

Growth Rate in a Low Birth Weight Infant Fed Exclusively Breast Milk

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Abstract

The most important goal in the nutritional management of the preterm infant is the ability to achieve optimum growth and development and provide adequate nutrition during the first months of life, which has major impact on the neurodevelopment of preterm infants.

Breast milk (BM) is universally considered to be the ideal diet for the first 4 to 6 months because it provides not only the nutrients needed for growth but also bioactive components that modulate neonatal development so it is important, even in the premature, to give exclusively BM, considered as the nutrition of choice recommended by the American Academy of Pediatrics since 1997.

The objective of the present study was to evaluate the nutritional status and growth in weight and height during the first six months of life in a child with low birth weight exclusively breastfed using the new tables of growth given by the WHO.

We present the case of a male child, who at birth at 33.6w of gestational age, the infant had low birth weight at 2045g.

Six controls were performed per professional in nutrition from birth to 6 months, nutritional status was evaluated with anthropometric indicators at each visit.

The mother was explained the importance of publishing the case considering that she wanted to exclusively feed her child up to six months even though she was working. She was informed that she had to sign the informed consent if agreed with the publication of the case.

Additionally, it was explained that she had to write down the record by 3-day dietary survey the number of times she was nursing her son for 3 days and the time that each breastfeed lasted, in order to calculate the average daily intake.

This is the first case report in Colombia that shows the growth and the speed of gain of the different anthropometric indicators month to month with the Fenton's tables and the new curves of the WHO and that has had calculated the average consumption of calories and nutrients using the formula reported in the literature.

The results of this study show that it is possible to obtain an adequate growth of exclusively breastfed infants in the first 6 months of life, under controlled and supervised circumstances, especially in the group of working mothers in the informal sector.

Keywords: Growth; Nutritional Status; Breastfeeding; Infants; Premature

Introduction

The most important goal in the nutritional management of the preterm infant is the ability to achieve optimum growth and development and provide adequate nutrition during the first months of life, and has major impact on the neurodevelopment of preterm infants [1-3].

Breast milk (BM) is universally considered to be the ideal diet for the first 4 to 6 months because it provides not only the nutrients needed for growth but also bioactive components that modulate neonatal development [4-10], so it is important, even in the premature, to give exclusively BM, considered as the nutrition of choice recommended by the American Academy of Pediatrics since 1997 [10].

The objective of the present study was to evaluate the nutritional status and growth in weight and height during the first six months of life in a child with low birth weight exclusively breastfed using the new tables of growth given by the WHO.

The importance of this study is that the new WHO tables for nutritional assessment have been used after the 50th postnatal week, which is the indication according to the Fenton tables [11], and there are no studies in Colombia that have evaluated the growth in one Preterm infant exclusively breastfed [12].

Another purpose of the present case report was to calculate the average amount of nutrients received by breastfeeding through a method validated in the literature of the calculation of nutrient content according to the consumption of breastfeeding exclusively.

Methodology

We present the case of a male child, born on February 1, 2016, product of a mother with gestational formula G₄P₂A₁, 39 years of age and who at birth weighed 60 kg, height of 1.46 cm, Had BMI of 28.1 and oligohydramnios and premature membrane rupture of 4 days. She had vaginal delivery without complications, at 33.6w of gestational age, with Apgar of 9 a minute and Apgar of 9 at 5 minutes. Umbilical cord under normal conditions. The infant had low birth weight at 2045g, height of 49 cm, cephalic perimeter of 29 cm, and thoracic perimeter of 27 cm.

Physical examination shows limbs without edema, good tone and muscle strength, strong crying, responds to stimuli, good sleep pattern and no sign of infection. He was hospitalized with the mother for the first 24 hours and lasted in phototherapy under observation for hyperbilirubinemia, fed exclusively on breast milk on demand with a good suction and grip reflex, vital signs within normal range.

The child complied with the immunization program in force by the Colombian Ministry of Health.

Diagnosis: Healthy Premature newborn.

Six controls were performed per professional in nutrition from birth to 6 months, nutritional status was evaluated with anthropometric indicators at each visit.

The mother was explained the importance of publishing the case considering that she wanted to exclusively feed her child up to six months even though she was working. She was informed that she had to sign the informed consent if agreed with the publication of the case.

Additionally, it was explained that she had to write down the record by 3-day dietary survey the number of times she was nursing her son for 3 days and the time that each breastfeed lasted, in order to calculate the average daily intake.

Recording of lactation intake was averaged for 1 and 2 months for 3 and 4 and 5 and 6 month respectively. Taking the record 3 times.

The data of the infant was introduced in the Fenton tables, indicated for the nutritional assessment of preterm infants up to week 50, and thereafter the WHO-indicated program was used to assess the child under 2 years of age, WHO ANTRO World Health Organization [13].

The mother was previously instructed by the expert dietitian, who asked about the frequency of breastfeeding and the approximate duration of each event, determined the number of lactations during the 24 hours of the day and the average time of Duration of each one. Then, with a formula, the amount of milk ingested at the time of lactation was determined. A validated formula was used to calculate breast milk production per minute and multiplied by the total of the day to then determine the calorie and nutrient content. This data was reviewed in each monthly control of the child [12-14].

The socioeconomic status of the mother was low as well as her educational level. The mother in each control received education on the advantages of exclusive breastfeeding and was actively recommended to breastfeed on demand and without pacifier or addition of water or other nutrients until the age of 6 months. In each control the motivation was reinforced and she was congratulated for the good progress of the child.

The Gold Standard in feeding the premature should be exclusive breastfeeding and overfeeding should be avoided to decrease the risk of rapid reattachment that can lead to excess fed in the premature infant. This can lead in long term to the onset of non-transmissible chronic diseases. In addition, high consumption of proteins and electrolytes such as sodium should be avoided to avoid renal overload in these patients [15-20].

Results

Regarding the nutritional assessment, the data of weights and sizes were evaluated until week 50 with Fenton tables. Thereafter up to 6 months in the tables of the WHO Antro program.

Simultaneously with the nutritional assessment, it was calculated the average consumption of calories and nutrients using the formula reported in the literature where it was asked in detail to the mother, previous training, on the number of times on the day that she breastfed her son and the time Lasting for 3 days in a row, during the 6 months [21].

The first and second month of life the infant was breastfed an average of 10 to 12 times a day, lasting average of 15 minutes in total for each suction performed. In the third and fourth, the mother lactated around 8 times each day, with a duration between 8 and 10 minutes for each feeding. The fifth and sixth months the mother lactated about 6 times day, taking an average of 10 minutes in each feeding.

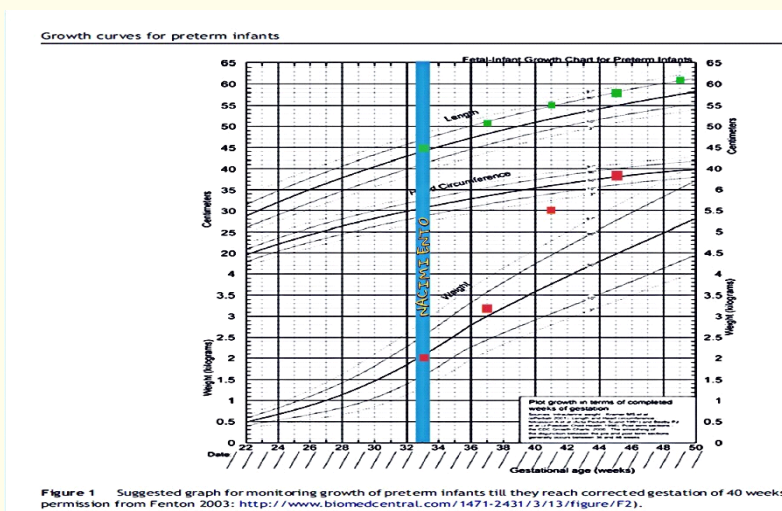


Figure 1 Suggested graph for monitoring growth of preterm infants till they reach corrected gestation of 40 weeks (with permission from Fenton 2003: <http://www.biomedcentral.com/1471-2431/3/13/figure/F2>).

Figure 1: Growing rate of the case report according to Fenton’s tables.

Taken from: Fenton, T.R. “A new growth chart for preterm babies: Babson and Benda’s chart updated with recent data and a new format”. *BMC Pediatrics* 3 (2003).

Graphs of Anthropometry according to WHO.

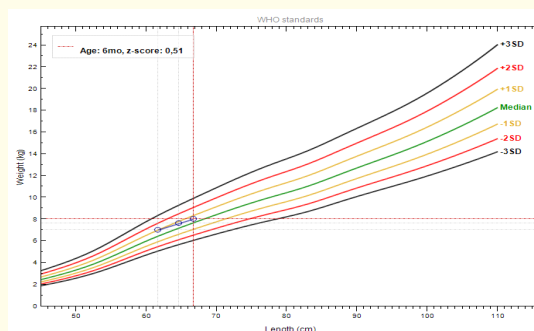


Figure 2: Growing rate of the case report: Weight Indicator for height from 4 months. This table shows the growth of the child in the indicator weight for height from week 50 with a good growth in their percentile and zeta score units.

Taken from <http://www.who.int/childgrowth/software/en/>

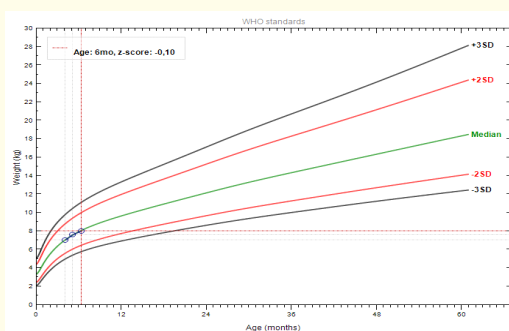


Figure 3: Growing rate of the case report: Weight for age.

Weight indicator for age. This graph shows the growth of the child in the weight-for-age indicator from week 50 with a good growth in its percentile and zeta score units.

Taken from <http://www.who.int/childgrowth/software/en/>

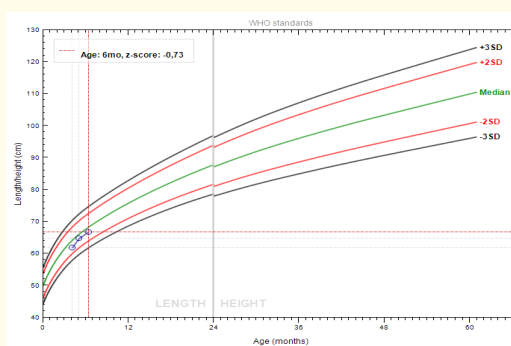


Figure 4: Growing rate of the case report: Height for the age.

Height indicator for age. This table shows the growth of the child in the height-for-age indicator from week 50 with good growth in their percentile and zeta score units.

Taken from <http://www.who.int/childgrowth/software/en/>

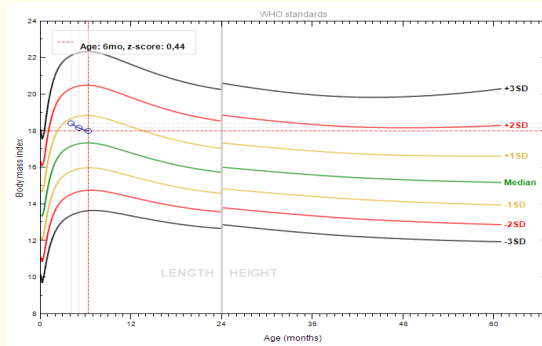


Figure 5: Growing rate by BMI.

Indicator by body mass index. This table shows the child's growth in the indicator of body mass index by age from week 50, with a good weight gain in percentile and zeta score, but the body mass index is not a good indicator of Nutritional assessment in the child less than two years old.

Taken from <http://www.who.int/childgrowth/software/en/>

Month	Weight (kg)	Height (cm)
Newborn	2.04	45
First	3.2	51
Second	5.5	55
Third	6.4	58
Fourth	7	61
Fifth	7.6	64
Sixth	8	66

Table 1: Weight chart and birth: Height at 6 months old.

Age (month)	Percentile	Zeta score
4	83.6	0.98
5	74	0.66
6	70	0.51

Table 2: Weight height indicator in Percentile and Zeta score.

After week 50 the premature must be assessed and must be valued with WHO tables for minors of 2 years.

Age (month)	Percentile	Zeta score
4	47	-0.08
5	52	0.06
6	46	-0.1

Table 3: In the weight-age indicator in Percentile and Zeta score.

Age (month)	Percentile	Zeta score
4	12.3	-1.16
5	26	-0.65
6	23	-0.73

Table 4: In the height-age indicator in Percentile and Zeta score.

Age (month)	Percentage	Zeta score
4	79	0.81
5	72	0.58
6	67	0.44

Table 5: BMI index in Percentile and Zeta score.

Age	Breast milk consumed (cc)	Ingested calories	Required calories	Percentage of adequacy	Proteins grams	Percentage of adequacy	Carbo-hydrates grams	Percentage of adequacy	Fats grams	% of adequacy
First and second month	960	600	473	127	9,6		68		36.4	
Third and fourth month	1040	640	603	106	10.4		74		39.5	
Fifth and sixth month	1000	693	632	110	10		71		38.0	

Table 6: Calories and Nutrients Ingested by Breastfeeding and Percentage Of Adequation

Discussion

The results of this study show that it is possible to obtain an adequate growth of exclusively breastfed infants in the first 6 months of life, under controlled and supervised circumstances, especially in the group of working mothers in the informal sector.

In this child, no diarrhea, hospitalization, anemia or malnutrition were observed during the exclusive breastfeeding, and this help us prove that breast milk should be the gold standard in the nutritional management of prematurity.

Conclusions

This is the first case report in Colombia that shows the growth and the speed of gain of the different anthropometric indicators month to month with the Fenton’s tables and the new curves of the WHO and has had calculated the average consumption of calories and nutrients using the formula reported in the literature.

It can be concluded from the results of this study that the promotion of breastfeeding in the world and in Colombia remains the gold standard of feeding in children younger than 6 months, although they are premature and demonstrate that a high percentage of women can breastfeed in a satisfactory way, the evolution of these children being optimal, independent of the mother’s working, and that this is not a reason to suspend breastfeeding exclusively during the first 6 months. We also believe that the motivation of the health team and the periodic monitoring of mothers and children are indispensable tools for adequate growth and development.

All anthropometric indicators classify the child in nutritional status adequate or eutrophic with an upward curve in all evaluated parameters confirming that exclusively breastfeeding in the first 6 months of life remains the gold standard in the nutritional management of feeding the premature.

It is concluded that breast milk is enough food for the infant until the 6th month of age if it is produced in adequate quantity. Exclusive breastfeeding on demand is associated with weight monitoring up to the 6th month rather than the routine prescription of infant formulas.

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