

Abstract submitted for oral presentation

AUTOMATED RESPIRATORY CYCLES SELECTION IMPROVES THE VARIABILITY OF RESPIRATORY MECHANICS MONITORING.

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Background: The variability of on-line respiratory mechanics (RM) data decreases its use as a tool to monitor ventilated infants. We postulate that calculating those data only from selected respiratory cycles will decrease the coefficient of variability ($CV=SD/mean$) below 20%.

Methods: In ten ventilated premature infants, we recorded ten minutes RM data from the ventilator in two modes. We used continuous pressure, flow and volume recordings to calculate resistance (R), compliance (C), time constant (τ), tidal volume (tV), C20/C and mechanical work of breathing (W) of isolated respiratory cycles. Evaluation of each cycle was done visually from respiratory loops and continuous waves. Good quality respiratory cycles were selected for analysis. From that evaluation, a software was developed to automatically select optimal cycles and to reevaluate the various parameters.

Results: 11648 breaths were assessed. The software identified good quality cycles with a specificity of 96-99%. The sensibility of 67% increased to 94% when including breath automatically assigned to a slightly lower degree of quality. In assist control, data calculated from the automated selection (data from the respirator; * $p<0,03$) had CV's of: R: 28% (35%), C:17%(31%*), τ :34%, tV 15%(24%*), C20/C:16%(29%*) and W:4%. Visually selected data were similar apart from a higher CV of τ . Results in synchronized intermittent mandatory ventilation are in the same direction.

Conclusion: Ventilator on-line RM monitoring can be improved by automated selection of good quality breath cycles. The decreased variability of continuous RM data makes those a more reliable tool to assess ventilatory situations and trends.