



Growth of preterm newborn infants

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At the end of the 19th century and beginning of the 20th century, Stephane Tarnier (1828-1897) and his student Pierre Budin (1846-1907), both obstetricians at *L'Hôpital Maternité de Paris*, attempted to systematize the care provided to preterm newborns.¹ In their lessons, which I recommend reading, they showed concern with thermal control, prevention of infections and nutrition. Nutritional adequacy should be checked by weight gain.¹ Budin believed these infants should have a growth rate similar to that of intrauterine growth. After more than one century, these principles have not become old-fashioned.

In the mid-20th century, intrauterine growth curves were created, and seminal data collected by Lubchenco et al. between 1948 and 1961 were published.² With the passing of time, several other intrauterine growth curves were published and several aspects began to be considered. Quite often, it was considered that curves were built from births and, consequently, they should not represent unborn infants. A cross-sectional study design was used, in which the data were collected from different sources, with sample sizes that were not always appropriate, and in which it was difficult to establish the correct gestational age, different races and even considerations about the effect of the altitude where the data were collected.³ Despite much criticism, these curves provided a lot of information. An important fact is that it was difficult to achieve the growth planned for preterm infants. By comparing the growth of preterm infants with that of the intrauterine fetus, one notes that most preterm infants, even those with appropriate-for-gestational-age weight, have an initial weight loss that places them below the 10th percentile, which characterizes dietary restriction.⁴ Still

today, preterm babies are undernourished in our hospital nurseries, a percentage that reaches nearly 90% after hospital discharge.⁵

Another method to assess the growth of preterm infants is to compare it with postnatal growth curves, as presented by Anchieta et al. in the current issue of *Jornal de Pediatria*.⁶ This type of curve, based on surviving

infants, has the advantage of using longitudinal data and predicting the initial weight loss. However, this approach is not free of criticism. These curves obviously depend on neonatal care practices, especially nutritional practices. Since managements fortunately improve, the results become obsolete with time. It is

important to pay attention to the time at which the data were collected and to the practices adopted at that time. The restriction on the postnatal use of diuretics and corticosteroids and the new nutritional practices may cause significant changes in future curves.⁷

If, on the one hand, nutritional deficiency produces long-lasting consequences, on the other hand, the attempt to maintain a growth rate that is similar to that which occurs in utero, with excess supply, may also have its consequences. It has been suggested that acceleration of growth with fortified formulas, comparatively to human milk, may trigger a metabolic syndrome with subsequent hypertension, dyslipidemia, obesity and insulin resistance, acting as a predisposing factor for cardiocirculatory disease.⁸

Thus, the growth curves published in the current issue are of utmost importance, as they help us to understand more about postnatal growth, may be used to detect infants with growth disorders and help us to plan future intervention studies. However, these curves have to be regularly redesigned, due to the continuous changes in neonatal care. Systematized multicenter registers may provide a continuous database, with the aim of keeping Brazilian postnatal growth curves up-to-date.

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Multicentric networks and the quality of neonatal care

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One of the major public health problems today concerns the increase in preterm births on a worldwide basis and their growing importance as a cause of infant mortality. The studies that demonstrate an increase in prevalence of preterms in the United States and Canada^{1,2} show that their most frequent causes are increase in obstetric interventions, increase in the number of multiple births, and improvements in the quality of gestational age determination, due to the replacement of date of last menstrual period by estimations made by fetal ultrasound early in pregnancy

In Brazil, there seems to be an increase in preterm births too, as shown by several studies, including one conducted in Ribeirão Preto, state of São Paulo, and another one in Pelotas, state of Rio Grande do Sul. In Ribeirão Preto³ there was a significant rise in the prevalence of preterm births from 7.6% in 1978-1979 to 13.6% in 1994. The authors suggest that the larger number of cesarean sections may have contributed to this increase, although it is quite hard to rule out problems with reverse causality in this case.

In Pelotas, the prevalence of preterm births increased from 5.6% to 7.5% between 1982 and 1993.⁴ Currently, we are conducting a new perinatal study in this city, and the results for the first four months of 2004 indicate an important

increase in preterm births, to around 18%. This increment apparently occurs in large newborns with 35 and 36 weeks of gestation – and is observed both in vaginal and cesarean deliveries. This finding suggests that we should regard all forms of interventions (not only C-sections, but also induced labor) as possible causes for this problem (Barros et al.; unpublished data).

Since preterm newborns are responsible for a significant proportion of neonatal and infant morbidity and mortality in any population, the topic discussed by the Brazilian Neonatal Research Network (BNRN) in the current issue of *Jornal de Pediatria* – the antenatal use of corticosteroids in preterm labor – is of extreme importance today.⁵ Corticosteroid therapy is considered to be highly effective as a preventive measure, but is often underused. Recent meta-analyses have shown that the use of corticosteroids in preterm labor or prior to the elective termination of preterm pregnancy, may substantially reduce neonatal mortality and severe morbidities such as hyaline membrane disease and intraventricular hemorrhage. Therefore, it is worrying that the recent and acclaimed series on Infant Survival, published by The Lancet, has estimated the use of this intervention – to be only 5% on a worldwide basis.⁶

In Latin America, the prevalence of antenatal corticosteroid therapy in preterm labor is not well known, since there is a paucity of population-based studies that allow its determination. A study conducted in Montevideo, Uruguay, and published in *Jornal de Pediatria*, showed that the use of corticosteroids in very low birth weight newborns amounted to 59.7%, 65.6% in public hospitals and 53.5% in private ones.⁷

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