

HIGH FLOW/LOW RESISTANCE CANNULAS FOR PERCUTANEOUS ARTERIOVENOUS CARBON DIOXIDE REMOVALFRANK BR, TAO W, BRUNSTON RL JR, ALPARD SK, BIDANI A, ZWISCHENBERGER JB.
ASAIO J 1997;43(5):M817-20

CE1-13

Objective

Compare pressure/flow characteristics of commercially available vascular cannulas.

Study Design

Bench and in vivo animal studies.

Study Population

3 sheep (adult Suffolk ewes).

Methods

Bench tests: 40% glycerine was pumped through cannulas at various flows and resultant pressures were recorded at inlet and outlet of cannulas. Flow reversal was performed to simulate arterial and venous use. M numbers were determined with a nomogram using flows at which no significant luminal change occurred.

Animal study: MAP was varied between 65 and 105 mmHg, and cannula pairs were selected with the venous cannula 4 Fr larger to minimize resistance. A graph was used to demonstrate the relationship of arteriovenous blood flow to carbon dioxide removal and resultant arterial PaCO₂.

Results

Table 2. The Predicted Carbon Dioxide Removal of Each Pair of Cannulas

Combinations of Cannulas	CO ₂ Removal (ml/min)		Increase in CO ₂ Removal (%)
	MAP = 65 mmHg	MAP = 105 mmHg	
8 Fr A/12 Fr V	118	157	33
10 Fr A/14 Fr V	244	310	27
12 Fr A/16 Fr V	370	480	29
14 Fr A/18 Fr V	409	508	24

Commentary

The currently used dedicated iLA cannula have a number of additional features required for this particular use. However, this remains the first study to assess vascular cannulas for use with pumpless membrane lungs in an arteriovenous shunt.

