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Background/Objective and hypotheses. Chest circumference (CC) is related to intrauterine growth rate as well as to development-function of respiratory system. We evaluated the relevance of birth body weight (BW) and blood serum Insulin-like Growth Factor (IGF-I)(IG1) in birth CC (BCC) relations to blood serum IGF-Binding-Protein-3 (IB3) after control for preterm birth (PTB), O2 supplementation as %O2 in respiratory gases (O2R) and assisted ventilation of any kind (AV) in the newborn (NWB) without life-threatening disease. Method. Data available in each NWB: 1) gender(SEX), gestational age (GA, unit: complete week), BW (unit: gr), BCC (unit: cm), BW<10th centile for GA (SGA), PTB defined as GA≤36 and, 2) same-day records of postnatal age (PNA, unit: day), AV, O2R and IG1-IB3 RIA measurements (unit: uM/dL) at one of the first 5 postnatal days (x₁), 5 days after x(y) and 10 days after x(z). NWBs with any among total parenteral nutrition, life-threatening disease, diabetes mellitus (DM), endocrine disease diagnosis out DM, or DM in mother were excluded. 78 NWBs were included (male SEX, n=43; SGA, n=20; GA range=28-42; BW range=1200-4150; BCC range=22.0-39.0; PTB, n=46; presence of O2R, n, x=22, y=11, z=1; presence of 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, PTB, AV, condition present=1, condition absent=0). Results. MLRs with IB3-LNx-y-z as outcome showed a significant partial correlation (PC) coefficient (r) of BCC PCs with IB3-LN when including as predictors 1) PNA, O2R, and AV chronologically corresponding to outcome and SEX, PTB and CC (BCC vs. IB3-LNx, r=.35, p=.0022; BCC vs. IB3-LNy, r=.47, p=.0000; BCC vs. IB3-LNz, r=.53, p=.0000), or 2) PNA, O2R, AV and IG1 chronologically corresponding to outcome, as well as SEX, PTB and BCC (BCC vs. IB3-LNx, r=.30, p=.0101; BCC vs. IB3-LNy, r=.30, p=.0104; BCC vs. IB3-LNz, r=.51, p=.0000), while they showed no significant r of BCC PCs with IB3-LNx-y-z when including as predictors PNA, O2R and AV chronologically corresponding to outcome, as well as SEX, PTB, BCC and BW (R2 of MLR models, .38-.66, significant in all cases). Conclusion. BW appeared more able than IG1 corresponding to IB3 in explaining BCC-IB3 relationships after control for SEX, PTB, PNA, AV and O2R in not-life-threatened NWBs.