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The Effects of Antenatal Betamethasone on Late Preterm Infants

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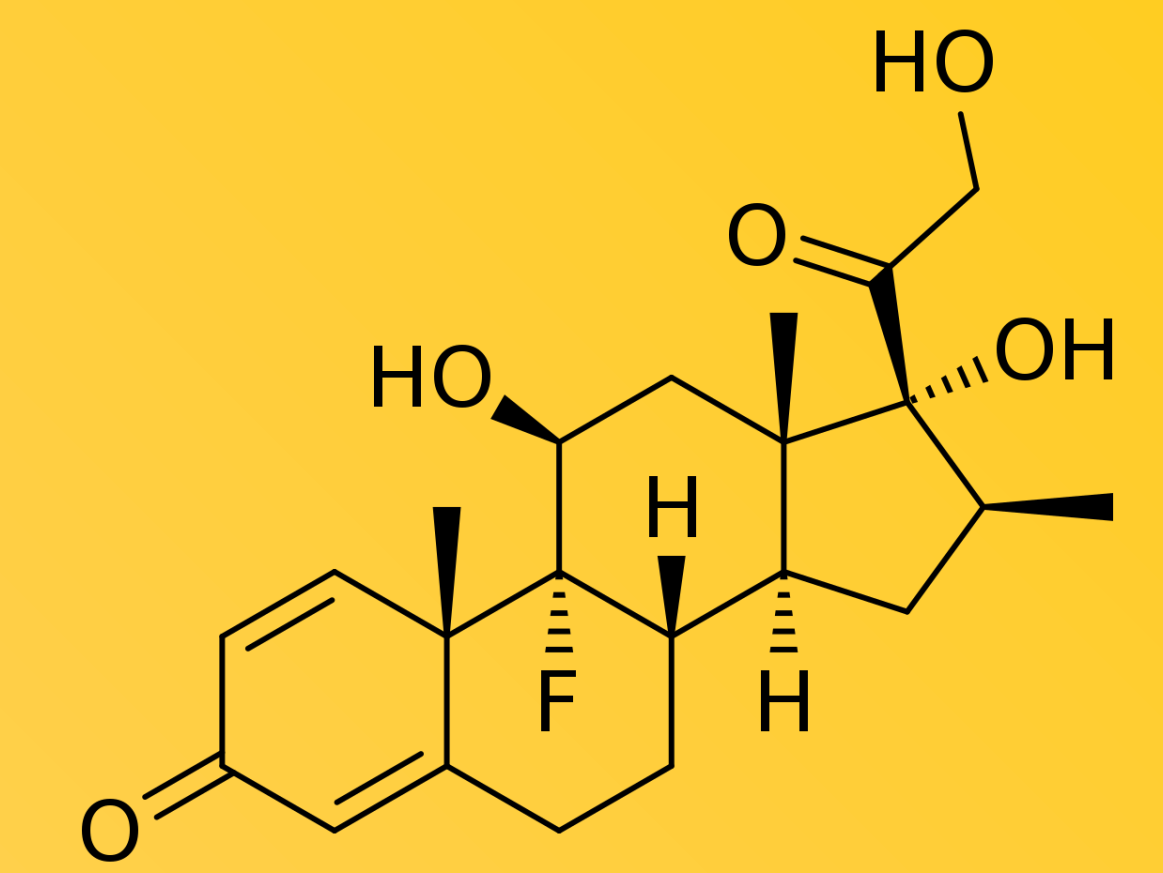
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The Effects of Antenatal Betamethasone on Late Preterm Infants

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Abstract

Administration of steroids to mothers expected to deliver in the late preterm period has previously been found to decrease neonatal respiratory morbidity. In this retrospective chart review, there were no significant differences between groups in the primary outcome of required respiratory support for the neonate, incidence of periventricular hemorrhage or neonatal death. However, this study found that their rate of hyperbilirubinemia, need for phototherapy, and NICU stays were longer than their counterparts whose mothers did not receive steroids or who only received one dose. These findings may provide support for future protocols directed to improve neonatal morbidity secondary to jaundice.

Background

Antenatal glucocorticoids have been used in pregnancies at risk for early preterm delivery since a consensus conference held by the National Institutes of Health in 1994. The multiple studies reviewed by this conference determined that injection of glucocorticoids reduces adverse neonatal outcomes when given to women who are likely to deliver before 34 weeks of gestation. In April 2016, the New England Journal of Medicine published a new study that investigated the use of corticosteroids in late preterm pregnancies (from 34 weeks 0 days to 36 weeks 6 days). This study demonstrated a clear improvement in neonatal respiratory outcomes. The current study was planned to examine whether an improvement has been made in neonatal morbidity at Jefferson Washington Township since the providers began administering antenatal corticosteroids to patients at risk of delivering in the late preterm period.

Methods

A retrospective chart review was performed on patients and their infants born during 34 to 36.6 weeks gestational age from May 2014 to December 2018 in Jefferson Hospital at Washington Township. The primary objective was to assess the newborn's need for respiratory support within 72 hours after birth, consisting of one or more of the following: the use of continuous positive airway pressure (CPAP) or high-flow nasal cannula for at least 2 consecutive hours, supplemental oxygen with a fraction of inspired oxygen of at least 0.30 for at least 4 continuous hours, extracorporeal membrane oxygenation (ECMO), or mechanical ventilation. Secondary objectives were the incidence of periventricular hemorrhage as seen on CT, ultrasound or MRI, neonatal death, length of NICU stay, neonatal hyperbilirubinemia, phototherapy, and neonatal hypoglycemia as defined as less than 45mg/dL. A two group independent t-test was used for continuous variables and chi-square, Fisher's exact tests for categorical, and logistic regression analyses were used to analyze differences between groups.

Results

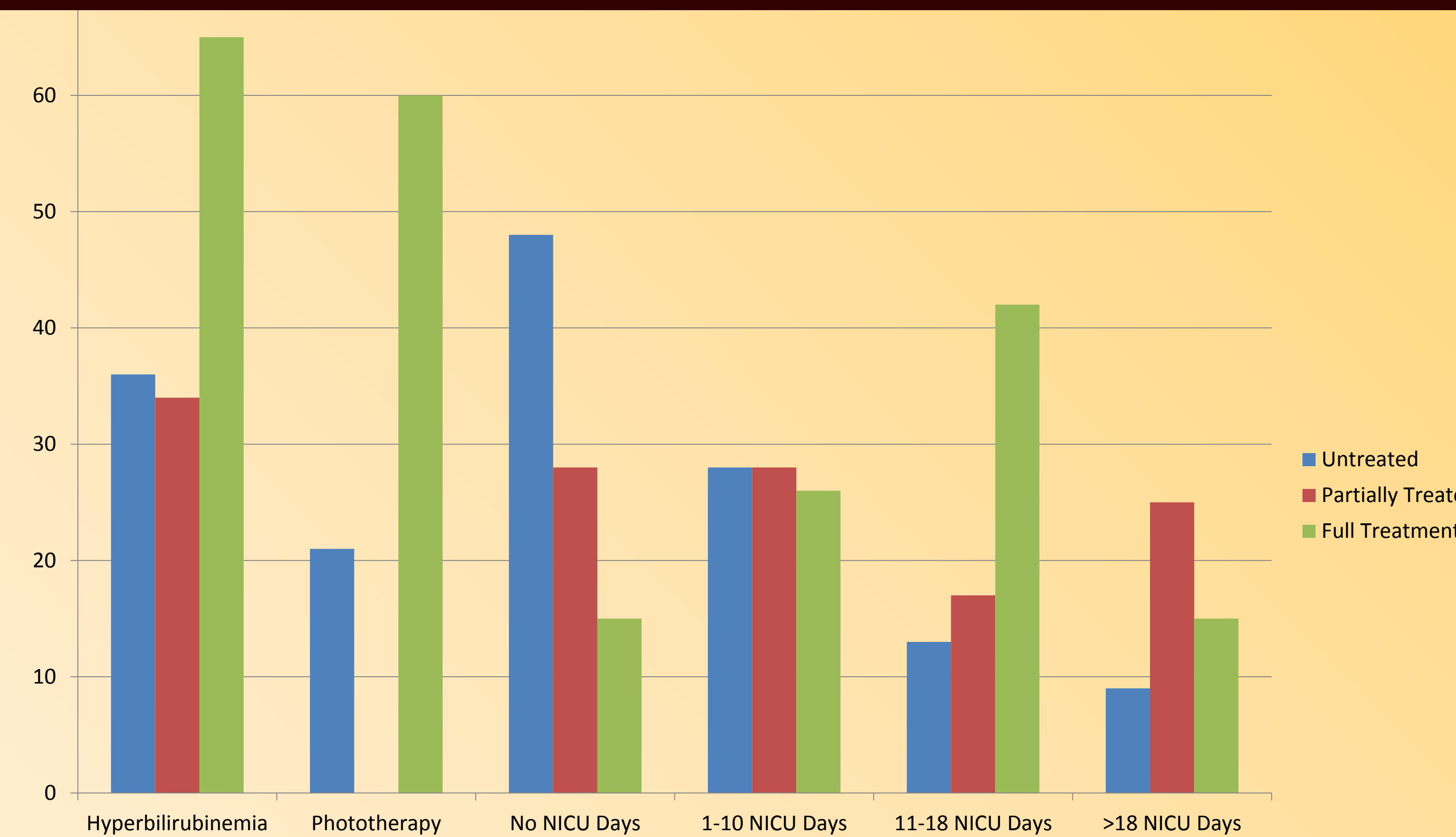


Chart 1. Comparison of Outcomes Between Treatment Groups

There were no significant differences between groups in the primary outcome. However, there was a significantly longer length of NICU stay ($P=0.0009$) and neonatal hyperbilirubinemia ($P=0.0063$) in the treated group of late preterm infants. Similarly, infants whose mothers received a full course of steroids also had a significantly higher rate of phototherapy ($P<0.001$). Mothers with chronic hypertension were more likely to have a full course of treatment ($P=0.0086$) as were those with pre-eclampsia ($P=0.029$) over those with other maternal complications including gestational hypertension. These results were not found to be altered by gestational age or time from steroid administration to delivery.

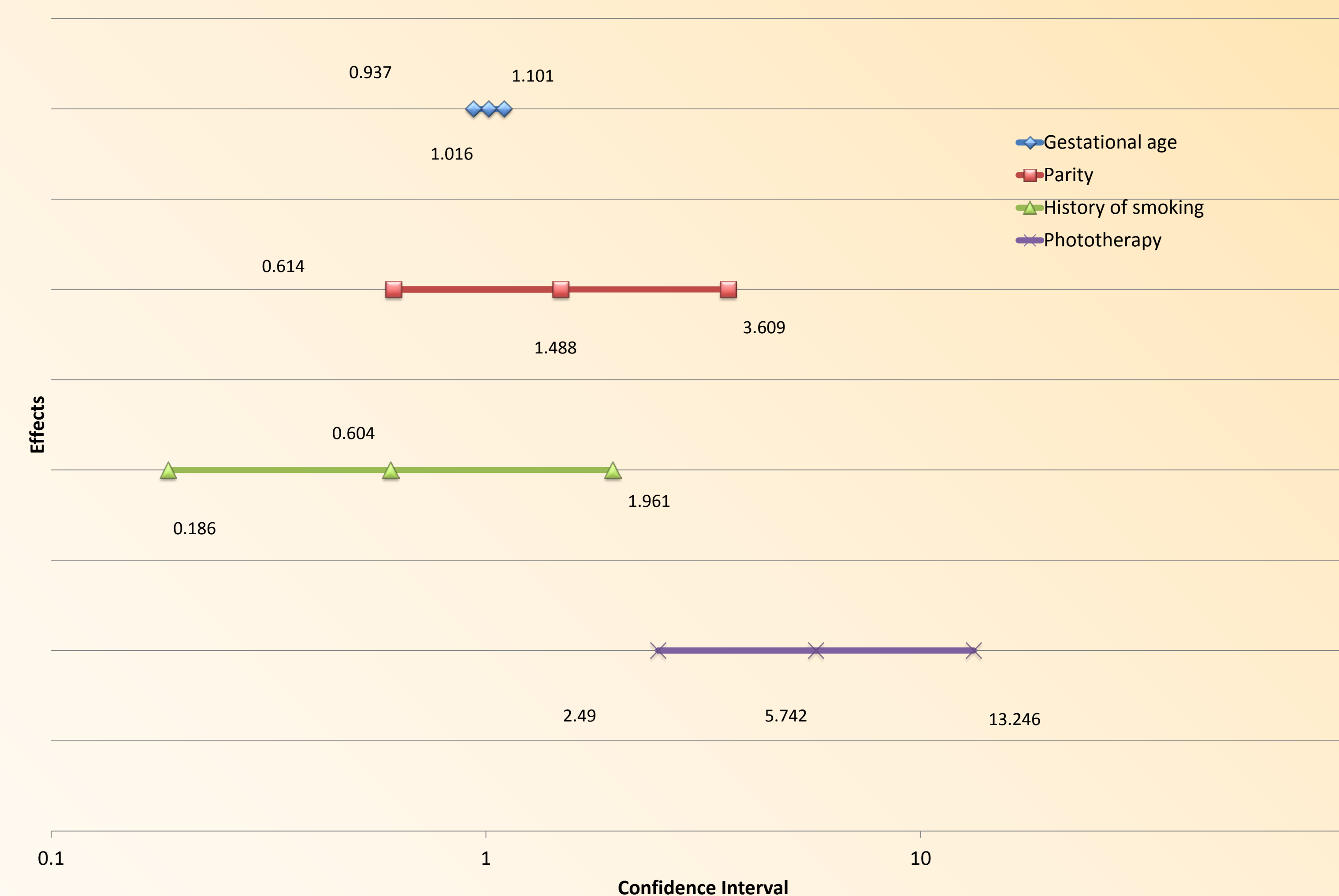


Chart 2. Confidence Intervals of Various Effects on Infants

Discussion

Contrary to the expected outcome, this study found unchanged rates of neonatal respiratory morbidity between infants whose mothers had received steroids and those who did not. Instead, the fully treated group of infants was found to have higher rates of jaundice and need for phototherapy with longer NICU stays. It is not completely clear what may have caused this correlation. One theory is the known effect of hyperglycemia in the mother from corticosteroids which may have caused a reflexive polycythemia in the fetus and therefore, red blood cell destruction and jaundice after birth. The rates of hyperbilirubinemia have been shown to be elevated in infants given antenatal steroids in previous studies, although whether it could be modulated by strict maternal glycemic control has not yet been studied. The respiratory benefits demonstrated in previous studies may outweigh the morbidity of jaundice requiring phototherapy. Further studies are needed to possibly apply various protocols for maternal glycemic control after steroid administration and investigate whether there is a measurable benefit to the rates of neonatal jaundice.



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