PEDIATRIC and NEONATAL IN-LINE MEDICATION DELIVERY

Purpose: To administer indicated inhaled medications in-line via hand held nebulizer (HHN) with continuous mechanical ventilation while maintaining a consistent peak inspiratory pressure.

Indications: Indicated for the nebulization of ordered medications that the physician chooses to be delivered aerosolized via the ETT to the lung parenchyma.

Contraindications / Hazards / Complications:
1. Contraindications may be specific for the medication(s) to be administered.
2. Bronchospasm (hyperreactive airways)
3. Monitor for air trapping
4. Monitor for excess moisture in expiratory filter and replace PRN
5. In-line HHN may not provide optimal medication delivery in continuous flow ventilators (Servo 300). Refer to PROC19.2 on Continuous Medicated aerosol in-line.
6. The added flow from the HHN will require more patient effort to trigger the ventilator to cycle a breath. If the patient is attempting spontaneous respiration, patient-ventilator asynchrony can occur.

Equipment: 1. Neonatal nebulizer kit or HHN with T-piece adapter
2. Prescribed medication
3. Oxygen flowmeter

Personnel: Physician orders therapy. The procedure is performed by the Respiratory Care Practitioner (RCP).

Procedure:
1. Check the patient’s chart for appropriate order. Must consist of medication, dosage, and frequency to be given.
2. Wash hands and apply personal protective equipment prior to assembling HHN and placing medication in reservoir.
3. For adult circuits, use T-piece to attach HHN in-line with inspiratory line of the ventilator circuit. NOTE: Adapters may be needed to attach nebulizer to inspiratory line of neonatal / pediatric circuit.
4. Connect nebulizer to oxygen flowmeter. Turn flowmeter on 6 LPM.
5. Monitor patient’s peak inspired pressure for an increase. This increase in pressure can be attributed to the added flow from the HHN.
6. Peak inspired pressures should be kept the same on pressure ventilated patients and +2 cm H₂O on volume ventilated patients.
   a. Pressure Ventilated Patients: After the HHN has been turned on, the peak inspiratory pressure (PIP) can be regulated by adjusting the inspiratory pressure control, until the peak pressure reads the ordered PIP. NOTE: After the HHN is completed and taken out of line, monitor the patients peak pressure and adjust the inspiratory control until ordered PIP is obtained.
   b. Volume Ventilated Patients: Note the patient’s PIP prior to HHN treatment. Adjust the patient’s pressure limit to 2 cm H₂O above patient’s peak pressure. Turn flowmeter to 6 LPM. NOTE: The patient may pressure limit throughout the treatment because of the added flow. This allows the patient to keep a consistent PIP while receiving in-line therapy. The pressure limit may be readjusted after completion of therapy. HHN is taken out of line after therapy is completed.
c. **Pressure-Regulated Volume-Control:** Determine pressure control level (inspiratory pressure) as noted by the difference between PIP and total positive end-expiratory pressure (PEEP). Set pressure control knob at this level. Change mode selector to “Pressure Control” and adjust inspiratory pressure as described in section ‘a’. When treatment is complete, remove HHN from circuit and place patient back on previous PRVC settings.

7. Discard personal protective equipment and wash hands after treatment.

8. Document per policy.

**NOTICE:** Assess expiratory filters for excess moisture and replace PRN and chart.

**NOTICE:** If using heated wire circuits, adjust humidity control toward the "sun" display to limit "rain-out" into the nebulizer during treatment. If using conventional circuit, adjust heater temperature to 28°C to limit "rain-out".

**Infection Control:**

1. Standard Precautions will be observed.
2. In-line nebulizers will be replaced Monday, Wednesday, Friday and PRN (dropped, contaminated, etc.).
3. Nebulizer solutions are sterile and dispensed / prepared aseptically.

**References:** Cardiopulmonary Services, PROC 11.0

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