Assessment of airway driving pressure and respiratory system mechanics during Neurally Adjusted Ventilatory Assist.

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Argomento: Insufficienza respiratoria acuta e ventilazione meccanica

Background

By means of a stable end-inspiratory pause, the airway plateau pressure (P_{plat}) can be reliably measured during Pressure Support (PS) to compute the airway driving pressure (ΔP), the respiratory system compliance (CPL_{RS}) and the pressure generated by the inspiratory muscles (Pmusc Index - PMI). [1]

We supposed that these measures could be obtained also during Neurally Adjusted Ventilatory Assist (NAVA). Aim of this study was to assess: 1) the feasibility of measuring P_{plat} and CPL_{RS} during NAVA (as compared with PS) and 2) the effects of different NAVA and PEEP levels on ΔP and PMI.

Methods

First, PS was targeted to a tidal volume of 4-8 ml/kg. Second, NAVA gain was chosen to generate the same peak pressureas during PS (baseline NAVA). Four support levels (PS; baseline NAVA; 50% and 150% of baseline NAVA) were randomly appliedat two PEEP levels (6 and 12 cmH_2O). At the end of each 20-minutes step a 2-seconds end-inspiratory pause was recorded to assess P_{plat}, CPL_{RS}, ΔP and PMI.

Results

Twelve patients were enrolled. PS and baseline NAVA levels were 3.5 (2-5.75) cmH_2O and 0.7 (0.2-1) $cmH_2O/\mu Volt$, respectively. The Bland and Altman analysis showed significant correlations between measurements of CPL_{RS} obtained during NAVA and PS ($y=2.05+0.97*x$, $R^2= 0.74$, $p < 0.001$), with clinically negligible systematic biases within the interval of confidence (bias 1.1 ± 4.1 ml/cmH_2O, $p < 0.05$). Table 1 shows the effects of changing NAVA and PEEP levels on respiratory parameters.

Conclusions

Measurement of P_{plat} by means of an end-inspiratory pause during NAVA was feasible and resulted in reliable measures of respiratory mechanic.

References

1) Foti G, *et al*. End-inspiratory airway occlusion: a method to assess the pressure developed by inspiratory muscles in patients with acute lung injury undergoing pressure support. *Am J Respir Crit Care Med*1997;156:1210–1216.