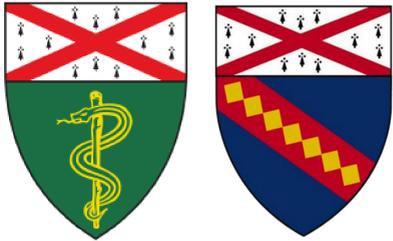


Antimicrobial Therapy for Suspected Urinary Tract Infection in Advanced Cancer Patients Transitioning to Comfort Measures



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INTRODUCTION

- Antimicrobial use among end-of-life patients is prevalent.
- Asymptomatic bacteriuria (ASB) and candiduria without evidence for disseminated candidiasis are two conditions often misdiagnosed as symptomatic urinary tract infection (UTI) and treated with antimicrobials.
- However, treatment for these two conditions are not recommended per IDSA guidelines [1, 2].
- There is limited data regarding antimicrobial therapy for suspected UTI in end-of-life settings, particularly the transition period to comfort measures (CM).
- **Study Objective:** To identify the risk factors related to inappropriate antimicrobial treatment for ASB or candiduria among the older end-of-life cancer patients transitioning to CM.

METHODS

Inclusion Criteria

- Adults ≥ 65 years with advanced cancer who had ≥1 urine culture obtained during admission to Yale New Haven Hospital from 7/2014 to 10/2016 that involved transition to CM.

Data Collection

- Age, gender, cancer type, urine culture results, length of stay in the hospital, and UTI signs or symptoms
- Total calendar days of UTI antimicrobial therapy, and evidence of symptomatic UTI

Symptomatic UTI definition

- 2017 National Healthcare Safety Network (NHSN) criteria [3]
 - Presence of at least one but no more than two bacteria in urine culture of ≥100,000 CFU/ml
 - Having UTI signs or symptoms within 7-day infection window period

Statistical Analysis

- X² or Fisher's exact testing
- Factors fitted in a modified multivariable Poisson regression model with logarithm of length of stay as the offset variable

RESULTS

- 300 patients were identified with advanced cancer and ≥1 urine culture obtained during admission involving transition to CM.
 - Median age: 74 years (range, 65-99 years)
 - Gender: Female (N=162, 54.0%)
 - Cancer type: Liquid tumor (N=66, 22.0%)
 - Median length of stay: 9 days (range, 2-138 days)
 - Discharge condition: Deceased (N=173, 57.7%)

- 40 patients received antimicrobials resulting in 279 total calendar-days of therapy after urine culture speciation data were reported.

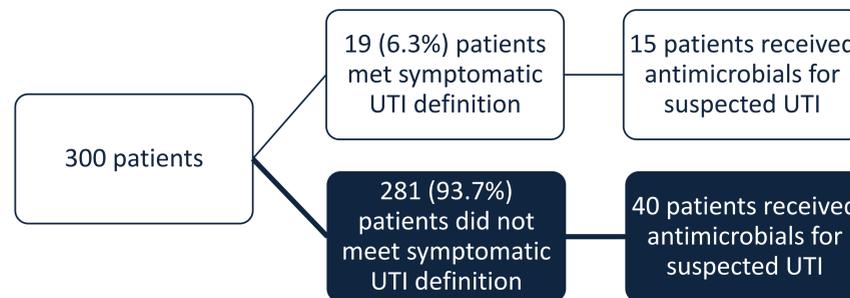


Table 1 Antimicrobial use for suspected UTI according to urine culture growth and associated signs or symptoms.

Urine Culture	Clinical Features ^a	Antimicrobial Use	
		Yes (N=40)	No (N=241)
Bacteriuria or Candiduria (≥100,000 CFU/ml)	Present	1 ^b	0
Bacteriuria or Candiduria (≥100,000 CFU/ml)	Absent	18	11
Bacteriuria or Candiduria (≥10,000, <100,000 CFU/ml)	Present	3	2
Bacteriuria or Candiduria (≥10,000, <100,000 CFU/ml)	Absent	13	17
No Growth ^c	Present	1	24
No Growth ^c	Absent	4	187

^a Includes fever (>38°C), suprapubic tenderness, costovertebral angle pain or tenderness, urinary urgency, urinary frequency, or dysuria
^b This patient had candiduria alone and therefore did not meet National Healthcare Safety Network criteria for symptomatic urinary tract infection.
^c Cultures with no growth, mixed flora (≥3 organisms), or growth <10,000 CFU/ml were defined as no growth.

Table 2 Incidence Rate Ratio (IRR) of inappropriate antimicrobial use based on a modified Poisson regression model

Urine Culture	IRR ^a (95% CI)
Bacteriuria or Candiduria (≥100,000 CFU/ml)	27.85 (6.02, 71.15)
Bacteriuria or Candiduria (≥10,000, <100,000 CFU/ml)	16.86 (6.02, 47.22)
No Growth	1.00

^a IRR was adjusted for gender, cancer type, and UTI-associated clinical features.

KEY FINDINGS

- In advanced cancer patients transitioning to CM, inappropriate antimicrobial use for suspected UTI is independently associated with bacteriuria or candiduria.
- Increasing bacteriuria or candiduria on urine culture is associated with an increasing risk of receiving inappropriate antimicrobial treatment.
- Inappropriate antimicrobial use for suspected UTI is not associated with UTI signs or symptoms.
- **These findings highlight a potential target for diagnostic (i.e., restricting urine culture orders) and antimicrobial stewardship.**

LIMITATIONS

- Small sample size may lead to sparse data bias.
- Major changes in NHSN definition from 2015 may result in misclassification of patients who were hospitalized in 2014.

REFERENCES

1. Nicolle, L.E., et al., *Infectious Diseases Society of America Guidelines for the Diagnosis and Treatment of Asymptomatic Bacteriuria in Adults*. Clinical Infectious Diseases, 2005. **40**(5): p. 643-654.
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3. Network, N.H.S., *National Healthcare Safety Network Patient Safety Component Manual*. 2017: Center for Disease Control and Prevention