AAP DISTRICT VIII SECTION ON NEONATAL PERINATAL MEDICINE

2021 ANNUAL CONFERENCE **ORIGINAL RESEARCH** (BASIC SCIENCE or CLINICAL)
ABSTRACT SUBMISSION FORM

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If yes, type and year of training _Neonatal perinatal fellow 2019-2021_____

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DEADLINE FOR RECEIPT OF ABSTRACT IS FEBRUARY 19, 2021. Submissions will be accepted for either poster or oral presentation. Authors will be notified of acceptance and format for presentation (poster or poster symposium) by **March 12, 2021.**

Title: Increased oxidative stress post-blood transfusion in preterm small for gestation infants compared to appropriate for gestation infants

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Background: Compared to appropriate for gestation (AGA) infants, small for gestation (SGA, defined as < 10 percentile birthweight for gestation and sex) infants are at higher risk of bronchopulmonary dysplasia and retinopathy of prematurity, diseases associated with oxidative stress. Although blood transfusions are associated with oxidative stress, it is unknown how SGA and AGA infants react to blood transfusion.

Methods: A prospective observational study of infants <30 weeks gestation at birth who received blood transfusion. Exclusion criteria included any blood product administered within 3 weeks, sepsis, renal and liver disorders. Urine was collected pre-transfusion, and at 24-48 and 49-72-hours post-transfusion. ELISAs were used to measure thiobarbituric acid reactive substances (TBARS), 8-isoprostane and 8-hydroxy-2-deoxyguanosine (8-OHdG) as markers of lipid peroxidation and DNA oxidative injury. Levels were normalized to the urinary creatinine levels. Statistical analysis was performed using a two-way non-paired Student t test or Mann-Whitney test for continuous variables as appropriate and $\chi 2$ or Fisher's exact test for categorical variables. Linear regression was performed to adjust for confounders.

Results: 58 AGA & 14 SGA infants were enrolled in the study. There was no difference between AGA and SGA infants in maternal age, antenatal steroid use, male infants, volume of blood transfused, age at transfusion in days (AGA 23±18, SGA 21±10) and corrected gestational age in weeks (AGA 28±4.2, SGA 28±5.2) at transfusion.

There was no difference in urinary TBARS and 8-isoprostane levels between the SGA and AGA infants before and at 24-48 and 49-72 hours after transfusion. 8-OHdG levels were similar between the two groups pre-transfusion. However, 8-OHdG levels were significantly higher in the SGA group at 24-48 hours (10805 ng/ml IQR 7916-21712 vs 6981 ng/ml IQR 6567-7956) and continued to rise at 49-72 hours (13221 ng/ml IQR 8013-41676 vs 6523 ng/ml IQR 2925-9960). When the data was adjusted for gestational age, birthweight, post-natal age in days, sex, antenatal steroids and mode of delivery using a general linear model, the differences in 8-OHdG remained significant at 24-48 (p= 0.009) and at 49-72 hours (p= 0.04).

Conclusion: SGA infants have increased oxidative stress after blood transfusions which may contribute to the higher incidence of BPD and ROP in this population. Our data suggests that transfusing blood to SGA infants should be done judiciously.