

PROLONGED PUMPLESS ARTERIOVENOUS PERFUSION FOR CARBON DIOXIDE EXTRACTION

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Objective

Evaluate outcome of extracorporeal CO₂ removal compared with mechanical ventilation only.

Study Design

Prospective experimental outcome studies evaluating extracorporeal CO₂ removal.

Study Population

15 mongrel dogs (short term studies), 9 sheep (3–7 day experiments).

Methods

Systemic artery to vein shunt with various interposed cardiac surgery oxygenators. Measurement of ABG, CO₂ removal performance, oxygenation performance, pressure gradients, cardiac index and work.

Results

Some increase in cardiac output, cardiac index and cardiac work, but less than expected from the added extracorporeal shunt flow. Practically no hemolysis, relatively stable haemoglobin and hematocrit levels, and safe platelet levels after 3–7 days. Efficient CO₂ removal and less efficient oxygenation due to arterial inflow.

The authors clearly distinguish pumpless extracorporeal lung assist from ECMO and propose the technique to be used at an earlier stage of respiratory failure in patients with good cardiac function because of the simplicity and comparative safety in comparison with ECMO. Cost effectiveness and the possibility of using less specialized personal, and the ease of exchanging the device in case of failure are seen as further advantages. A key advantage is that this procedure practically eliminates the danger of brain emboli in the absence of intracardiac shunts. Extracorporeal lung assist may promote parenchymal healing, and reverse hypoxic pulmonary vasoconstriction.

Commentary

Visionary study that outlines the perspectives and technology needs for pumpless extracorporeal lung assist.

