

## LITERATURE COMMENTARY TO:

### **FIRST EXPERIENCE WITH A NEW MINIATURIZED PUMP-DRIVEN VENOVENOUS EXTRACORPOREAL CO<sub>2</sub> REMOVAL SYSTEM (iLA ACTIVE): A RETROSPECTIVE DATA ANALYSIS**

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#### **Method**

- Retrospective Data Analysis , Period: March 2012 – July 2013
- 12 patients undergoing ECCO<sub>2</sub>-R (extracorporeal CO<sub>2</sub> removal) with the iLA active®  
(Definition ECCO<sub>2</sub>-R in this institution: blood flow up to max. 2l, 22 or 24 Fr. double lumen cannula)
- 6 patients with primarily hypercapnic lung failure
  - Indications: bridging to lung transplantation / re- transplantation, AECOPD, refractory status asthmaticus, infectious triggered exacerbation of drug-induced lung fibrosis
  - Goal of ECCO<sub>2</sub>-R for this group of patients:
    - Enabling spontaneous breathing or weaning from mechanical ventilation
    - Avoidance of intubation for AECOPD patients
- 6 Patients with primarily hypoxic lung failure
  - This group of patients did not fulfill criteria for full ECMO support
  - They underwent highly invasive mechanical ventilation, 4 of these patients had been ventilated for more than 2 weeks before ECCO<sub>2</sub>-R
  - Goal of ECCO<sub>2</sub>-R for this group of patients:
    - To achieve less invasive ventilation settings by reducing tidal volumes, thus enabling higher PEEP levels or spontaneous breathing
- 4 Patients were cannulated with 24 Fr., 8 Patients with 22 Fr. NovaPort® twin double lumen cannulas  
22 Fr. = jugular vascular access (1. choice)  
24 Fr. = femoral vascular access (sedated patients with other catheters inserted into the right jugular vein, very small jugular vein, or presence of thrombosis by ultrasound)
- iLA active® iLA® Kits were used for all patients
- Target blood flow rate 1l up to max. 2l, target aPTT 50-60 seconds, venous suction pressure was kept below 80mmHg

## Clinical Results:

- Within the first 4 hours on the iLA active® , effective CO<sub>2</sub> removal was observed in all patients with concomitant normalization of pH
- Tidal volumes, PIP as well as minute volumes could be reduced significantly within the first 24 hours
- Change in patients ventilation situation:
  - Five Patients were awake and breathing spontaneously during ECCO<sub>2</sub>-R
  - Avoidance of intubation in one patient, treated for failure of noninvasive ventilation
  - Extubation of one patient the day following initiation of ECCO<sub>2</sub>-R
  - Weaning to assisted spontaneous breathing via tracheostomy cannula allowing communication and mobilization after 2 (2 Pat.) and 3 (1 Pat.) days
- Results
  - Six patients were successfully weaned from the system and survived to hospital discharge
  - One patient had to be switched to VV-ECMO due to deterioration of oxygenation on the second day and survived (definition VV-ECMO in this institution is amongst others: blood flow > 2 l. and cannulation using 27 Fr. or 31 Fr. double lumen cannulas, if necessary two single lumen cannulas)
  - Five patients died while being treated. Nonsurvivors had a significantly poorer oxygenation and were ventilated significantly longer before initiation of ECCO<sub>2</sub>-R
  - Primarily hypercapnic respiratory failure was associated with a better outcome
- Complications
  - In one patient, a retroperitoneal hematoma occurred immediately after cannulation of the femoral vein, probably because of inadvertent puncture of the artery
  - In one patient the system had to be changed four times due to clotting of the membrane after 7,8,14 and 20 days
  - In another patient, a system change due to clotting was necessary after 3 days

## Conclusion

- Benefits of the iLA active® low flow therapy:
  - Easy insertion of the cannula
  - Simple filling and starting the extracorporeal service with the iLA active®
  - A low resistance gas exchange membrane specially optimized for low flow- and mid-range blood flows
  - Patient mobilization
  - **The main results of our retrospective analysis show that the iLA active® removed CO<sub>2</sub> efficiently and enabled fast resolution of acidosis. As a consequence, a significant reduction in inspiratory pressures and minute ventilation could be achieved → protective ventilation to avoid ventilator-associated lung injury to improve outcome.**