Claims

1. Use of citrulline in the manufacture of a pharmaceutical composition to maintain pulmonary vascular tone in a patient undergoing cardio-pulmonary bypass surgery for a cardiac defect by:

(a) 100-300 mg/kg citrulline to be administered as a bolus to the patient at the initiation of the surgery;

(b) 100-300 µmol/L citrulline to be added to the hemoconcentration replacement fluid administered to the patient during cardiopulmonary bypass-surgery;

(c) citrulline to be administered as a post-surgery bolus of 10-30 mg/kg 15-45 minutes after decannulation from cardiopulmonary bypass; and

(d) citrulline to be infused into the patient after the surgery for 6-48 hours at 5-15 mg/kg/hour,

wherein the patient's plasma citrulline level is raised above 100 µmol/L.

2. The use of claim 1, wherein the cardiac defect is selected from the group consisting of a cardiac defect associated with excess pulmonary blood flow, an atrial septal defect, ventricular septal defect, and single ventricle lesion.

3. The use of claim 1 or 2, wherein the surgery is selected from the group consisting of arterial switch procedure and Glenn and Fontan procedures.

4. The use of any one of claims 1-3, wherein the amount of citrulline to be used is sufficient to raise the patient's plasma citrulline level for up to 48 hours postoperatively.

5. The use of any one of claims 1-4, wherein the patient is less than 6 years old.

6. The use of any one of claims 1-4, wherein the patient is less than 10 days old.

7. The use of any one of claims 1-4, wherein the patient is at risk for persistent pulmonary hypertension of the newborn (PPHN).

8. The use of any one of claims 1-7, wherein the period between the initiation of surgery and the administration of the post-surgery bolus is to be 4 hours or less.

9. The use of any one of claims 1-7, wherein the citrulline infusion is to be started within 5-10 minutes of the post-surgery citrulline bolus.

10. The use of any of claims 1-9, wherein the duration of post-operative invasive mechanical ventilation of the patient receiving the hemoconcentration replacement fluid composition including the effective amount of citrulline is less than or equal to 15 hours.

11. The use of any of claims 1-9, wherein the duration of post-operative total respiratory support of the patient receiving the hemoconcentration replacement fluid composition including the effective amount of citrulline is less than or equal to 50 hours.