Category :**Respiratory: ARDS**

A178 - ***Transvenous Diaphragm Neurostimulation Improves PaO2/FiO2 in a Preclinical ARDS Model***

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Introduction:

PaO_2/FiO_2 is the main clinical tool used to categorize the level of acute lung injury in ventilated patients and has been shown to be well correlated with atelectasis in the context of the utilization of lung recruitment strategies.(1) It is also used to categorize the degree of severity of lung injury. We have previously shown that temporary transvenous diaphragm neurostimulation (TTDN) mitigates PaO_2/FiO_2 loss in pigs with healthy lungs ventilated for 50 hours.(2) This study investigated the impact of TTDN on PaO_2/FiO_2 in a moderate-ARDS preclinical model, with mechanical ventilation (MV) for 12 hours post-oleic-acid-induced lung injury.

Methods:

MV was delivered to deeply sedated pigs 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. Moderate ARDS was induced using oleic acid, delivered via the pulmonary artery until $PaO_2/FiO_2 < 200$. Animals were then ventilated with the same strategy for 12 hours post-injury. MV+TTDN100%-group (n=6) received TTDN synchronized to inspiration on every breath, targeting a neurostimulation-induced reduction in ventilator pressure-time-product of 15-20%; MV-group (n=6) received volume-control MV only.

Results:

PaO_2/FiO_2 was not statistically different at baseline or post-injury and was higher at study-end in MV+TTDN100% (432 (383-490)) than MV (364 (327-376), p=0.0360). PaO_2/FiO_2 recovery over time was better in MV+TTDN100%, and was affected by time (p<0.0001), and interaction of TTDN and time (p=0.0275).

Conclusion:

PaO_2/FiO_2 recovery was faster with TTDN in a moderate-ARDS model, compared to lung-protective MV alone. We previously published that TTDN, using the same neurostimulation approach as this study, mitigated PaO_2/FiO_2 loss in healthy-lung pigs ventilated for 50 hours. These findings indicate that TTDN results in better PaO_2/FiO_2 both in homogenous and heterogenous lungs.(5)

References:

1.**Nakahashi et al** *J Crit Care* 4 534.e1-534.e5, 2013
2.**Rohrs et al** *J Appl Physiol* 1:290-301, 2021

Image :

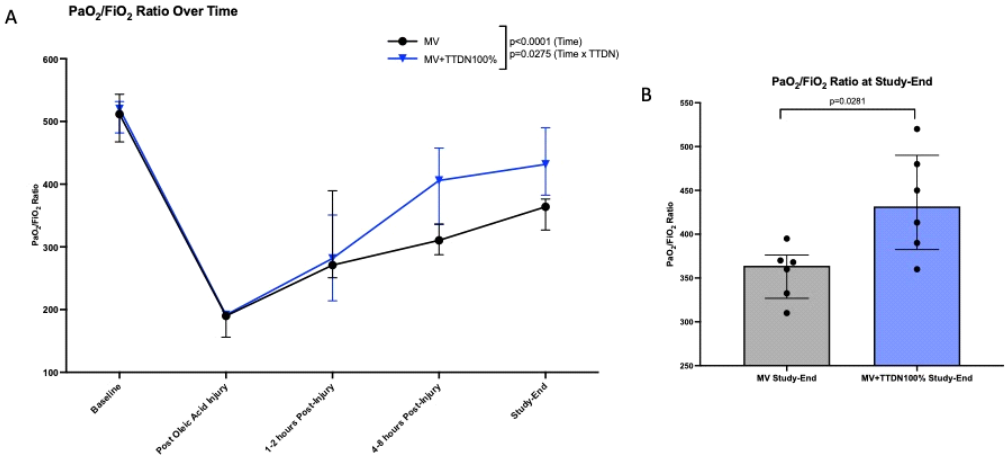

Figure 1 A: Median (IQR) PaO2/FiO2 over time. B: Median (IQR) PaO2/FiO2 at study-end.