SURFACTANT ADMINISTRATION ACUTELY AFFECTS CEREBRAL HEMODYNAMICS IN VERY LOW BIRTH WEIGHT INFANTS. JR Kaiser, CH Gauss, and DK Williams. University of Arkansas for Medical Sciences, Little Rock, AR.

**Background** Surfactant therapy for the treatment of respiratory distress syndrome reduces mortality and morbidity among very low birth weight (VLBW, birth weight 501-1500 g) infants by rapidly improving pulmonary function, reducing respiratory complications, and by promoting weaning from the ventilator. This life-saving procedure, however, causes a number of dramatic transient hemodynamic and blood gas disturbances that may be associated with impaired cerebral blood flow regulation and subsequent brain injury. **Objective** Since previous studies of surfactant’s impact on cerebral hemodynamics produced contradictory results, we examined the acute effects of Survanta® (beractant), the most widely used surfactant preparation in the United States, on systemic and cerebral hemodynamics and gas exchange in VLBW infants using a continuous monitoring system. **Study Design** Fourteen VLBW infants with respiratory distress syndrome had continuous monitoring of mean cerebral blood flow velocity (using transcranial Doppler ultrasound), PaCO₂ and PaO₂ (using a continuous blood gas monitoring system), and mean arterial blood pressure, before, during, and after Survanta administration. Peak values and relative changes of the 4 variables for 45 minutes after surfactant were calculated. Logistic regression was used to determine whether increases in mean cerebral blood flow velocity after surfactant were more likely when certain combinations of concurrent increases and/or decreases of mean arterial blood pressure, PaCO₂, and PaO₂ occurred. **Results** Mean birth weight was 908 ± 210 g and mean gestational age 26.9 ± 2.2 weeks’. The median time from birth to monitoring was 6.5 hours. Mean cerebral blood flow velocity increased 79.1 ± 51.2% (range of 20.2-208%) following surfactant and peaked at 16.3 ± 6.0 minutes. PaCO₂ (increased 47.7 ± 24.4%; range 7.8-88.1%) was highly associated (OR=57.5, p<0.001) with mean cerebral blood flow velocity; as PaCO₂ increased, mean cerebral blood flow velocity increased (~90% of the time). In contrast, mean arterial blood pressure (OR=3.1, p=0.117) had much less impact on mean cerebral blood flow velocity. PaO₂ was not associated with mean cerebral blood flow velocity. **Conclusion** Survanta administration caused substantial increases in mean cerebral blood flow velocity, PaCO₂, and PaO₂, and small increases in mean arterial blood pressure. Cerebral autoregulation was probably intact in this population since mean cerebral blood flow velocity primarily varied with PaCO₂ and not mean arterial blood pressure.