111. Pediatric and Adolescent Sepsis Epidemiology and Clinical Characteristics, Emerging Infections Program, 2014–2015

Runa Hatti. Gokhale, MD, MPH[1]; Matthew Sapiano, PhD[1]; Raymund Dantes, MD, MPH[1]; Francisca Abanyie-Bimbo, MD, MPH[2]; Lucy E. Wilson, MD, ScM[3]; Nicola Thompson, MSc, PhD[1]; Rebecca Perlmuter, MPH, CIC[4]; Joelle Nadle, MPH[5]; Linda Frank, RN, BSN, PHN[5]; Geoff Brousseau, MPH[6]; Helen Johnston, MPH[6]; Wendy M. Bamberg, MD[6]; Ghinwa Dumyati, MD[7]; Ruth Lynfield, MD[8]; Malini DaSilva, MD, MPH[9]; Marion A. Kainer, MBBS, MPH, FRACP, FSHEA[10]; Alexia Y. Zhang, MPH[11]; Valerie Ocampo, RN, MPH[12]; Monika Samper, RN[12]; Lourdes Irizarry, MD[13]; Marla M. Sievers, MPH[13]; Meghan Maloney, MPH[14]; Susan Ray, MD[15]; Shelley Magill, MD, PhD[1]; David Katz, MD, MPH[1] and Lauren Epstein, MD, MSc[1]; [1]Centers for Disease Control and Prevention, Atlanta, Georgia; [2]Division of Healthcare Quality Promotion, Atlanta, Georgia; [3]University of Maryland Baltimore County, Baltimore, Maryland; [4]Maryland Department of Health, Baltimore, Maryland; [5]California Emerging Infections Program, Oakland, California; [6]Colorado Department of Public Health and Environment, Denver, Colorado; [7]New York Rochester Emerging Infections Program at the University of Rochester Medical Center, Rochester, New York; [8]Minnesota Department of Health, Saint Paul, Minnesota, [9]HealthPartners Institute, Minneapolis, Minnesota, [10]Tennessee Department of Health, Nashville, Tennessee, [11]Oregon Public Health Division-Acute and Communicable Disease Prevention, Portland, Oregon, [12]Oregon Health Authority, Portland, Oregon, [13]New Mexico Department of Health, Santa Fe, New Mexico, [14]Connecticut Department of Health, Hartford, Connecticut, [15]Emory University School of Medicine, Atlanta, Georgia

Session: 37. Bacteremia, CLABSI, and Endovascular Infections
Thursday, October 3, 2019: 12:15 PM

Background. Sepsis is an important contributor to mortality among children and young adults. However, recent studies focused on hospital management and burden estimation do not provide critical data to inform prevention efforts. We conducted detailed medical record reviews to describe the epidemiology and clinical characteristics of children and young adults with sepsis to inform prevention and early recognition targets.

Methods. We utilized the Emerging Infections Program (EIP) to collect comprehensive data via retrospective record review for patients with severe sepsis or septic shock discharge diagnosis codes from a nonrandom sample of hospitals across 10 states. Children and young adults, aged 30 days through 21 years, discharged between September 30, 2014 and October 1, 2015, were randomly selected for inclusion. We performed a descriptive analysis of these data.

Results. Among 734 patients hospitalized with sepsis, 92% were living in a private residence 4 days before admission, 38% had an outpatient medical encounter in the 7 days before admission, 14% had sepsis onset after hospital day 3, and 11% died within 90 days of sepsis diagnosis. The most frequently identified infection was lower respiratory tract infection (14%); for 317 (43%) no infection was documented as a cause of sepsis. The most frequently identified pathogen was *Staphylococcus aureus* (10%); for 326 (44%) no pathogen was identified as a cause of sepsis. Among 394 (54%) patients with ≥1 chronic underlying medical condition (CUMC), the most common were pulmonary disease (35%), hematologic/oncologic disease (31%), immune compromise (24%), and cardiovascular disease (20%). Patients with CUMC had a higher percentage of their sepsis onset after hospital day 3, death within 90 days of sepsis diagnosis, and *Pseudomonas aeruginosa* as a cause of sepsis (table). The percentage of patients with no pathogen identified was similar between those with CUMC and those without.

Conclusion. In our large cohort of children and young adults with sepsis, most had sepsis onset outside of the hospital and over half had chronic conditions. Our data suggest that distinct approaches may be needed to develop effective prevention and early recognition strategies for children and young adults depending on the presence of chronic conditions.

Table 1. Clinical Characteristics of Children and Young Adults with Sepsis, Emerging Infections Program, 2014–2015[a]

	One or more chronic underlying medical condition(s)	No chronic underlying medical condition	Total
Total	394	340	734
Male	196 (50%)	153 (45%)	349 (48%)
Age (median, IQR)	10 (4–15)	10 (2–15)	10 (3–15)
Location 4 days before sepsis			
Private residence	354 (90%)	320 (94%)	674 (92%)
Long term care facility	5 (1%)	0	5 (0.7%)
Another acute care hospital/Long term acute care hospital	23 (6%)	12 (4%)	35 (5%)
Other[b]	9 (2%)	5 (2%)	14 (2%)
Unknown	3 (0.8%)	3 (0.9%)	6 (0.8%)
Outpatient medical encounter 7 days prior to admission	158 (40%)	120 (35%)	278 (38%)
Sepsis onset after hospital day 3	76 (19%)	24 (7%)	100 (14%)
Died within 90 days of sepsis diagnosis	60 (15%)	24 (7%)	84 (11%)
Infection causing sepsis[c]			
Lower respiratory tract infection	55 (14%)	48 (14%)	103 (14%)
Blood stream infection	42 (11%)	33 (10%)	75 (10%)
Urinary tract infection	15 (4%)	33 (10%)	48 (7%)
Intra-abdominal infection	14 (4%)	26 (8%)	40 (5%)
No infection documented	202 (51%)	115 (34%)	317 (43%)
More than one infection	16 (4%)	20 (6%)	36 (5%)
Undetermined	26 (7%)	12 (4%)	38 (5%)
Other	24 (6%)	53 (16%)	77 (11%)
Pathogen causing sepsis			
Staphylococcus aureus	35 (9%)	41 (12%)	76 (10%)
Streptococcus spp.	28 (7%)	47 (14%)	75 (10%)
Escherichia coli	22 (6%)	32 (9%)	54 (7%)
Klebsiella pneumoniae	24 (6%)	10 (3%)	34 (5%)
Pseudomonas aeruginosa	24 (6%)	5 (2%)	29 (4%)
Rhinovirus	22 (6%)	13 (4%)	35 (5%)
Influenza	11 (3%)	11 (3%)	22 (3%)
Respiratory Syncytial Virus	9 (2%)	16 (5%)	25 (3%)
Candida spp.	7 (2%)	2 (0.6%)	9 (1%)
No pathogen identified	180 (46%)	146 (43%)	326 (44%)

[a] Children younger than 6 months and continuously hospitalized since birth are excluded
[b] Includes homeless and incarcerated
[c] As documented by discharge diagnosis code

Disclosures. All authors: No reported disclosures.

112. Physiological Signature of Bloodstream Infection in Critically Ill Patients

Alex Zimmet, MD[1]; Matthew Clark, PhD[2]; Shrirang M. Gadrey, MD, MPH[3]; Taison Bell, MD[4]; J. Randall Moorman, MD[3] and Christopher Moore, MD[3]; [1]University of Virginia Medical Center, Charlottesville, Virginia; [2]Advanced Medical Predictive Devices, Diagnostics, and Displays, Charlottesville, Virginia; [3]University of Virginia, Charlottesville, Virginia; [4]UVa Health System, Charlottesville, Virginia

Session: 37. Bacteremia, CLABSI, and Endovascular Infections
*Thursday, October 3, 2019: 12:15 PM*

Background. Bloodstream infection (BSI) is associated with high mortality rates in critically ill patients but is difficult to identify clinically. This uncertainty results in frequent blood culture testing, which exposes patients to additional costs and the potential harms of unnecessary antibiotics. Accordingly, we aimed to identify signatures in physiological data from critically ill adults that characterize BSI.

Methods. We reviewed all blood culture, vital sign, laboratory, and cardiorespiratory monitoring (CRM) data from patients admitted to the medical and surgical/trauma ICUs at the University of Virginia Medical Center from February 2011 to June 2015. Blood culture results were categorized as positive, negative, or contaminant. For the BSI population, we included data obtained within 12 hours before or 24 hours after the acquisition of a positive blood culture. The control population included data greater than 12 hours before or 24 hours after the acquisition of a positive blood culture, and all data from patients without BSI. We used multivariable logistic regression to identify the physiological characteristics of BSI.

Results. We analyzed 9,955 ICU admissions with 144 patient-years of vital sign and CRM data (1.3M hourly measurements). The average age was 59 years; the population was mostly Caucasian (81%) and male (56%). There were 5,671 (57%) admissions with ≥1 blood culture, and 744 (7%) had a BSI. The in-hospital mortality rate for patients with BSI was 28% vs. 12% for all others. The physiological signature of BSI was characterized by abnormalities in 12 parameters (Figure 1)—e.g., BSI was more likely in patients with a higher pulse and lower platelets. Several associations were nonlinear—e.g., temperature and WBC had U-shaped relationships with BSI. The internally validated C-statistic was 0.77.

Conclusion. Statistical modeling revealed a clinically sensible physiological signature of BSI that could assist with bedside decisions regarding the utility of blood culture testing in critically ill adults.

Figure 1: Physiological Profile of Bloodstream Infection
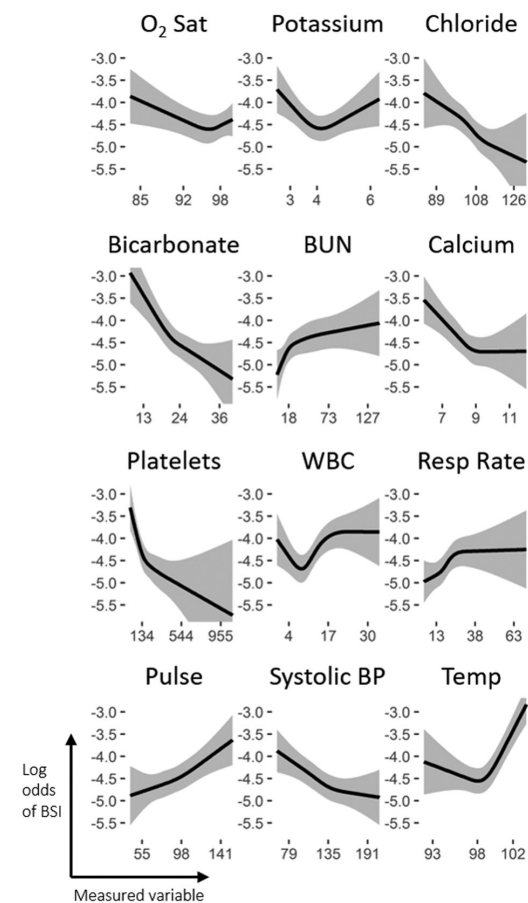
Log-odds plots for physiologic parameters that characterized BSI. The x-axes show the values of the measured parameters; the y-axes show the log odds of BSI. Increasing values on the y axis indicate higher odds of BSI.

Disclosures. All authors: No reported disclosures.