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Role of caesarean and antenatal corticosteroids in very low birth weight infants

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English key words: infant, very low birth weight; intracranial hemorrhages; cohort studies; mortality; infant, premature; cesarean section.
Spanish kew words: recién nacido de muy bajo peso; hemorragias intracraneales; estudios de cohortes; mortalidad; prematuro; cesárea.

Reception date: January 17, 2017 • **Acceptance date:** January 19, 2017
Publication date: January 25, 2017

Evid Pediatr. 2017;13:6.

HOW TO CITE THIS ARTICLE

Carvajal Encina F, Rivas Fernández MA. Papel de la cesárea y los corticoides antenatales en la supervivencia de los prematuros extremos. Evid Pediatr. 2017;13:6.

This article is available at http://www.evidenciasenpediatria.es/EnlaceArticulo?ref=2017;13:6
 • ISSN: 1885-7388

Role of caesarean and antenatal corticosteroids in very low birth weight infants

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Original article: Hübner ME, Ramírez R, Burgos J, Domínguez A, Tapia JL, Neocosur Neonatal Network. Mode of delivery and antenatal steroids and their association with survival and severe intraventricular hemorrhage in very low birth weight infants. J Perinatol. 2016;36:832-6.

Abstract

Authors' conclusions: among vertex-presenting singletons with a gestational age of between 24 to 30 weeks, better survival and intraventricular hemorrhage-free survival were associated with administration of antenatal steroids (ANS), independent of mode of delivery. In infants at 24 to 25 weeks gestation the combination of ANS/cesarean section was associated with improvement in both outcomes.

Reviewers' commentary: despite clinical relevance of the results (reduction of mortality, possibility of avoiding serious neurological sequelae), important limitations in the study design make it necessary to postpone decision-making until new studies are available.

Key words: infant, very low birth weight; intracranial hemorrhages; cohort studies; mortality; infant, premature; cesarean section.

Papel de la cesárea y los corticoides antenatales en la supervivencia de los prematuros extremos

Resumen

Conclusiones de los autores del estudio: en los partos únicos con presentación de vértice de 24 a 30 semanas de gestación, el uso de esteroides antenatales se asoció a una mayor supervivencia y a supervivencias en hemorragia interventricular grave, independientemente del tipo de parto. En los nacidos entre las 24 y 25 semanas de gestación, la combinación de esteroides antenatales más cesárea se asoció con una mejoría en ambos resultados.

Comentario de los revisores: a pesar de tratarse de unos resultados con gran relevancia clínica (disminución de la mortalidad, posibilidad de evitar graves secuelas neurológicas), existen importantes limitaciones en el diseño del estudio, las cuales hacen que se deban considerar con reserva las conclusiones de los autores y posponer la toma de decisiones a futuros estudios.

Palabras clave: recién nacido de muy bajo peso; hemorragias intracraneales; estudios de cohortes; mortalidad; prematuro; cesárea.

STRUCTURED ABSTRACT

Objective: to determine whether delivery by caesarean section (CS) and receipt of antenatal steroids (ANS) in vertex-presenting singletons with a gestational age (GA) between 24 and 30 weeks is associated with improved overall survival and severe intraventricular haemorrhage (sIVH)-free survival.

Design: retrospective cohort study.

Setting: twenty-five neonatal intensive care units in Argentina, Brazil, Chile, Paraguay, Peru and Uruguay (shared database of the Neocosur Network).

Study sample: 4386 vertex-presenting singleton newborns 24 to 30 weeks' GA with birth weight between 500 and 1500 g and no major congenital malformations delivered in participating hospitals between 2001 and 2011. The authors did not report any losses to follow-up.

Assessment of prognostic factor: administration of ANS (at least one dose) and/or CS. Newborns were classified into four groups based on the mode of delivery and whether they had received ANS or not.

Outcome assessment: the outcome variables "survival" and "sIVH-free survival" (severe, grades III-IV) at discharge were compared in the four groups, with the group of newborns delivered by CS and that received ANS set as the reference category. Logistic regression multivariate analysis was performed to estimate unadjusted and adjusted odd ratios (ORs) The authors analysed three regression models (Model 1 [M1]: unadjusted analysis of outcome variables in all four groups; Model 2 [M2]: adjusted analysis adding the covariates sex, Apgar < 3 at 1 and 5 minutes, sepsis < 72 h, premature rupture of membranes [PROM] > 18 h and small for gestational age [SGA] for the 24-25 weeks' GA subgroup; Model 3 [M3]: analysis including the same covariates for the 26-30 weeks' GA subgroup).

Main results: 45.8% were born by vaginal delivery (VD). Of the total NBs, 77.3% had received ANS (84.5% of those born by CS and 68.9% of those born by VD). There were statistically significant differences between the VD and the CS groups in perinatal and demographic variables (except in sex). The unadjusted comparison by mode of delivery showed increased survival and sIVH-free survival in NBs delivered by CS.

M1 showed increased survival in NBs that received ANS, independent of the mode of delivery. M2 suggested an association between the combination of ANS/CS with improved survival and sIVH-free survival compared to the use of ANS in NBs with VD (OR, 0.62 [95% confidence interval (95 CI), 0.41 to 0.92] and OR, 0.56 [95 IC, 0.37 to 0.85], respectively). M3 only showed a reduced survival in NBs delivered vaginally that did not receive ANS (OR, 0.35; 95 CI, 0.28 to 0.46) and increased sIVH in NBs that did not receive ANS, especially in those born by VD (OR, 0.36; 95 CI, 0.28 to 0.46).

Conclusion: the use of ANS was associated with an increased survival and sIVH-free survival, independent of mode of delivery, except in infants born at 24 to 25 weeks' gestation, in whom the combination of ANS/CS was associated with improvements compared to VD.
Conflicts of interest: none.

Funding source: voluntary and not-for-profit professional network.

COMMENTARY

Justification: the improved survival in extremely preterm newborns raises the need to achieve survival free of severe sequelae. It is clear that the use of ANS is associated with an improved survival and decreased incidence of respiratory distress and IVH in these patients.[1] The study is relevant, since the impact of mode of delivery in this group of patients is not clear. The recommendation of performing caesarean sections in preterm births is restricted to cases of breach presentation and intrauterine growth restriction,[2] and also contemplated in deliveries at 25 or fewer weeks' gestation when there are signs of foetal distress.[3]

Validity/scientific rigour: the research question was clearly defined. The inclusion and exclusion criteria were appropriate. The authors used an extensive database and included every patient that met the criteria. The number of NBs included in each group was not specified. The CS and VD groups were not comparable (the VD group had higher proportions of NBs not exposed to ANS, with GA < 25 weeks and with Apgar scores < 3 at 5 minutes), so the impact of exposure could not be assessed directly. The authors developed relevant regression models, but omitted adjustments by prognostic factors that may have an impact on the outcomes under study: number of doses of ANS (dose-response relationship), time elapsed between ANS use and delivery, reasons for not administering ANS (22.7%), use of mechanical ventilation and use of vasoactive agents. The analysis also omitted the hospital of delivery as a potential confounding variable. Save for the level of care being the same in all units, there was no mention of whether they were comparable in other aspects (patient characteristics, clinical guidelines, human resources and equipment). There was no information on the criteria used to decide the mode of delivery. There was no description of the method used to assess the "IVH grade III and IV" outcome. It is not known whether the data were collected by individuals blinded to the outcomes of interest. Although adjustments to the data were made in the regression analysis, several relevant factors were not included, raising doubts as to whether the cohorts were representative of the populations exposed or not exposed to ANS and delivered by CS.

Clinical relevance: given the importance of the analysed outcomes, the reported improvement would be highly relevant to decision-making. However, the study did not guarantee the comparability of the CS and VD groups, and its findings were not consistent with those of a Cochrane review[4] that analysed CS versus VD in preterm newborns and found no significant differences in perinatal mortality, Apgar scores, neonatal distress or hypoxic-ischaemic encephalopathy (the review did not analyse sIVH). In addition to all the biases already mentioned, the methodological limitations that generally apply to retrospective cohort designs entail that its conclusions should only be considered as hypotheses from which to develop further studies. Furthermore, the results did not include an assessment of maternal risks or cost.

Applicability to clinical practice: reducing mortality and severe neurologic sequelae could possibly justify (taking into account the risks to the mother) the routine implementation of ANS combined with CS, even if the effect size were very small. However, the low internal validity of the study combined with the limitations inherent in its retrospective design and

the lack of consistency with other studies, require that the conclusions of the authors be interpreted with caution, and that changes in decision-making be postponed until further evidence becomes available.

Conflicts of interest: the authors of this commentary have no conflicts of interest to declare.

REFERENCES

1. Crowley P. WITHDRAWN: prophylactic corticosteroids for preterm birth. Cochrane Database Syst Rev. 2007;18(3):CD000065.
2. Durie DE, Sciscione AC, Hoffman MK, Mackley AB, Paul DA. Mode of delivery and outcomes in very low-birth-weight infants in the vertex presentation. Am J Perinatol. 2011;28:195-200.
3. Periviable birth. Obstetric Care Consensus No. 3. American College of Obstetricians and Gynecologists. Obstet Gynecol. 2015;126:e82e94.
4. Alfirevic Z, Milan SJ, Livio S. Caesarean section versus vaginal delivery for preterm birth in singletons. Cochrane Database Syst Rev. 2013;12:CD000078.