

INCIDENCE OF ASCENDING URINARY TRACT INFECTIONS IN ELDERLY PATIENTS ADMITTED TO THE MEDICAL ICU

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KEYWORDS

Urinary Tract Infection, Elderly, Medical ICU, Catheter-Associated UTI, Escherichia coli, Nosocomial Infection

ABSTRACT

Urinary tract infections (UTIs) are among the most common nosocomial infections, particularly in elderly patients admitted to the Medical Intensive Care Unit (MICU). These infections, often ascending in nature, can lead to severe complications such as sepsis and multi-organ failure.

This study investigates the incidence, risk factors, microbiological profile, and clinical outcomes of ascending UTIs in elderly ICU patients. A retrospective cohort study was conducted on 500 elderly MICU patients over a two-year period (2022–2023). The incidence of ascending UTIs was 28%, with Escherichia coli (55%) and Klebsiella pneumoniae (25%) being the predominant pathogens. Prolonged catheterization, diabetes, and immunosuppression were identified as major risk factors. 32% of affected patients developed sepsis, and the mortality rate was 12%.

Our findings highlight the urgent need for improved infection control measures, judicious catheter use, and antibiotic stewardship programs to reduce the burden of UTIs in critically ill elderly patients.

INTRODUCTION

Ascending urinary tract infections (UTIs) occur when bacteria travel from the bladder to the upper urinary tract, leading to pyelonephritis, sepsis, and acute kidney injury (AKI). Elderly ICU patients are at increased risk due to:

Prolonged catheterization, providing a direct entry route for pathogens.

Weakened immune function, reducing resistance to infections.

Comorbidities (e.g., diabetes, chronic kidney disease) that impair host defenses.

This study aims to:

1. Determine the incidence of ascending UTIs in elderly MICU patients.
2. Identify key risk factors predisposing patients to infection.
3. Analyze microbiological trends to guide targeted antibiotic therapy.

LITERATURE REVIEW

Studies have reported ICU UTI incidence rates between 20–35%, with elderly patients facing higher risks due to frequent catheter use and comorbidities.

A 2021 study by Smith et al. found that catheter-associated UTIs (CAUTIs) contribute to 50% of ICU-related UTIs. A systematic review by Patel et al. (2022) highlighted:

E. coli (52%) and *Klebsiella pneumoniae* (20%) as predominant pathogens.
Multidrug-resistant (MDR) organisms, especially in long-stay ICU patients.
Early catheter removal reducing UTI incidence by 40%.

This study builds on existing research by providing updated data on UTI trends in elderly ICU patients in a tertiary care setting.

METHODOLOGY

Study Design

A retrospective cohort study was conducted in the MICU of a tertiary care hospital from January 2022 to December 2023.

Inclusion Criteria

Elderly patients (≥ 65 years) admitted to the MICU
MICU stay of at least 48 hours
Confirmed diagnosis of ascending UTI (clinical symptoms, urinalysis, urine culture)

Exclusion Criteria

Patients with pre-existing urinary tract abnormalities
Patients with asymptomatic bacteriuria
Patients discharged within 48 hours

Data Collection

Data was collected on:
Demographics (age, sex, comorbidities)
Medical history (diabetes, CKD, immunosuppression)
Catheterization details (duration, type, and indications)
Microbiological culture results
Clinical outcomes (length of ICU stay, complications, mortality)

RESULTS

Incidence of UTIs in Elderly MICU Patients

Total patients studied: 500

Patients who developed ascending UTIs: 140 (28%)

Risk Factor Analysis

Microbiological Profile

Antibiotic Resistance Patterns:

E. coli: High resistance to ciprofloxacin (65%) and ampicillin (58%)

K. pneumoniae: High resistance to third-generation cephalosporins (52%)

P. aeruginosa: High resistance to carbapenems (40%)

DISCUSSION

Key Findings

The 28% UTI incidence is consistent with global ICU trends.

Prolonged catheterization remains the most significant risk factor.

Multidrug-resistant (MDR) organisms pose a major challenge, necessitating targeted therapy.

Preventive Strategies

Early catheter removal to reduce CAUTI risk.

Aseptic insertion & maintenance of urinary catheters.

Routine urine culture screening in high-risk patients.

Antibiotic de-escalation to prevent MDR infections.

CONCLUSION

Ascending UTIs are a major concern in elderly ICU patients, associated with high morbidity and mortality rates. Targeted interventions, including catheter care protocols, early detection, and antimicrobial stewardship, are critical for reducing UTI-related complications.

Future Research Directions:

Machine learning-based risk prediction models for UTIs.

Novel antimicrobial therapies to combat MDR pathogens.

Non-invasive diagnostic biomarkers for early UTI detection.

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