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Megan H. Tucker

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Pulmonary Severity Score as a Measure of Sepsis-Induced Acute Lung Injury in Preterm Infants

Megan H Tucker, MD; Hung-Wen Yeh, PhD; Daniel Oh; Nicole Shaw; Navin Kumar, MD; Venkatesh Sampath, MD

Children’s Mercy Kansas City; Hurley Medical Center

Background

• Sepsis is the most common indirect cause of acute lung injury (ALI) in adult and pediatric patients. Sepsis-induced ALI has not been described in preterm infants.
• We hypothesized that sepsis-induced ALI occurs in preterm infants and can be quantified by the pulmonary severity score (PSS).

Objectives

1. To determine whether late onset sepsis (LOS) and other systemic inflammatory diseases are temporally correlated with ALI as quantified by the PSS trajectory.
2. To determine the sepsis subtypes associated with the greatest induced ALI have not been described in preterm infants.

Design/Methods

• Study type: retrospective case-control study
• Data abstracted from Center for Pulmonary Disease Infant Repository
• Inclusion criteria: infants < 31 weeks GA and < 1500 grams with LOS and rule out (RO) sepsis events
• PSS trajectories for confirmed sepsis events (n=211) and RO sepsis events (n=123) analyzed for signs of ALI using linear mixed-effects models.

Results

Figure 1: Timepoints for collection of pulmonary severity score (PSS)

-72h before ABXs
-48h before ABXs
-24h before ABXs
Time 0 (1st dose ABXs)
+24h after ABXs
+48h after ABXs
+72h after ABXs
+168h after ABXs

Figure 2: Patients Screened and Sepsis Event Breakdown by Subtype and Organism

502 infants <31 w/ less than 1500 grams admitted 2010-2018 prior to DOL
59 Excluded – 30 due to serious congenital anomalies or genetic syndrome, 29 transferred prior to 36 weeks corrected GA
443 eligible infants
275 infants without sepsis
211 total number of sepsis events
168 infants with at least 1 sepsis event

Figure 3: Mean PSS trajectories between confirmed and rule out sepsis events

Time in relation to antibiotics (hours)

*Statistically significant difference between -72h PSS and subsequent time points.
†Statistically significant difference in PSS between CF and RO sepsis.

Figure 4: Mean PSS trajectories across sepsis subtypes

Discussion/Conclusion

• LOS in neonates is temporally associated with an increase in PSS after sepsis diagnosis, implying ALI.
• When analyzed by sepsis subtypes, similar trends were observed in the PSS across all sepsis phenotypes but highest among episodes of CF+ sepsis.
• This is the first study to examine and report ALI in relation to postnatal sepsis in preterm infants.
• Future work will examine whether infants who develop sepsis-induced ALI are at increased risk of moderate or severe bronchopulmonary dysplasia.