Subject: OXYGEN ADMINISTRATION AND MONITORING PROCEDURE

Nasal Cannula
Simple Mask
Non-Rebreathing Mask
Venturi Mask
O-Ring
Humidification

Type: Core Policy ___
      General Policy X

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Recommended:
Patient Services Policy and Procedure Council

Approved:
Paula Webb, DNP RN, NEA-BC
Vice President, Nursing/CNO

Review:
Initial/Date

PURPOSE:
Administer supplemental oxygen to infant, pediatric, and adolescent patients via nasal cannula, simple mask, non-rebreathing mask or venturi mask, and to establish guidelines for the monitoring of oxygen therapy.

PERFORMED BY:
RN, LVN, Respiratory Care, or ACT

POLICY:
Oxygen is administered under the directive of a physician, in accordance with PS 099 “Code Blue/Med Alert: Authorization to Treat” or unit specific emergency policies.

INDICATIONS FOR OXYGEN THERAPY:

1. Respiratory and / or cardiac arrest. Use 100% oxygen
2. Hypotension.
3. Low cardiac output and metabolic acidosis.
4. Respiratory distress.
5. Hypoxemia:
   A. Determined by Arterial Blood Gas
      i. PaO₂ less than 80 mmHg
   B. Determined by pulse oximetry
      i. SpO₂ less than 92%

   Titrate according to ordered SpO₂ range.
PRECAUTIONS / HAZARDS / POSSIBLE COMPlications:

1. The administration of supplemental oxygen to patients with certain congenital heart lesions (eg, hypoplastic left-heart, single ventricle) may compromise the balance between pulmonary and systemic blood flow.
2. The administration of supplemental oxygen to patients with chronic CO₂ retention (eg, end-stage cystic fibrosis) may result in a decrease in respiratory drive.
3. Care should be taken when oxygen is delivered to preterm infants (less than 37-weeks gestation). It is suggested that the oxygen supplementation should not result in a PaO₂ greater than 80 mmHg.
4. Pulmonary toxicity may result from prolonged exposure to high concentrations of oxygen.
5. Absorption atelectasis may occur under conditions of reduced lung capacities.
6. High flows of cold gas can induce cold stress in newborn infants. This may result in alterations in the infant’s respiratory pattern or apnea. For newborns or hypothermic patients requiring oxygen via mask or blow by, use warmed gases.
7. Petroleum-based products that do not contain additives may be applied topically to dry lips or around the nares of patients who are prescribed supplemental oxygen therapy. (Examples include Vaseline and Chapstick).
   a. All petroleum-based products are strictly prohibited in the Surgical Services areas
   b. Petroleum-based products are not to be used to insert tracheostomy tubes, nasotracheal tubes or nasogastric tubes.

MONITORING AND DOCUMENTATION:

1. Assessment and documentation
   A. Patient assessment
   B. Oxygen device and applicable flow or F₃O₂

2. SpO₂ or arterial blood gas
   A. Checked and documented 10 – 30 minutes after initiation of O₂
   B. Checked and documented 10 – 30 minutes after changes in O₂ flow or device

REMARKS

Include: cardiac, respiratory, work of breathing, and neurologic status. Document patient response to oxygen change(s) and specific comfort interventions provided.

Continuous or spot check SpO₂ as ordered by the physician.

EQUIPMENT:

1. Oxygen source:
   A. Wall outlet with oxygen flowmeter,
   B. Oxygen cylinder with regulator and flowmeter,
   C. Oxygen/ Air blender with flowmeter.

2. Bubble humidifier:
   A. Nasal cannula,
   B. Simple mask.

Note: Do not use a bubble humidifier with a venturi mask. If appropriate, add bland aerosol to venturi device per manufacturer.
1. **OXYGEN DELIVERY DEVICES:**

**Nasal Cannula** (available in 3 sizes):

1. **Description:**
   - A. Two soft prongs inserted into the patient’s nares.
   - B. Secure the cannula tubing to patient’s face
   - C. $O_2$ flow is documented, $F_{O_2}$ is variable

2. **Maximum oxygen flows:**
   - A. Infants and newborn patients: less than 2 l/min
     - i. Change flow in $\frac{1}{2}$ lpm increments
   - B. Pediatric patients: less than 4 l/min

3. **Low Flow Oxygen**

4. **Precautions:**
   - A. Improper sizing can lead to obstruction
   - B. Skin irritation

5. **Troubleshooting:**
   - A. Patient
     - i. Is the nasal passage patent
     - ii. Changes in patient assessment
   - B. Check equipment
     - i. Flowmeter on and cannula hooked up
     - ii. Tubing is not kinked
     - iii. Is the cannula securely in place

**Simple Mask** (available in 3 sizes):

1. **Description:**
   - A. Mask with holes and oxygen tubing to deliver 5 – 10 l/min oxygen.
   - B. $O_2$ flow is documented.

2. **Minimum oxygen flows:**
   - A. Oxygen masks should not be weaned below 5 l/min.

3. **Precautions:**
   - A. Aspiration of vomitus
   - B. Skin irritation

4. **Troubleshooting:**
   - A. Patient
     - i. Changes in patient assessment
   - B. Check equipment
     - i. Flowmeter on and $O_2$ tubing hooked up

**Remarks:**

- **Nasal Cannula**
  - Note: Heated-Humidified High Flow Nasal Cannula, refer to RT 086.
  - Do not cut prongs as this greatly alters the efficacy of the device.

- **Simple Mask**
  - $F_{O_2}$ is variable, simple masks are not recommended for precise concentrations.
  - Mask acts a reservoir

- Flows greater than 1 l/min delivered to infants may deliver more than 50% oxygen which is potentially toxic to lungs.

- When oxygen flows are weaned below 2 l/min, use a low-flow flowmeter.

- Do not use petroleum based products on the irritated area.

- Excessive mucus, mucosal edema, or deviated septum.

- Inadequate flow may lead to rebreathing $CO_2$

- Masks are confining and may not be well tolerated in the alert pediatric patient.
ii. Tubing is not kinked
iii. Flow is not less than 5 l/min

**Non-rebreathing Mask** (available in 2 sizes):

1. Description:
   A. Oxygen is supplied to a mask with a reservoir bag and one-way valves to ensure a fresh gas supply to the patient.
   B. $O_2$ flows 10 – 15 l/min
   C. $O_2$ flow is documented.
   F$O_2$ approached 100% using this device properly.

2. Minimum oxygen flows:
   A. Non-rebreather masks should not be weaned below 10 l/min

3. Precautions:
   A. Disruption of oxygen flow may cause immediate decompensation.
   B. Aspiration of vomitus
   C. Skin irritation
   Reservoir bag should remain inflated.
   Limited room air entrainment.

4. Troubleshooting:
   A. Patient
      i. Changes in patient assessment
   B. Check equipment
      i. Flowmeter on and oxygen tubing to mask is hooked up
      ii. Tubing is not kinked

**Venturi Mask** (available in 2 sizes):

1. Description:
   A. Oxygen supplied to the mask is forced through a small jet orifice which then pulls room air along thus supplying high flows with a precise F$O_2$.
   B. $O_2$ flows are dependent on the F$O_2$
   C. F$O_2$ is documented.
   F$O_2$’s which can be set are between 24% – 50%.
   Respiratory Care will initiate a Venti-mask setup.

2. Troubleshooting:
   A. Patient
      i. Changes in patient assessment
   B. Check equipment
      i. Flowmeter on and oxygen tubing to mask is hooked up
      ii. Tubing is not kinked
2. **O-Ring**

1. **Description:**
   A. Oxygen is supplied to a tracheostomy tube via small bore tubing attached to an O-Ring adaptor (NIF adaptor).
   B. O$_2$ flow is documented, F$_{O_2}$ is variable
   C. Humidity:
      i) Compressed air cool mist or heated humidity via tracheostomy collar.
      ii) Bubble humidifier added to O-Ring setup.

2. **Maximum oxygen flows:**
   A. O$_2$ flows less than 2 L/min
   Flows higher than 2 L/min may increase the patient’s work of breathing.

3. **Precautions:**
   A. Dry gas may increase the viscosity of secretions.

4. **Troubleshooting:**
   A. Patient
      i) Monitor the tracheostomy tube for obstruction or dislodgement
      ii) Is the O-Ring clear of secretions
   B. Equipment:
      i) Flowmeter on and O$_2$ tubing hooked up
      ii) Tubing is not kinked
      iii) O-Ring is securely in place

**Humidification**

1. **Description:**
   A. Adds molecular water to dry medical gas.

2. **Bubble humidifiers are optional for when setting up:**
   A. Nasal cannula
   B. Simple mask (up to 8 - 10 L/min flow)

3. **Troubleshooting:**
   A. To warn of an obstruction to flow and to prevent bursting of the bubble humidifier, a simple pressure-relief “pop-off” is incorporated into the bubble humidifier.
   B. There will be an audible alert (whistling or high-pitched noise) when
      i) The O$_2$ flow is impeded
      ii) The O$_2$ flow is too high.

   Bubble humidifiers are not for use with:
   - Non-rebreather mask
   - Venturi mask (see next section)

   O$_2$ flow will be directed out of the oxygen delivery system and will result in lower than intended flow to the patient.

   Temperature affects humidification. The higher the temperature of the gas, the more water vapor it can hold.
4. Aerosol generators are used for:  
   A. Add humidity to Venturi mask  
   B. Aerosol mask or face shield (with or without supplemental oxygen)  
   C. Tracheostomy collar  

Adding an aerosol requires a physician order.  
Aerosols can be heated for increased humidity.  

5. Precaution:  
   i) Cool aerosols with higher flows can chill smaller patients.  
Monitor for changes in body temperature.  

REFERENCES:  

