Background: Birth chest circumference (BC) may be related to Insulin-like-Growth-Factor-I blood serum levels (IG1) in the human newborn (NWB).

Objective and hypotheses: We evaluated the relevance of birth body weight (BW) to birth crown-heel length (BL) ratio (BW through BL, BW/BL) in BC relations to IG1 after control for BW for birth gestational age (GA) ≤ 10th centile (SGA), respiratory oxygen supplementation (O2S) and assisted ventilation of any kind (AV) in not-life-threatened NWBs.

Method: NWBs with any among total parenteral nutrition, life-threatening disease, diabetes mellitus (DM), endocrine diagnosis out of DM, malformation, clinically relevant trunk trauma, and mother with DM were excluded. Each of 78 included NWBs had available data for: a) gender (SEX), GA (unit: complete week; range = 28-42), BW (unit: kg; range = 1.200-4.150), BL (unit: m; range = 0.360-0.550), BC (unit: cm; range = 22.0-39.0), BW/BL (unit: kg/m; range = 3.158-8.137), SGA, postnatal age (PNA; unit: day) and b) same-day records at one of the first 5 postnatal days (x), 5 days after x (y) and 10 days after x (z) for O2S, AV, as well as IG1 RIA measurements (unit: uM/dL) (male SEX, n, 43; birth at GA ≤ 36, n, 46; SGA, n, 20; O2S, n, x = 22, y = 11, z = 1; AV, n, x = 8, y = 4, z = 1). Natural log-transformed IG1 (IG1-LN) resulted near-normally distributed. Multiple Linear Regression (MLR) was used (computations; male SEX, SGA, O2S, AV, condition present = 1, condition absent = 0).

Results: MLR showed a significant partial correlation (PC) coefficient (r) of BC PCs with outcomes IG1-LN x-y-z when including as predictors 1) PNA, O2S and AV chronologically corresponding to IG1-LN, SEX, SGA and BC, all together (MLR1; BC vs. IG1-LN; x, r: .38, p: .0011; y, r: .47, p < .0000; z, r: .42, p: .0002) while no significant r of BC PCs with outcomes IG1-LNx-y-z was found after adding as predictor to MLR1 either 2) BW/BL (MLR2) or 3) BW/BL and GA (MLR3) (R2 of considered MLR models:: .27-.52, always significant).

Conclusion: BW/BL could be involved in BC relations to IG1-LN not explained by SEX, SGA, PNA, O2S and AV in the not-life-threatened NW.