Additionally, molecular characterization of resistance mechanisms was not performed, which would have provided valuable insights into the specific genetic determinants of resistance.

The study's findings have important implications for clinical practice and infection control strategies. The identification of carbapenem exposure as a major risk factor supports the implementation of antimicrobial stewardship programs focused on optimizing carbapenem use. The high rates of resistance observed emphasize the need for enhanced infection prevention and control measures, including improved hand hygiene, environmental cleaning, and isolation protocols (19).

The implementation of antimicrobial stewardship interventions during the latter part of our study period showed promising preliminary results, with a modest reduction in new MDR acquisitions. These interventions included mandatory infectious disease consultation for carbapenem prescriptions, implementation of de-escalation protocols, and enhanced surveillance of antimicrobial use patterns. Continued evaluation of these interventions over extended periods will be necessary to assess their sustained impact on resistance rates (20).

VI. CONCLUSION

This study demonstrates a high prevalence of multidrug-resistant A. baumannii in our ICU setting, with significant associations between resistance development and specific clinical factors including prior carbapenem exposure, prolonged mechanical ventilation, and extended ICU stay. The alarming resistance rates observed, particularly to carbapenems, highlight the urgent need for comprehensive antimicrobial stewardship programs and enhanced infection control measures.

The significantly worse clinical outcomes associated with MDR A. baumannii infections, including higher mortality rates and prolonged hospitalization, underscore the critical importance of prevention strategies. The identification of modifiable risk factors provides opportunities for targeted interventions to reduce the burden of MDR A. baumannii in ICU settings.

Future research should focus on implementing and evaluating comprehensive prevention strategies, developing novel therapeutic approaches for MDR A. baumannii infections, and conducting molecular

epidemiological studies to better understand resistance mechanisms and transmission patterns. The continued surveillance of antimicrobial resistance patterns and evaluation of intervention strategies will be essential for combating this growing threat to patient safety in critical care settings.

The findings of this study contribute to the growing body of evidence regarding MDR A. baumannii in ICU settings and provide valuable insights for clinicians, infection control practitioners, and healthcare administrators working to address this significant healthcare challenge. Implementation of evidence-based prevention strategies and antimicrobial stewardship programs will be crucial for reducing the burden of MDR A. baumannii and improving patient outcomes in ICU settings.

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