Ceftiraxone versus Levofloxacin for the Empirical Treatment of Escherichia coli Urinary Tract Infections in the Setting of High Fluoroquinolone Resistance

Samantha Wang, PharmD, MPH; Patrick Ratliff, PharmD, BCPS, BCCCP; Russ Judd, PharmD, BCPS
Saint Joseph Hospital, Lexington, KY

BACKGROUND

Urinary tract infections (UTIs) are among the most common bacterial infections, affecting 150 million annually worldwide.1 A wide variety of bacteria are responsible for causing UTIs; however, Escherichia coli remains the most common etiological organism.2 Per the Infectious Disease Society of America guidelines, options for the initial treatment of pyelonephritis requiring hospitalization include intravenous levofloxacin or extended-spectrum cephalosporins.3 Ceftriaxone and levofloxacin have reported eradication rates of 88.7%-91.1% and 79.8%-95.3%, respectively, when used as empiric therapy for complicated UTIs.4,5 Globally, uropathogenic E. coli resistance rates to fluoroquinolones have increased over 10-fold in the past twenty years, causing delays to appropriate therapy with subsequent increased morbidity and mortality.6 In 2015, 38% of uropathogenic E. coli at this institution were levofloxacin-resistant and 10% were ceftiraxone-resistant.7 Inappropriate antibiotic therapy is imperative for optimizing patient outcomes.8

PURPOSE

The purpose of this study is to compare the clinical outcomes of patients that received ceftiraxone as first-line treatment to those who received levofloxacin as empiric antimicrobial treatment of E. coli UTIs in the setting of high fluoroquinolone resistance.

METHODS

Study Design

• Retrospective, single center, cohort study

Inclusion Criteria

• ≥18 years of age admitted to inpatient status between January 1, 2012 and December 31, 2015 dates with E. coli UTI
• Positive urine cultures for E. coli drawn within 24 hours of presentation (triage time if ED, admission time if direct admit)
• First dose given of either ceftiraxone or levofloxacin as empiric therapy

Exclusion Criteria

• Patients with polymicrobial UTIs or UTIs not caused by E. coli
• Patients who received both agents as empiric therapy prior to the availability of susceptibility results
• Concomitant infection that occurred outside of the urinary tract
• Renal transplant recipients
• Patients with documented suspected or confirmed prostateitis

Data Collection

• Patients with microbiologically confirmed E. coli UTIs will be identified via the laboratory’s automated susceptibility testing system. All other data collection will be performed using Cerner electronic health records and Premier.

OUTCOMES

Primary Outcome

• Hospital length of stay

Secondary Outcomes

• Time to appropriate therapy
• All-cause in-hospital mortality
• ICU readmission
• ICU length of stay, if applicable
• Total hospital cost
• Susceptibility rate to therapy
• Time to switch to an oral agent

OUTCOMES DATA

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<thead>
<tr>
<th>OUTCOMES DATA</th>
<th>Length of stay</th>
<th>ICU admission</th>
<th>ICU length of stay</th>
<th>Time to switch to oral agent</th>
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<tbody>
<tr>
<td>Baseline Characteristics</td>
<td>Total hospital cost</td>
<td>Requirement for modification of antibiotic therapy</td>
<td>ICU admission in-hospital deaths</td>
<td>Susceptibility rate to oral agent</td>
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<tr>
<td>Age</td>
<td>BMI</td>
<td>Comorbidities</td>
<td>Gender</td>
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<td>Allergies to antibiotics</td>
<td>First dose antibiotic</td>
<td>Presence of urinary tract abnormalities</td>
<td>Recent urinary tract instrumentation</td>
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REFERENCES