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ORIGINAL ARTICLE

Postnatal growth at hospital discharge in extremely premature newborns in Spain☆,☆☆

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KEYWORDS
Extremely premature infant;
Postnatal growth;
Birth weight;
Birth length;
Head circumference;
Postnatal growth restriction

Abstract
Introduction: Postnatal growth restriction is considered a universal problem in extremely premature infants (EPI), and causes great concern due to the possible relationship between nutrition, sub-optimal postnatal growth, and neurodevelopment delay.
Objectives: To describe the weight gain in EPI and to determine the changes in the length and head circumference (HC) at hospital discharge in survivors.
Patients and methods: The study included 4520 Caucasian EPI from single pregnancies and without severe malformations, born in the centres participating in the Spanish SEN1500 network (2002–2011). The weight was recorded at birth, 28 days, 36 weeks post-menstrual age (PMA), and at discharge. The length and HC were measured at birth and at discharge.
Results: The rate of weight gain (exponential method) was 8.0 g/kg/day (birth to 28 days); 14.3 g/kg/day (28 days to 36 weeks); and 11.7 g/kg/day (36 weeks to discharge). At discharge, postnatal growth restriction was greater for length (z-score between −1.78 and −2.42, depending on GA), followed by weight (−1.67 to −1.79), and HC (−0.69 to −0.81).
Conclusions: Weight gain in the first weeks after birth is slow in EPI, and they exhibit an almost universal postnatal growth restriction that involves mainly length and weight. In addition to weight, a close control of longitudinal growth and HC are essential for nutritional assessment and detection of patients at risk for poor growth and neurodevelopment after hospital discharge.

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◊ Appendix A details the names of the hospitals and researchers of the SEN1500 neonatal network.

PALABRAS CLAVE
Recién nacido extremadamente prematuro;
Crecimiento posnatal;
Peso al nacimiento;
Longitud al nacimiento;
Perímetro craneal;
Restricción posnatal del crecimiento

Crecimiento posnatal hasta el alta hospitalaria en recién nacidos extremadamente prematuros españoles

Resumen
Introducción: La restricción posnatal del crecimiento es considerada un problema universal en recién nacidos extremadamente prematuros (RNEP), generando gran preocupación debido a la posible relación entre nutrición, crecimiento posnatal subóptimo y alteraciones del neurodesarrollo.
Objetivos: Describir la evolución de la ganancia posnatal de peso en RNEP y conocer los cambios en la longitud y el perímetro craneal (PC) al alta hospitalaria en los supervivientes.
Pacientes y métodos: Se estudió a 4.520 RNEP de raza blanca, de gestaciones únicas y sin malformaciones, nacidos en los centros participantes en la red española SEN1500 (2002-2011). El peso se registró al nacimiento, 28 días, 36 semanas de edad posmenstrual y al alta hospitalaria. La longitud y el PC se estudiaron al nacimiento y al alta.
Resultados: La velocidad de ganancia ponderal fue de 8,0 g/kg/día (nacimiento-28 días); 14,3 g/kg/día (28 días-36 semanas), y 11,7 g/kg/día (36 semanas-alta hospitalaria). Al alta, la restricción posnatal del crecimiento fue mayor para la longitud (z-score entre −1,78 y −2,42, en función de la edad gestacional), seguida del peso (−1,67 a −1,79) y, finalmente, el PC (−0,69 a −0,81).
Conclusiones: Los RNEP presentan una velocidad de ganancia ponderal lenta en las primeras semanas tras el nacimiento y una restricción posnatal del crecimiento que afecta en mayor grado a la longitud y al peso. Además del peso, un control estrecho del crecimiento longitudinal y del PC es fundamental para la valoración nutricional y la detección de pacientes de riesgo respecto al crecimiento y el neurodesarrollo tras el alta hospitalaria.

Introduction

Postnatal growth restriction has been noted as a universal problem in very low birth weight (VLBW) preterm infants, independently of the level of care or intensity of the facility where the infant is born.[1,2] Growth during childhood is customarily assessed through comparison to tables of percentiles for different anthropometric values obtained from the study of large samples of the population. In the case of preterm infants, growth curves have usually been developed using cross-sectional anthropometric birth data from newborns of different gestational ages (GAs).[3] The Committee on Nutrition of the American Academy of Pediatrics proposed that the optimal care and nutrition of preterm infants after birth would be those allowing them to achieve a postnatal growth that approximates the intrauterine growth—in terms of anthropometric measurements and body composition—of a normal foetus of the same postmenstrual age.[4] However, this outcome is rarely observed in everyday clinical practice, raising considerable concern among health professionals as regards the quality of the care and nutrition provided to these patients.[5,6] This concern mostly involves the potential relationship between nutrition, suboptimal postnatal growth and motor and/or cognitive impairment in subsequent stages of life.[7–10] Embleton et al. remarked on the inevitability of postnatal growth retardation in preterm infants due to the time it takes to achieve recommended dietary intakes, as well as the difficulty in recovering from the additional nutritional deficits accrued during this time, which are more pronounced in more immature and sicker infants.[11]

In Spain, Krauel Vidal et al.[12] studied the weight, length and head circumference (HC) at birth and at discharge in a cohort of VLBW infants born at 32 or fewer weeks' gestation in any of 55 Spanish neonatal units between 2002 and 2003. The main finding of this study was postnatal growth restriction, evinced by a decreased z-score in the 3 parameters under study. Growth restriction was most pronounced in length, followed by weight, which was below the 10th percentile at the time of discharge in 77% of the infants. Another study recently conducted in Spain that included 5470 infants delivered at 22–26 weeks' gestation[13] compared the outcomes of two different periods (2002–2006 vs 2007–2011). In addition to increases in survival and survival without major morbidity, the study found a significant increase in birth weight in the second period (758.9 ± 160.7 vs 773.8 ± 158.6 g; $P < .001$), as well as in the weight of survivors at 28 days (991 ± 209 vs 1029 ± 211 g; $P < .001$) and 36 weeks of postmenstrual age (PMA) (1890 ± 365 vs 1967 ± 377 g; $P < .001$). These data suggest that there may have been improvement in antenatal care as well as in neonatal care, in general and in the nutritional practices following admission to neonatal units. However, the postnatal growth pattern of extremely preterm infants (EPIs) has not been analysed again in this more recent period of time. The objectives of our study were to: (1) describe postnatal weight gain outcomes relative to PMA in a contemporary cohort of Spanish newborns delivered at 28 or fewer weeks' gestation during their initial hospital stay, and (2) to assess the changes in length and HC between birth and hospital discharge in survivors.