

Causation

Children who were exposed to antenatal corticosteroids and had birth weights ≤ 1500 g did not have adverse growth, cognitive, or lung function outcomes at age 14 years

Doyle LW, Ford GW, Rickards AL, et al. *Antenatal corticosteroids and outcome at 14 years of age in children with birth weight less than 1501 grams. Pediatrics* 2000 Jul;106:e2.

QUESTION: Are children who were exposed to antenatal corticosteroids and had birth weights ≤ 1500 g at increased risk of adverse growth, cognitive, and lung function outcomes at age 14 years?

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Design

Cohort study.

Setting

A hospital in Melbourne, Australia.

Participants

154 consecutive infants (mean gestational age 29.4 wks, 53% boys) with birth weights ≤ 1500 g who survived to

age 14 years, corrected for prematurity. 130 children (84%) were assessed at age 14 years.

Assessment of risk factors

78 mothers (51%) had received 1 course of antenatal corticosteroids (betamethasone) to accelerate fetal lung maturation, and 76 (49%) had not received any antenatal corticosteroids.

Main outcome measures

Height, weight, and head circumference (z scores for appropriate age and sex, relative to the British Growth Reference of 1990); cognition (Wechsler Intelligence Scale for Children—Third Edition [WISC-III]); visual memory (Bead Memory Test from the Stanford-Binet Intelligence Scale); visual motor, memory, and organisational skills (Complex Figure Test of Rey); academic achievement (Wide Range Achievement Test [WRAT3]); and lung volume and flow rates. Outcome assessors were unaware of exposure to antenatal corticosteroids.

Main results

At age 14 years, children who had been exposed to antenatal corticosteroids were taller than those who had not been exposed (mean difference in z scores 0.36, 95% CI 0.01 to 0.72, adjusted for birth weight and midparental height), and had better cognitive functioning as assessed by the WISC-III full scale (mean difference 6.3, CI 1.6 to 11.0, adjusted for social class and maternal education) and performance scale (mean difference 5.5, CI 0.6 to 10.4, adjusted for social class, maternal education, bronchopulmonary dysplasia, cerebroventricular haemorrhage, and birth weight). The groups did not differ for weight; head circumference; visual memory; visual motor, memory, and organisational skills; academic achievement; or lung function.

Conclusion

Children who were exposed to antenatal corticosteroids and had birth weights ≤ 1500 g were taller and had better cognitive functioning at age 14 years than children who were not exposed to antenatal corticosteroids.

COMMENTARY

There are few reports of long term follow up of neonatal survivors of corticosteroid treatment. The study by Doyle *et al* adds to our understanding of the effects of antenatal corticosteroids on key outcomes of growth and intellectual function that are of concern to parents and care providers. Additionally, Doyle *et al* examine these outcomes in infants who were less mature and had lower birth weights than those in previous studies.

The study sample was from Australia. The decision to provide antenatal steroids to the mothers was based on a clinician's decision and was not random. Thus, initial differences might have existed between the 2 groups of infants. The authors attempted to account for potential differences by adjusting for such confounding variables as birth weight, maternal education, and parental height. The potential confounding variables did not affect any of the statistically significant differences between the groups. The authors further reduced bias by ensuring that the outcome assessors were blinded to the infant's exposure to antenatal steroids. As the benefits of antenatal steroids became evident, less opportunity existed to randomise for steroid treatment. Although a cohort study design was used, the diligence of the authors in accounting for differences between groups strengthened the design and provided a reasonable approach when a randomised sample was not available.

The results reinforce the existing literature advocating the benefits of antenatal administration of steroids to women at risk of preterm birth. Although the short term benefits of steroids (ie, reductions in respiratory problems, necrotising enterocolitis, and neonatal deaths) have been shown in a meta-analysis,¹ less information is available on the long term benefits. Perinatal nurses working in obstetrical and neonatal settings as well community nurses who work with mothers and babies are increasingly asked by families about the effects of perinatal interventions on long term outcomes. As neonatal survival improves, quality of life of survivors, physically and intellectually, will become more important to the children and their families. Knowledge of the long term effects of antenatal steroids will play a part in appropriate counselling and health education for families.

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1 Crowley P. Prophylactic corticosteroids for preterm birth. *Cochrane Database Syst Rev* 2000;(2):CD000065.