

Patient demographics and comorbidity profiles associated with hospitalized patients admitted with resistant vs. susceptible urinary tract infections (UTI): A multicenter analysis

Jon B. Bruss, MD, MSPH, MBA1, David Melnick, MD2, Akash Jain, PhD2, John Murray, MPH3, Ian Critchley, PhD2, Stephen Kurtz, MS2 and Vikas Gupta, PharmD, BCPS3

1Alarus Development International, LLC, Paposha Springs, CO; 2Spero Therapeutics, Cambridge, MA; 3Becton, Dickinson and Company, Franklin Lakes, NJ

ABSTRACT

Background: A significant percentage of patients admitted to the hospital with UTI are managed with ESBL+ and/or quinolone-resistant (QR) Enterobacteriaceae (ENT) that can complicate patient outcomes due to potentially inadequate antibiotic therapy. Current methods are expensive and are fraught with false-negative results, often leading to the inappropriate use of antibiotics associated with susceptible and resistant UTI and the underlying comorbidities.

Methods: We analyzed the first positive urine culture and adjudicated the demographics associated with susceptible and resistant UTI in those with a discharge or primary secondary UTI (ICD code from 038 US hospitals from October 1, 2015-2017 (365,749 patients). Patient demographics were identified using AHRQ classifications to assess for specific risk factors and categorized by EBL + QR non-susceptible status. Healthcare-associated (HCA) episodes were defined as admissions from another care facility, admission in the prior 30 days, and presence of diabetes or cancer comorbidity. The Fisher’s exact test was used to test for significance.

Results: Of 16,020 adults (mean age 60.9 years; 77.7% female) with culture positive ENT UTI were identified, 11.0% (n=1763) were ESBL +, 31.3% (n=517) were QR NS & 3% (n=483) being both ESBL + and QR NS. Admissions with ESBL + QR NS were significantly more likely to be male, admitted with HCA risk factors and with higher important comorbidities, including diabetes and cardiovascular disease, compared to susceptible. Admissions with ESBL + QR NS were increased (length of stay (LOS) and higher costs (p<0.001). The alternatives (QR NS) and were evaluated (the epidemiology of IV to PO transition during admission. Escherichia coli, Klebsiella pneumoniae, Klebsiella oxytoca, Enterobacter cloacae, Enterobacter aerogenes).

We excluded admissions that underwent surgical procedures or had another cause of infection during index admission using the following diagnostic codes: any surgical procedure, concomitant skin and structure infection, pneumonia or intraabdominal infection. Patients from 68 US acute care hospitals in the period between 2015-2017 were included (BD Insights Research Database, Franklin Lakes, NJ USA; formerly CareFusion Research Database).

Resistant pathogens were identified for the following pathogens, where applicable:

- ESBLs: confirmed as ESBL-positive per commercial panels or intermediate/resistant to extended spectrum cephalosporins (either ceftriaxone, cefotaxime, cefazidine or cefepime).
- Quinolone NS: intermediate or resistant to ciprofloxacin, levofloxacin or moxifloxacin.
- IV to PO was identified as conversion to a PO antibiotic that had a duration of at least 24 hours where PO conversion occurred after at least 24 hours of IV antibiotic therapy.
- Patient characteristics and outcomes were categorized by ESBL and QR non-susceptible status (ESBL +, QR NS, other ESBL +, QR NS) and ESBL + QR NS in patients that received IV antimicrobials only and IV with step-down PO antimicrobial therapy during their hospitalization.

Patient demographics were identified using Agency for Healthcare Research and Quality Clinical Classifications Software (AHRQ CB/CCS) to assess for specific risk factors.

Healthcare-associated (HCA) episodes were defined as admitted from another acute care facility (e.g., skilled nursing facility, long-term acute care hospital, rehabilitation hospital, hospice), admission in the prior 30 days, dailys ICD10 code 299.2 (dependence on renal dialysis), or cancer comorbidity as identified in the AHRQ CCS classification.

Unadjusted hospital mortality, cost and length of stay were determined from financial, outcomes and billing data as calculated by each facility. The Fisher’s exact test was used to test for significance.

CONCLUSIONS

- About 1 in 11 admissions with UTI are ESBL +QR NS and 1 in 3 are ESBL + and/or QR NS. These admissions are more likely to be male, with HCA risk factors and other important comorbidities.
- Current oral antibiotic therapy is limited in such episodes and oral treatment alternatives are needed.

METHODS

- Patient demographics and comorbidity profiles associated with hospitalized patients admitted with resistant vs. susceptible urinary tract infections (UTI): A multicenter analysis

REFERENCES


J Bruss
Spero Therapeutics
675 Massachusetts Ave
Cambridge, MA 02139
jbruss@alarusdevelopment.com
BD Insights
vikas.gupta@bd.com