

Category : **Respiratory: mechanical ventilation**

**A74 - Dose-dependent effect of diaphragm neurostimulation on gfap serum concentrations in pigs mechanically ventilated for 50 hours**

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**Introduction:**

Preclinical studies have demonstrated that mechanical ventilation (MV) is associated with brain injury. Glial fibrillary acid protein (GFAP) is an accepted serological marker for brain injury. We evaluated whether diaphragm neurostimulation in synchrony with lung-protective MV for 50 hours, in a normal-lung porcine model, would affect GFAP serum concentrations in comparison with never-ventilated and mechanically ventilated pigs.

**Methods:**

Twenty-eight healthy juvenile pigs with non-injured lungs were divided into four groups: MV only (MV group, n=8), MV in association with diaphragm neurostimulation delivered every other breath (TTDN50%+MV group, n=7), MV in association with diaphragm neurostimulation delivered every breath (TTDN100%+MV group, n=7) and never ventilated (NV group, n=6). A central line catheter with embedded electrodes was inserted into the left subclavian vein for the TTDN50%+MV and TTDN100%+MV subjects, and the diaphragm was activated by temporary transvenous diaphragm neurostimulation (TTDN), targeting a reduction in pressure-time product between 15 and 20%. Volume control MV was set to achieve and maintain a tidal volume of 8 ml/kg with a PEEP of 5 cmH<sub>2</sub>O. Blood samples were collected at the end of the experiment, to analyze GFAP serum concentrations.

Data are expressed as median and interquartile ranges. The Kruskal-Wallis test and Dunn's multiple comparison test were used for statistical analysis. P-values <0.05 were considered statistically significant.

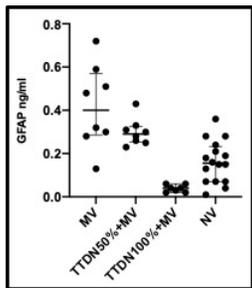
**Results:**

GFAP serum concentrations found were: 0.40 ng/ml (0.28-0.57) for the MV group, 0.29 ng/ml (0.25-0.32) for the TTDN50%+MV group, 0.04 ng/ml (0.02-0.06) for the TTDN100%+MV group, and 0.15 ng/ml (0.07-0.23) for the NV group, with statistically significant differences between groups, as determined by the Kruskal-Wallis test, p<0.0001.

**Conclusion:**

In a porcine model, TTDN+MV for 50 hours resulted in lower GFAP serum concentrations in comparison with the MV group, with a dose-dependent effect.

**Image :**



Dot plot showing the GFAP concentrations found in the serum: 0.40 ng/ml (0.28-0.57) for the MV group, 0.29 ng/ml (0.25-0.32) for the TTDN50%+MV group, 0.04 ng/ml (0.02-0.06) for the TTDN100%+MV group, and 0.15 ng/ml (0.07-0.23) for the NV group, with statistically significant differences between groups, as determined by the Kruskal-Wallis test, p<0.0001. Post-hoc analysis using Dunn's multiple comparison test showed

*considerable statistical differences in serum GFAP concentrations between the MV and TTDN100%+MV groups (0.40 vs. 0.04,  $p < 0.0001$ ), the MV and NV groups (0.40 vs. 0.15,  $p = 0.0170$ ), and the TTDN50%+MV and TTDN100%+MV groups (0.29 vs. 0.04,  $p = 0.0008$ ).*