1054. Biofilm Formation Among Escherichia coli Bloodstream Infection Isolates Is Associated With Source of Bacteremia and Bacterial Sequence Type

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Background. The clinical impact of Escherichia coli biofilm formation is unknown.

Methods. Adults with E. coli bloodstream infections (BSI) were prospectively enrolled from 2002 to 2015. All E. coli isolates were genotyped using Multilocus sequence typing (MLST) and using crystal violet biofilm formation assay quantified by absorbance at 540 nm (OD540) in triplicate. Associations between biofilm formation and patient/bacterial characteristics were characterized by t-tests and ANOVA tests.

Results. Ninety-eight percent (186) of the 189 isolates formed detectable biofilms. Bacterial sequence type (ST) was associated with biofilm formation (P = 0.001), as ST73 (average OD540 = 0.017) and ST393 (average OD540 = 0.016) had higher average biofilm formation while ST69 (average OD540 = 0.007) and ST460 (average OD540 = 0.002) had lower biofilm formation. E. coli isolates with non-multidrug-resistant (non-MDR) phenotype were associated with increased biofilm formation (MDR: average OD540 = 0.006; average non-MDR: OD540 = 0.01; P = 0.003).

BSI isolates arising from pneumonia or urinary/urethral infections were associated with the highest biofilm production (P = 0.04). No associations were identified between biofilm formation and route of infection, APACHE-II score, mortality, or complications of BSI.

Conclusion. In this prospective study of E. coli BSI isolates, biofilm formation was associated with ST, non-MDR phenotype, and BSI source.

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1055. Epidemiology and Mechanisms of Carbapenem Resistance in Recurrent Extended-Spectrum ß-Lactamase-Producing Enterobacteriaceae Bacteremia

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Background. Carbapenems are the treatment of choice for bacteremia caused by extended spectrum ß-lactamase producing Enterobacteriaceae (ESBL-E). The emergence of carbapenem resistance (CR) in ESBL-E isolates has been described; however, the rate of such resistance in clinical settings is unknown. We describe the frequency and mechanisms of CR in recurrent ESBL-E bacteremia at an NCI-designated cancer center.

Methods. We performed a prospective whole genome sequencing (WGS) study and retrospective cohort review of adult (age ≥21 years) patients with ESBL-E bacteremia from January 2015 and July 2016. Recurrent bacteremia was defined as identification of the same organism in blood culture at any time following initial successful treatment. CR was defined as resistance to meropenem. Carbapenemase production was assessed in the microbiology laboratory using Carba-NP. Available paired isolates were genotyped using Multilocus sequence typing (MLST) and underwent crystal violet biofilm formation assay quantified by absorbance at 540 nm (OD540) in triplicate. Associations between biofilm formation and patient/bacterial characteristics were characterized by t-tests and ANOVA tests.

Results. One hundred and sixteen patients with ESBL-E bacteremia were identified. E. coli was the most common organism (86%), followed by K. pneumoniae (12%), and K. oxytoca (2%). Recurrent bacteremia was identified in 17 (15%) patients (E. coli n = 15, K. pneumoniae n = 2). Of these, 6 (35%) were CR and 516 (83%) were Carba-NP negative. All six recurrent CR isolates occurred in patients with leukemia. Five isolate pairs were available for WGS. In four of five pairs (three E. coli, one K. pneumoniae), CR emerged from the same strain causing the original infection; one recurrence was caused by another distinct E. coli with a OXA-48-like gene. Compared with parental strains, CR E. coli contained deletions in porin-encoding genes and had increased mapping depth for genes encoding CTX-M ESBLs. The K. pneumoniae was Carba-NP negative with no identifiable CR mechanism.

Conclusion. Emergence of CR following treatment for ESBL-E bacteremia was seen only in leukemia patients and was primarily due to porin loss and amplification of ESBL genes, rather than acquisition of exogenous carbapenemases. These are the first clinical data describing the molecular mechanism of ESBL-E transformation to CR. This data serves as the basis for future studies of antimicrobial stewardship interventions to limit the emergence of CR in ESBL-E.

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1056. Predicting Central Nervous System Complications in *Staphylococcus aureus* Bacteremia Using Clinical Scoring System

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**Background.** Central nervous system (CNS) complications occurring in patients with *Staphylococcus aureus* bacteremia (SAB) are the most severe complications. In this study, we compared clinical data of SAB patients between cases with and without CNS complications and analyzed the risk factors of CNS complications.

**Methods.** Data from cases with SAB occurred during 5 years at four hospitals were collected. The presence of CNS complications was confirmed by brain MRI, CT, or lumbar puncture. We excluded the cases who already had CNS lesions such as trauma, brain tumor, or cerebrovascular accident and the cases who died or transfer out <7 days of bacteremia onset. Cases were divided into complication group or noncomplication group according to the presence of CNS complication. We compared the clinical profiles between the groups, and analyzed the risk factor of CNS complications by multivariate logistic regression analysis.

**Results.** A total of 1,085 cases of SAB patients were included. Among these, 43 (4%) cases were complication group (embolic infarct [n = 23], brain hemorrhage [n = 8], infarct with hemorrhage [n = 8], and brain abscess or meningitis [n = 4]), while 810 (76%) cases were noncomplication group. Two hundred and forty-one cases were excluded. The results of multivariate analysis were shown in Table. When selecting by having less than three factors among SOFA > 5, methicillin-susceptible, endovascular infection (weight 2), presence of metastatic infection and community onset, it helps to exclude the most complex (AUC of ROC curve = 0.77, P < 0.01, sensitivity 67.5%, specificity 75.5%, positive predictive value 12.9%, negative predictive value 97.7%).

**Conclusion.** CNS complication could be excluded by using clinical variables.

**Variables**

| Complication Group (n = 43) | Non-Complication Group (n = 810) | P-Value |
|----------------------------|---------------------------------|---------|
| Sex (M)                    | 23 (56%)                        | 49 (62%)| 0.25  |
| Age (mean)                 | 66 (17)                         | 450 (56) | 0.08  |
| Community onset            | 30 (70%)                        | 450 (56) | 0.03  |
| Methicillin-susceptible    | 27 (63%)                        | 380 (47) | 0.07  |
| SOFA score (median)        | 6 (9)                           | 3.5 (6)  | 0.01  |
| Duration of bacteremia (median) | 4 (1-6)                        | 2 (0-5)  | 0.01  |
| Endovascular involvement of infection | 18 (42)                      | 106 (13%) | 0.01  |
| Presence of any metastatic infection | 20 (47%)                    | 155 (19)  | <0.01 |
| 90-day mortality           | 11 (24)                         | 121 (19) | 0.03  |

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1057. Treatment Efficacy of Ceftriaxone vs. Cefazolin for Methillin-Susceptible *Staphylococcus aureus* Infections

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**Background.** Methillin-susceptible *Staphylococcus aureus* (SSA) infections are traditionally treated with intravenous (IV) nafcillin, oxacillin, or cefazolin, all antibiotics that require multiple doses per day. Despite theoretical limitations of using ceftriaxone in SSA infections, some clinical studies suggest noninferiority of ceftriaxone compared with standard of care. At Parkland Memorial Hospital, many patients diagnosed with SSA infections receive self-administered Outpatient Parenteral Antimicrobial Therapy (S-OPAT). Daily-dosed ceftriaxone is often used for convenience and feasibility of medication adherence.

**Methods.** We conducted a retrospective cohort study among S-OPAT patients receiving cefazolin and ceftriaxone for treatment of SSA infections. We compared infection type and planned duration of therapy as baseline differences between the treatment cohorts. Our clinical outcomes of interest were 30-day readmission rates and treatment failure as defined by repeat positive blood culture within 6 months.

**Results.** We identified 184 patients treated with cefazolin and 74 patients treated with ceftriaxone. Characteristics of treatment plan are shown in Table 1. There were no statistically significant differences in infection type or mean duration of therapy between the two treatment cohorts. Outcomes are shown in Table 2. There were no statistically significant differences in readmission rates and rate of treatment failure.

**Conclusion.** Our retrospective review suggests patients treated with ceftriaxone for MSSA bacteremia had similar clinical outcomes as those treated with cefazolin. While this study is limited in its retrospective nature, the findings suggest that ceftriaxone may be a safe and more convenient antibiotic option in certain MSSA infections.

**Disclosures.** All authors: No reported disclosures.

1058. Prognostic Biomarkers for Persistent Bacteremia and Mortality in Complicated *S. aureus* Bloodstream Infection

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**Background.** *Staphylococcus aureus* is a leading cause of bacteremia, yet there remains a significant knowledge gap in the identification of relevant biomarkers that predict clinical outcomes in patients with *S. aureus* bacteremia. Heterogeneity in the host response to invasive *S. aureus* infection suggests that specific biomarker signatures could be utilized to differentiate patients prone to severe disease, thereby facilitating earlier implementation of more aggressive therapies. To further elucidate the inflammatory correlates of poor clinical outcomes in patients with *S. aureus* bacteremia, we evaluated the association between a panel of blood proteins at initial presentation of bacteremia and disease severity outcomes.

**Methods.** We identified 184 patients treated with cefazolin and 74 patients treated with ceftriaxone. Characteristics of treatment plan are shown in Table 1. There were no reported disclosures.