

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) administering citrulline as a bolus to the patient at the initiation of the surgery;
 - (b) adding citrulline to the hemoconcentration replacement fluid administered to the patient during cardiopulmonary bypass surgery;
 - (c) administering citrulline as a post-surgery bolus of about 10-30 mg/kg about 15-45 minutes after decannulation from cardiopulmonary bypass; and
 - (d) infusing citrulline into the patient after the surgery,wherein the patient's plasma citrulline level is raised above 100 $\mu\text{mol/L}$.
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 bolus of citrulline administered at the initiation of surgery is 100-300 mg/kg of citrulline.
5. The use of any one of claims 1-4, wherein 100-300 $\mu\text{mol/L}$ citrulline is added to the hemoconcentration replacement fluid used during cardiopulmonary bypass.
6. The use of anyone of claims 1-5, wherein the amount of citrulline infused into the patient after the surgery is 5-15 mg/kg/hour of citrulline.
7. The use of any one of claims 1-6, wherein the amount of citrulline used is sufficient to raise the patient's plasma citrulline level for up to 48 hours postoperatively.
8. The use of any one of claims 1-7, wherein the patient is less than about 6 years old.

9. The use of any one of claims 1-7, wherein the patient is less than about 10 days old.
10. The use of any one of claims 1-7, wherein the patient is at risk for persistent pulmonary hypertension of the newborn (PPHN).
11. The use of any one of claims 1-10, wherein the period between the initiation of surgery and the administration of the post-surgery bolus is 4 hours or less.
12. The use of any one of claims 1-10, wherein the citrulline infusion is started within 5-10 minutes of the post-surgery citrulline bolus.