

## **PERCUTANEOUS VENOVENOUS CO<sub>2</sub> REMOVAL WITH REGIONAL ANTICOAGULATION IN AN OVINE MODEL**

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### **Objective**

To develop and test a simplified venovenous circuit with regional citrate anticoagulation.

### **Study Design**

Animal study.

### **Study Population**

Five sheep.

### **Methods**

The healthy animals received a double lumen catheter for the pump-driven extracorporeal circuit. Regional anticoagulation consisted of a continuous citrate infusion to the inflow limb. Systemic calcium levels were maintained by calcium chloride infusion through a central line. The study lasted 24 hours.

### **Results**

CO<sub>2</sub> transfer was directly proportional to gas flow and blood flow. Normocapnia was maintained despite a 75% reduction in minute ventilation. At 24 hours there was no significant clot formation in the circuit and no hemorrhage occurred.

The ionized calcium levels were persistently higher than the target level. A progressive decline in calcium chelation was observed with increasing blood flow.

### **Commentary**

ECMO therapy requires systemic anticoagulation. The authors use the regional citrate anticoagulation to avoid possible complications associated with systemic heparin. This method is known from hemodialysis.

Blood flow in this application may be too high to achieve the desired effect on coagulation. The fact that no clots occurred may be explained instead by the high blood flows and the low resistance of the membrane. Also, 24 hours may not be long enough to evaluate coagulation effects in extracorporeal CO<sub>2</sub> removal. Patients may suffer from coagulation abnormalities which were not addressed in the study.

Intensive care patients receive systemic anticoagulation with or without AVCO<sub>2</sub>R. The iLA system does not require additional heparin dosage so this method is unnecessary in iLA applications.

While the double lumen catheter may help avoid complications from 2 puncture sites it introduces the risk of damage to the blood cells through the pump.

