Longitudinal growth dynamics of term symmetric and asymmetric small for gestational age infants

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With 4 figures and 5 tables

Abstract: Background: Available information on auxological attainments of symmetric and asymmetric SGA (small for gestational age) infants presents conflicting views. The complete absence of longitudinal data on growth patterns of both types of Indian SGA infants prompted us to undertake this study. Aim: To study distance and velocity growth pattern of weight and crown-heel length (CHL) of symmetric and asymmetric SGA infants. Subjects & Methods: Weight and CHL amongst full-term 100 symmetric SGA, 100 asymmetric SGA and 100 AGA infants from upper socio-economic strata were mixed-longitudinally measured at birth, 1, 3, 6, 9 and 12 months in the Department of Pediatrics, PGIMER, Chandigarh, India. Results: The symmetric SGA infants measured significantly lighter and shorter than asymmetric infants. SGA infants of both types and sexes possessed significantly (p ≤ 0.001) lower weight and length values than AGA, normal Indian and western infants. Weight and CHL growth velocities demonstrated inconsistent trends. Peak growth velocity for weight and CHL of symmetric, asymmetric SGA and AGA infants was attained between 1–3 months. Average z-scores for weight and CHL were found to be lesser amongst symmetric SGA as compared to asymmetric infants, revealing compromised catch-up growth. Conclusion: The poorer postnatal auxological attainments of SGA infants as compared to normal infants reveals continuation of effect of intra-uterine nutritional insult during infancy, which measured significantly more in symmetric than asymmetric SGA infants.

Keywords: SGA; infant growth; weight; crown-heel length; growth velocity

Introduction

Small for gestational age (SGA) infants have an increased risk of growth faltering (Black et al. 2013) as well as developing metabolic alterations and short stature, subsequently (Clayton et al. 2007). By definition, SGA describes a neonate whose birth weight is below the 10th percentile for gestational age and sex of the accepted reference standards (WHO 1950; Bakketeg 1998).

Small for gestational age consists of heterogeneous subgroups with different etiologies. Depending upon timing and severity of insult/nutritional deprivation, SGA infants are classified into symmetrical and asymmetrical phenotypes (Villar & Belizan 1982). Inhibiting factors which operate early in pregnancy (first trimester) result in birth of a symmetrically growth retarded baby whose weight, length and brain mass (head circumference) are affected. Conversely, if insult/nutritional deprivation occurs later in pregnancy, the brain is spared (as head circumference measures normal) but length as well as weight will be decreased, resulting into birth of asymmetric child (Clayton et al. 2007; Black et al. 2013).

The symmetric and asymmetric SGA infants differ in their etiology and implication for survival, morbidity, cognitive development and physical growth. The SGA infants with symmetric growth retardation possessed lighter (Lin et al. 1991) and shorter (Strauss & Dietz 1998; May et al. 2001) growth attainments besides having smaller head circumference (Holmes et al. 1977; Davies et al. 1979; Villar et al. 1984; Tenovuo et al. 1987; Fewtrell et al. 2001; Ochiai et al. 2008; Kaur et al. 2012) than their asymmetric counterparts. On the contrary, Strauss & Dietz (1997) reported...