

## Evaluation of safety and effectiveness of Neurally Adjusted Ventilatory Assist (NAVA) in premature infants with acute respiratory distress syndrome (RDS)

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### Introduction:

Triggering and synchronization may be problematic during mechanical ventilation in newborn infants, particularly in very premature ones. Neurally adjusted ventilatory assist (NAVA) is a new concept in mechanical ventilation wherein the patient's respiratory drive, measured from the diaphragm electrical activity (EAdi), controls the timing and the magnitude of the pressure delivered. Small preliminary studies have shown that NAVA can be successfully used also in children (1,2) and in term (2) and preterm infants (3). These preliminary reports concluded that NAVA seems to provide better ventilator/patient synchrony and lower tidal volumes and peak pressures when compared to conventional ventilation.

### Methods:

Between January 2010 and February 2011 we have enrolled 10 preterm babies with acute RDS, capable to trigger the ventilator (Servo I Maquet). The babies were ventilated in the first 12 hours with synchronized intermittent mandatory ventilation (SIMV) and after with NAVA at least for 12 hours. After 1-6-12 hours of each ventilation mode were examined arterial blood gases (ABGs), expired minute and tidal volume (VT), peak airway pressures (PIP), mean airway pressure (MAP), arterial oxygen tension to fraction of inspired oxygen ratio (PaO<sub>2</sub>/FiO<sub>2</sub>).

In 8 patients ventilator rate of cycling (RR mech), patient's spontaneous respiratory rate (RRneu) and, as synchrony index, RR mechanical to neural ratio (MNR=RRmech/RRneu) were calculated.

### Results:

Population characteristics: mean gestational age 31.8± 2.8w, mean birth weight 1816±714.8g, mean age at the study 2.2±1.5days, 70% male and 30% female.

During NAVA, the PIP decreased as compared with SIMV mode (11.23±3.52cmH<sub>2</sub>O vs. 17.43±8.43 cmH<sub>2</sub>O; p<0.01) with a significant reduction of MAP level (7.20±1.73cmH<sub>2</sub>O vs. 8.13±1.9cmH<sub>2</sub>O; p<0.05). VT resulted higher during SIMV (9.6ml/kg±4.4) than during NAVA (8.3ml/kg ±4.0) (p< 0.05). PaO<sub>2</sub>/FiO<sub>2</sub> was higher in NAVA (181.01±52.59 vs. 157.62±44.94; p<0.01). There were no significant difference in ABGs between the 2 modes. RRmech showed no differences between PRVC and NAVA (48bpm±15.7 vs. 55.9bpm±4.3, respectively) while RRneu resulted lower in PRVC than in NAVA (12.6bpm± 9.8 vs. 54.1bpm ±3.4). MNR was higher in NAVA (8.7±7.1 vs. 1.04±0.02; p< 0.05). After the study period treatment time with NAVA ranged from 15 to 102 hrs (median = 26 hrs). All babies were extubated after NAVA, and there were no adverse events during the study.

### Discussion:

NAVA seems to be safe and effective to increase patient-ventilator synchrony, well tolerated and associated with a lower peak pressure and thus a lower risk of lung injury, when compared to pressure support mode.

### References:

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