

POSTOPERATIVE PULMONARY HYPERTENSION PROTOCOL

I Patient identified in High Risk Category(Pre-op) and the presence of any one of the factors below:

- a) Mean pulmonary artery pressure is greater than 25 mm Hg intraoperatively.
- b) Estimated RV pressure greater than 50-60% systemic.
- c) Intra-op TE Echo findings of significant tricuspid regurgitation with some RV dysfunction
- d) Intraoperative issues with: ventilation/oxygenation, long CPB run, arrhythmias etc.
- e) Clinical indicators of Low Cardiac Output (Decrease in SVO₂/Cerebral Oximeter, elevated RAP, Decrease urine output, elevated lactate, metabolic acidosis)

II Institute Pulmonary Hypertension Protocol:

- 1) Premedicate with fentanyl/morphine +/- muscle relaxant prior to endotracheal suctioning or any painful procedure.
- 2) Continuous Morphine infusion
- 3) Continuous neuromuscular blockade in the first 24-48 hours post-op.(Use of BIZ monitor vs Train of Fours?)
- 4) Consider early institution of Nitric Oxide at 10-20 ppm
- 5) Avoid Hypoxia relative to underlying defect. Maintain baseline level of supplemental oxygen.
- 6) Avoid Metabolic/ Respiratory Acidosis: Maintain pH 7.4-7.5 and PaCO₂ 30-40.
- 7) Avoid Hyperinflation/atelectasis
- 8) Avoid polycythemia (Keep Hct range 36-45)
- 9) Maintain normal body temperature (36.5-37.5)
- 10) Follow Open Chest guidelines.

III Nursing Considerations:

- 1) Strategies to minimize overstimulation by surrounding environment.
- 2) **Have extra dose of sedation and neuromuscular blockade readily available.(Morphine and vecuronium/ pancuronium).**
- 3) Avoid hypothermia/hyperthermia
- 4) Preoxygenate prior to suctioning(non-shunt dependent patients with 100% FiO₂; Shunt patients with O₂ required to achieve 75-85% saturations)
- 5) Administer extra dose of sedative and neuromuscular blockade prior to suctioning/or any procedure that might cause agitation/pain.
- 6) Notify MD for any ABG with pH < 7.35 or > 7.5 ; PaCO₂ > 40 or < 30

NOTIFY MD IMMEDIATELY FOR ANY OF THE CLINICAL SIGNS OF A PULMONARY HYPERTENSIVE CRISIS. A SUDDEN INCREASE IN CVP OR DECREASE IN SATURATIONS BY MORE THAN 10% REQUIRES IMMEDIATE INTERVENTION.

Early Signs

Labile saturations
Tachycardia
Decreased pulses/perfusion
Stable blood pressure
Decreased SV02/MVO2

Late Signs

Increase in CVP/RAP
Tachycardia/hypotension
Hypoxemia
Oliguria
Lactic acidosis

ACUTE MANAGEMENT

- 1) **Hyperventilation and oxygenation: 100% for Non-Shunt dependent lesions .
For Shunt patients give supplemental O2 to get saturations to baseline.**
- 2) **Urgent administration of supplemental sedation and neuromuscular agent**
- 3) **Start Nitric Oxide if not already being administered**
- 4) **Start inotropic support if hemodynamic instability.**
- 5) **Obtain ABG , lactate and comprehensive metabolic panel and correct abnormalities.**
- 6) **Echocardiogram to assess cardiac function, tricuspid regurgitant velocity.**

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