



ORIGINAL ARTICLE

New population growth curves in Spanish extremely preterm neonates[☆]



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KEYWORDS

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Large for gestational age;
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Very low birth weight

Abstract

Introduction: Most anthropometric reference data for extremely preterm infants used in Spain are outdated and based on non-Spanish populations, or are derived from small hospital-based samples that failed to include neonates of borderline viability.

Objectives: To develop gender-specific, population-based curves for birth weight, length, and head circumference in extremely preterm Caucasian infants, using a large contemporary sample size of Spanish singletons.

Patients and methods: Anthropometric data from neonates ≤ 28 weeks of gestational age were collected between January 2002 and December 2010 using the Spanish database SEN1500. Gestational age was estimated according to obstetric data (early pregnancy ultrasound). The data were analysed with the SPSS.20 package, and centile tables were created for males and females using the Cole and Green LMS method.

Results: This study presents the first population-based growth curves for extremely preterm infants, including those of borderline viability, in Spain. A sexual dimorphism is evident for all of the studied parameters, starting at early gestation.

Conclusions: These new gender-specific and population-based data could be useful for the improvement of growth assessments of extremely preterm infants in our country, for the development of epidemiological studies, for the evaluation of temporal trends, and for clinical or public health interventions seeking to optimise foetal growth.

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PALABRAS CLAVE

Curvas de crecimiento;
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Peso;
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Perímetro craneal;
Grande para la edad gestacional;
Apropiado para la edad gestacional;
Pequeño para la edad gestacional;
Recién nacido de muy bajo peso

Nuevas curvas poblacionales de crecimiento en recién nacidos extremadamente prematuros españoles**Resumen**

Introducción: La mayoría de los datos antropométricos de referencia utilizados en nuestro país proceden de estudios llevados a cabo fuera del mismo hace muchos años, o bien están basados en datos de un único o pocos centros. Además, el número de recién nacidos extremadamente prematuros (RNEP) incluidos ha sido muy escaso.

Objetivos: Desarrollar unas tablas y gráficas de referencia poblacionales en nuestro país para el peso, la longitud y el perímetro craneal (PC), por edad gestacional y sexo, en RNEP de raza blanca procedentes de gestaciones únicas.

Pacientes y métodos: Se incluyeron de todos los recién nacidos ≤ 28 semanas de EG, registrados sobre la base de los datos SEN1500 durante 10 años (2002–2011). La EG se estimó basándose en la ecografía fetal precoz o la fecha de la última regla. Los datos se analizaron mediante el paquete estadístico SPSS 20 y se crearon tablas percentiladas de referencia independientes para varones y mujeres, utilizando el método LMS de Cole y Green.

Resultados: Se presentan las primeras tablas y gráficas percentiladas con base poblacional en nuestro país de peso, longitud y PC en RNEP, incluyendo recién nacidos al límite de viabilidad. Se objetiva un dimorfismo sexual desde las 23 semanas de gestación.

Conclusiones: Estas nuevas referencias, específicas por sexo y de base poblacional, pueden ser útiles para mejorar la evaluación del crecimiento del prematuro extremo en nuestro país, así como para el desarrollo de estudios epidemiológicos, o evaluación de tendencias temporales y de intervenciones clínicas o de salud pública dirigidas a la optimización del crecimiento fetal. Un dimorfismo sexual es evidente desde etapas muy tempranas de la gestación.

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Introduction

For over half a century, various somatometric studies in newborns have established reference data for birth weight, length, and head circumference (HC). The first studies from North America are dated from the 1960s^{1,2} and have been and continue to be used in many neonatal units worldwide. However, many of these studies are not population-based, are based on the data of a single or a few centres, the data collection methodology is inconsistent, they may offer data obtained from different groups of patients, and sometimes do not take into consideration the sex of the newborn, providing grouped data for both sexes. Furthermore, some studies exclude high-risk pregnancies and many calculate GA based solely on the date of the last menstrual period (LMP). This was common practise in the early studies, and may have led to estimation errors, which would be more accused the greater the prematurity and also in post-term gestations.^{3,4} Another methodological issue is whether GA is given on the basis of completed weeks or rounded off to the nearest completed week.⁵ Based on the chosen criterion, one child could be included in one category or the one immediately above. Finally, but no less important, the improvement of health care both in general and for mothers in particular means that standard references from over 50 years ago may not be appropriate for present-day neonates.

Something that is wanting in the past and in most of the present studies is the low number of extremely preterm infants they include, especially newborns below 26 weeks GA.⁶ This gap makes it hard to know what is appropriate

in intrauterine trophogenic growth in this group of preterm neonates, and in addition to limiting the development of epidemiological studies on temporal trends, it prevents the assessment of the impact of clinical or public health interventions that seek to enhance foetal growth. Consequently, the objective of this study was to develop population-based reference tables and charts in Spain for weight, length, and head circumference by GA and sex in extremely preterm (22–28 weeks of GA) white singleton newborns free from major congenital anomalies.

Patients and methods

Using the Red Nacional Española SEN1500 (SEN1500 National Spanish Network) database,⁷ we conducted a cross-sectional study of all live-birth newborns including those who died in the delivery room, who were Caucasian, singleton, and born without malformations in participating hospitals from January 1, 2002 to December 31, 2011. The number of participating centres varied during the period under study, ranging from 49 to 63. The centres represented nearly all of Spain's autonomous communities, and we estimate that the study included between 60% and 65% of all very-low-birth-weight infants in Spain.

Measurements were taken following the usual procedures in each participating centre. The collected data were entered in the morbidity and mortality form of the Network, previously approved by the research and ethics boards of the participating hospitals. The form included data on the NBW,

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