

Respiratory Distress of the Newborn and Its Relationship to Group B Streptococcal Colonization

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Synopsis:

Widespread use of intrapartum penicillin prophylaxis in the U.S., since 1996, has contributed to the decrease in rates of early-onset *Group B Streptococcus* (GBS) disease from 1.8 per 1,000 live births to 0.32 per 1,000 live births. Despite this decline, GBS continues to be the leading cause of bacterial sepsis and meningitis in newborns. A NICHD sponsored multi-center study, conducted from 1995 to 1999, investigated protective levels of maternal antibodies against early-onset invasive GBS disease in neonates. Incidental findings from this investigation showed that 8.8% of newborns colonized by GBS at birth had signs of respiratory distress within 48 hours after birth. Additionally, penicillin use during labor was associated with a 2.62 fold increase in respiratory distress in the colonized newborn.

Research has shown that infusion of GBS organisms results in pulmonary vasoconstriction and hypertension caused by bacterial phospholipids, which leads to respiratory distress syndrome (RDS) in laboratory animals. Additionally, it is known that exposure of *Streptococcus mutans* to penicillin induces secretion of bacterial phospholipids. These provocative findings lead to the hypothesis that GBS carriage in "asymptomatic" infants represents a risk factor for respiratory distress. If confirmed, this represents an unintended consequence of intrapartum prophylaxis.

This investigation is a prospective, population-based, non-interventional, minimum-risk study. A sub-population of infants who show symptoms of respiratory distress will be evaluated using a case: control analysis. This study will compare GBS-colonized and non-colonized newborns with regards to the development of respiratory distress, pulmonary hypertension, and other morbidities. The role of bacterial phospholipids in the development of respiratory distress will also be evaluated to determine the role that intrapartum penicillin use may play in this morbidity. We hypothesize that "asymptomatic" GBS colonization in newborns constitutes as a risk factor for respiratory distress and that the use of intrapartum penicillin augments this risk.

Alta Bates Summit Medical Center (ABSMC) is located within one mile of Children's Hospital & Research Center Oakland (CHRCO). Approximately 8,000 infants are delivered each year at ABSMC, which is the highest volume of deliveries performed by any institution in Northern California. A single group of neonatologists serves both the Neonatal Intensive Care Units at ABSMC and CHRCO, which are close affiliated. Both of these institutions collaborated on the NICHD study conducted from 1995 to 1999, entitled "Determination of Protective Levels of Maternal Antibody Against Early-onset GBS Disease in Neonates". It was the incidental findings from this pivotal study that prompted the current investigation.