Category :**Respiratory: ARDS**

A179 - ***Transvenous Diaphragm Neurostimulation Lowers Transpulmonary Driving Pressure in a Preclinical ARDS Model***

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Introduction:

Acute respiratory distress syndrome (ARDS) drives morbidity and mortality, and exacerbates mechanical ventilator-induced lung injury (VILI). Mauri et al. recommend transpulmonary driving pressure be limited to < 10-12 cmH_2O in patients with inhomogeneous lung parenchyma, to mitigate VILI.(1) Amato et al. reported that relative risk of death increases with every 7 cmH_2O increase in driving pressure.(2) Current practice aims to reduce VILI in ARDS patients by limiting driving pressure. We previously showed that temporary transvenous diaphragm neurostimulation (TTDN) reduces driving pressure in normal lungs ventilated for 50 hours; here we investigate whether TTDN reduces driving pressure in a moderate-ARDS preclinical model.(3)

Methods:

Moderate ARDS was induced in deeply sedated pigs, mechanically ventilated using volume-control mode at 8 ml/kg, PEEP 5 cmH_2O, with respiratory rate and FiO_2 set to achieve normal arterial blood gas values. ARDS was induced using oleic acid, delivered via the pulmonary artery until PaO_2/FiO_2 < 200. Animals were then ventilated for 12 hours post-injury. MV+TTDN100% group (n=6) received TTDN synchronized to inspiration on every breath, targeting a reduction in ventilator pressure-time-product of 15-20%; MV group (n=6) received volume-control ventilation only.

Results:

Transpulmonary driving pressure was lower both at post-injury and at study-end, and total study exposure to transpulmonary driving pressure was 36% lower in the MV+TTDN100% group than the MV group. TTDN on every breath limited transpulmonary driving pressure below 10 cmH_2O post-injury and at study-end. Median transpulmonary driving pressure was 6.2 cmH_2O greater in MV than MV+TTDN100% at study-end.

Conclusion:

TTDN reduces transpulmonary driving pressure by 36%, reducing the risk of VILI and the relative risk of death in a moderate-ARDS model.

References:

1. **Mauri et al**. *Intensive Care Med* 42: 9: 1360-1373, 2016
2. **Amato et al.** *N.Engl.J.Med.* 372: 8: 747-755, 2015
3. **Rohrs et al.** *J.Appl.Physiol.* 131: 1: 290-301, 2021

Image :

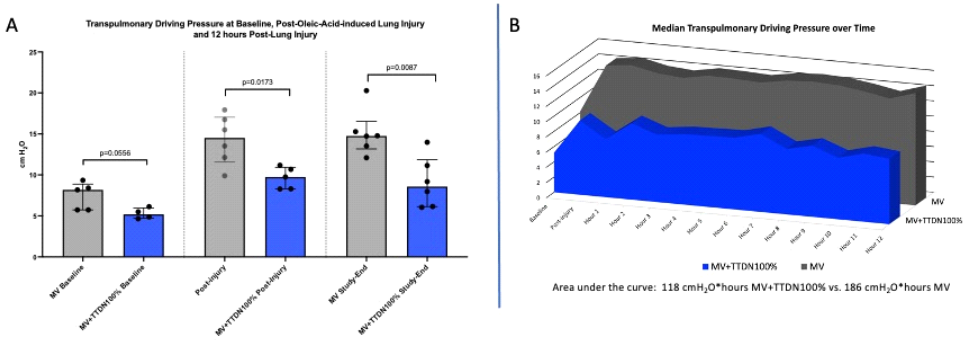

Figure 1 A: Median (IQR) driving pressure was lower in the MV+TTDN100% group post-injury and at study end. B: Median transpulmonary driving pressure over time, showing 36% less driving pressure over the experiment for the MV+TTDN100% group.