PATTERN OF GROWTH, ENDOCRINE GROWTH FACTORS AND INSULIN RESISTANCE FROM BIRTH TO 12 MONTHS OF LIFE IN SMALL FOR GESTATIONAL AGE CHILDREN BORN AT TERM

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Background. The condition of born small for gestational age (SGA) has dramatically increased in recent years. Particular attention by neonatologists and pediatric endocrinologists has been taken in evaluating the long and short-term consequences of this condition on growth and metabolism. Persistent short stature is one of the more important consequences on growth , but a rapid catch up growth is more frequently observed in these newborns. In recent years several studies have reported hyperinsulinemia and reduced insulin sensitivity, from the first months of life in subjects born SGA who showed a rapid catch-up of weight growth, as well as increased levels of leptin. These early metabolic features can be predisposing factors for the development of metabolic complications already in the pediatrc age, More controversial is the literature regarding the correlation between postnatal growth and insulin like growth factors.

Objectives.
1) to evaluate the linear and weight growth in the first year of life in a group of 30 SGA subjects born at term
2) to evaluate in this population, the trend of growth factors such as insulin, leptin, IGF-1, IGFBP-3, and of the index of insulin resistance (HOMA-IR) during the first year of life,
3) to assess the correlation between the growth factors and height-weight growth from birth to 12 months of life

Methods. A total of 30 subjects born at term were studied: 15 with a birthweight < - 2SD and a normal length; 15 with both length and weight < - 2SD for gestational age. Anthropometrical parameters and blood sampling for the evaluation of glucose, insulin, IGF1, IGFBP3 and leptin were obtained at birth (T0), 1st (T1), 3rd (T2), 6th (T3) and 12th (T4) month of life. Insulin resistance was calculated by Homa-IR. To study the correlation between the extent of catch up growth and the growth factors plasma values, patients were divided according to the growth percentile achieved at any time of the study and statistical analysis was done with a T-test between subjects above and below the 50° pcl of growth

Results

1) Auxological parameters

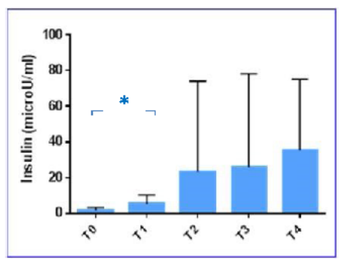
Weigth

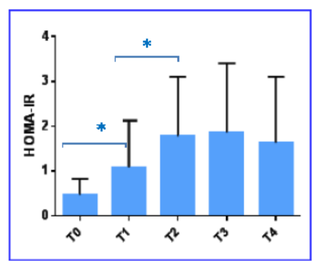
T0	T1	T2	T3	T4
TOT= 30 ≤3° = 30 Mean (gr): 2346,67 ± 185,01	TOT=30 3°-10° = 13 10°-25° = 6 25°-50° = 6 50°-75° = 5 Mean (gr): 3578,17 ± 372,82	TOT= 30 3°-10° = 5 10°-25° = 15 25°-50° = 2 50°-75° = 7 75°-90° = 1 Mean (gr): 5261,43 ± 542,33	TOT= 30 3°-10° = 7 10°-25° = 7 25°-50° = 8 50°-75° = 3 75°-90° = 5 Mean (gr): 6983,33 ± 718,06	TOT= 30 3°-10° = 8 10°-25° = 8 25°-50° = 9 50°-75° = 4 75°-90° = 1 Mean (gr): 8937,17 ± 801,69

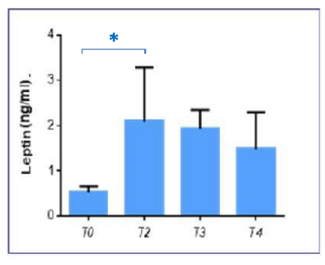
Length

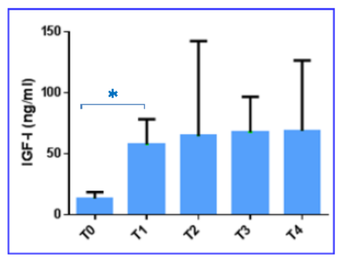
T0	T1	T2	T3	T4
TOT= 30 ≤3° = 15 3°-10° = 8 10°-25° = 5 25°-50° = 1 50°-75° = 1 Mean (cm): 45,98 ± 1,35	TOT= 30 ≤3° = 2 3°-10° = 8 10°-25° = 14 25°-50° = 1 50°-75° = 5 Mean (cm): 50,99 ± 1,61	TOT= 30 ≤3° = 2 3°-10° = 7 10°-25° = 7 25°-50° = 8 50°-75° = 3 75°-90° = 1 Mean (cm): 57,58 ± 2,11	TOT= 30 ≤3° = 0 3°-10° = 4 10°-25° = 10 25°-50° = 7 50°-75° = 8 75°-90° = 1 Mean (cm): 64,10 ± 1,59	TOT= 30 ≤3° = 0 3°-10° = 2 10°-25° = 9 25°-50° = 13 50°-75° = 5 75°-90° = 1 Mean (cm): 73,17 ± 2,27

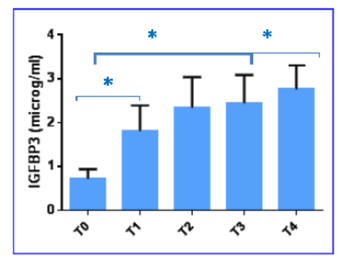
2) Trends of growth factors





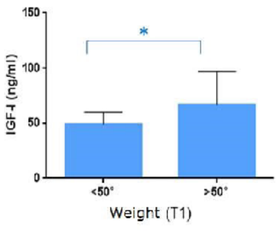


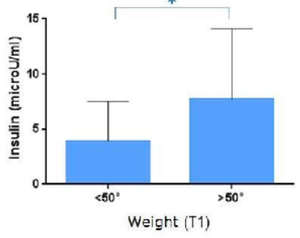


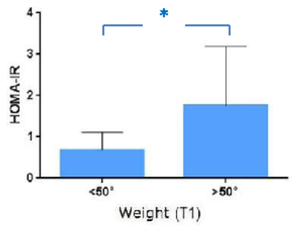


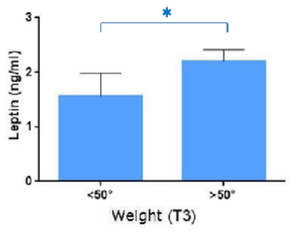
3) Correlation between weight-length catch up growth and growth factors

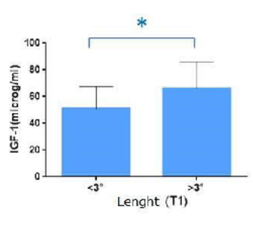
* P < 0.05

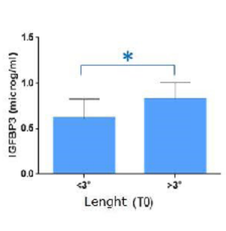


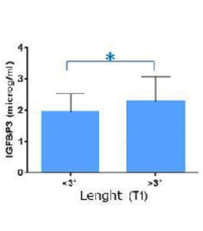












Conclusions. Our results support previous data showing that most of the infants small for gestational age, born at term, present a rapid post natal catch up growth. The catch up is particularly rapid and dramatic for weight and a slower for height. Moreover our data support an important role of IGF1(T1 e T3 $p< 0.05$), insulin (T1 $p < 0.05$) and leptin (T3 $p< 0.05$) in the rapid weight catch-up growth in the first months of life; the significant and early increase of insulin resistance (T1 $p< 0.05$) can explain later metabolic abnormalities that characterize SGA subjects. The correlation with length catch up growth was significant for IGF1 and IGFBP3 at the first month of life but not for insulin and insulin resistance

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