



ORIGINAL ARTICLE

Assessment of foetal nutrition status at birth using the CANS score[☆]



S. Martínez-Nadal*, X. Demestre, F. Raspall, C. Vila, J. Álvarez, P. Sala

Societat Cooperativa d'Instal·lacions Assistencials Sanitàries Hospital de Barcelona, Barcelona, Spain

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Clinical assesment of nutritional status score;
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Ponderal index

Abstract

Introduction: Foetal malnutrition (FM) is the result of a loss or failure of intrauterine acquisition of the correct amount of fat and muscle mass, with short and long term implications. As the diagnosis of FM is essentially clinical, the aim of this study was to detect the incidence of FM using the Clinical Assessment of Nutritional Status (CANS) score, and compare the results with the classic anthropometric parameters.

Patients and methods: Retrospective population of term infants was studied between 2003 and 2014 ($n = 14,477$). They were classified into adequate weight (AGA), small weight (SGA) and large weight (LGA) for gestational age newborns. The CANS score was performed on all infants enrolled in the study, and the ponderal index (PI) was calculated, considering an FM cut off value of a CANS score <25 and $PI <2.2 \text{ g/cm}^3$.

Results: Using the CANS score, 7.6% ($n = 1101$) of the population showed FM, 50.3% ($n = 538$) of SGA, 76.2% ($n = 193$) subgroup $<p3$, and 4.67% ($n = 559$) of AGA. The CANS score was <25 in 7.26% ($n = 1043$) of newborns with $PI \geq 2.2 \text{ g/cm}^3$ ($n = 14,356$), and the CANS score was >24 in 49% with $PI <2.2 \text{ g/cm}^3$ ($n = 109$).

Conclusions: It is worthwhile identifying all newborns with FM due to the risks they may have in the short and long term.

CANS score assessment allows a better identification of nutritional status of infants than only using the curves of weight for gestational age.

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* Corresponding author.

E-mail address: silviamnadal@hotmail.com (S. Martínez-Nadal).

PALABRAS CLAVE

Clinical assesment of nutritional status score;
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 Parámetros antropométricos;
 Índice ponderal

Valoración clínica del estado nutricional fetal al nacer mediante el *Clinical Assessment of Nutritional Status score*

Resumen

Introducción: La malnutrición fetal (MF) traduce una pérdida o fallo de adquisición intrauterina de la cantidad adecuada de grasa y masa muscular, asociando connotaciones pronósticas a corto y largo plazo. Siendo el diagnóstico de MF esencialmente clínico, el objetivo de este trabajo es detectar la incidencia MF mediante el *Clinical Assessment of Nutritional Status score* (CANS score), y comparar los resultados con los parámetros antropométricos clásicos.

Pacientes y métodos: Estudio retrospectivo poblacional de recién nacidos a término entre 2003 y 2014 (n = 14.477). Se clasificaron en recién nacidos de peso adecuado, pequeño y grande para la edad gestacional. Se realizó el CANS score y se calculó el índice ponderal (IP) a todos los recién nacidos incluidos, considerándose MF los puntos de corte: CANS score < 25 e IP < 2,2 g/cm³.

Resultados: Mediante el CANS score el 7,6% (n = 1.101) de la población presentó MF, el 50,3% (n = 538) de los recién nacidos de peso pequeño para la edad gestacional, el 76,2% (n = 193) del subgrupo < p3 y el 4,67% (n = 559) de los recién nacidos de peso adecuado para la edad gestacional. El CANS score fue < 25 en el 7,26% (n = 1.043) de los recién nacidos con IP \geq 2,2 g/cm³ (n = 14.356), y el CANS score fue > 24 en el 49% con IP < 2,2 g/cm³ (n = 109).

Conclusiones: Es conveniente identificar todos aquellos recién nacidos con MF por los riesgos que pueden presentar a corto y largo plazo. La valoración mediante CANS score permite una mejor identificación del estado nutricional de los recién nacidos que empleando únicamente las curvas de peso según la edad gestacional.

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Introduction

Foetal malnutrition (FM) is a clinical state characterised by intrauterine loss of or failure to acquire normal amounts of fat and muscle mass. Its assessment should be included in the evaluation of all newborns regardless of the classification of their weight for gestational age, as birth weight alone is a poor indicator of nutritional status.¹

In recent years it has been observed that children with FM are more likely to have lower IQ scores, require special education, or have a neurologic disability, intellectual disability, learning disorders or seizures in late childhood compared to children without FM.¹⁻⁵ Neurologic alterations may be aggravated by different circumstances during the neonatal period, and especially by hypoglycaemia and/or feeding difficulties. Furthermore, FM is associated more frequently with cardiovascular, endocrine and metabolic disorders at larger ages.⁶⁻⁸

Foetal malnutrition can be due to different causes, and in developed countries it is most often caused by placental insufficiency. In the past decade there has been a significant increase in pregnancies in older mothers, following assisted reproductive technologies, and in women with chronic or systemic diseases, which are associated with a higher incidence of preterm birth and low birth weight. Thus, there is renewed interest in assessing for FM as accurately as possible. Traditionally, assessment of the foetal nutritional status in the newborn has relied on various anthropometric parameters, such as the head circumference to length ratio (HC/L), the arm circumference to head circumference ratio (AC/HC) and Rohrer's

ponderal index (PI), the latter of which is the most commonly used.^{1,6,9,10}

There is also a clinical score that does not appear often in the literature, the Clinical Assessment of Nutritional Status (CANS) validated by Metcoff in 1994. It is easy to learn and quick to administer, and consists of evaluating nine superficial clinical signs that differentiate between newborns with adequate nutrition and malnutrition.¹¹

The aim of our study was to determine the incidence of FM in term newborns in our hospital by means of the CANS score, and whether weight for gestational age and calculation of the PI suffice for the assessment of FM.

Patients and methods

We conducted a retrospective study in a population of term neonates (born at 37–41 weeks' gestation), with no exclusions, between March 2003 and March 2014. Gestational age was determined based on the first day of the last menstrual period and/or the first trimester ultrasound, and measured in completed weeks. We collected the following data: birth weight, length and head circumference within 24 h postbirth. Weight was measured placing the unclothed newborn on a digital SECA® scale with a measuring range of 0.1–15 kg and an accuracy of ± 5 g; the length was determined by measurement of the crown-heel length with a rigid Maciá® stadiometer with a 0–80 cm range and an accuracy of ± 0.5 cm; and head circumference (occipitofrontal) with a flexible measuring tape accurate to 0.5 cm. We entered these anthropometrical measurements

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