

iNO delivery and monitoring during different ventilation modes.

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Introduction. Complex congenital heart surgery may induce long duration of mechanical ventilation. This MV has to be protective avoiding VILI during PSV, VCV HFO, NAVA, and NIV. As a high percentage of these patients experiences pulmonary hypertension, the delivery of pulmonary vasodilators has to be available and accurate in all the ventilation modes.

Methods. With a new device able to deliver and monitor inhaled NO, 51 patients were included, with a median of 4 [2 to 6] measurements per patient. Of the 195 measurements, 115 were performed on pressure controlled ventilation, 9 on volume controlled, 3 on high frequency oscillatory ventilation and 68 on non-invasive mechanical ventilation. The Bland Altman methodology was used to evaluate the agreement between the set and the measured iNO concentrations.

Results. The Bland-Altman plot is shown in Figure 1. The measurement error, as assessed by the mean value of the difference, was significant (mean -1.01, [-3.27 – 1.24] ppm, one sample t-test p value < 0.001), indicating the presence of a fixed bias. We could not identify any proportional bias, and the slope of the linear regression of differences on averages was not significant (p=0.14). The mean bias on controlled ventilation was -1.13 [-3.65 – 1.36] ppm and was -0.76 [-2.36 – 0.84] ppm on non-invasive ventilation.

Comments: There was a -8.6 %, 95%CI [-26.0 – 8.8] difference between the delivered concentration and the concentration set at the device.

Conclusions. iNO delivery is possible safely and accurately in different ventilation modes including PSV, VCV, HFO, NAVA, and NIV.

Figure 1. Bias: the difference between the set and delivered concentrations; Average concentration: the mean of the set and delivered concentrations; in dotted lines the mean and 95%CI of the difference.

