Maternal risk factors for intrapartum fever and the efficacy of paracetamol on perinatal outcomes

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Objective

Our study is to identify maternal risk factors for the development of intrapartum fever and determine its effects on short term neonatal morbidity. In addition, we performed a sub-analysis on the study population receiving intravenous or oral paracetamol to determine whether early reduction of intrapartum fever would reduce fetal tachycardia and affect both neonatal and maternal morbidity.

Methods

This study was conducted at Richmond University Medical Center, New York, which is a high risk tertiary care center for obstetrics and neonates. Medical records of mothers that entered active labour (spontaneous or induced) that developed a systemic fever of greater than 38 degrees Celsius during the time period of November 2014 to March 2015 and the records of their respective neonates were retrospectively reviewed. Exclusion criteria included non-singleton gestations, infants delivered before 34 weeks, stillbirths, and congenital fetal anomalies. A group of similar patient that did not develop maternal fever (temperature <38 C) were used for comparison. Of the 307 charts reviewed, 154 met the inclusion criteria. 63 were excluded because of missing maternal or neonatal records. Therefore, 51 patients and their neonates were included in the febrile cohort and 46 in the non-febrile group. Data on demographical, antepartum, intra-partum and neonatal outcomes were collected. The intrapartum factors assessed included gestational age at delivery, induction of labor, augmentation of labor with oxytocin or artificial rupture of membranes, admitting diagnoses, pain management (meperidine, epidural), length of stages of labour, length of membrane rupture, fetal heart tracings, and number of vaginal examinations. Intrapartum outcomes evaluated included mode of delivery, estimated blood loss, presence of meconium and clinical chorioamnionitis. Neonatal outcomes assessed included fetal weight, sex, Apgar scores, admission to intensive care unit, requirement of respiratory assistance (bag-mask, ventilation), hypotonia, presence of neonatal seizures and positive blood cultures. A sub-analysis was performed on the febrile cohort to determine if correction of fetal tachycardia and normalization of maternal temperature at one hour post administration of intravenous or oral paracetamol affected neonatal outcome. Statistical analysis was carried out using IBM SPSS 22. 0. Univariate analysis for continuous variables was compared using the Students t test or Mann-Whitney U test. Categorical data was compared using Chi-squared test or Fisher's exact tests. A p value of <0. 05 was considered statistically significant.

Results

Demographics were similar for maternal age, BMI, and gestational age at delivery, with non-significant differences. Risk factors for development of intrapartum fever included nulliparity (83. 1% versus 40%, p<0. 01), epidural use (89. 8% vs 4. 2%, p<0. 05), oxytocin augmentation (79. 6% vs. 41. 0%, p<0. 001), number of vaginal exams (mean 6. 43 vs 4. 46, p<0. 005), and increasing length of first stage of labor (228. 93 vs. 202. 68, p<0. 01). Rate of cesarean delivery was significantly higher in the febrile cohort (49. 0 % vs 27. 5%, p<0. 05) as was a larger estimated blood loss (595 vs. 437 ml, p<0. 01) and increased presence of meconium (32. 9% vs 10%, p<0. 01). Chorioamnionitis was noted in 22. 4% of the febrile patients. In addition, 5. 9 % of neonates in the febrile cohort had positive blood cultures, 25. 4 % exhibited symptoms of respiratory distress, 7. 8 % required bag and mask ventilation, and 2. 6% required mechanical ventilation. One infant in the febrile cohort developed neonatal seizure. Paracetamol was administered to all patients in the febrile cohort. If the maternal temperature remained more than 38 Celsius one hour post paracetamol administration, there was in increased neonatal respiratory distress (31. 6% vs 27. 1%), bag-mask ventilation (15. 4% vs. 4. 3%), and presence of meconium (38. 9% vs. 27. 3%), although these differences did not reach statistical significance. The presence of fetal tachycardia one hour post paracetamol was associated with a significant increase in incidence of caesarean delivery (70. 0% vs 40. 6%, p<0. 05).

Conclusion

Intrapartum fever can be due to both infectious and non-infectious origins. We demonstrate a number of risk factors associated with the development of intrapartum fever, with possible infection being one of many associated factors. Significant maternal morbidity included increased rate of cesarean delivery, which may be attributed to increased rate of fetal tachycardia. This pilot study demonstrates the correction of maternal fever and fetal tachycardia with paracetamol may reduce adverse maternal and perinatal outcomes. Further studies analyzing possible risk factor modifications and causal links of non-infectious origins of intrapartum fever are warranted.