ON-LINE RESPIRATORY MECHANICS IN NEWBORNS: STABILITY AND EFFECT OF VENTILATORY MODE.

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OBJECTIVES: Neonatal ventilators include software giving information on respiratory mechanics (RM). Integration of those values with clinical variables could improve management of ventilation. Therefore, we investigated the accuracy and stability of those variables in Assist Control (AC) and Synchronised Intermittent Mandatory Ventilation (SIMV) modes.
MATERIAL AND METHODS: 1) Data (Ventilation pressures, Tidal Volume (VTe), Minute Ventilation (MV), Compliance (C), Resistance (R)) from a Dräger Babylog 8000 ventilator were recorded on 10 seconds intervals in 15 stable infants ventilated in AC during 3 consecutive three minutes periods. 2) For each period, compliance, resistance and tidal volume were also calculated for one demonstrative respiratory loop reconstructed from continuous pressure, flow and volume recordings, and compared with ventilator data. 3) Nine newborns initially ventilated in SIMV mode were recorded in SIMV and AC modes (with same settings) for 9 minutes each.
RESULTS: 1) In AC, 10 seconds periods variability for VTe, MV, C, and R, is relatively high, with standard deviations of 16, 13, 18 and 26 % of the mean respectively. When averaged for three minutes, values are more consistent (variation around the mean 3.5, 5.6, 4.7, and 5.8%). 2) Calculated values from loops are within 20% of ventilator values. 3) SIMV values for pressures, VT, and MV are obviously significantly different from AC. R variation between modes was 25% ($p=0.01$), and difference for C was 13% ($p=0,19$) .
CONCLUSIONS: Variability of RM parameters in both modes makes use of immediate readings of lower clinical value. The average of those parameters is more stable and could be integrated in ventilator softwares. Non-assisted breaths interfere with calculation of RM values, and this probably explains differences between SIMV and AC modes. Accordingly, RM assessment of patients on SIMV ventilation should be done with a brief switch to AC mode.