Background: Birth chest circumference (BC) may be related to Insulin-like Growth Factor (IGF)-Binding-Protein-3 blood serum levels (IB3) 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 IB3 after control for BW for birth gestational age (GA) <= 10th centile (SGA), respiratory O2 supplementation (O2S), assisted ventilation of any kind (AV) and IGF-I blood serum levels (IG1) 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 the 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 = 3.16-8.14), 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 and IB3 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 IB3 (IB3-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 that the partial correlation (PC) coefficient (r) of BC PCs with outcomes IB3-LNx-y-z was significant when including as predictors 1) PNA, O2S and AV chronologically corresponding to IB3-LN, SEX, SGA and BC, all together (MLR1; BC vs. IB3-LN; x, r: .38, < .0000; y, r: .50, < .0000; z, r: .62, < .0000), or 2) PNA, O2S, AV and IG1 chronologically corresponding to outcome, SEX, SGA and BC, all together (MLR2; BC vs. IB3-LN; x, r: .27, p: .0231; y, r: .27, p: .0228; z, r: .53, < .0000) but no significant BP PCs with outcomes IB3-LNx-y-z was found after adding as predictor to MLR1 or to MLR2 either 3) BW/BL (MLR3) or 4) BW/BL and GA (MLR4) (R2 of considered MLR models: .38-.68, always significant).

Conclusion: BW/BL may be involved in BC relations to IB3-LN not explained by SEX, SGA, PNA, O2S, AV and IG1 in not-life-threatened NWBs.