A139 - Extracorporeal CO2 removal reduces inspiratory muscle effort during renal replacement therapy in a difficult to wean patient after orthotopic liver transplantation: a case report

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Introduction:
During a spontaneous breathing trial respiratory mechanics can worsen, and respiratory muscle effort can increase, leading to respiratory muscle fatigue, pump failure, hypercapnia and an unsuccessful weaning from mechanical ventilation. This case report discusses the possibility of applying extracorporeal CO2 removal (ECCO2R) to reduce respiratory muscle effort in a liver transplant recipient who already failed three weaning attempts from mechanical ventilation.

Methods:
The ECCO2R membrane lung was integrated into a conventional renal replacement therapy circuit and blood flow was increased from 150 to 300 ml/min. Measurements of respiratory mechanics (including esophageal pressure, as shown in figure 1) were used to assess the reduction of respiratory effort before and during the application of ECCO2R.

Results:
After 5 minutes of spontaneous breathing (SB), respiratory rate increased from 12 to 24 breaths/min, PaCO2 increased from 39 to 54 mmHg, pressure time product per minute (PTP/b) and pressure time product per liter (PTP/L) increased to 142.9±26.9 cmH2O s/min (from 78.9±15.3 cmH2O s/min in PSV), and 13.4±2.5 cmH2O s/L (from 7.1±1.1 cmH2O s/L in PSV), respectively. ECCO2R was subsequently started with a sweep gas flow of 10 L/min. After 1 hour of ECCO2R, respiratory rate decreased to 18 breath/min, PaCO2 decreased to 44 mmHg; and PTP/b and PTP/L decreased to 83.9±19.3 cmH2O s/min and 9.5±1.8 cmH2O s/L, respectively. The patient was successfully extubated and ECCO2R was discontinued after 36 hours.

Conclusion:
In a difficult-to-wean patient recovering from orthotopic liver transplantation (OLT), ECCO2R can be added to a renal replacement circuit and may reduce the ventilatory demand and prevent severe hypercapnia and respiratory distress, thus facilitating the recovery of adequate spontaneous ventilation and allowing effective weaning from mechanical ventilation.

Consent to publish: written informed consent for the publication was obtained from the participant.
From the left to the right: esophageal pressure (i) during pressure support ventilation (PSV); (ii) during spontaneous breathing trial (SBT); (iii) during SBT + ECCO2R