113. Understanding the Changes in Infective Endocarditis Admission in Pennsylvania During the Opioid Crisis

Jessica A. Meisner, MD, MS, MSHP;1 Judith A. Anesi, MD;2 Judith A. Anesi, MD;1 Xinwei Chen, MS;2 and Dave Grande, MD, MPA;1 1University of Pennsylvania, Philadelphia, Pennsylvania; 2Division of General Internal Medicine, Philadelphia, Pennsylvania

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Background. Nationwide, there has been a rise in cases of infective endocarditis (IE) correlating with the rise of the opioid crisis. Pennsylvania (PA) has the third highest rate of drug overdose deaths in the country, with Allegheny and Philadelphia counties having the highest rates in the country. With this study, we evaluated how IE has changed in the face of the opioid crisis with respect to the population impacted and associated healthcare utilization in PA.

Methods. We performed a retrospective cohort study of all adults admitted to an acute care hospital in PA between January 2013 and March 2017 with a diagnosis of IE. Patients were identified through the Pennsylvania Health Care Cost Containment Council (PHC4) via billing codes. Exposed patients were those with drug use-associated IE (DU-IE); the unexposed group was those with non-DU-IE. We determined the number of admissions and geographical distribution of IE and DU-IE in the state. We then assessed for differences in hepatitis C (HCV) and HIV serostatus, length of stay (LOS), insurance status, total hospital charges, and rates of valve surgery between the two groups.

Results. There were 17,224 admissions for IE in PA during the study period, of which 11.2% were DU-IE. In Allegheny and Philadelphia counties, 14.4% and 20.5% were from DU-IE, respectively. DU-IE cases increased from 6% in 2013 to 17% in 2017, P < 0.001. We found several significant differences between the DU-IE and non-DU-IE groups: DU-IE group was younger (median 33 vs. 69 years old, P < 0.001); the LOS was longer in the DU-IE group (10 vs. 7 days, P < 0.001); the percentage of patients leaving Against Medical Advice was higher in DU-IE group (11.2% vs. to 1.1%, P < 0.001); a higher proportion of the DU-IE group were HCV and HIV seropositive (27.1% vs. 3.3% for HCV, 2.4% vs. 0.74% for HIV, P < 0.001).

Conclusion. Pennsylvania had an increase in the number of IE cases over the last 4 years, driven by the opioid crisis, with Philadelphia and Allegheny counties being the most impacted areas. While this study is limited by the use of claims data, it demonstrates the downstream effects of the opioid crisis on the patient population at risk and the healthcare system due to longer and costlier hospital stays. This study supports the need for innovative and integrative care models to support them.

Table 1: Demographics

| Characteristic | Non-DU-IE (n=15,103) | DU-IE (n=1,921) | P value |
|---------------|----------------------|----------------|---------|
| Median age (IQR) | 65 (56-60) | 71 (67-65) | <0.001 |
| Gender: Female (%) | 6,727 (44%) | 1,053 (55%) | <0.001 |
| Race (%) | | | <0.001 |
| White | 1,274 (83.3%) | 1,472 (77%) | <0.001 |
| Black | 1780 (11.8%) | 278 (14.4%) | 0.04 |
| Asian | 101 (0.7%) | 13 (0.7%) | 0.79 |
| American Indian | 12 (0.0%) | 1 (0.0%) | 0.5 |
| Other | 242 (1.6%) | 32 (1.7%) | 0.71 |
| Unknown | 236 (1.5%) | 34 (1.8%) | 0.71 |
| Ethnicity (%) | | | |
| Hispanic | 280 (1.8%) | 57 (2.9%) | 0.05 |
| Non-Hispanic | 1,506 (98.2%) | 1,864 (97.1%) | 0.05 |
| Insurance (%) | | | |
| Medicare | 10,020 (66.5%) | 1,524 (79.2%) | <0.001 |
| Medicaid | 2,043 (13.4%) | 272 (14.2%) | <0.001 |
| Commercial | 2,089 (13.9%) | 250 (12.8%) | <0.001 |
| Other | 72 (0.5%) | 7 (0.4%) | 0.47 |
| Unknown | 143 (0.9%) | 19 (0.9%) | 0.47 |
| Hepatitis C positivity (%) | | | |
| Positive | 1,103 (72%) | 178 (9.3%) | <0.001 |
| Negative | 1,046 (68%) | 1,743 (90.7%) | <0.001 |
| Congenital Heart Disease (%) | | | |
| Previous history | 1,046 (70%) | 158 (8.2%) | <0.001 |
| History of coronary artery disease (%) | | | |
| Previous history | 1,046 (70%) | 158 (8.2%) | <0.001 |
| Previous stroke (%) | | | |
| Previous history | 1,046 (70%) | 158 (8.2%) | <0.001 |
| Cerebrovascular disease (%) | | | |
| History of previous stroke | 1,046 (70%) | 158 (8.2%) | <0.001 |
| Pacemaker (%) | | | |
| Previous history | 1,046 (70%) | 158 (8.2%) | <0.001 |

Table 2: Outcomes

| Outcome | Non-DU-IE (n=15,103) | DU-IE (n=1,921) | P value |
|---------|----------------------|----------------|---------|
| Median Charges (IQR) | 46,800 (20,680-120,000) | 66,622 (37,894-1,045) | <0.001 |
| In-hospital mortality (%) | 1,307 (8.5%) | 197 (1.0%) | <0.001 |
| In-hospital mortality (%) | 1,307 (8.5%) | 197 (1.0%) | <0.001 |
| SRC mortality (%) | 1,307 (8.5%) | 197 (1.0%) | <0.001 |
| SRC mortality (%) | 1,307 (8.5%) | 197 (1.0%) | <0.001 |
| Valve Replacement (%) | 1,152 (6.9%) | 100 (5.2%) | <0.001 |
| Valve Replacement (%) | 1,152 (6.9%) | 100 (5.2%) | <0.001 |

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114. Chorioretinal Lesions in Persons Who Inject Drugs and Are Hospitalized with Bloodstream and Related Infections

Margaret A. Greven, MD; Jessica Weinstein, MD; Kathi Tsamis, MD; Philippe F. Ayres, BV; Erin W. Barnes, MD; and James E. Peacock, Jr, MD; 1-Wake Forest School of Medicine, Winston-Salem, North Carolina, 2-Wake Forest Baptist Medical Center, Winston-Salem, North Carolina

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Background. Eye infection is one of the many potential sites of infection in persons who inject drugs (PWID). The purpose of this study was to determine the prevalence of chorioretinal (CR) lesions, identify causative organisms, and correlate symptoms with ophthalmic involvement in PWID hospitalized with bloodstream infection (BSI) and/or related metastatic foci of infection (MFI).

Methods. Actively using PWID 18 years or older admitted to Wake Forest Baptist Med Ctr with documented BSI or MFI related to injection drug use (IDU) who were prospectively enrolled after providing informed consent. All patients, whether or not they had eye symptoms, received a dilated retinal examination as soon as feasible after admission. Ocular symptoms, visual acuity, and ophthalmic examination findings were recorded and fundus photos were obtained as indicated. Patients could be re-enrolled if re-admitted with a different infection.

Results. Fifty-three PWID with 55 episodes of disseminated infection related to IDU underwent ophthalmic exams at a median of 7 days post-admission. Mean age was 33.4 years and 51% were female. Twenty (38%) patients had HCV viremia but none had active HIV infection. Heroin was the injection drug of choice in 55% of PWID. Of the 55 episodes of systemic infection, 33 were classified as infective endocarditis (IE), 6 were BSI only, 10 were BSI with MFI, and 5 were MFI without active BSI. Nine (17%) patients had CR involvement on examination but only 33% (3/9) were
symptomatic. Of those with ocular involvement, 1 had fungal endophthalmitis due to Candida albicans. Single or multifocal subretinal infiltrates were found in 5/9 patients (MSSA 2, MRSA 2, H. parainfluenzae 1, 2/9 had cotton wool spots (S. mitis 1, MRSA 1), and 7/9 had intraretinal or white-centered hemorrhages (MSSA 3, MRSA 2, S. mitis 1, H. parainfluenzae 1). Of the 9 patients with CR lesions, 7 had IE. Interestingly, 3.8% (5/139) had old multifocal CR scars, possibly related to prior disseminated infection.

**Conclusion.** PWID admitted with BSI or MFI may have ophthalmic involvement even in the absence of ocular symptoms, especially in the setting of IE. Further study is needed to characterize the epidemiology of these infections, to identify risk factors for ocular involvement, and to optimize diagnosis and management.

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115. Evaluation of the Clinical Impact of the T2MR for the Diagnosis of Bloodstream Infections
Tamar Seitz, MD; Sebastian Baumgartner, MD; Christoph Wenske, MD and Alexander Zoellny, MD; SMG SU Dresden, Department of Infectious Diseases and Tropical Medicine, Dresden, Dresden, Germany

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**Background.** The EK-189 study evaluates the clinical impact of T2 magnetic resonance imaging (T2MR) for rapid detection of bloodstream infections (BSI) caused by ESKEPA-pathogens (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, and Escherichia col) compared with blood culture (BC). Here we present preliminary results from this ongoing study.

**Methods.** Patients newly admitted to an infectious diseases department with suspected bloodstream infection with ESKEPA-pathogens (based on predefined criteria) are included and randomized into BS1 diagnosis with (a) T2MR and blood culture or (b) blood culture alone. Routine diagnostic workup including chest X-ray, complete laboratory workup (including blood count, C-reactive protein, interleukin-6) is performed in all patients. Antibiotic regimens are selected empirically based on suspected pathogens and are switched to targeted therapy at the discretion of the treating physician once a pathogen is detected. Outcome parameters include time to targeted (predefined) antibiotic therapy and time to discharge. Test characteristics of the T2MR compared with BC are also assessed.

**Results.** So far 44 patients were included (22 in each group). In 9/22 patients (41%) in the T2MR group a pathogen was detected (4 Escherichia col, 2 Klebsiella pneumoniae, 1 Staphylococcus aureus, 1 Pseudomonas aeruginosa and 1 Acinetobacter baumannii) and in 3/22 (14%) patients in the BC group (all E. col). The comparison of T2MR vs. BC is depicted in Table 1. Sensitivity and specificity of T2MR in comparison to BC were 100% and 64.7%. All positive results in T2MR were considered true positive results. The days until clinical improvement, the need for admission at ICU and the in-hospital mortality were similar in both groups.

**Conclusion.** The results from this preliminary analysis show that in patients with suspected BSI with ESKEPA pathogens, T2MR detects more pathogens than BC and potentially provides a quicker detection and shorter time to targeted therapy. Further analyses of this ongoing study with a larger sample size are needed to evaluate the impact of the use of T2MR on patient’s outcome.

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116. Risk Factors and Clinical Outcomes of Carbapenem Non-Susceptible Gram-Negative Bacteremia in Patients with Acute Myelogenous Leukemia
Dong Hoon Shin, MD; Kang Il Jun, MD; Song Mi Moon, MD, PhD; Wan Beom Park, MD, PhD; Ji Hwan Bang, MD, PhD; Eu Suk Kim, MD, PhD; Sang Won Park, MD, PhD; Hong Bin Kim, MD, PhD; Nam Joong Kim, MD, PhD; Chang Kyung Kang, MD and Myoung-don Oh, MD, PhD; Department of Internal Medicine, Seoul National University College of Medicine, Seoul, Seoul, Republic of Korea

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**Background.** Fever and leukocytosis are very common in patients with burn injury. Many patients had to do blood cultures frequently during their hospitalization given the concern of bacteremia. We opt to utilize the clinical characters of the patients to evaluate the risk for bacteremia and avoid unnecessary blood culture.

**Methods.** The adult patients (218 years) with burn injury were selected from the Nationwide Inpatient Sample database (2005–2014). Using ICD-9 codes, we further identified bacteremia, total body surface area (TBSA) of burn, inhalation pneumonia, urinary tract infection, wound infection, escharotomy, placement of central venous line, indwelling urinary catheter, gastrostomy tube (G-tube), intubation, and total parenteral nutrition (TPN). The risk factors for bacteremia were evaluated by Logistic regression. A risk-adjusted model to predict the occurrence of bacteremia was developed by discriminant analysis.

**Results.** In total, 241,323 hospitalized patients with burn injury were identified. The incidence of bacteremia was 1.1% (n = 2,634). Comparing with the patients without bacteremia, those with bacteremia were older (51.1 vs. 46.7 year old, P < 0.001), had more severe burn injury (50.7% vs. 12% with burn TBSA over 20%, P < 0.001) and comorbidities (22.7% vs. 14.9% with Charlson index ≥ 2, P < 0.001), higher in-hospital mortality (5.6% vs. 3.7%, P < 0.001), longer hospital stay (26 vs. 5 days, P < 0.001) and more hospital charges ($206,028 vs. $360,339, P < 0.001). After adjusting for age, sex, race, and Charlson index of the patients were adjusted by Logistic regression, it was found that the factors of inhalation injury (OR = 1.25, 95% CI 1.03–1.51), intubation (OR = 1.62, 95% CI 1.44–1.82), TPN (OR = 1.56, 95% CI 1.31–1.81), placement of central venous line (OR = 1.86, 95% CI 1.57–2.17), and G-tube (OR = 2.04, 95% CI 1.60–2.60) were associated with increased risk for bacteremia. A risk-adjusted model composed of the patient’s age, Charlson index, burn TBSA, inhalation injury, intubation, TPN, placement of central venous line, and G-tube could predict the occurrence of bacteremia with an accurate rate of 85.4% (Table 1).

**Conclusion.** The risk factors and risk-adjusted model for bacteremia may assist to decide whether a blood culture is needed in the hospitalized burn patients.

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| Factors | Functions * |
|---------|-------------|
| Age (Y) | Bacteremia: 0.554 X1 + 0.414 X2 + 0.98 X3 + 0.669 X4 + 2.387 X5 + 1.322 X6 + 1.438 X7 + 1.239 X8 + 0.757
| Charlson index (X) | Bacteremia: 0.149 X1 + 0.328 X2 + 0.336 X3 + 0.138 X4 + 0.144 X5 + 0.033 X6 + 0.59 X7 + 0.164 X8 + 0.193
| Burn TBSA (%) | Bacteremia: 0.149 X1 + 0.328 X2 + 0.336 X3 + 0.138 X4 + 0.144 X5 + 0.033 X6 + 0.59 X7 + 0.164 X8 + 0.193
| Infection injury (X) | Bacteremia: 0.149 X1 + 0.328 X2 + 0.336 X3 + 0.138 X4 + 0.144 X5 + 0.033 X6 + 0.59 X7 + 0.164 X8 + 0.193
| Central venous line (%) | Bacteremia: 0.149 X1 + 0.328 X2 + 0.336 X3 + 0.138 X4 + 0.144 X5 + 0.033 X6 + 0.59 X7 + 0.164 X8 + 0.193
| Intubation (%) | Bacteremia: 0.149 X1 + 0.328 X2 + 0.336 X3 + 0.138 X4 + 0.144 X5 + 0.033 X6 + 0.59 X7 + 0.164 X8 + 0.193

*The age and Charlson index are the actual values of the patient.

**Table 1:** Risk-adjusted model for predicting bacteremia of hospitalized burn patients