

**1001. Evaluation of the Clinical Efficacy and Safety of Oral Antibiotic Therapy for *Streptococcus* spp. Bloodstream Infections**

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**Session:** 131. Bacteremia and Endocarditis

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**Background.** Despite the severity and frequency of bloodstream infections (BSI), the effectiveness of oral definitive therapy remains unknown. The objective of this study was to evaluate the efficacy and safety of step down oral antibiotics for the treatment of *Streptococcus* spp. BSI.

**Methods.** This was a retrospective cohort study of adult, hospitalized patients with *Streptococcus* spp. BSI between June 2015 and June 2017. Patients were excluded if received <48 hours of antibiotic therapy or therapy was started >48 hours from first positive culture. Patients were grouped by receipt of step down oral antibiotic therapy (PO group) vs. full course IV therapy (IV group) and compared for demographics, clinical course, and outcomes. The primary outcome was 30-day mortality and hospital length of stay (LOS). The secondary outcomes included 30-day recurrence of BSI and adverse events (AEs).

**Results.** One hundred ninety-five patients met inclusion criteria; median age was 51 year old, 68% were male, 57% were Hispanic, and 71% had community-onset BSI. Sixty-four (33%) were treated with step down oral therapy. The most common source of bacteremia was pneumonia (21%); 8% had endocarditis. Comorbidities were similar between the groups, with diabetes being most common (IV 22% vs. PO 19%,  $P = 0.29$ ). Severity of illness measured by need for ICU admission, initial lactate level, and SOFA score was similar between the two groups. *S. viridans* was the most frequent pathogen isolated (IV 28% vs. PO 27%,  $P = 0.87$ ). Ceftriaxone (39%) for the IV group and levofloxacin (30%) for the PO group were the most common definitive therapy prescribed. PO group received 4 days of IV therapy prior to transition to orals. The IV group had significantly higher mortality rate (11% vs. 2%,  $P = 0.02$ ) and longer LOS (median 9 days [IQR 5–18] vs. 5 days [4–7.75],  $P \leq 0.01$ ) compared with the PO group. 30-day recurrence (IV 2% vs. PO 5%,  $P = 0.40$ ) and AEs (IV 2% vs. PO 3%,  $P = 0.60$ ) were similar between the two groups.

**Conclusion.** In *Streptococcus* spp. BSI, step down oral antibiotic therapy was associated with a significantly shorter LOS compared with IV only therapy without compromise of clinical outcomes. Larger prospective trials evaluating step down oral therapy are warranted to confirm our results.

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

**1002. Epidemiology of Pneumococcal Bacteremia in a Large Tertiary Center**

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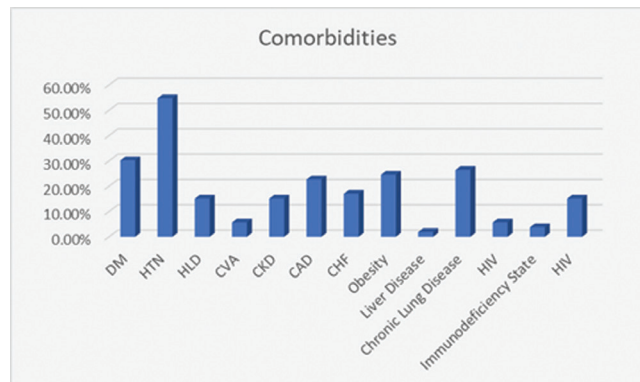
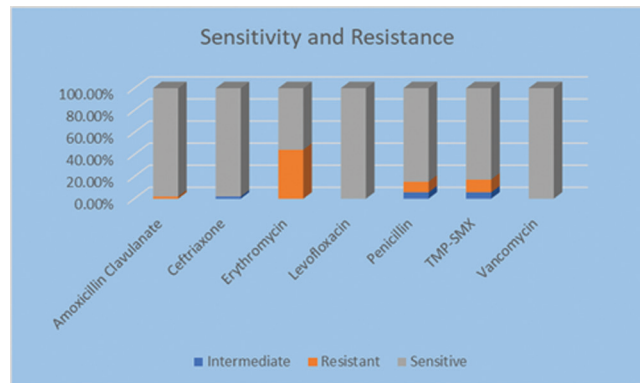
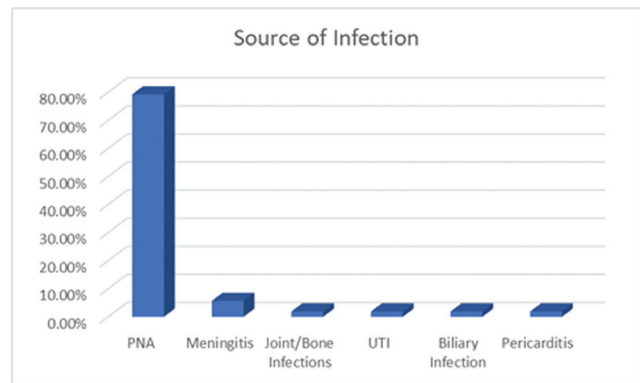
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**Background.** *Streptococcus pneumoniae* remains an important cause of bacteremia in the United States with high morbidity and mortality despite readily available treatment and vaccines. Increased incidence of bacteremia observed during 2017–2018 season.

**Methods.** Retrospective chart review of patients admitted with pneumococcal bacteremia over the last two winter seasons. Demographics, laboratory data, ICU stay, need for ventilation or pressor, comorbidities, and mortality were collected.

**Results.** Fifty-three patients enrolled. 62% admitted during 2017–2018. Sixty-six percent white, 60% male, mean BMI 27 (38% had normal BMI). Mean age was 55 years (1–93) (57% > 61). Mean hospital length of stay was 7.8 days (1–30). More than 40% required ICU stay. The use of NPPV, vasopressors, and mechanical ventilation were 6%, 15%, and 17%, respectively. Most common presentation: dyspnea 30% and fever 18%. Smoking history (55%). Eighty percent of these patients had pneumonia. Resistance to penicillin 9% and intermediate susceptibility 6%. Resistance to erythromycin 44% and trimethoprim-sulfamethoxazole 12% which increased during winter 2017 (52% and 12%) compared with winter 2016 (30% and 10%). Only 2% of patients with pneumonia had positive sputum culture for pneumococcus and 62% had positive serum pneumococcal antigen with bacteremia. Positive co-detection of bacterial or viral targets in sputum using Multiplex PCR did not correlate with mortality and hospital stay but they were more likely needed ICU stay, use of vasopressor and mechanical ventilation. 43% of empiric therapy was as recommended by IDSA guidelines. Comparing 2016 vs. 2017 seasons, mortality (15% vs. 6%), hospital stay (9 days vs. 7 days), use of NPPV (5% vs. 6%) mechanical ventilation (15% vs. 18%) and vasopressor (5% vs. 21%). No correlation between influenza infection and bacteremia. Overall 6-month mortality and re-admission rate was 9% and 2%, respectively. Mortality was higher in overweight patients (60% vs. 20%), non-smokers (40% vs. 20%), coronary artery disease (40%) and congestive heart failure (40%).

**Conclusion.** Pneumococcal bacteremia cause significant morbidity and mortality, we observed less mortality and hospital stay, but more use of NPPV, mechanical ventilation, and vasopressor during 2017–2018 season which had widespread influenza like activity.



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**1003. Clinical Implications of Emerging Nonvaccine-Serotype Invasive Pneumococcal Disease Among Adults in the Republic of Korea in the Era of Protein-Conjugated Pneumococcal Vaccine**

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**Background.** In the Republic of Korea (ROK), protein conjugated vaccines (PCV13 and PCV10) in replacement of PCV7 have been used in children since 2010, and then included in the childhood national immunization program (NIP) in 2014. This study investigated indirect effect of PCVs on serotypes in PCV-naïve adult invasive pneumococcal disease (IPD) and its clinical implications.

**Methods.** A prospective observational cohort study was conducted, through the serotype surveillance program following the NIP implementation of 23-valent pneumococcal polysaccharide vaccine (PPV23) for elderly population (≥65 years) from 2013 to 2015. Clinical data and pneumococcal isolates from adult IPD patients (≥18 years) were collected from 20 hospitals. Clinical characteristics were compared between vaccine-serotype (VT) and nonvaccine-serotype (NVT) groups.

**Results.** Of a total of 319 IPD patients enrolled, 189 cases (59.2%) were available for serotypes. Among them, the proportion of PCV-naïve cases was 99.5% (188/189) and 189 patients consisted of NVT ( $n = 64$ , 33.9%) and VT group ( $n = 125$ , 66.1%). Compared with the previous study in the ROK (2004–2010), the proportion of PCV13 serotypes was decreased (61.4% vs. 37.0%,  $P < 0.001$ ) and PPV23 serotypes were stationary (71.5% vs. 65.6%), but NVT serotypes were increased (23.4% vs. 33.9%,  $P = 0.033$ ) in our study. The most common serotype was 3 (20.8%) and 34 (23.4%) in VT and NVT group, respectively. VT group had more bacteremic pneumonia (72.0% vs. 48.4%,  $P = 0.002$ ). There was no difference of the case fatality rate between NVT and VT groups (29.7% vs. 35.2%,  $P = 0.447$ ). Multiple logistic regression analysis showed that chronic kidney disease (odds ratio [OR] 10.26, 95% confidence interval [CI] 1.94–54.44,  $P = 0.006$ ), younger age of 18–49 years (OR 4.04, 95% CI 1.29–12.71,  $P = 0.017$ ), deep-seated infection (OR 3.73, 95% CI 1.34–10.39,  $P = 0.012$ ), meropenem resistance (OR 3.21, 95% CI 1.49–6.91,  $P = 0.003$ ) were significantly associated with NVT-IPD cases.

**Conclusion.** Our study indicates that emerging and expanding NVT-IPD among adults, probably due to indirect herd effect of widespread use of pediatric PCV. Further changes of IPD serotypes might occur and IPD serotypes should be monitored for developing better pneumococcal vaccination policy.

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#### 1004. Frequency of Occurrence and Antimicrobial Susceptibility of Bacteria Isolated From Patients Hospitalized With Bloodstream Infections in United States Medical Centers (2015–2017)

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**Background.** Bloodstream infections (BSIs) cause significant morbidity and mortality. We evaluated the frequency and antimicrobial susceptibility of bacteria causing BSIs in the United States.

**Methods.** A total of 9,210 bacterial isolates were consecutively collected (1/ patient) from 33 US medical centers in 2015–2017 and tested for susceptibility by reference broth microdilution methods in a central laboratory (JMI Laboratories) as part of the International Network for Optimal Resistance Monitoring (INFORM) program. Whole-genome sequencing was performed on carbapenem-resistant *Enterobacteriaceae* (CRE).

**Results.** The most common organisms were *S. aureus* (SA; 24.3%), *E. coli* (EC; 20.8%), *K. pneumoniae* (KPN; 9.1%), coagulase-negative staphylococci (7.3%), *E. faecalis* (5.5%), *P. aeruginosa* (PSA; 4.7%), and  $\beta$ -hemolytic streptococci (4.7%). Overall, 50.0% of isolates were Gram-negative bacilli (GNB) and 41.4% were *Enterobacteriaceae* (ENT). All SA were susceptible (S) to dalbavancin (MIC<sub>90</sub>, 0.03  $\mu$ g/mL), linezolid, tigecycline (TGC), and vancomycin; >99.9% S to daptomycin, 97.6% S to ceftaroline, and 57.8% S to oxacillin. The most active agents against ENT were CAZ-AVI (99.9% S; table), amikacin (AMK; 99.7% S), and the carbapenems meropenem (MEM) and doripenem (99.1% S). Ceftolozane-tazobactam (C-T; tested in 2017 only) was active against 96.9% of ENT. Ceftriaxone (CRO)-S rates were 83.0% and 86.5% among EC and KPN, respectively. CRO-non-S KPN exhibited low S rates to most agents, except CAZ-AVI (99.1% S), TGC (93.6%), AMK (93.8%), and colistin (COL; 93.4%). Among 28 CRE isolates (0.7% of ENT), 21 produced a KPC-like, 2 an NMD-like, and 1 a KPC-17 and an NDM-1. COL (100.0% S), C-T (98.7% S), CAZ-AVI (98.2% S), AMK (97.9% S), and tobramycin (95.6% S) were very active against PSA. CAZ-AVI and C-T remained active against most PSA isolates non-S to MEM (93.0 and 95.0% S, respectively) and/or piperacillin-tazobactam (P-T; 88.9 and 91.3% S) and/or CAZ (86.9 and 88.2% S).

**Conclusion.** GNB represented 50.0% of bacteria isolated from patients with BSIs and the most active agents against these organisms were CAZ-AVI and AMK. Various agents exhibited excellent overall coverage against Gram-positives, including dalbavancin, daptomycin, linezolid, and TGC.

Organism/ resistant subset (no.)	MIC <sub>50</sub> /MIC <sub>90</sub> in $\mu$ g/mL (%S)				
	CAZ-AVI	C-T*	Cefepime	P-T	MEM
<i>P. aeruginosa</i> (433)	2/4 (98.2)	0.5/1 (98.7)	2/16 (87.8)	4/64 (86.5)	0.5/8 (80.1)
<i>Enterobacteriaceae</i> (3,746)	0.12/0.25 (99.9)	0.25/0.5 (96.9)	≤0.12/8 (88.5)	2/8 (93.4)	0.03/0.06 (99.1)
<i>E. coli</i> (1,902)	0.12/0.25 (99.9)	0.25/0.5 (98.7)	≤0.12/16 (85.8)	2/8 (95.6)	≤0.015/0.03 (99.7)
<i>K. pneumoniae</i> (832)	0.12/0.25 (99.9)	0.25/1 (96.9)	≤0.12/8 (88.5)	2/16 (92.2)	0.03/0.03 (97.7)
CRO-NIS KPN (112)	0.25/1 (99.1)	1/16 (81.6)	>16/16 (14.3)	16/64 (64.3)	0.03/8 (83.0)
<i>E. cloacae</i> (297)	0.25/0.5 (100.0)	0.25/16 (83.9)	≤0.12/4 (89.9)	2/64 (81.1)	0.03/0.12 (99.0)

\* Tested in 2017 only.

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#### 1005. HIV-Associated Bloodstream Infection (BSI): Trends Over 7 Years

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**Background.** Patients with HIV are known to be at risk for bacteremia. Whether the type of organisms changed over time is uncertain. We present a review of bacteremia in HIV-patients during 2010–2016.

**Methods.** We reviewed blood culture (BC) results (January 1, 2010–December 31, 2016), selected patients with BSI, defined their HIV status, the place of onset (community onset [CO]: 0–3 days after admission; hospital onset [HO]: ≥4 days), patient demographics, the source and organism distribution and compared patients with and without HIV.

**Results.** We encountered 5,179 BSI episodes, 93 were among 73 HIV-patients (table). HIV patients were younger, and more likely to be African Americans. Majority of cases were community onset (79.1% and 74.5% in cases with/without HIV, respectively). The three most common organisms in HIV patients were *Staphylococcus aureus* (SA), *Escherichia coli* (EC) and *Streptococcus pneumoniae* (SPN) and in non-HIV patients SA, EC, and *Klebsiella pneumoniae* (KP). While the rate of SA (25.3%–22.0%), SPN (2%–3%), and KP (10.2%–8.4%) remained stable during the study period, EC rate increased (18.5–25.7;  $P = 0.002$ ). HIV patients were more likely to have the respiratory tract as the source of BSI.

**Conclusion.** HIV-patients remain at higher risk for SPN and to have a respiratory source of BSI but the top causes of BSI in patients with and without HIV are SA and EC. Whether the higher rate of SPN among HIV patients is related to poor compliance with vaccination or suboptimal immune status is uncertain. Further studies are needed to compare pneumococcal vaccination compliance rate in patients with or without HIV.

**Table:** Bloodstream Infection: Organism Distribution in Patients Stratified to Their HIV Status.

HIV Status	Age (years): mean ± SD	Patient Characteristics		Common Organisms						Source		
		Male	AA	SA	EC	SPN	KP	VA	STB	UTI	Res	
Yes (93)	48.5 ± 13.1	60.2	86.0	28.0	19.4	11.8	4.3	16.3	17.5	22.6	19.4	
No (5,086)	63.2 ± 17.2	53.0	57.6	24.0	21.6	2.2	9.0	21.2	18.3	24.3	8.4	
<i>P</i>	<0.001	0.2	<0.001	0.4	0.7	<0.001	0.08	0.3	0.9	0.8	<0.001	

African Americans; vascular; Soft tissue/bone; urinary tract; respiratory.

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#### 1006. Demographic, Clinical, Microbiological Characteristics and Outcome of Patients Admitted to the Emek Medical Center with Blood Stream Infection Acquired in LTCF: A 5-Year Surveillance

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**Background.** Residents from long-term care facilities (LTCF) hospitalized with an acute infectious disease are challenging in terms of diagnosis and treatment, considering atypical clinical presentation are high rate of resistant bacteria.

This study aimed to Characterize patients with LTCF acquired bacteremia (LTCF-B), epidemiology of blood cultures (BC) and potential risk for mortality.

**Methods.** A retrospective study of LTCF residents hospitalized with LTCF-B. Demographic, clinical and laboratory data were collected and analyzed using SPSS 22 and SAS.

**Results.** One hundred seventy-seven LTCF residents hospitalized in internal wards were included, mean age 81.6 years, mostly completely dependent, 54.8% were males. Most frequent diagnoses was urinary tract infection (UTI), second by respiratory tract infections. Half were hospitalized during prior 6 months, one-third had a permanent indwelling urinary catheter. On admission, 70% had WBC blood count >10,000 cells/mL. The following pathogens were isolated from BC: Gram-negative enterobacteriaceae (70%): *E. coli* were 40% and Gram-positive cocci (21%): *S. aureus* 5.08% (55.5% of them MRSA). Extended-spectrum- $\beta$ -lactamase (ESBL) producing enterobacteriaceae were in 47.1% BC, clearly document increase during the years, 26% (2010)–63% (2014). Absolute majority of enterobacteriaceae were sensitive to carbapenems and