**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.
- 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.
- 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.
- $X^2$ 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 data were reported.

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

<table>
<thead>
<tr>
<th>Urine Culture</th>
<th>Clinical Features</th>
<th>Antimicrobial Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes (N=40)</td>
</tr>
<tr>
<td>Bacteriuria or Candiduria (≥100,000 CFU/ml)</td>
<td>Present</td>
<td>1</td>
</tr>
<tr>
<td>Bacteriuria or Candiduria (≥100,000 CFU/ml)</td>
<td>Absent</td>
<td>18</td>
</tr>
<tr>
<td>Bacteriuria or Candiduria (≥10,000, &lt;100,000 CFU/ml)</td>
<td>Present</td>
<td>3</td>
</tr>
<tr>
<td>Bacteriuria or Candiduria (≥10,000, &lt;100,000 CFU/ml)</td>
<td>Absent</td>
<td>13</td>
</tr>
<tr>
<td>No Growth c</td>
<td>Present</td>
<td>1</td>
</tr>
<tr>
<td>No Growth c</td>
<td>Absent</td>
<td>4</td>
</tr>
</tbody>
</table>

- Includes fever (>38°C), suprapubic tenderness, costovertebral angle pain or tenderness, urinary urgency, urinary frequency, or dysuria.
- This patient had candiduria alone and therefore did not meet National Healthcare Safety Network criteria for symptomatic urinary tract infection.
- Cultures with no growth, mixed flora (≥2 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.**

<table>
<thead>
<tr>
<th>Urine Culture</th>
<th>IRR * (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteriuria or Candiduria (≥100,000 CFU/ml)</td>
<td>27.85 (6.02, 71.15)</td>
</tr>
<tr>
<td>Bacteriuria or Candiduria (≥10,000, &lt;100,000 CFU/ml)</td>
<td>16.86 (6.02, 47.22)</td>
</tr>
<tr>
<td>No Growth</td>
<td>1.00</td>
</tr>
</tbody>
</table>

* 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**