How early is the rise in Leptin levels in Small for Gestational Age children with catch up growth?

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INTRODUCTION

• Incidence of Low Birth Weight (LBW) world wide is 15.5% (range 6 to 18%) 1
• 70% of LBW infants are SGA (Birth Weight < 10th percentile) 2
• By 2 years age, most SGA achieve catch up growth (CUG) 2
• Being born SGA and postnatal CUG strongly associated with metabolic derangements: -
  • Hyperinsulinemia and Insulin resistance 3
  • Adipokines imbalance -High Leptin and low Adiponectin levels 4

INDIAN SCENARIO

• India is world’s capital of LBW babies, contributing 40%
• LBW incidence -30% (UNICEF) and 21.5% (NFHS-3)
• More than two-thirds of LBW are SGA
• Our institute data -30-45% newborns are SGA
• Onset of Insulin resistance as early as 4 years of age (Pune Study)
  • Tempo of postnatal CUG had highest level of risk factors for Type 2 DM and CVD 6
• Higher Leptin and Insulin in cord blood of Indian SGA newborns support intrauterine origin of central adiposity and hyperinsulinemia in Indians 7

OBJECTIVES

• Primary Objective: To evaluate serum Leptin and Insulin levels in term SGA at 15-18 months age
• Secondary Objective: To evaluate their association with catch up growth

MATERIALS AND METHODS

• Study approved by institutional ethical committee
• Study Design-Cross-sectional observational
• 60 term SGA children consented and enrolled
• Gross anomaly, IEM and chronic illness excluded
• Current anthropometry measured at inclusion.
• Birth data recorded from discharge document
• Reference standards used - WHO growth charts
• Data analyzed for CUG as gain in weight or length SDS or both >0.67 SDS (percentile band)
• Fasting blood samples analysed for Leptin and Insulin using Electro-chemiluminescence and ELISA kit respectively
• Insulin sensitivity evaluated using homeostatic model assessment index (HOMA-IR)

RESULTS

Leptin levels higher in CUG (2.6±1.98 ng/dl) than NCUG (1.8±1.20 ng/dl), difference being insignificant, p>0.09

CONCLUSIONS AND RECOMMENDATIONS

• Leptin levels higher in SGA with CUG(2.6) vs NCUG(1.8), p=0.09
• This rise in Leptin levels evident as early as 15 months
• CUG positively relate with hyperinsulinemia, p*=0.05 and increased HOMA-IR value, p*<0.039
• Leptin levels strongly correlated with Insulin levels, p*=0.004 and HOMA-IR, p*=0.002
• Therefore, High Leptin at early age indicates early onset of Insulin resistance

• Regular follow up of SGA for anthropometric parameters
• Those showing CUG especially in weight monitored more frequently
• Insulin levels, Leptin levels and HOMA should be monitored in all SGA
• SGA children with high Leptin levels kept in close follow up
• Excessive weight gain avoided to prevent metabolic syndrome in later life

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