The effects of serum insulin, leptin, ghrelin, adiponectin and resistin levels on early postnatal growth in small for gestational age newborns

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Background:

Adipose tissue acts as an endocrine organ, secreting biologically active molecules in response to external stimuli or lipid overloading. These adipose tissue-derived signaling molecules include adipokines such as leptin, adiponectin and resistin. On the other hand, ghrelin is the hunger hormone and an endogenous growth hormone secretagogue.

The terms “IUGR” and “small for gestational age (SGA)” have been used synonymously in medical literature, but there exist small differences between the two. SGA definition is based on the cross-sectional evaluation (either prenatal or postnatal), and this term has been used for those neonates whose birth weight is less than the 10th percentile for that particular gestational age or two standard deviations below the population norms on the growth charts, and the definition considers only the birth weight without any consideration of the in-utero growth and physical characteristics at birth. Rapid weight gain during infancy in SGA children seemed to be associated with increased fat mass rather than lean mass. Early catch-up growth after SGA birth rather than SGA itself has been noted as a cardiovascular risk factor in later life. Children who are born SGA also have a predisposition to accumulation of fat mass, particularly intra-abdominal fat.

Objective and hypotheses:

This study aimed to investigate the relation between weight gain and serum insulin, leptin, ghrelin, adiponectin and resistin levels in small for gestational age newborns during neonatal period.

Method:

Newborns whose weight was < the 10th percentale for gestational age were classified as small for gestational age newborns. Asymetrical SGA newborns were included in this study. All newborns were term. The mothers who had chronic systemic diseases, hypertension, significant endocrine conditions, and were taking corticosteroids and glucose metabolism-related drugs were excluded. Also, the infants with major congenital anomalies, chromosomal anomalies, and proven intrauterine and perinatal infections were excluded.

Anthropometric measurements and blood samplings for newborns were obtained following the delivery and at the end of the first month. Blood samples for biochemical analysis were taken before feeding.

Results:

Biochemical parameters were similar for two groups ($p>0.05$) except for serum resistin levels at the birth. At the birth serum resistin levels were significantly lower in SGA group ($p<0.01$). At the end of the first month there was no difference between biochemical parameters for two groups ($p>0.05$). Δweight gain were negatively correlated with serum ghrelin ($p<0.01$) and resistin ($p<0.05$) levels of birth in SGA group. In control group there was positively correlation between Δweight gain and serum insulin levels of birth ($p<0.01$).

Conclusion:

Our results indicates that serum ghrelin and resistin levels negatively affect early posnatal growth in SGA newborns. On the other hand serum insulin levels were important in healthy newborns during early postnatal weight gain.

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