BURNS: INHALATION INJURY - ICU

PURPOSE: To outline the management of the patient with an inhalation injury.

SUPPORTIVE DATA:

Inhalation of combustion products is the most lethal component of a burn airway injury. Inhaling super-heated air produces tissue damage and necrosis in the upper airway. Inhaling heated particles of soot and other matter also produces direct injury to the lower airway, impairing pulmonary function. Oxygen therapy and intubation with ventilatory support are often required.

When carbon monoxide (CO) is inhaled, it binds with Hemoglobin (Hgb) to form carboxyhemoglobin. CO has a much greater affinity for Hgb than oxygen. Patients with increased carboxyhemoglobin levels will have falsely high oxygen saturation.

Patients are most at risk for inhalation injury if:

- The burn injury was sustained in an enclosed space
- Aerosolized flammable liquid was ignited
- There was a flammable gas explosion
- There was prolonged exposure to a burning structure
- Burn is directly to the face with swelling

Signs of inhalation injury include soot in nares and oropharyngeal cavity, carbonaceous sputum, singed nasal hairs and eyebrows, burns of face, mouth, and conjunctivitis. Complications of inhalation injury include pneumonia, Acute Respiratory Distress Syndrome (ARDS), and laryngospasm.

Inhalation medications may ordered by the provider and administered by the Respiratory Care Practitioner

- Aerosolized heparin (patient must be intubated on high frequency percussive ventilator)
- Albuterol nebulized every 4 hours (alternated with heparin)
- Acetylcystine if mucus casts are detected

ASSESSMENT:

1. Assess the following parameters immediately upon admission and every 1 hour for 12-24 hours (as determined by physician based on level of facial swelling) in the ICU, then every 2 hours:
   - Vital signs
   - Stridor, wheezing, hoarseness
   - Oxygen saturation via pulse oximetry
   - Tachypnea, shortness of breath, accessory muscle use
   - Deterioration in level of consciousness
   - Pain
   - Nausea
   - Vertigo
2. Assess for signs of pneumonia and ARDS a minimum of every 4 hours:
   - Rhonchi, rales, diminished breath sounds
   - Increasing peak inspiratory pressure (PIP)
   - Change in secretion characteristics
3. Assess lab values as drawn on admission and as ordered:
   - White blood cell count
   - Arterial blood gases including carboxyhemoglobin level

SAFETY:

4. Maintain security of endotracheal tube (ETT)/tracheostomy tube. ETT/tracheostomy may be held in place via the following:
   - Trach ties to head harness
   - ETT/tracheostomy holders

REPORTABLE CONDITONS:

5. Notify the provider for:
   - Deterioration in vital signs, oxygen saturation
   - Stridor, wheezing, hoarseness
   - Tachypnea, shortness of breath
   - Increasing PIP
   - Increase in oxygen (FiO2) requirement
   - Signs of pulmonary infection
   - Mental status changes (confusion/agitation)
   - Abnormal lab values
     - Carboxyhemoglobin greater than 15%
   - Instability of ETT, e.g., sutures become loose

COLLABORATION:

6. Collaborate with Respiratory Care regarding alternate modes of ventilation.

PATIENT/FAMILY TEACHING:

7. Instruct on the following:
   - ETT securing methods
   - Reason for artificial airway

ADDITIONAL STANDARDS:

8. Refer to the following as indicated:
   - Artificial Airway - ICU
   - Burns: Chemical/Thermal Injury
   - Confused Patient
   - Immobility
   - Intravenous Therapy
   - Mechanical Ventilation
   - Ventilatory Modes, Alternate – ICU
   - Oxygen Therapy
   - Pain Management
   - Restraints
   - Sedation and Analgesia (Intravenous) – ICU

DOCUMENTATION

9. Document in accordance with documentation standards.

Initial date approved:	Reviewed and approved by:	Revision Date:
11/94	Professional Practice Committee Nurse Executive Council Attending Staff Association Executive Committee	11/00, 03/05, 04/09, 03/14, 03/15, 1/19