

**Respiratory Care Services
John Dempsey Hospital
Policy and Procedure Manual**

Subject: Heated humidifier & disposable heated wire adult ventilator circuit

Rationale: The delivery of humidification of inspired gas to patients during mechanical ventilation support is necessary. When the upper airway is bypassed and an artificial airway present (endotracheal or tracheostomy tube), the loss of heat and moisture to the respiratory tract can result in serious airway damage (hypothermia, inspissation of airway secretions, destruction of airway epithelium, and atelectasis). The use of the heated humidifier and disposable heated wire adult ventilator circuit proves beneficial in promoting airway humidification and heat preservation. This is accomplished by the heated humidifier and heated wire circuit actively increasing both the heat and water vapor of inspired gases. The heated humidifier and heated circuit should be able to provide a minimum of 30mg H₂O/L of delivered gas at 30°C and be able to deliver an inspired gas temperature of 33 ± 2°C

Equipment: Heated humidifier
Disposable heated wire adult ventilator circuit
Dual Temperature probe
Water traps

Indications:

1. An endotracheal or tracheostomy tube is present and humidification of inspired gas during mechanical ventilation is required.

Contraindications:
None

Hazards / Complications Associated with Heated Humidification Devices:

1. Potential for electrical shock or burns
2. Hypothermia / Hyperthermia
3. Thermal injury to airway
4. Tubing meltdown of heated-wire circuit 2° to circuits covered or humidifier voltage incompatibility
5. Underhydration, impaction of mucus secretions, mucus
6. Hypoventilation and/or alveolar gas trapping due to mucus plugging
7. Increased resistive WOB due to mucus plugging

8. Unintentional tracheal lavage / nosocomial infection from pooled condensate in patient circuit
9. Increased airway pressures, patient-ventilator dysynchrony and improper ventilator performance 2° to pooled condensate in patient circuit

Procedure:

1. The use of a heated humidifier and heated wire circuit will be instituted as a means of delivering humidification of inspired gases to all patients requiring mechanical ventilation via an artificial airway.
2. The heated humidifier and heated wire circuit will be selected for use for those patients anticipated to require continuous/long term mechanical ventilation for a period greater than 48 hours. It will also be used for those patients who exhibit contraindications for HME use.
3. A heated humidifier and heated wire circuit will also be used for those patients who exhibit contraindications for HME use (mechanically ventilated patients who have thick, copious secretions and/or massive hemoptysis; mechanically ventilated patients whose secretions have become copious or appear to be increasingly tenacious when using an HME).
4. The heated humidifier and heated wire circuit should be visually inspected during the patient-ventilator system checks
5. The following must be monitored as part of the equipment inspection process
 - sufficient heat and humidification is being provided
 - proper temperature settings are selected; temperature probes functioning properly; temperature monitored as near patient's airway opening as possible and adjusted accordingly
 - heated humidifier/heated wire circuit performance meets specifications during expected peak inspiratory flowrates and minute ventilation delivery
 - inspiratory gas should not exceed 37°C at airway threshold
 - heated humidifier alarm settings (if applicable) High temp alarm no higher than 37°C and low temp alarm set no lower than 30°C
 - sufficient sterile water level maintained for humidification

- pooled condensate in patient circuit properly drained / removed from circuit as necessary
 - quantity and consistency of secretions should be noted and characteristics recorded on ventilator flow sheet
6. The respiratory therapist is expected to be able to
- comply with Universal Precautions
 - possess a complete understanding of the operation, maintenance, and troubleshooting of the ventilator, circuit, and humidifying device
 - assess the patient's response to humidification
 - recognize any adverse reaction to humidification
 - appropriately respond to adverse events
 - recommend modifications in humidification techniques

References:

1. AARC Clinical Practice Guidelines: Humidification during Mechanical Ventilation, Respiratory Care, 1992; 37:887-890.

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