2171. Comparing Surveillance Definitions for Noncatherter-Associated Urinary Tract Infections

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Background. Patient sharing between hospitals and long-term care facilities (LTFC) is widespread. However, surveillance criteria for noncathedater associated urinary tract infection (UTI) vary by healthcare setting. Consequently, patients with identical features of UTI may meet criteria in LTFC but not in hospitals. A common definition that spans hospitals and LTFC may inform UTI surveillance efforts across healthcare facilities.

Methods. We performed a cohort analysis of all suspected UTI cases in women ≥65 years from 21 LTFC enrolled in a clinical trial evaluating cranberry capsules to reduce bacteriuria plus pyuria from August 2012 to October 2015. We applied 2017 Hospital National Healthcare Safety Network (NHSN), 2012 LTFC NHSN, and proposed criteria (Figure 1) to all suspected UTI cases. Proposed criteria were derived a priori. Differences in the correlated proportions of UTI detected per criteria were assessed using Mood's test.

Results. Of 350 suspected UTI cases, LTFC NHSN criteria detected more UTI (22/350, 6.3%) compared with hospital NHSN (15/350, 4.3%; \( P = 0.04 \)) and proposed (15/350, 4.3%; \( P = 0.02 \)) criteria (Table 1). Half (11/22) of LTFC NHSN UTI included 2\( \times 10^3 \) CFU/mL of organisms from a catheterized urine as the microbiological criterion. Four UTI meeting LTFC NHSN or proposed criteria did not meet the hospital NHSN criteria because fever is only a listed clinical feature for patients ≥65 years.

Conclusion. Current hospital and LTFC NHSN criteria both have limitations. The hospital NHSN criterion excludes fever in older adults as a clinical feature. The LTFC NHSN criteria include insensitive microbiological criteria. Our proposed surveillance criteria address these limitations and may be generalizable to both hospitals and LTFC.

Table 1. UTI Detection by Surveillance Criteria.

| Criteria | \( P \) value |
|----------|--------------|
| **LTFC NHSN** | |
| Hospital NHSN | Present | Absent |
| Present | 13 | 2 | 2.04 |
| Absent | 9 | 326 | 0.04 |
| **LTFC NHSN** | |
| Proposed | Present | Absent |
| Present | 15 | 7 | 0.02 |
| Absent | 326 | | 0.02 |

2172. Assessment of Cefepime Neurotoxicity in the FDA Adverse Reporting System

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Saturday, October 6, 2018: 12:30 PM

Background. Cefepime is a fourth-generation cephalosporin antibiotic used for the treatment of neutropenic fever, pneumonia, and urinary tract infections. The safety of cefepime is now being questioned as it has been implicated as a possible cause for lesser known adverse effects, including neurotoxicity. The objective of this study was to evaluate the association between cefepime and neurotoxicity.

Methods. Adverse drug reactions (ADRs) were reported to the US Food and Drug Administration (FDA) from January 1, 2015 to September 30, 2017 were extracted from the FDA’s Adverse Event Reporting System (FAERS). The Medical Dictionary for Regulatory Activities (MedDRA) was used to identify preferred terms that were subsequently used to create a neurotoxicity composite ADR. Reporting Odds Ratios (ROs) and corresponding 95% confidence intervals (95% CI) were calculated for the neurotoxicity composite ADR and for common preferred terms associated with neurotoxicity. An association was considered to be statistically significant if the 95% CI did not include 1.0.

Results. The neurotoxicity composite ADR (consistent of 40+ MedDRA preferred terms) occurred in 13.9% (\( n = 209/1504 \)) of cefepime reports. Cefepime was three times more likely to have a report of the neurotoxicity composite ADR as compared with other drugs in the FDA’s FAERS database (OR, 2.90; 95% CI, 2.51–3.36). The most frequent individual MedDRA preferred terms for the neurotoxicity composite ADR included (in descending order): "confusional state" (3.1%, 46/1504), "mental status changes" (2.8%, 42/1504), "encephalopathy" (2.3%, 35/1504), "seizure" (3.2%, 47/1504), "myoclonus" (1.8%, 27/1504), and "neurotoxicity" (1.2%, 18/1504). The highest ROs with cefepime vs. other drugs were in (descending order): "myoclonus" 45.0 (30.6–66.1), "encephalopathy" 29.7 (21.2–41.6), "mental status changes" 27.8 (20.4–37.8), "neurotoxicity" 26.7 (16.7–42.6), "confusional state" 4.3 (3.2–5.7), and "seizure" 3.5 (2.5–4.9).

Conclusion. Cefepime was associated with significantly higher odds of myoclonus, status epilepticus, mental status changes, neurotoxicity, confusional state, seizure, and a neurotoxicity composite ADR as compared with other drugs. Practitioners should use caution in initiating cefepime in those patients at risk of neurotoxicity and monitor closely for ADRs.

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Table 1: Comparison of Charts Requiring Review

| Monthly Average with Chart Review | Monthly Average with Computerized Algorithm | Improved Efficiency, % |
|-----------------------------------|---------------------------------------------|------------------------|
| BRST                             | 63                                          | 27                     | 57                     |
| COLO                             | 43                                          | 21                     | 52                     |
| HYST                             | 38                                          | 7                      | 82                     |
| HPRO                             | 72                                          | 30                     | 59                     |
| KPRO                             | 59                                          | 27                     | 55                     |
| CBGB                             | 30                                          | 5                      | 83                     |

Conclusion. Careful modification of the ICON foundations system resulted in a 55% decrease overall in the need for chart review without affecting accuracy of reporting.

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2174. A 10-Year Review of Infection Burden in Hospitalized Burn Patients in the United States
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Background. Burn patients are particularly vulnerable to infection. We assessed the incidence and outcomes of burn patients with common infections in acute care hospitals. We also investigated the risk factors for infection and the effect of infection on the mortality of burn patients.

Methods. Using the Nationwide Inpatient Sample database (2005–2014), we identified adult patients (≥18 years) with burn injury by ICD-9 codes. The infections of our interest included bacteremia, pneumonia, urinary tract infection (UTI); surgical infection, Clostridium difficile infection, skin and soft-tissue infection, cardiovascular infection, infection of throat, nose and ear. The infection rate, mortality, length of hospital stay (LOS) and hospital charge of burn patients were evaluated. The risk factors for infection and in-hospital death of burn patients were analyzed by logistic regression.

Results. 125,957 burn cases were identified, and 10,301 (8.2%) had at least one infection. UTI and pneumonia were the most common infections of burn patients, and their incidences were 3.0 and 2.8%, respectively. Infection of burn patients was associated with 2.5 times increase in mortality (7.7% vs. 3.0%, P < 0.001), nearly five times prolonged LOS (median 19 days vs. 4 days, P < 0.001) and 6.5 times higher hospital charge (median $145,389 vs. $22,477, P < 0.001). In 10-year study period, the infection rate of burn patients increased from 5.1% in 2005 to 9.5% in 2008, then stayed around 9.0% (median $145,389 vs. $22,477, P < 0.001) in 2014, while the mortality of the patients with infection varied by year (Figure 2). In multivariate analysis, pneumonia was the only infection type that increased the risk for in-hospital death (OR = 1.38, 95% CI 1.20–1.58). Age and total body surface area (TBSA) of burn were the major risk factors for infection and in-hospital death of burn patients.

Conclusion. The incidence of infection in burn patients increased during 2005–2014. The age and TBSA of burn are the major risk factors for infection and mortality. Except for pneumonia, most infections were not associated with increased risk for in-hospital death of the burn patients.

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2175. In vitro Potency of Ceftolozane/Tazobactam and Other Antipseudomonal β-Lactams Against P. aeruginosa
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Background. Challenges due to multidrug resistant Gram-negative bacterial pathogens such as P. aeruginosa (PSA) are increasing globally. Suboptimal antimicrobial therapy of infections caused by PSA is associated with increased morbidity and mortality. As a result, antimicrobial susceptibility (±S) studies are pivotal to identifying trends in antimicrobial resistance that inform decisions regarding choice of antimicrobial therapy. This study assessed the in vitro potency of 7 antipseudomonal agents including ceftolozane/tazobactam against PSA collected from numerous sites across the United States.

Methods. Multiple U.S. hospitals provided nonduplicate respiratory and blood isolates of PSA for potency testing. MICS against PSA were determined using broth microdilution methods according to CLSI for seven antipseudomonal agents, including: aztreonam, ceftazidime, ceftolozane/tazobactam, imipenem, meropenem and piperacillin/tazobactam. Susceptibility (%S) was defined per CLSI or FDA breakpoint criteria.

Results. Fourteen hospitals geographically spread across the United States provided total of 560 PSA isolates. Of the antibiotics assessed, ±S to C/T was the highest at 95% with an MIC90 of 1 µg/mL and MIC50 of 2 µg/mL. In comparison, other ±S (MIC90/MIC50) were as follows: ceftazidime 76% (4/64); ceftazidime 75% (5/32); piperacillin/tazobactam 73% (8/128); meropenem 72% (0.5/16); aztreonam 65% (8/32) and imipenem 65% (2/16).

Conclusion. For this geographically diverse PSA population, ceftolozane/tazobactam demonstrated the highest overall susceptibility (95%). Other antipseudomonal agents inclusive of the carbapenems displayed susceptibilities of 65–76%. In the era of escalating PSA resistance to the β-lactams, the potency of ceftolozane/tazobactam may represent an important clinical option.

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2176. Single β-Lactama v. Combination Regimens: Assessing the Probability that an Active Agent Would Be Selected When Considering Empiric Therapy for P. aeruginosa
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Background. While the value of a combination vs. monotherapy in the management of P. aeruginosa (PSA) infection continues to be a topic of debate, the rising antimicrobial resistance observed for this pathogen has made it increasingly difficult to select appropriate (i.e., susceptible) empiric regimens. Herein, we evaluated the probability of the β-lactams to provide a susceptible result for PSA when using the agents as either monotherapy or as part of a combination regimen.

Methods. Contemporary nonduplicate PSA isolates derived from blood or the respiratory tract of patients hospitalized in the United States were utilized. MICS were determined using broth microdilution methods for amikacin (AMK, cephalosporin (FEP), ceftazidime (CAZ), ceftolozane/tazobactam (C/T), ciprofloxacin (CIP), fosfomycin (FOF), meropenem (MEM), piperacillin/tazobactam (TZP) and tobramycin (TOB). Overall susceptibility (%S) of the regimen was derived from the monotherapy value plus the cumulative susceptibility of the additional agent for each isolate.

Results. Total of 560 unique PSA were studied. When assessing β-lactam monotherapy, only ceftolozane/tazobactam exceeded 90% susceptibility, while cephalosporin, ceftazidime, meropenem and piperacillin/tazobactam ranged from 72 to 76% (Table). When considering combination therapy, the addition of the second agent amikacin > tobramycin > ciprofloxacin > fosfomycin enhanced the achievable %S for cephalosporin, ceftazidime, meropenem and piperacillin/tazobactam, whereas very little change was noted for ceftolozane/tazobactam due to the intrinsic potency of this compound as a single agent (Table).

Conclusion. While the addition of amikacin, tobramycin, ciprofloxacin or fosfomycin increased the probability that an active agent would be selected when considering empirical with cephalosporin, ceftazidime, meropenem and piperacillin/tazobactam, ceftolozane/tazobactam achieves a similar activity profile using a monotherapy approach.