3.06 Alpha-1 Antitrypsin ameliorates lung injury in an ex vivo model of Acute Respiratory Distress Syndrome

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Background: Acute Respiratory Distress Syndrome (ARDS) is characterized by hypoxemia, altered alveolar-capillary permeability and an inflammatory pulmonary odema. A curative therapy for ARDS remains elusive and the mortality rate is alarmingly high. The endogenous serine anti-protease Alpha-1 Antitrypsin (AAT) is a candidate treatment option for ARDS. As such, we aimed to investigate the therapeutic potential of AAT in an ex vivo porcine model of ARDS.

Methods: Healthy lungs were explanted from female pigs, perfused, warmed to 37°C and ventilated. Baseline variables were recorded prior to initiation of the ventilator-induced lung injury protocol was initiated and administration of 20mg/kg LPS via the perfusate. The intervention group received 240mg/kg AAT via the perfusate 1 hour post-injury. Inflammatory cytokines and neutrophil elastase (NE) activity were quantified by Enzyme-linked Immunosorbent Assay (ELISA) and a commercially-available kit, respectively.

Results: Trends were observed in the AAT group (n=5) towards decreased pulmonary artery pressure, pulmonary vascular resistance, peak inspiratory pressure and plateau pressure compared to the untreated group (n=5). Gas exchange was significantly improved in lungs that received AAT while inflammation and NE activity was significantly reduced versus the untreated lungs.

Conclusions: While work remains to fully characterize the therapeutic benefit of AAT, preliminary results are promising.

Keywords: ARDS, Alpha-1 Antitrypsin, ex vivo lung perfusion

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