

## COMBINATION OF ARTERIOVENOUS EXTRACORPOREAL LUNG ASSIST AND HIGH-FREQUENCY OSCILLATORY VENTILATION IN A PORCINE MODEL OF LAVAGE-INDUCED ACUTE LUNG INJURY: A RANDOMIZED CONTROLLED TRIAL

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### Objective

To compare the combined effects of arteriovenous extracorporeal lung assist (AV-ECLA) and high-frequency oscillatory ventilation (HFOV) on pulmonary gas exchange, hemodynamics, and respiratory parameters in a lavage-induced porcine lung injury model.

### Study Design

Prospective, randomized animal study in 33 healthy female pigs.

### Methods

ARDS was induced by saline lung lavage until the  $\text{PaO}_2$  decreased to  $53 \pm 8$  mmHg. The animals were randomly assigned to four groups:

Group 1, pressure-controlled ventilation (PCV) with  $V_t$  of 6ml/kg BW; group 2, PCV with  $V_t$  of 6 ml/kg BW and AV-ECLA; group 3, HFOV; group 4, HFOV and AV-ECLA. In group 2 and 4, the femoral artery and vein were cannulated and a low-resistance membrane lung was interposed. After isolated evaluation of AV-ECLA, the mean airway pressure was increased by 3 cm  $\text{H}_2\text{O}$  from 16 to 34 cm  $\text{H}_2\text{O}$  every 20 minutes, accompanied by blood gas analyses and measurements of respiratory and hemodynamic variables.

### Results

Only in AV-ECLA-treated animals was normocapnia achieved. No significant increase of  $\text{PaO}_2$  attributable to AV-ECLA alone was detected. Mean airway pressure augmentation resulted in a significant increase in  $\text{PaO}_2$  in all groups. Peak inspiratory pressure was significant lower in HFOV-treated animals.

### Discussion

The combination of AV-ECLA and HFOV resulted in normocapnia and comparable  $\text{PaO}_2$ , although a smaller ventilator pressure amplitude was applied. Long-term animal studies are needed to assess whether this approach results in further lung protection.

