Preventability of Hospital Onset Bacteremia and Fungemia: A Pilot Study of a Potential New Indicator of Healthcare-Associated Infections

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Journal Title: Open Forum Infectious Diseases
Volume: Volume 4, Number suppl_1
Publisher: (publisher) | 2017, Pages S182-S183
Type of Work: Article
Publisher DOI: 10.1093/ofid/ofx163.336
Permanent URL: https://pid.emory.edu/ark:/25593/s6f9s

Final published version: http://dx.doi.org/10.1093/ofid/ofx163.336

Accessed November 26, 2017 3:00 AM EST
Disclosures. All authors: No reported disclosures.

477. Comparison of Clinical Characteristics and Outcomes Between Community-Acquired and Healthcare-Associated Bacteremia Cases due to Bacteroides Species

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Session: 57. HAI: Surveillance + Reporting
Thursday, October 5, 2017: 12:30 PM

Background. Differences in clinical characteristics and outcomes between community-acquired (CA) and healthcare-associated (HCA) Bacteroides bacteremia cases are not well known.

Methods. We evaluated all positive blood cultures between March 2012 and December 2016 in a Japanese 781-bed acute hospital. Identification and susceptibility was performed based on CLSI criteria, and MALDI-TOF has been used since January 2015 in addition to conventional methods.

Results. Of 3611 bacteremia cases, 266 (7.4%) were due to obligately anaerobic bacteria, such as Clostridium species (n = 97 [36.5%]), Fusobacterium species (15 [7.5%]), and Bacteroides species (65 [24.4%]), of which 31 (47.7%) were HCA and 34 (52.3%) were CA. In 22 (33.8%) cases, > 2 blood cultures were positive.

B. fragilis was most frequently isolated (n = 25 [38.5%]), then B. thetaiotomicron (n = 9 [13.8%]), B. vulgatus (n = 5, 7.7%), B. uniformis (n = 3 [4.6%]), B. distasonis (n = 2 [3.1%]), B. ureolyticus (n = 2 [3.1%]), B. capillosus (n = 1 [1.5%]), and B. ovatus (n = 1 [1.5%]). After introducing MALDI-TOF, the number of unidentified Bacteroides species fell from 12 (18.5%) to 5 (7.7%). Sensitivity to ampicillin/sulbactam, cefmetazole, and clindamycin was 85.2%, 92.6%, and 59.3%, respectively. Most bacteremia (51 [78.5%]) were of intra-abdominal origin. Baseline characteristics and immunocompromised status of HCA and CA bacteremia (51 [78.5%]) were of intra-abdominal origin. Baseline characteristics and immunocompromised status of HCA and CA bacteremia patients were similar, except for diabetes, which was more frequent in HCA cases (Table). There was significantly higher 7- and 30-day mortality in HCA than in CA cases (P = 0.03).

Conclusion. The higher mortality in HCA Bacteroides bacteremia suggests the need for appropriate multidisciplinary management of these cases.

Comparison of HCA vs. CA bacteremia episodes due to Bacteroides species

- CA (n = 31), n (%) and HCA (n = 34), n (%) and P value
- Mean age (SD) 75.2 (11.6) 68.3 (17.5) 0.28
- Male 22 (75.9) 27 (72.2) 0.78
- Diabetes 3 (10) 13 (33.3) 0.04
- Solid tumor 8 (27) 13 (45.7) 0.31
- B. fragilis 0 (0) 15 (58.6) 0.20
- B. thetaiotomicron 5 (17.2) 4 (10.3) 0.88
- 7-day mortality 0 (0) 6 (16.7) 0.03
- 30-day mortality 2 (7.4) 11 (32.4) 0.03
- Mean length of stay 35.7 (36.5) 40.1 (55.3) 0.33
- after bacteremia (SD) 14 (37.8) 0.62

Disclosures. All authors: No reported disclosures.

478. Hospital Onset Staphylococcus aureus Bacteremia is a Better Measure than MRSA Bacteremia in Assessing Infection Prevention: Evaluation of 51 US Hospitals

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Session: 57. HAI: Surveillance + Reporting
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Background. Hospital Onset (HO) Methicillin-resistant Staphylococcus aureus (MRSA) bacteremia is publicly reported and tied to the Hospital-Acquired Conditions Reduction program. It reflects a surrogate of risk of infection of MRSA invasive disease in the hospital setting, and reported as a standardized infection ratio that adjusts for admission MRSA prevalence, hospital size and medical school affiliation. However, it may not adequately represent all HO S. aureus bacteremia, which is unaffected by the prevalence of resistance to methicillin.

Methods. We compared the rates of NSH-defined laboratory ID events for HO methicillin susceptible S. aureus (MSSA) and MRSA bacteremia in 51 hospitals (small, <100 beds, n = 15; medium, 100–300 beds, n = 15; large, >300 beds, n = 21) from a single electronic hospital system over a 12-month period abstracting data from one clinical decision support system. We also compared the rates of HO S. aureus bacteremia based on hospital size.

Results. Of 340 HO S. aureus bacteremia events (1.22 per 10,000 patient-days) occurred during calendar year 2016 (MSSA n = 218, 64%; MRSA n = 122, 36%). 14/15 small hospitals did not have any HO S. aureus bacteremia events during the study period. HO MSSA bacteremia rates were 0.58 and 0.77 per 10,000 patient-days for medium size and large-size hospitals respectively (P = 0.009). In contrast, HO MRSA bacteremia rates were 0.71 and 0.47 per 10,000 patient-days for medium size and large-size hospitals respectively (P = 0.045). There was no correlation between HO MSSA and MRSA bacteremia for large and medium size hospitals (Figure).

Conclusion. By measuring only HO MRSA, a significant portion of patients with increased morbidity and mortality are overlooked. HO S. aureus bacteremia may provide a better measure to use to evaluate invasive S. aureus risk in the hospital setting, and would mitigate the MRSA prevalence factor. These findings are important when we evaluate policy related to what is considered a hospital acquired condition.

Figure: Relation between HO MSSA and MRSA Bacteremia for Based on Hospital Size.

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479. Preventability of Hospital Onset Bacteremia and Fungemia: A Pilot Study of a Potential New Indicator of Healthcare-Associated Infections

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Session: 57. HAI: Surveillance + Reporting
Thursday, October 5, 2017: 12:30 PM

Background. Central-line associated bloodstream infections (CLABSI) are a subset of hospital-onset bacteremia and fungemia (HOB), a potential indicator of health-care-associated infections (HAI) that can be objectively and directly obtained from electronic health records. We undertook a pilot study to elucidate the causes and determine the preventability of HOB.

Methods. HOB was defined as growth of a microorganism from a blood culture obtained ≥3 calendar days after admission in a hospitalized patient. A random sampling of HOB events across 2 academic hospitals and a pediatric intensive care unit in a third academic hospital were identified between October 1, 2014 and September 30, 2015. Medical records were reviewed to identify potential risk factors and sources of bacteremia. Two physicians used underlying patient factors, microorganism, and other clinical data to rate the preventability of each HOB event in an “ideal hospital” on a 6-point Likert scale.

Results. Medical records for 60 HOB events (20 in each hospital) were reviewed. The most common organisms were coagulase-negative Staphylococcus (28%) and Candida spp. (17%) (Figure 1). The most likely sources of bacteremia and fungemia included CLABSI (28%) and skin contaminants/commensals (17%) (Figure 2). Forty-nine percent of HOB events not associated with skin commensals were rated as potentially preventable (Figure 3). Fifty percent of HOB events randomly sampled across 2 hospitals occurred in an intensive care unit. Central venous catheters, urinary
catheters, and mechanical ventilation were present in the previous 2 days among 73%, 20%, and 25% of all HOB events, respectively. Only 10% of all HOB events occurred in a patient without an indwelling device. Only 20% of HOB events resulted in a National Healthcare Safety Network (NHSN) reported CLABSI.

Conclusion. Half of HOB events are potentially preventable in this pilot study. HOB may be an indicator for a large number of preventable HAIs not currently measured by NHSN. Larger studies across a variety of hospital settings are needed to assess the generalizability of these results the implications of HOB surveillance for infection prevention practices and patient outcomes.

Methods. The project was conducted at a 120-bed hospital within the Central Texas Veterans Healthcare System (CTVHCS). Rooms selected for inclusion were marked with a fluorescent marker in predetermined locations by a member of the research team. When the EMS staff person completed the routine cleaning process a member of the research team recorded the fluorescent score and obtained microbiological samples from the room. The aerobic bacterial colony (ABC) count for pre-cleaning and post-manual cleaning was also categorized into "clean" and "not-clean" categories, where clean was defined as ABC counts <2.5 CFU/cm².

Results. A chi-squared test of independence revealed that there was no association between surfaces considered "clean" according to ABC criteria and "clean" according to fluorescent marker score, chi-square = 1.6167, df = 1, P = 0.20. A mixed effects logistic regression model showed that fluorescent clean score was not a significant predictor of a clean surface as defined by the <2.5 CFU/cm² criteria (P = 0.96).

Conclusion. While the fluorescent marker has been shown to be useful for determining if a surface has been wiped, our results show that fluorescent marker score may not be a good proxy for assessing surface disinfection. Our results suggest that fluorescent markers only determine if the manual process of wiping has been conducted without taking into account other variables that play a role in disinfecting the surface.

Disclosures. All authors: No reported disclosures.