THE CONTRIBUTION OF ARTERIO-VENOUS EXTRACORPOREAL LUNG ASSIST TO GAS EXCHANGE IN A PORCINE MODEL OF LAVAGE-INDUCED ACUTE LUNG INJURY

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Objective
To evaluate the contribution of arterio-venous extracorporeal lung assist (AV-ECLA) to pulmonary gas exchange in a porcine lavage-induced acute lung injury model.

Study Design
Prospective experimental animal study in 33 healthy female pigs.

Methods
Following saline lung lavage until decrease of PaO$_2$ to 51 ± 16 mm Hg and a stabilization period of 1 hour, AV-ECLA was implemented by femoral vascular access. Animals were mechanically ventilated in a pressure-controlled mode, at standard PEEP being applied of 5 cm H$_2$O. Following, under apnoeic oxygenation, variations of sweep-gas flow were performed every 20 minutes in order to evaluate the membrane lungs efficacy, in terms of carbon dioxide (CO$_2$) removal and oxygen (O$_2$) uptake.

Results
AV-ECLA is highly effective in eliminating CO$_2$. If combined with apnoeic oxygenation, normocapnia was not achievable. With respect to oxygenation, AV-ECLA did not increase PaO$_2$ at PEEP of 5cm H$_2$O and increased Qs/Qt.

Discussion
AV-ECLA is an effective treatment modality in ARDS. The author concluded, that although nearly complete CO$_2$ elimination can be achieved, oxygenation must be provided with a ventilator, following the rules of lung protective ventilation. Oxygenation depends on lung recruitment and might be maintained applying a Vt-even lower than 6 ml/kg body weight. Nevertheless, the effect of a higher PEEP on oxygenation has not been examined in this setting.