

## BICU Smoke Inhalation HFOV Protocol

**HFOV FOR SMOKE INHALATION:** May be used for patients who meet the following criteria:

- The presence of carbonaceous sputum with suctioning
- Significant intraoral or pharyngeal burns
- Upper air way edema, red, dried mucosa or small mucosal blisters
- Inhalation injury of the epithelium confirmed by bronchoscopy
- Evidence of smoke inhalation
- PaO<sub>2</sub>/FiO<sub>2</sub> less than 200
- Patient history of fire in an enclosed space i.e. building, house
- Carboxyhemoglobin value greater than 10

### **PROCEDURE: BEFORE PLACING PATIENT INITIALLY ON THE VENTILATOR**

- Suction patient
- Sedating and paralyzing patient may be necessary
- Bias flow is set at approximately 35LPM and may be adjusted up or down to meet patient needs
- Set IT at 33%
- Set initial Hz at 5
- Set an initial mPaw at 5cmH<sub>2</sub>O above the conventional ventilator mPaw or 33 ± 5cmH<sub>2</sub>O, if initially starting on HFOV. You may consider a recruitment maneuver first, if patient is extremely hypoxic by applying 40cmH<sub>2</sub>O for 40 seconds.
- If oxygenation worsens, increase mPaw in 3-5cmH<sub>2</sub>O increments every 30 minutes.
- Set power at 4.0 and rapidly increase to achieve chest wiggle (visual vibration from shoulders to mid-thigh area).
- Start FiO<sub>2</sub> at 1.0
- Connect the patient to the oscillator and start the oscillator
- Obtain an ABG in 30 minutes of initiation the every 4 hours for 24 hours, every 6 hours for 24 hours then every 12
- Check CXR within 1-4 hours of initiation
- FiO<sub>2</sub> should remain at 100% until carboxyhemoglobin is less than 10
- Suction every 6 hours

### **SIGNS AND SYMPTOMS ASSOCIATED WITH CARBOXYHEMOGLOBIN SATURATION**

- Less than 5% - Normal
- 5% - 10% - Visual disturbance
- 11% - 20% - Headache, flushed skin
- 21% - 30% - Nausea, ataxia
- 31% - 40% - Irritability, vertigo, hallucinations
- 41% - 50% - Tachypnea, tachycardia, shock
- Greater than 50% - Coma, seizures, respiratory failure, death

### **OXYGENATION MANAGEMENT**

- Increase MAP to get SpO<sub>2</sub> greater than or equal to 92%
- Stop adjusting MAP when SpO<sub>2</sub> is greater than or equal to 90%
- **VENTILATION MANAGEMENT:** Maintain good CWF(chest wiggle factor). If you lose wiggle or it becomes dampened, try the following:
  - Suctioning
  - X-ray to rule out pneumothorax
  - Increase bed firmness on air mattress
  - Increase amplitude

- Saline lavage 10 – 20mL with tracheal suction every 6 hours
- Bronchoscopy Daily until secretions clear

### **SEVERE HYPERCAPNEA WITH pH LESS THAN 7.25**

- Check X-Ray
- Decrease Frequency in increments of 0.5 every 30-60min
- Create a small cuff leak. You want to deflate cuff until you see MAP drop 5cmH<sub>2</sub>O. Stop the deflation, disconnect syringe, turn MAP back to where it was originally set. If MAP is bouncing around all over the place your cuff leak is too big.
- Consider increasing I Time % in increments of 5 until IT reaches 50%

**WEANING:** Once HFOV has been initiated and mPaw settings are stabilized

- Titrate FiO<sub>2</sub> every 8-12 hours keeping SpO<sub>2</sub> > 92% and the PaO<sub>2</sub> < 65mmHg
- Titrate FiO<sub>2</sub> to  $\leq$  0.40 for 12 hours before reducing the mPaw
- Begin reducing mPaw in increments of 1-2cmH<sub>2</sub>O every 8-12 hours
- If acceptable oxygenation on a FiO<sub>2</sub> of  $\leq$  0.40 with a mPaw  $\leq$  25cmH<sub>2</sub>O for 12 hours consider conventional ventilation

**CONVENTIONAL VENTILATOR SETTINGS** When the above goal is met,

### **INITIAL SETTINGS**

- PIP titrated to achieve delivered TV of 6-8mL/kg
- Pplat < 35cmH<sub>2</sub>O
- I:E of 1:1
- PEEP – 12cmH<sub>2</sub>O mPaw should be 20cmH<sub>2</sub>O(  $\pm$  2cmH<sub>2</sub>O)
- Rate 20-25/min
- ABG 1 hour after switching to PC
- Wean PEEP to 5cmH<sub>2</sub>O by increments of 1-2 every 2 hours keeping SpO<sub>2</sub> > 92%