1461. Antimicrobial Susceptibility Patterns of Common Complicated Urinary Tract Infection Pathogens in US Hospitals, 2013–2018

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Session: 157. Urinary Tract Infections
Friday, October 4, 2019: 12:15 PM

Background. In response to increasing rates of antimicrobial resistance, carbapenems have become first-line treatments for many infections. This, in turn, fosters the potential for resistance (CR). Efforts to mitigate the emergence of CR through carbapenem-sparing strategies must rest on a fundamental understanding of antibiotic resistance patterns among commonly encountered pathogens. Therefore, we examined the microbiology of complicated urinary tract infections (cUTI) in hospitalized patients in the United States.

Methods. We performed a multicenter retrospective cohort study in the Premier database of approximately 180 hospitals, 2013–2018. Using an ICD-9/10-based algorithm we identified all adult patients hospitalized with cUTI and included those with a positive blood or urine culture. Patients with carbapenem-resistant organisms were excluded. We examined the microbiology and susceptibilities to common cUTI antimicrobials (third-generation cephalosporin [C3], fluoroquinolones [FQ], trimethoprim-sulfamethoxazole [TMP/SMZ], fosfomycin [FFM], nitrofurantoin [NFT], and triple-resistant [TR]) over time.

Results. Among 28,057 organisms from 23,331 patients, the 3 most common pathogens were *E. coli* (EC, 41.0%), *K. pneumoniae* (KP, 12.1%), and *P. aeruginosa* (PA, 11.0%). Among these organisms, resistance to C3 was 10.4% among PA, 12.6% KP and 48.9% EC. EC was most likely to exhibit resistance to all agents of interest, and demonstrated the highest resistance rate to TMP/SMZ (61.5%), and lowest to NFT (10.4%). In contrast, KP had the highest rate of resistance to NFT (27.9%) and lowest to FQ (4.9%). The lowest rate of resistance among PA was to TMP/SMZ (1.9%), and highest to C3 (10.4%). The prevalence of TR in 2013–2014 and 2017–2018, respectively, was 34.2% and 37.4% for EC, 11.8% and 14.2% for KP, and 7.0% and 4.6% for PA.

Conclusion. Among the most common pathogens isolated in hospitalized patients with cUTI, and particularly in EC, high and increasing single resistance and TR rates to common antimicrobials were evident, Current empiric treatment strategies may be insufficient against the growing threat of TR.

1462. Derivation of a Prediction Model for Risk of Drug-Resistant Urinary Tract Infection

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Session: 157. Urinary Tract Infections
Friday, October 4, 2019: 12:15 PM

Background. Urinary tract infections (UTIs) are among the most common indications for antibiotic therapy. As antibiotic resistance continues to grow, it is critical to identify those at higher risk for drug-resistant (DR) UTIs to guide empiric therapy, improve clinical outcomes, and limit costs of care. The aim of this study was to identify risk factors for DR UTI and develop a risk scoring tool which could aid in empiric antibiotic prescribing.

Methods. Single-center retrospective pilot study of adult patients treated for UTI from August 1, 2015 to August 31, 2016. Patients who had asymptomatic bacteriuria, were pregnant within 4 months of admission, or had improperly collected urine cultures were excluded. DR was defined as phenotypic resistance to at least 1 agent in 3 or more antibiotic classes commonly used to treat UTIs. Risk factors for DR UTI were derived from previously published literature and multivariable logistic regression of individual patient data (IPD). Adjusted odds ratios (aORs) were developed by combining ORs from previous literature and IPD. A scoring tool was derived from weight-proportional integer-adjusted coefficients of the predictive model aORs.

Results. Risk factors were derived from 9 previously published studies and adapted using IPD (N = 77) and included: long-term care (aOR = 4.31), prior hospitalization (aOR = 1.8), previous antibiotics (aOR = 4.33), advanced age (aOR = 1.12), urinary catheterization (aOR = 2.2), immune suppression (aOR = 1.6), and male sex (aOR = 2.56). Previous DR UTI was forced into the model (OR = 1.1). Baseline incidence of DR UTI was 28.7%. A risk score from 1 to 20 was developed and applied to IPD and demonstrated an area under the receiver operator curve (AUROC) of 0.625 (95% CI 0.484–0.767). Removing sex from the score produced an AUROC of 0.64 (95% CI 0.497–783). A sensitivity analysis applying the score to only urinary isolates that exhibited resistance to third-generation cephalosporins (13.8%) produced similar results.

Conclusion. Residence in long-term care and previous antibiotics were among the risk factors most closely associated with DR UTI. Considering cumulative risk scores may be useful in predicting DR UTI however the current study was hindered by a large degree of heterogeneity in previous literature.

1463. The Rates of UTI Outpatient and Inpatient Visits from 2001 to 2015 Among an Insured Population

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Session: 157. Urinary Tract Infections
Friday, October 4, 2019: 12:15 PM

Background. Hospitalizations attributable to urinary tract infections (UTI) have increased in recent years. One possible reason for the increase in admissions is a lack of effective oral agents, due to increasing rates of antimicrobial resistance, necessitating treatment with IV antibiotics. Our objective was to compare the rates of inpatient vs. outpatient treatment for UTIs.

Methods. We used the MarketScan database to identify UTI inpatient and outpatient visits from January 2001 through September 2015. Incidence rates for inpatient and outpatient visits were determined as a function of people at risk for UTIs. A difference-in-difference model with a change point in 2007 was used.

Results. During our study period, we identified 32,521,146 outpatient visits for UTI and 297,470 inpatient UTI visits. Rates for inpatient and outpatient visits were rising at similar rates before 2007. After 2007, the slopes differed, and the incidence of outpatient visits increased statistically (P = 0.023) when compared with inpatient visits.

Conclusion. Incidence of UTI hospitalizations is increasing but not as quickly as UTI outpatient visits. Since 2007, patients are more likely to be treated in the outpatient setting rather than in the inpatient setting.

1464. The Utility of Double Balloon Urinary Catheter in Reducing Rates of Catheter-Associated Urinary Tract Infections in a Tertiary Care Teaching Hospital

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Session: 157. Urinary Tract Infections
Friday, October 4, 2019: 12:15 PM

Background. Catheter-associated urinary tract infections (CAUTI) have been shown to increase hospital length of stay, healthcare costs, morbidity, and mortality. Studies that evaluate the role of urinary catheter design in preventing CAUTI are lacking. One such design is the double-balloon (DB) urinary catheter that has a second distal balloon; this design is aimed at reducing mucosal injury and inhibiting coiling of the in situ catheter. We carried out a comparative study to (a) determine whether CAUTI rates differ for different types of urinary catheters, and (b) identify risk factors associated with the acquisition of CAUTI in patients with DB vs. non-double-balloon (NDB) urinary catheters.

Methods. We conducted a retrospective cohort study of all patients who acquired CAUTI from January 2017 through December 2018. We collected age, sex, body mass index, medical history including benign prostatic hypertrophy, urinary tract infection (UTI), prostate cancer, stroke, surgery within the last 30 days including the type of surgery, indication for indwelling urinary catheter, location of catheter insertion, duration of catheterization, presence of pyuria, and type of catheter used. Statistical analyses were carried out using IBM SPSS software. Test statistics included independent sample t-test. CAUTI rates were expressed per 1000 catheter-days.

Results. Sixty-seven patients acquired CAUTI during the study period. NDB catheters included the following types: Foley, temperature sensing catheters, and coude catheters. Patients with DB and NDB catheters were similar in age, gender, diabetes, history of stroke, history of recent surgery, or history of UTI. CAUTI rates among patients with the DB catheters was 28 events per 29,018 catheter-days vs. 39 events per 33,579 catheter days for NDB type (P = NS). On stratification, CAUTI rates for foley, temperature sensing catheters, and coude catheters were 1.12, 1.27 and 2.70, respectively (P = NS).

Conclusion. There were no statistically significant differences in CAUTI rates at our facility among patients with DB vs. NDB urinary catheters. The decision on the choice of the catheter for use in our facility will likely depend on the comparative costs of the respective catheters.

1465. Resistance to Oral Antibiotics Among Urinary Tract Infection Isolates of *Escherichia coli* from the United States and Europe in 2017

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Session: 157. Urinary Tract Infections
Friday, October 4, 2019: 12:15 PM

Background. Clinical guidelines have recommended oral antibiotics such as the cephalosporins, fluoroquinolones, and trimethoprim-sulfamethoxazole (TMP-SMX) for the treatment of urinary tract infections (UTI's) caused by *Escherichia coli* (EC). The utility of these agents continues to be eroded by increased prevalence of expanded spectrum β-lactamase (ESBL) genes and concomitant resistance determinants to other antimicrobial classes. This study assessed the prevalence of ESBL phenotypes among