Individualized positive end-expiratory pressure and regional gas exchange in porcine lung injury

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**Supplemental Digital Content 5 - PEEP strategies**

## *PEEP strategies*

PEEP levels were identified guided by the following three different strategies to be compared later in a cross-over design.

## *Table-PEEP strategy*

PEEP and FIO2 were adjusted according to the ARDS-net lower PEEPP/FIO2-table (17) and resulting PEEP was defined as *table-PEEP*.

## *Maximal-oxygenation-PEEP strategy and minimal-tidal-recruitment strategy*

*Maximal recruitment maneuver and decremental PEEP trial*

A maximal recruitment maneuver was performed (18). During recruitment and PEEP titration, FiO2 was set to 1.0, PEEP to 30 cm H2O and pressure-controlled ventilation with 15 cm H2O driving pressure was initiated, resulting in plateau airway pressures of 45 cm H2O. After 4 minutes, PEEP was increased to 35 cm H2O with constant driving pressure. These settings were maintained for 2 min, followed by resetting PEEP to 30 cm H2O for 4 min (resting phase). This sequence of PEEP increments (5 cm H2O steps), followed by return to 30 cm H2O PEEP (resting phase), were repeated until PEEP of 45 cm H2O and peak airway pressures of 60 cm H2O were reached. Sets of blood gas and respiratory mechanics measurements were performed during the resting phases at PEEP of 30 cm H2O. The recruitment was stopped, when any of the following criteria was met: a) PaO2 > 400 mmHg, b) mean arterial pressure (MAP) < 55 mm Hg, or c) SpO2 < 90%.

After the maximal recruitment maneuver, a decremental PEEP trial was performed. Ventilator was switched back to volume-controlled ventilation while maintaining FiO2 at 1.0 and VT at 6-8 ml/kg. Starting from a PEEP of 30 cm H2O, PEEP was decreased in steps of 2 cmH2O. Respiratory and blood gas measurements were taken and Electrical Impedance Tomography (EIT) was performed after 4 minutes at every PEEP step. The PEEP trial was stopped when a) ZEEP was reached, b) mean arterial pressure (MAP) < 55 mmHg, or c) SpO2 < 90%.

*Maximal-oxygenation-PEEP*

After finishing the trial, “*Maximal-oxygenation-PEEP*” was defined as the PEEP level 2 cm H2O above the PEEP level that resulted in a PaO2-decrease of more than 5% of maximum during the PEEP trial.

*Minimal-tidal recruitment-PEEP strategy*

A every PEEP step during decremental PEEP trial *Regional-Ventilation-Delay-Inhomogeneity* (RVDI) was measured during a slow inflation (12 ml/kg BW) using EIT to monitor tidal recruitment. “*minimal -tidal recruitment-PEEP*” was defined as PEEP level that avoids an increase in RVDI*.*