Further prospective studies are needed to validate AMC as accurate surrogate for AC in FN children with cancer.

#41 Manual Validation of an Automated Tool to Extract Blood Culture and Susceptibility Data from the Electronic Health Record for Children with Acute Myeloid Leukemia

William Otto, The Children’s Hospital of Philadelphia

Background. Children with acute myeloid leukemia (AML) require high-intensity chemotherapy to achieve durable remission. AML chemotherapy causes bone marrow suppression resulting in vulnerability to infection, most frequently bloodstream infections (BSI). While the most commonly described organisms include Gram-negative pathogens such as Pseudomonas aeruginosa, the epidemiology and resistance profile of these pathogens can change. It is important to monitor the epidemiology of these infections over time to inform clinical care. Previously capture of these microbiology data required laborious manual chart reviews that are often done intermittently and with variable accuracy, limiting the impact of the results. We sought to develop and validate an automated tool for extracting blood culture results, including antimicrobial susceptibility profiles for positive results from the electronic health record (EHR).

Method. An automated tool to extract blood culture results from the EHR (Epic Systems, Verona WI) was developed using SQL. This tool has the ability to be applied to the EHR of all children with newly diagnosed AML treated at the Children’s Hospital of Philadelphia from January 1, 2011 to December 31, 2020, regardless of subsequent relapse and treatment. Data from all blood cultures (including standard, fungal, mycobacterial, and subacute bacterial endocarditis blood cultures) were captured. Manual chart review was performed by an Infectious Diseases physician to abstract the same blood culture results to determine accuracy of the automated extraction tool. The manual abstraction was considered the gold standard. The BSI epidemiology of AML patients during this time period were described to illustrate the utility of this tool.

Results. There were 91 children with newly diagnosed AML who received chemotherapy during the study period. Of the collected 3,150 cultures obtained and tested, 206 (6.5%) were positive. There were 37 distinct pathogens identified (Table 1). Of the positive cultures, 114 (55.3%) were resistant to anaerobic antimicrobial testing (AST) per institutional standards. In total, 1,427 AST results were captured in the automated tool. Manual validation confirmed that concordance between the automated abstraction and chart review was 98% for the organisms grown on culture and accurately identified all AST results. The majority of organisms were Gram-positive. The most frequently identified species was Streptococcus mitis/oralis, found in 40/206 (19.4%) of positive cultures (Table 1). Of S. mitis/oralis that underwent AST, only 8/21 (38.1%) were susceptible to penicillin. Escherichia coli was the most common Gram-negative pathogen, accounting for 3/12 (25%) of all AST results. Gram-negative pathogens were suspected in 3/12 (30%) of patients, and for 13/12 (87.5%) of patients, AST results were positive.

Conclusion. We developed and automated tool to extract blood culture results from the EHR of children with AML at a single center. This tool was manually validated and found to be 100% accurate. This tool has the ability to efficiently capture the BSI epidemiology of a specific patient population at high risk for BSI. Further work is needed to confirm the accuracy of this tool at more centers. Implementation at other sites will allow this tool to be employed for various purposes including large, multicenter epidemiology research studies or quality improvement projects.

#42 A Retrospective Study of Valganciclovir Discontinuation Due to Toxicity or Intolerance in Pediatric Solid Organ Transplant Patients

Sahil Demirhan, Children’s Hospital at Montefiore, The Albert Einstein College of Medicine

Background. Cytoptegalovirus (CMV) prevention strategies in pediatric solid organ transplantation (SOT) include universal prophylaxis or pre-emptive therapy with valganciclovir (VGCV) based on CMV risk stratification. However, VGCV is associated with a risk of toxicities and discontinuation of VGCV due to either the development or discontinuation of Pneumocystis jiroveci pneumonia (PJP) prophylaxis with trimethoprim-sulfamethoxazole (TMP-SMX), which is also myelosuppressive. There are no currently approved oral lactic acidosis options for CMV in pediatric SOT recipients.

Method. This was a single-center retrospective cohort study of HCT recipients < 20 years old who underwent HCT at Duke University between 2000 and 2016. Routine pre-emptive surveillance testing for CMV was performed; CMV viremia was defined as a positive whole blood hybrid capture CMV DNA assay or quantitative plasma CMV PCR. We used log-logistic regression to evaluate associations between anaerobic antibiotic exposure (vancomycin, metronidazole, meropenem, piperacillin-tazobactam) and CMV viremia or disease. However, future pediatric and adult studies are warranted to evaluate this previously reported association in other populations, including studies evaluating for a possible role of the gut microbiome in modifying CMV viremia risk after HCT.

Conclusion. In this study of pediatric HCT recipients, we did not find evidence of an association between anaerobic antibiotic exposures and CMV viremia risk. However, studies of pediatric and adult HCT recipients warrant this previously reported association in other populations, including studies evaluating for a possible role of the gut microbiome in modifying CMV viremia risk after HCT.

#43 Antibiotic Exposure and Risk of Cytomegalovirus Viremia Among Pediatric Hematopoietic Stem Cell Transplant Recipients at a Single Institution

Sarah M Heston, Duke University

Background. Cytomegalovirus (CMV) causes substantial morbidity and mortality after hematopoietic stem cell transplantation (HCT), and antibiotic exposure after HCT is increasingly recognized as a risk for negative clinical outcomes. Recent studies identified an association between receipt of antibiotics with an anaerobic spectrum of activity and infection with cytomegalovirus (CMV) after HCT in adults. We hypothesized that receipt of antibiotics with an anaerobic spectrum would predict CMV viremia in a well-characterized cohort of pediatric HCT recipients.

Method. We conducted a single-center retrospective cohort study of HCT recipients <18 years of age who underwent HCT at Duke University between 2000 and 2016. Routine pre-emptive surveillance testing for CMV was performed; CMV viremia was defined as a positive whole blood hybrid capture CMV DNA assay or quantitative plasma CMV PCR. We used log-logistic regression to evaluate associations between anaerobic antibiotic exposure (vancomycin, metronidazole, meropenem, piperacillin-tazobactam) and CMV viremia or disease. However, future pediatric and adult studies are warranted to evaluate this previously reported association in other populations, including studies evaluating for a possible role of the gut microbiome in modifying CMV viremia risk after HCT.

Conclusion. In this study of pediatric HCT recipients, we did not find evidence of an association between anaerobic antibiotic exposures and CMV viremia risk. However, studies of pediatric and adult HCT recipients warrant this previously reported association in other populations, including studies evaluating for a possible role of the gut microbiome in modifying CMV viremia risk after HCT.
Caucasian and 26% of SOT were Hispanic/Latino. Hospitalizations among HCT/CT and SOT accounted for approximately 12% of all hospitalizations reported to the registry (n = 1683). Almost half of the reported HCT/CT (48%) and SOT (44%) cases were hospitalized. In those hospitalized, 11 (19%) HCT and 18 (12.5%) SOT cases required ICU admission. Half (50%) of HCT hospitalized cases received mechanical ventilation. One SOT death and 3 (11.1%) required mechanical ventilation, while 6 (6.7%) SOT cases received oxygen support, and none required mechanical ventilation. The majority of HCT/CT cases (64%) were hospitalized between Days 100 and 365 post-transplant. Approximately half (48%) of the HCT cases had received an allogeneic HCT. Myeloablative conditioning was the most common regimen reported (48%), among hospitalized HCT cases. Approximately half of SOT hospitalized cases had received a kidney transplant (48%) followed by liver (30%) and heart (19%). Of the 63 hospitalized SOT cases, the majority (87%) were receiving tacrolimus at COVID-19 diagnosis. One SOT died related to COVID-19 was reported, while no related deaths were reported in the HCT/CT group.

Conclusion. Although HCT/CT and SOT cases were low in comparison to all cases submitted to the registry, almost half of these cases required hospitalization. Only one COVID-19 related death was reported (SOT group); however, up to 20% of cases received ICU care. This data may aid clinicians developing future prospective studies examining COVID-19 risk mitigation and effective treatment strategies among this increased-risk population.

#53 Morbidity and Mortality Associated with Respiratory Syncytial Virus (RSV) Among Pediatric Hematopoietic Cell (HCT) Recipients: Preliminary Results from a Multi-Site U.S. Study.
Hailey S. Ross, St. Jude Children's Research Hospital

Background. RSV is the most common lower respiratory tract infection (LRTI) among children. Serious adverse outcomes are more likely among immunocompromised patients, including progression to pneumonia, respiratory failure, and increased mortality rates. We present interim analysis results from a multi-site study to characterize morbidity and mortality associated with RSV infection among pediatric HCT patients.

Method. Pediatric (< 18 years old at transplant) HCT recipients from 10 U.S. transplant centers part of the Pediatric Infectious Diseases Transplant Network (PIDTTRAN) who underwent HCT between 2010 and 2019 and were RSV positive during pre-transplant conditioning or within 365 days of HCT were identified from medical records. Demographics, underlying condition, and clinical characteristics were abstracted and entered in an electronic REDCap survey. Descriptive statistics were used to characterize the clinical course and outcomes of RSV infection.

Results. In total, 108 HCT patients were eligible with 108 (96%) reporting 1 case of RSV. Within 365 days of transplant and 5/month post-transplant 4 reported 2 episodes resulting in 113 RSV episodes included in the analysis. Approximately half (53.7%) were male, 53 (49.1%) were white/Caucasian, with a median age of 7 years at the time of RSV diagnosis. The majority only received 1 HCT (84%) prior to RSV diagnosis. The most common HCT was allogeneic type (77%), 63 (59%) received myeloablative conditioning, and 23 (22.3%) were t-cell depleted. Just over one third (38%) had received systemic steroids in the 2 weeks prior to RSV diagnosis. Among the 113 episodes, 3 (2.7%) received palivizumab and 34 (30%) received IVIG in the 4 weeks prior to RSV diagnosis. One fourth (25.6%) were hospitalized due to RSV and 13 (11.5%) were diagnosed with LRTI at presentation and 3 (2.7%) progressed to LRTI after initial diagnosis. One SOT death related to COVID-19 was reported, while no related deaths were reported in the HCT/CT group.

Conclusion. Preliminary results from this continuing multi-site study demonstrate RSV is an ongoing concern among SOT recipients with approximately half developing LRTI and two thirds requiring hospitalization. These data help our understanding of RSV infections in this population and inform future prospective study design to better define RSV risk as well as help address optimal prophylaxis and treatment strategies for SOT recipients at risk for severe illness.

Pediatric ID Research
#11 Development of a Kinetic ELISA (kELISA) and Reactive B Cell Frequency (RBF) Assay to Detect Respiratory Syncytial Virus (RSV) Pre-Fusion F Protein-Specific Immune Responses in Infants
Sofia Sepe Rolma, Vanderbilt University Medical Center

Background. RSV is a major cause of pediatric respiratory disease. Antibodies to the prefusion conformation of the RSV fusion (pre-F) protein are needed for virus neutralization.

Method. We measured RSV-specific responses in two groups of children <3 years of age; 1 group had laboratory-confirmed RSV (RSV-infected) or infants born in the period May to September and enrolled prior to their first RSV season (RSV-uninfected). RSV-infected infants had blood samples obtained at 1, 6, 9, and 12 months after infection. RSV-uninfected infants had blood samples obtained at enrollment, at the end of their first RSV season, and 6 months later. A kELISA to measure RSV pre-F-specific antibodies and an RBF assay to identify RSV F-specific B cells were developed.

Results. 102 subjects were enrolled; 11 were excluded due to missed visits or withdrawal. Of the 65 subjects in the RSV-uninfected group, all were kELISA positive at enrollment, consistent with maternal antibody transfer. Only 3 subjects had sufficient samples for analysis at multiple time points; 29 became seronegative and 24 remained seropositive. In the seronegative group, the kELISA value decreased rapidly to <0.25 by 6 months after the RSV season in 27/29 (93%), (Figure 1a). In the persistently seropositive group, all 24 subjects maintained a positive kELISA value, with some developing higher values over time, consistent with asymptomatic infection (Figure 1b). An RBF assay was used to determine whether antibodies were due to persistent maternal antibodies or endogenous production (Figure 1c). In the seronegative group, 24/29 (80%) had a negative RBF; in the seropositive group, 23/24 (96%) had a positive RBF during follow-up. There were 26 subjects in the RSV-infected group; 22 had sufficient samples for analysis at multiple time points. All were seropositive by kELISA at one month post-infection with variable kELISA values during follow-up (Figure 1d); 17/22 (77%) had a positive RBF, although 4 of the subjects without a positive RBF had indeterminate results at ≥1 visit.

Conclusion. Assays measuring F-specific immune responses in infants will be critical for RSV vaccine development. A kELISA targeting RSV pre-F epitopes, with an RBF assay targeting RSV F-specific B-cells, may allow discrimination for maternal and infant-derived antibodies.

#12 Comparing Treatment of Pediatric Bronchiolitis and Upper Respiratory Infections in Primary, Tertiary, and Urgent Care Settings
Laura Dellplip, Albany Medical College

Background. Pediatric bronchiolitis and upper respiratory infections (URI) are almost always of viral origin and thus managed without antibiotics. Inappropriate antibiopic use for such diagnoses can contribute to antimicrobial resistance. We assessed the appropriateness of pediatric bronchiolitis and URI treatment in primary, tertiary, and urgent care settings within a large health system in Upstate New York and compared treatment appropriateness between the three settings.

Method. We conducted a retrospective, observational chart review of patient visits in pediatric primary, pediatric tertiary, and urgent care settings where there was a presumptive diagnosis of bronchiolitis or URI between January 1 and December 31, 2019 using ICD-10 diagnostic codes. We assessed patient treatment for each visit as “appropriate,” “possibly appropriate,” or “inappropriate” based on extracted chart data. We performed simple proportion calculations for each treatment category in each care setting, and then compared proportions for each treatment category between settings using chi-square and logistic regression models.

Results. Of the 450 patient visits reviewed in each care setting, 354 primary care, 375 tertiary care, and 442 urgent care visits met the inclusion criteria. Table 1 shows proportion of appropriately, possibly appropriately, and inappropriately treated visits in the primary, tertiary, and urgent care settings. The tertiary care and urgent care settings had a statistically significant proportion of possibly appropriate or inappropriate encounters at 2.4% and 4.8% respectively. In comparing odds ratios for possibly appropriate or inappropirate treatment of pediatric bronchiolitis and URIs between care settings, urgent