Postoperative Pulmonary Edema

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Postoperative Pulmonary Edema

- Half the patients with perioperative pulmonary edema have preoperative evidence of cardiovascular disease.

Ann Surg 172:883, 1970

Conditions Leading to Pulmonary Edema, Acute Lung Injury, and ARDS

Increased Hydrostatic Pressure
- Acute left ventricular failure
- Chronic congestive heart failure
- Volume overload
- Thoracic lymphatic insufficiency
- Obstruction of LVOT

Mixed or Incompletely Understood Pathogenesis
- Hanging injuries
- High-altitude pulmonary edema
- Narcotic overdose
- Neurogenic pulmonary edema
- Postextubation obstructive pulmonary edema
- Re-expansion pulmonary edema
- Tocolytic therapy
- Uremia

Altered Permeability State
- Acute radiation pneumonitis
- Aspiration of gastric contents
- Drug overdose
- Near-drowning
- Pancreatitis
- Pneumonia
- Pulmonary embolus
- Shock states
- SIRS and multiple organ failure
- Sepsis
- Transfusion
- Trauma and burns

Sabiston Textbook of Surgery, 17th ed.

Postoperative Pulmonary Edema

- Cardiogenic causes
  - LV dysfunction (MI, Heart failure)
- Non-cardiogenic causes
  - Aspiration pneumonitis
  - Fluid overload
  - Post-obstructive lung edema

Chest 1999; 115(5): 1371-1377

Postoperative Pulmonary Edema

- Non-cardiogenic causes
  - Neurogenic pulmonary edema secondary to postoperative hyponatremic encephalopathy
  - Head trauma
  - Pheochromocytoma

Chest 1999; 115(5): 1371-1377

Postobstructive Pulmonary Edema

- Etiology
  - Large negative intrathoracic and transpulmonary pressure. These have generally been reported to be secondary to trying to inspire against an obstructed airway.
  - Some authors feel young healthy patients- especially male athletes- are at higher risk because of the ability to generate greater negative intrathoracic pressure.
- Causes
  - obstructive sleep apnea
  - mediastinal tumor
  - oropharyngeal surgery

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Postobstructive Pulmonary Edema

- Causes
  - Laryngospasm (the most common cause)
  - Strangulation
  - Epiglottitis
  - Foreign-body aspiration
  - hypothyroidism, thyroid goiter
  - hiccups
  - croup
  - TMJ arthroscopy

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Postobstructive Pulmonary Edema

- Causes
  - hematoma
  - difficult intubation
  - biting of a laryngeal mass
  - raised airway resistance in intubated patients
  - inspissated tracheal secretions
  - upper airway tumor
  - obesity
  - acromegaly

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Postobstructive Pulmonary Edema

- Clinical presentations
  - sudden onset of dyspnea, tachypnea, hypoxemia, hypercapnia, and pink frothy secretions after relief of airway obstruction
  - The onset is usually within minutes of relief of upper airway onstruction, but some may not develop for several hours.

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Postobstructive Pulmonary Edema

- Clinical presentations
  - CXR: a widened vascular pedicle with centralized bilateral alveolar and interstitial infiltrates
  - Rapid onset and resolution, with the significant clinical and radiographic improvement in 12 to 24 hours.
  - Cardiogenic etiology and aspiration pneumonia should be entertained

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Postobstructive Pulmonary Edema

- Incidence
  - The incidence has been report in the literature to be up to 11%, with a special predilection for head and neck patients.

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Postobstructive Pulmonary Edema

- Treatment
  - Positive pressure ventilation during the phase of laryngospasm
  - If prolonged laryngospasm (ie, greater than 30 seconds), consideration should be given to the administration of SCC 1 mg/kg, followed by intubation and mechanical ventilatiion.
  - Patients frequently require at least physiological PEEP (5 mmHg)

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Postobstructive Pulmonary Edema

- Treatment
  - Diuretics: controversial; furosemide 0.5~1 mg/kg, commonly reserved for patients with marked hypervolemia from aggressive intraoperative hydration
  - Hemodynamic monitoring
  - ECG and serum troponin may be indicated to rule out cardiac injury

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Treatment of Postoperative Pulmonary Edema

- Lowering hydrostatic pressure in the lungs to the lowest possible level consistent with adequate perfusion of all organ systems.
  - Diuretics, fluid restriction, vasodilator
  - Dialysis if associated renal failure is present
  - Positive-pressure ventilation with PEEP to increase lung volume

Miller's Anesthesia, 6th ed.

For this patient...

- No previously cardiac, pulmonary, kidney or liver dysfunction
- Normal preoperative EKG, CXR, BUN/CRE, AST/ALT level
- No blood transfusion
- Not overhydrating intraoperatively
- Rapidly resolution

For this Patient

- Check EKG and cardiac enzyme to rule out cardiogenic pulmonary edema
- May consider positive pressure ventilation with PEEP if still de-saturated

Thank You!!