Impact of an altered mental status (AMS)/suspected urinary tract infection (UTI) protocol on urine culture collection and antibiotic consumption in a long-term care facility

Dyer A1, Depew J1, and Dodds Ashley E2,3

1- Southeastern Regional Medical Center, Lumberton, NC, USA; 2 – Duke Antimicrobial Stewardship Outreach Network, Durham, NC, USA; 3- Division of Infectious Diseases, Duke University Medical Center, Durham, NC, USA

Abstract (Updated)

Purpose/Background: There are several causes of altered mental status (AMS) in the elderly; however, AMS often leads to unnecessary antibiotic treatment for suspected UTI. Increased antibiotic consumption in long-term care facilities has led to health risks for all residents. This study evaluated the effectiveness of a protocolized approach for addressing AMS and UTI in a long-term care facility. The primary objective of the study was to decrease antibiotic consumption in the AMS/UTI protocol, with the secondary objective of reducing AMS.

Methodology: A comprehensive protocol for assessment and management of AMS and suspected urinary tract infection was created using NACHRI Guidelines for AMS and UTI Management (Figure 1). The protocol improved appropriate culturing scenarios and techniques as well as standard orders for enhanced observation and vital sign monitoring in select patients. Providers and nursing staff were educated by the infectious disease (ID) pharmacist and ID physician on the protocol, facility antibiogram, and appropriate UTI therapy. Pre-intervention data were collected for all patients where the protocol was initiated from January 1 – March 31, 2016 and compared to post-intervention data from the same time period in 2015. Urine cultures, antibiotic consumption, and resident hospitalizations during the study periods were evaluated for all patients who followed the protocol. Patients who were not enrolled were identified through retrospective chart review.

Results: During the study period, 217 eligible patients were enrolled in the AMS/UTI protocol; however, 27 were lost to follow-up. The proportion of urine cultures with no growth increased, but this was not statistically significant (0.224 vs. 0.278; NS). The proportion of culture positive patients who were treated for UTI saw a numerical decline from 22 to 15.

Conclusions: An AMS/UTI protocol in conjunction with nurse and provider education may significantly reduce the number of inappropriate urine cultures in a long-term care facility and has the potential to reduce antibiotic prescribing for UTI.

Background

• Studies have shown that higher antibiotic prescribing rates in nursing facilities are linked to increased health risks, such as Clostridium difficile infection (CDI), even for residents who did not receive antibiotics.1

• Asymptomatic bacteriuria is common in long-term care residents and has been reported to range from 25-50% in women, and 15-40% in men.2

• Patients with short-term indwelling catheters have a 9-23% colonization rate.2

• Intervenational data for this prospective, single center trial were collected from January 1 to June 30, 2015. Data were analyzed using modified intent to treat. Patients who were not treated per the protocol were included in the antibiotic consumption and urine culture quality analyses. Comparator data were collected from January to June 2015.

• Additional interventions were implemented to address other causes of AMS such as dehydration and renal failure.2

• A statistically significant decrease in the proportion of urine cultures with growth from 22 to 15 was noted.

• Providers and residents were educated on appropriate UTI indicators and management techniques.

• Patients treated with antibiotics had an increased risk of hospitalization.

• The average number of urine cultures per month decreased after implementation of the protocol and nurse education on appropriate urine collection culture from 15.6 to 9.0, but this was not statistically significant.

• The hospital admission rate was lower for patients who received care per the protocol (4.3% vs. 22.4%); however, a larger sample size is needed to determine if the protocol prevents hospitalizations.

Methods

• A comprehensive protocol for assessment and management of AMS and suspected urinary tract infection was created using Situation Background Assessment Recommendation (SBAR) format (Figure 1).

• Providers and nursing staff were educated by the ID physician and ID pharmacist on the protocol, facility antibiogram, and appropriate UTI therapy.

• Pre-intervention data were collected for all patients where the protocol was initiated from January 1 – March 31, 2016 and compared to post-intervention data from the same time period in 2015. Urine cultures, antibiotic consumption, and resident hospitalizations during the study periods were evaluated for all patients who followed the protocol. Patients who were not enrolled were identified through retrospective chart review.

• The protocol stressed appropriate culturing scenarios and techniques as well as standard orders for enhanced observation and vital sign monitoring in select patients.

• Providers and nursing staff were educated by the ID physician and ID pharmacist on the protocol, facility antibiogram, and appropriate UTI therapy. Prospective data were collected from January to June 2015.

• Of these patients treated using the protocol, 3 (13%) were sent to the Emergency Department (ED) > 14 days after protocol implementation and received a diagnosis of UTI. Of note, none of these patients repeated the protocol as indicated.

• One patient (4.3%) was admitted to SRMC for dehydration and renal failure 6 days after protocol initiation and antibiotic therapy.

• Of the 49 patients who did not follow the protocol, 31 (22.4%) were admitted to the hospital and 3 (6.1%) visited the ED. Of these hospital visits, 1 patient (2.0%) with an AMS diagnosis and 5 patients (20.2%) with a UTI diagnosis may have been diverted from the hospital if the protocol had been implemented.

• Overall antibiotic therapy decreased significantly after protocol implementation; however, decreases in antibiotic consumption for UTI were not significant.

Results

• Twenty-three (31.9%) of 72 eligible patients were enrolled in the AMS/UTI protocol.

• Of these patients treated using the protocol, 3 (13%) were sent to the Emergency Department (ED) > 14 days after protocol implementation and received a diagnosis of UTI. Of note, none of these patients repeated the protocol as indicated.

Antibiotic Consumption

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>January – June 2015</th>
<th>January – June 2016</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Days of Therapy/ Patient Days</td>
<td>119.5</td>
<td>66.6</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>UTI Days of Therapy/ 1000 Patient Days</td>
<td>10.0</td>
<td>17.7</td>
<td>NS</td>
</tr>
</tbody>
</table>

Urine Culture Results

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>January – June 2015</th>
<th>January – June 2016</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive UTIs</td>
<td>0.38 (0.17)</td>
<td>0.03 (0.1)</td>
<td>p &lt; 0.01</td>
</tr>
<tr>
<td>Proportion Colonized</td>
<td>0.255 (0.14)</td>
<td>0.189 (0.10)</td>
<td>NS</td>
</tr>
<tr>
<td>Proportion Colonized</td>
<td>0.439 (0.46)</td>
<td>0.559 (0.26)</td>
<td>NS</td>
</tr>
<tr>
<td>Proportion no growth</td>
<td>0.234 (0.22)</td>
<td>0.278 (0.15)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Conclusions

• An AMS/UTI protocol in conjunction with nurse and provider education, may significantly reduce the number of contaminated urine cultures in a long-term care facility and has the potential to reduce antibiotic prescribing for UTI.

• Although the findings were not statistically significant, the average number of urine cultures per month decreased after implementation of the protocol and nurse education on appropriate urine collection culture from 15.6 to 9.0, but this was not statistically significant.

• A statistically significant decrease in the proportion of urine cultures contaminated (17.7% vs. 2) was noted.

• The proportion of cultures with no growth and 1-2 organisms present increased; however, there was a numerical decline in each of these categories.

• The proportion of urine cultures with no growth increased, but saw a numerical decline from 22 to 15.