854. Impact of Antimicrobial Stewardship and Rapid Diagnostics in Children with Staphylococcus aureus Bacteremia

Stephanie N. Welch, PharmD1; Rupal Patel, PharmD, BCPS2; Lee Morris, MD, MSPH1; Aimée Dassner, PharmD, BCIDC2; Nigel L. Roizard, PhD, MS1 and Jeanne Forrester, PharmD, BCPS, BCIDC2; Atrium Health, Charlotte, North Carolina;

2Atrium Health, Carolinas, Charlotte, North Carolina; 2Children's Medical Center Dallas, Dallas, Texas

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Background. Rapid diagnostic testing (RDT) in combination with antimicrobial stewardship programs (ASPs) has been associated with improved outcomes in adults with Staphylococcus aureus bacteremia (SAB). Data in children are lacking. In January 2017, Atrium Health implemented a pediatric culture and rapid RDT. The objective of this study was to determine the impact of those interventions.

Methods. This was a retrospective, multicenter, quasi-experimental study of children ≤18 years with neonatal SAB from March 2015 to August 2016 (pre-intervention; PRE) and March 2017 to August 2018 (post-intervention; POST). The primary outcome was time to an optimal antibiotic. Secondary outcomes included time to effective antibiotic, total antibiotic exposure in the first 5 days, duration of bacteremia, infectious diseases (ID) consultation, time to central line removal, hospital and pediatric ICU length of stay (LOS), need for vasopressors or intubation, recurrence of SAB within 90 days, and inpatient mortality.

Results. Of 101 patients with SAB, 32 and 36 met inclusion criteria for the PRE and POST groups, respectively. The median time to optimal antimicrobial therapy decreased by 23 hours (PRE 44.3 hours vs. POST 21.3 hours; P = 0.008). Duration of bacteremia (65% vs. 23%; P = 0.028) and mortality (12.5% vs. 0%; P = 0.044) was also significantly reduced. Differences in median time to effective therapy (7 hours vs. 5.1 hours; P = 0.74), total antibiotic exposure in the first 5 days (160 hours vs. 152 hours; P = 0.4), hospital LOS (9.9 vs. 8.5 days; P = 0.25), and pediatric ICU LOS (7 vs. 6 days; P = 0.23) did not meet statistical significance. The PRE group had more patients with ID consultation (78% vs. 89%; P = 0.23) and shorter time to central line removal (68 hours vs. 20 hours; P = 0.037). There was no difference in the need for vasopressors (3 vs. 3 patients; P = 0.99) or intubation (2 vs. 4 patients; P = 0.68). Throughout the study period, recurrence of SAB only occurred in one patient (PRE).

Conclusion. Concurrent implementation of RDT and an ASP in pediatric patients with SAB decreased time to optimal antimicrobial therapy, duration of bacteremia, and mortality. RDT coupled with timely feedback from an ASP contributed to improved SAB management and clinical outcomes in children.

Disclosures. All Authors: No reported Disclosures.

855. Evolution of Group B Streptococcal Capsular Type V Invasive Infections in Neonates and Young Infants: A Whole Genome Sequencing Study

Anthony R. Flores, MD, MPH, PhD1; Misu A. Sanson, MD, PhD2; Brittany J. Shah, BS1; Marcia Rench, BSN1; Samuel A. Shelburne, MD, PhD1; Samuel A. Shelburne, MD, PhD1; and Carol J. Baker, MD2; 1UTHSCMcGovern Medical School, Houston, Texas; 2UTHSC/McGovern Medical School, Houston, Texas; 3Baylor College of Medicine, Houston, Texas; 4The University of Texas MD Anderson Cancer Center, Houston, Texas; 5University of Texas Health Science Center, Houston, Texas

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Background. Since 1970 group B Streptococcus (GBS) has been a frequent cause of sepsis or meningitis in young infants. Capsular polysaccharide type V was first recognized in 1990 and has increased to the point where it now causes ~15% of GBS infections. GBS type V strains are almost entirely sequence type 1 (ST1) in adult infections. To understand the evolution of type V GBS, we sequenced infant strains before 1990 to more contemporary isolates from young infants and adults.

Methods. Thirty-five strains isolated from blood or CFSS of infants <90 days of age (Houston, 1979–1996) were compared with the following previously sequenced type V, ST1 strains: (1) 14 from infant blood or CFSS from Center for Disease Control and Prevention (CDC) (2015–2017), (2) 193 blood ST1 isolates from adults (Houston, 1992–2013), and (3) 516 invasive isolates from the CDC (2015–2017). Isolates were sequenced using an Illumina MiSeq instrument followed by molecular typing, antimicrobial resistance gene determination, and phylogenetic analysis. Antimicrobial susceptibility testing (AST) was performed using disk diffusion and E-test.

Results. The majority (29/35) of Houston young infant strains were ST1. Type V GBS strains isolated prior to 1990 were more likely to be of ST-2 or ST-26 (5/10) compared with those from 1990 or later (2/425 and 14/14 CDC infant invasive type V). Tetracycline resistance was not identified in 83% (29/35) while erythromycin resistance (EMR) occurred in only 23% (8/35) of the strains. Compared with early neonatal isolates, MR was significantly more frequent among contemporary neonatal (12/14, 86%, P < 0.0001) and adult (502/710, 71%, P < 0.0001) ST5 GBS. Phylogenetic analysis showed two distinct clades defined in part, by MR. A high-frequency MR (340/360, 94%) clade was defined by the presence of erm(B) on Tn3872 while the low-frequency clade MR (159/530, 45%), was more diverse in mobile elements contributing to MR. The majority (27/29) of early neonatal ST1 GBS strains were observed in the low-frequency MR clade.

Conclusions. Invasive disease from EMR type V GBS before 1990 consisted of more diverse STs but is now almost exclusively ST1. Differences in the frequency of MR between early neonatal and contemporary type V ST1 GBS suggest MR may, in part, have driven the expansion of type V ST1 GBS.

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