ABSTRACTS

204. Mucosal Cytokine Profiles in Children with COVID-19

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Session: 122. Caroline B. Hall Lecture
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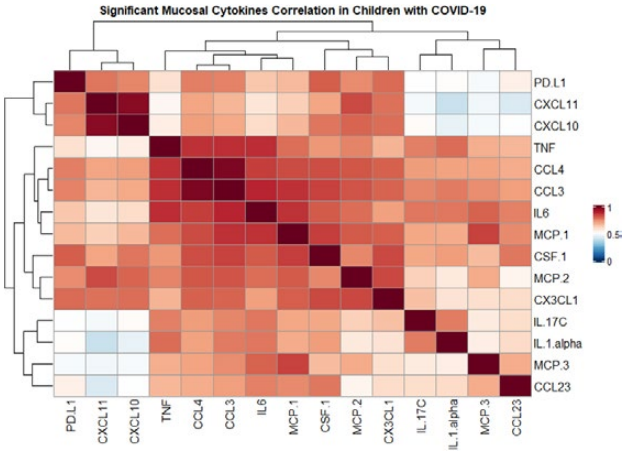
Background. The mechanisms associated with COVID-19 in children are not well understood. We sought to define the differences in nasopharyngeal (NP) cytokine profiles according to clinical presentation in children with COVID-19.

Methods. Single-center, prospective study in 137 children and adolescents < 21 years of age hospitalized with COVID-19, and 35 age, sex and race matched pre-pandemic (2016-2019) healthy controls. Children with COVID-19 were categorized according to their clinical presentation in: COVID-19-symptomatic; COVID-19-screening, and multisystem inflammatory syndrome (MIS-C). NP swabs were obtained within 24 hours of admission to measure SARS-CoV-2 loads by rt-PCR, and a 92-cytokine panel. Unsupervised and supervised analysis adjusted for multiple comparisons were performed.

Results. From 3/2020 to 1/2021, we enrolled 76 COVID-19-symptomatic children (3.5 [0.2-15.75] years); 45 COVID-19-screening (11.1 [4.2-16.1] years), and 16 MIS-C (11.2 [5.9-14.6] years). Median NP SARS-CoV-2 loads were higher in COVID-19-symptomatic *versus* screening and MIS-C (6.8 vs 3.5 vs 2.82 $\log_{10}$ copies/mL; p< 0.001). Statistical group comparisons identified 15 cytokines that consistently differed between groups and were clustered in three functional categories: (1) antiviral/regulatory, (2) pro-inflammatory/chemotactic, and (3) a combination of (1) and (2); (**Fig 1**). All 15 cytokines were higher in COVID-19-symptomatic *versus* controls (p< 0.05). Similarly, and except for TNF, CCL3, CCL4 and CCL23, which were comparable in COVID-19-symptomatic and screening patients, the remaining cytokines were higher in symptomatic children (p< 0.05). PDL-1 (p=0.01) and CCL3 (p=0.03) were the only cytokines significantly decreased in children with MIS-C *versus* symptomatic COVID-19 children.



The 15 cytokines identified by multiple comparisons were correlated using Person's in R software. Red reflects a positive correlation and blue a negative correlation with the intensity of the color indicating the strength of the association.

Conclusion. Children with symptomatic COVID-19 demonstrated higher viral loads and greater mucosal cytokines concentrations than those identified via screening, whereas in MIS-C concentrations of regulatory cytokines were decreased. Simultaneous evaluation of viral loads and mucosal immune responses using non-invasive sampling could aid with the stratification of children and adolescents with COVID-19 in the clinical setting.

Disclosures. Octavio Ramilo, MD, Adagio (Consultant)Bill & Melinda Gates Foundation (Grant/Research Support)Janssen (Grant/Research Support)Lilly (Consultant)Merck (Consultant, Grant/Research Support)NIH (Grant/Research Support)Pfizer (Consultant)SANOFI (Board Member) Asuncion Mejias, MD, PhD, MsCS, Janssen (Grant/Research Support, Advisor or Review Panel member)Merck (Grant/Research Support, Advisor or Review Panel member)Roche (Advisor or Review Panel member)Sanofi (Advisor or Review Panel member).

1. The Relationship Between Chlorhexidine Skin Concentration and Multidrug-Resistant Organism (MDRO) Colonization in ICU Patients

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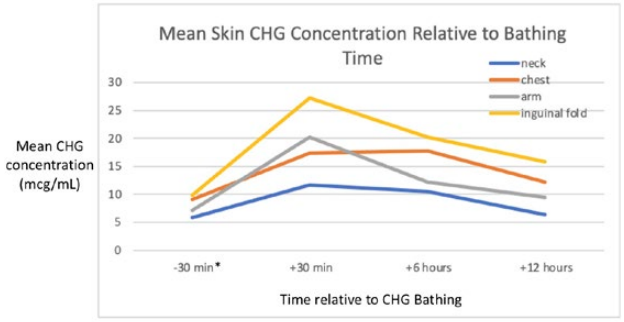
Session: O-01. Addressing MDRO Colonization and Infection

Background. Daily bathing of ICU patients with chlorhexidine gluconate (CHG) is an important method for healthcare-associated infection prevention. We set out to understand the relationship between CHG concentrations and MDRO colonization

Methods. In our trauma/surgical ICU at a large urban medical center, we performed CHG concentrations 2 days/week at 4 times points relative to CHG bathing (Medline, Northfiled, IL) application: 30 min. prior, and 30 min., 6 hrs., and 12 hrs. after application. CHG testing was done at 4 body sites: lateral neck, anterior chest, arm, and inguinal fold. On the contralateral side we tested the presence of the following 4 MDROs: methicillin resistant *S. aureus* (MRSA), and 3 enteric bacteria--extended spectrum beta-lactamase (ESBL)+ gram-negative rods, vancomycin resistant enterococcus (VRE), and carbapenem resistant enterobacteriaceae (CRE).

Results. We performed testing for 256 patient-days total, of which 42 were swabbed 1 time, 38 swabbed twice, 79 swabbed 3 times, and 97 swabbed 4 times (patient movement for tests, ICU transfer were limitations). Mean CHG skin concentrations were above the MICs of pathogens at all post-CHG application time points at all body sites at all times points (Figure) and decreased during the time points after bathing. In a logistic regression model controlling for patient characteristics, MRSA detection was inversely associated with CHG concentration with an 18% increase in odds of recovery for each 2-fold decrease in CHG concentration, as well as presence of a GI device and lack of ability to sit and roll. In a logistic regression model controlling for patient characteristics, resistant enteric bacteria detection was inversely associated with CHG concentration with an 11% increase in odds of recovery for each 2-fold decrease in CHG concentration, as well as mechanical ventilation, GI device, central line, and ICU duration.



*detectable CHG concentration prior to application occurred in patients with ICU stay ≥1 day

Conclusion. In our large study of CHG use and its association with MDRO detection, CHG concentrations decreased during the 24 hours after application, but were typically above concentrations considered adequate to kill MDROs. CHG concentration were inversely associated with the presence of MRSA and resistant enterics, suggesting that CHG application quality is a key component of the CHG bathing process.

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2. Space Time Trends of Community Onset *Staphylococcus aureus* Infections in Children Living in Southeastern United States: 2002-2016

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Session: O-01. Addressing MDRO Colonization and Infection

Background. Staphylococcus aureus (*S. aureus*) remains a serious cause of infections in the United States and worldwide. Methicillin susceptible *S. aureus* (MSSA) is the cause of half of all health care–associated staphylococcal infections, and Methicillin Resistant *S. aureus* (MRSA) is the leading cause of community onset skin and soft tissue infections in the US. This study looks at a 15-year trend of community onset (CO)-MRSA and MSSA infections