The Canadian Neonatal Network™/Le Réseau Néonatal Canadien™

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Research Proposal

Timing of a Single Course Antenatal Steroids and Neurodevelopmental Outcomes of extremely preterm infants: A National Cohort Study

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Scope of the problem

Administration of antenatal corticosteroids (ANS) prior to preterm delivery is one of the most effective interventions to improve neonatal outcomes. However, there is paucity of data from large cohort studies about the effect of a single course of ANS on the neurodevelopmental outcomes of children born extremely preterm. In particular, the impact of timing and differential exposure to ANS is not clear.

Research Questions

In surviving extremely preterm infants who were born at <29 weeks' gestation, is there an association between different ANS to birth intervals exposure (0/no administration, partial <2 days, complete (optimal) 2-7 days and complete >7 days) and neurodevelopmental outcomes at 18-24 months corrected gestational age?

Objectives

To compare the rates of NDI and significant NDI (sNDI) between extreme preterm infants with different ANS to birth intervals and to examine the association of differential ANS exposure with neurodevelopment in these infants.

Methods

A national retrospective cohort of preterm infants (23^0-28^6 weeks) born between 2010 and 2020, admitted to CNN units and completed neurodevelopmental assessment at 18-24 months' corrected age in CNFUN centers. Infants were grouped and compared based on different ANS exposure (none, partial <2 days, complete 2-7 days and complete >7 days). Multivariable regression models with GEE to account for clustering by site adjusted for potential confounders (maternal education, maternal diabetes, gestational hypertension, gestational age, infant sex, singleton, rupture of membranes >24 hours, intrapartum magnesium sulfate, outborn status, and SNAPEII scores) were used to estimate adjusted OR (95% CI). The complete ANS 2-7 days prior to birth was the reference group.

Outcomes

Primary outcomes are NDI (any of cerebral palsy (CP), Bayley scores <85 in any domain, hearing or visual impairment) and sNDI (any of non-ambulatory CP, Bayley scores <70 in any domain, hearing aid/cochlear implant, bilateral visual impairment). Secondary outcomes include the components of NDI and sNDI.

Timeline

The study was submitted to Pediatric Academic Society and CNN, and it was accepted as a poster presentation at 16th Neonatal Neurocritical Care Conference in San Diego. We anticipate one year to write the manuscript and submit for publication, following feedback from these conferences.