

Staying Alive - Postoperative Airway  
Management  
for Adults & Peds

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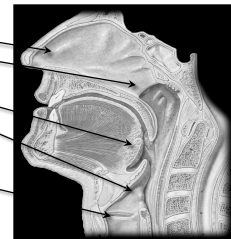
*“A perianesthesia  
nurse has the ability  
to recognize a  
problem before it  
becomes an  
emergency.”*

modified from Arnold Glasow

Respiratory System

Components of the Upper Airway

- Nose
- Nasopharynx
- Oropharynx
- Laryngopharynx
- Larynx



Risk for Postoperative Pulmonary  
Complications

- Upper abdominal or thoracic surgery
- Cigarette smoking
- Chronic respiratory disease
- Emergency surgery
- Anesthetic time >180 minutes or more

- Age > 70 years
- Renal failure
- Poor nutritional status
- Significant intraoperative blood loss
- Sleep disordered breathing  
with/without OSA

## Initial Airway Assessment

- Airway
  - Unobstructed, open, patent?
  - Adjuncts in place - oral/nasal airways?
  - Obstructed?
  - Endotracheal tube?
  - Tracheostomy?

## Initial Airway Assessment

- Breathing
  - Spontaneous, easy, regular?
  - Shallow, slow, rapid, irregular
  - Clear to auscultation?
  - Quiet or noisy?
  - Wheezing, rales, rhonchi
  - Apneic?

## Initial Airway Maneuvers

- Oxygen saturation assessment
- Stimulate patient
- Reposition head
- Head tilt/chin lift/jaw thrust
- Apply oxygen
- Insert airway adjunct as appropriate

## Postanesthesia Airway Issues

## Airway Obstruction

- Upper airway obstruction
  - Tongue relaxation
  - Edema, bleeding, soft tissue
- Rx
  - Chin lift, jaw thrust - airway maneuvers
  - Oral/nasal airway? Intubate?

- Laryngospasm
  - Partial or complete
  - Triggered by secretions (debris), Stage 2 extubation
  - May hear crowing (partial); see respiratory effort, no air movement
  - Rx
    - HOB ↑ , 100% O<sub>2</sub>, Bag w/positive pressure, airway maneuvers, meds, suction

- Bronchospasm
  - Pre-existing reactive airway, aspiration, allergy, pulmonary edema, foreign body
  - Coughing, , dyspnea, wheezing, shallow respirations
  - Rx
    - Bronchodilators, O<sub>2</sub>, epi, suction, removal of foreign body, support ventilation

- Subglottic edema
  - Most common in 1 to 4 year old
  - Procedures > 1 hour, head movement
  - Stridor, retractions
  - Rx
    - Racemic epi, humidified O<sub>2</sub>
    - Consider admission

## Aspiration

- Low frequency, high risk
- Full stomach, nasal or oropharyngeal airway in place, gag reflexes returning, nausea/vomiting
- Greatest risk - physical nature of the aspirate, chemical nature of the aspirate, volume of the aspirate

- Risk factors for aspiration pneumonitis: particulate matter, pH <2.5, volume >25 cc or 0.4 cc/kg
- 50% of aspirations occur postoperatively
- Prevention is key to avoiding/minimizing

- Symptoms
  - Tachypnea, tachycardia, hypotension, hypoxemia, rales, bronchospasm, laryngospasm
  - Gastric contents in oropharynx
  - CXR - findings may be inconclusive initially; radiographic findings may lag behind clinical signs by 24 hours

- Rx
  - Prophylaxis - nonparticulate antacids (Bicitra), H<sub>2</sub> blockers (ranitidine), gastrokinetic agent (metoclopramide)
  - Sellick maneuver (cricoid pressure) to prevent regurgitation
  - Supportive - suction, O<sub>2</sub>, bronch, PEEP
  - Avoid steroids, antibiotics

## Apnea/ Hypoventilation

- Cause: residual anesthetic agents, narcotics, muscle relaxants, inadequate reversal, thoracic or abdominal procedures, neuromuscular diseases
- Signs/symptoms: hypercarbia, ↓ RR, shallow respirations, ↑ ETCO<sub>2</sub>, ↑ PaCO<sub>2</sub>

- Rx
  - Manage cause, may need reversal, give supplemental O<sub>2</sub>, stimulate
  - Cautious use of opioids, sedatives
- Don't get lulled into a sense of security - O<sub>2</sub> saturation adequate - may be hypercarbic!

## Hypoxemia

- Reduced risk with pulse oximetry
- Cause: low inspired O<sub>2</sub>, hypoventilation, shunts, atelectasis, upper airway obstruction

- S/S: agitation, somnolence, tachypnea, hyper/hypotension, cyanosis
- Rx
  - Correct cause, O<sub>2</sub>, deep breathing, incentive spirometry
  - Intubate, ventilate

## Pulmonary Embolism

- Patient predisposed: obese, CHF, immobile, malignancy, pelvic/long bone procedures
- Signs/symptoms: tachycardia, tachypnea, pleuritic chest pain, hemoptysis, complaining of breathlessness, hypotension, ECG-nonspecific ST changes in 2/3 of patients, anxiety, syncope

- Rx
  - Prevention: SQ heparin, SCDs decrease incidence
  - Correct hypoxemia & hemodynamic instability
  - Anticoagulation (IV heparin)
  - Pulmonary angiography remains standard for diagnosis

## Pulmonary Edema

- Caused by fluid overload, CHF, pulmonary injury
- Signs/symptoms: hypoxemia, rales, ↓ pulmonary compliance, on CXR: infiltrates

- Rx
  - Treat cause, diuretics/fluid restriction to ↓ afterload, meds, O2, ventilation

## Noncardiogenic Pulmonary Edema

- Causes include upper airway obstruction, laryngospasm, bolus dosing with naloxone, incomplete reversal of neuromuscular blockade, significant period of hypoxia
- POPE

## Causes of POPE

- Type I
  - Postextubation laryngospasm
  - Epiglottitis
  - Croup
  - Choking/foreign body
  - Strangulation
  - Hanging
  - Endotracheal tube obstruction

- Laryngeal tumor
- Goiter
- Mononucleosis
- Postoperative vocal cord paralysis
- Migration of Foley catheter balloon used to tamponade epistaxis
- Near drowning
- Intraoperative direct suctioning of endotracheal tube adapter

## Causes of POPE

- Type II
  - Post-tonsillectomy/ adenoidectomy
  - Post-removal of upper airway tumor
  - Choanal stenosis
  - Hypertrophic redundant uvula

- S/S: respiratory distress w/tachypnea, SOB, tachycardia, pink frothy sputum, rales & rhonchi, ↓ O2 sat, hypoxemia & hypercarbia, pulmonary infiltrates
- Rx
  - Oxygen, CPAP, reintubate, PEEP supportive. morphine, diuretics?

## Pneumothorax

- Caused by percutaneous internal jugular and subclavian vein cannulation, monitoring line placement, certain UE blocks, surgical procedures of chest

- Signs/symptoms: sharp ipsilateral chest pain, dyspnea, ↓ breath sounds, hyperresonance on affect side
- Rx
  - O2, CXR: 20% or less - observe; >20% pneumo or cardiac compromise: chest tube

## Nursing Competencies

- Demonstrate basic airway management - BLS
  - Perform a respiratory assessment on admission and discharge and per unit protocol and patient condition.
  - Identify the signs and symptoms of respiratory distress or airway obstruction.
  - Identify existing and/or select the type of airway adjunct and oxygen delivery system based on adequacy of oxygenation and condition of patient.

- Demonstrate advanced airway management: ACLS.
  - Determine effectiveness of ventilation.
  - Demonstrate use of bag-valve-mask.
  - Identify equipment utilized for advance airway support.
  - Identify indications for advanced airway support.

- Provide nursing care for the patient experiencing respiratory complications.
  - Demonstrate assessment for complete or partial respiratory obstruction.
  - Recognize signs of airway obstruction.
  - Provide appropriate nursing interventions for emergency respiratory complications.
  - Demonstrate appropriate interventions to prevent emergency respiratory complications.

## Additional Competencies

- Provide nursing care for the patient experiencing
  - Laryngospasm
  - Bronchospasm
  - Hypoxemia
  - Aspiration
  - Pulmonary edema
  - Pulmonary embolism
  - Pneumothorax

## Risk Management

- Maintain Standard of Care
- Continuing education
- Proper use of equipment
- Documentation
  - According to unit/facility policy
  - Accurate, complete reporting of events
  - Maintain integrity of medical record

## Caveats

- Use common sense & critical thinking skills....
- Prepare for the unexpected....
- Watch out for the zebras....
- Know your unit....
- Know your resources....
- Tell the story....

By failing to prepare, you are preparing to fail.

Benjamin Franklin (1706 - 1790) US statesman, diplomat, inventor, printer

Expect the best, plan for the worst, and prepare to be surprised.

Denis Waitley US motivational speaker