Providence Health Care	Department: **Respiratory Services**	Date Originated: January 1997 Reviewed/Revised: **November 2008**
PROCEDURE	Topic: Critical Care – Non Invasive Ventilation using Conventional Ventilators (Respiratory Therapy) Number: B-00-12-12013	Related Links: B-00-12-12014

APPLICABLE SITES:

St. Paul's Hospital
Mount Saint Joseph Hospital

GENERAL INFORMATION:

Conventional invasive ventilators may be set up to deliver non-invasive ventilation via a full face mask.

Ventilators with non-invasive mode, and with expiratory sensitivity adjustment should be used wherever possible, as it allows for adjustments to help compensate for mask leaks.

The patient must be alert, cooperative, and able to protect his or her own airway. They should also be hemodynamically stable.

EQUIPMENT:

- Appropriate size non-vented mask
- Rubber head strap
- Swivel elbow connector
- Conventional ventilator with NIV mode and expiratory sensitivity adjustment
- Active heated humidifier
  - For MR730: Fill with water but do not turn the humidifier on
  - For MR850: Fill with water and turn on the humidifier – press and hold the mask ventilation mode button
- Gastric tube
  - Is required if abdominal distension develops, or if the patient is being fed enterally
  - Is recommended if ventilating pressures are > 20 – 25 cmH_20

GOALS OF NON-INVASIVE MASK VENTILATION:

1. Respiratory rate < 25 bpm
2. V_t > 6 mL/kg
3. P_{aw} < 25 cmH_2o
4. Improvement in ABG's within the first 1 – 2 hours

PREFERRED MODES OF VENTILATION:

Non-invasive mode should be selected if available on the conventional ventilator.

1. CPAP with pressure support mode:
    - Is better tolerated than other ventilation modes
    - Initial settings:
        - CPAP: 2 – 5 cmH_2O
        - PS: 10 – 20 cm H_2O
    - If patient has difficulty cycling to expiration or initiating inspiration, PCV is recommended

2. Pressure control ventilation mode:
    - Employs a set T_i and low RR (may also have no set RR)
    - May allow for easier breath cycling
    - May reduce patient discomfort and work of breathing

3. Volume control ventilation mode:
    - Last choice of ventilation modes
    - Generates high pressure at the mask, which increases the possibility of gastric distention and aspiration

PROCEDURE:

1. Verify need for mask ventilation and explain the procedure to the patient.

2. Ensure continuous monitoring with ECG and pulse oximetry is in place.

3. Place patient in semi-Fowler's position as tolerated.

4. Replace the flex tube from the ventilator circuit with the elbow connector and appropriately sized mask with headgear.

5. Ensure proper ventilator function and set the ventilator to CPAP mode with PS. Initiate the CPAP level at 2 – 5 cmH_2O with the PS set to achieve a V_t of 6 – 8 mL/kg.

6. Fit the mask over the patient's mouth and nose. It is preferable to have a slightly smaller mask than one that is too large.

7. Adjust the rubber head strap securely around the patient's head to hold the mask in place.

    NOTE: If significant leaks are present, attempt troubleshooting in the following order:

        1. Readjust mask and head strap
        2. Adjust expiratory sensitivity
        3. Decrease inspiratory rise time
        4. Decrease the CPAP level
        5. Decrease the PS level

8. Assess patient response to therapy. Monitor RR, V_t, SpO_2, dyspnea level, accessory muscle use, abdominal distention, mental status, ability to clear secretions and protect the

airway, ABG's, and general comfort.

9. Explain to the patient the importance of notifying the RN or RRT if he or she feels any abdominal distention, discomfort, nausea, or the need to vomit.

   NOTE: A gastric tube should be inserted if abdominal distention is present.

10. If tolerated, short rest periods may be provided to allow for oral intake of medications and expectoration of secretions.

11. Chart all relevant information in the Progress Notes of the patient record, and on the Respiratory Flowsheet and Kardex.

WEANING FROM NON-INVASIVE MASK VENTILATION:

1. Wean the PS as tolerated to a level of 5 cmH_2O.

2. Slowly trial the patient off of mask ventilation for longer periods of time as tolerated.

3. Provide supplemental oxygen as required.