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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) in birth CC (BCC) relations to blood serum Insulin-like-Growth-Factor-I (IG1) 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), presence/absence of BW < 10th centile for GA (SGA) or of PTB defined as GA ≤ 36, and 2) same-day records of AV, O2R, and IG1 RIA-measurements (unit: μM/dL) at one of the first 5 postnatal days (x), 5 days after x(y) and 10 days after x(z), of postnatal age (PNA, unit: day). NWBs with any among total parenteral nutrition, life-threatening disease, diabetes mellitus (DM), endocrine disease diagnosis or 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 IG1 (IG1-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 IG1-LNx-y-z as outcome showed a significant partial correlation (PC) coefficient (r) of BCC PCs with IG1-LN when including as predictors PNA, O2R and AV chronologically corresponding to outcome, as well as SEX, PTB and BCC (BCC vs. IG1-LNx, r= .372, p=.0012; BCC vs. IG1-LNy, r= .399, p=.0005; BCC vs. IG1-LNz, r= .285, p=.0142), while no significant r of BCC PCs with IG1-LNx-y-z was observed in MLRs including 1) IG1-LNx-y-z as outcome and 2), as predictors, PNA, O2R and AV chronologically corresponding to outcome as well as SEX, PTB, BCC and BW (R2 of MLR models, .27-.54, significant in all cases). Conclusion. BW could be involved in BCC-IG1 relationships not explained by SEX, PTB, PNA, O2R and AV in the not-life-threatened NWB.