Perianesthesia Complications

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Objectives

• Review special cases including:
  - Airway complications
  - Cardiology
  - PONV
  - Malignant Hyperthermia
  - ABGs (Handout)
Complications-Airway

- Obstruction
- Laryngospasm
- Bronchospasm
- Pulmonary Edema
- Pulmonary Embolism
- Hypoventilation
- Aspiration
- Pneumothorax
Obstruction

- Upper airway-tongue, swelling, secretions
- Reposition, suction, artificial airway,
Laryngospasm
Signs and Symptoms

- Partial/Complete
  - Agitation
  - Anxiety, panic
  - Dyspnea, hypoxemia, hypercarbia
  - Crowing Respirations
  - Stridor
  - Absent breath sounds with visible effort
  - Use of abdominal or accessory muscles
Precipitating Factors

- Excess secretions
- Vomitus
- Blood
- Airway placement
- Coughing
- Frequent suctioning
- Pungent inhalational anesthetics
Nursing Interventions

- Reduce environmental stimuli
- Administer humidified O2
- Positive pressure ventilation with BVM with 100% O2
- Succinylcholine
- Steroids
- Lidocaine
- Reintubate
- Prevention-extubation deep or still asleep
Bronchospasm
Risk Factors

- Aspiration
- Tracheal/pharyngeal suctioning
- Intubation
- Histamine release
- Allergic response
- COPD
Signs and Symptoms

- Wheezing
- Shallow, noisy respirations
- Dyspnea
- Use of accessory muscles
- Tachypnea
- Decreased O2 saturation
Nursing Interventions

- Decrease airway irritability
- Administration of bronchodilators
- Humidified O2
- If severe, consider muscle relaxants, lidocaine, epinephrine and hydrocortisone
Pulmonary Edema
Risk Factors

- Fluid Overload
- Laryngospasm
- Narcotics
- PE
- LVF, MV dysfunction
- Sepsis
- DIC
- Naloxone administration in young adults
Signs and Symptoms

- Signs/Sx
  - Tachycardia
  - Dyspnea
  - Tachypnea
  - Confusion
  - Wheezing
  - Hypotension
  - Pink frothy sputum
  - Infiltrates on CXR
Nursing Interventions

- Reduce the cardiac workload
- Place in upright position
- Remove and treat the causes of edema
- Anti-anxiety measures
- Maintain oxygenation
- Administer diuretics
- Maintain fluid restrictions
- I and O
- Consider afterload reduction
Pulmonary Edema

Negative Pressure Pulmonary Edema or Non-Cardiac Pulmonary Edema

Can be associated with an increased inspiratory force prior to or associated with extubation
Pulmonary Embolus
Risk Factors

- Virchow’s Triad
- Obesity
- CHF
- Immobility
- Malignancy
- Fracture-Pelvic, Long Bone
- Surgery
Signs and Symptoms

- Hypoxia
- Restlessness
- Headache
- Apprehension
- Delirium
- Splinting
- Retractions
- Pleuritic Pain
- JVD
- Chest Pain
- Dysrhythmias
Nursing Interventions

- Correct hypoxemia
- Support cardiac output
- Heparin therapy
- Bedrest
- Fluids
Hypoventilation

Signs and Symptoms

↓ respiratory rate
↓ respiratory depth
Retention of CO2 >45 mm/Hg
Hypoxemia

Nursing Interventions

Stimulate patient to increase RR and depth
Identify and remove cause
Intubation and mechanical ventilation
Aspiration

**Causes** - teeth, obesity, full stomach, trauma, ETOH

**Signs/Symptoms** - depend on cause
- dyspnea, cyanosis, tachycardia, cough, hypoxemia
- bronchospasm

**Nursing Interventions** - removal of FB, airway support, proper positioning, for gastric contents-steroid and antibiotic
Pneumothorax

**Risk Factors** - PPV, Central line placement, brachial plexus or intercostal nerve blocks

**Signs/Symptoms** - apprehension, cyanosis, chest pain, diminished breath sounds on affected side, tracheal shift toward unaffected side

**Nursing Interventions** - observe, CXR, O2, prepare for chest tube insertion (pneumo >20%)
Cardiovascular

- Cardiovascular Function
- Hypotension/Hypertension
- Cardiac Dysrhythmias
Cardiovascular

- **Preload**—reflects the venous return to the heart and is a measure of right heart function
  - RAP, CVP, PCWP
- **Afterload**—resistance the heart must work against to eject blood out of the left ventricle
  - DBP or SVR
- **Contractility**—CO or CI (CO x BSI)
Care of Cardiac Surgery Patients

Potential Complications

1. Bleeding
   a. Surgical causes
   b. Non surgical causes

2. Cardiac Tamponade
Care of Cardiac Surgery Patients

Potential Complications

3. Cardiogenic Shock
   low output syndrome

4. Arrythmias
   pulmonary cause-ETT, pneumo,
   non pulmonary-MI, hypothermia, electrolytes
Pearls of Wisdom

*Know about blood products available for your patient

*Know risk factors for potential complications

*Be prepared for sudden changes in patient’s status

*Keep one eye on the monitor

*And the other on the patient and chest tubes

*Know your equipment
Hypotension/Hypertension

- Blood pressure change from 20-30% of baseline
- Common causes - volume, medications (narcotics, anesthetics), pain, ischemia,
- Treat causes
Cardiac Dysrhythmias

- Treat Causes
- ACLS protocol
PONV

Incidence
occurs in 1/3 of patients undergoing surgery
up to 80% incidence among patients with
predetermined risk factors

Causes-Multifactorial, therapy multimodal
Independent Risk Factors

*female
*nonsmoker
*history of PONV
*history of motion sickness
Associated Risk Factors

- Age
- Presence of delayed gastric emptying
- ASA status
- Anxiety
- Pain
- Preoperative Fasting
Associated Surgical Risk Factors

- Surgery duration
- Type of Surgery
  - ENT
  - Abdominal
  - Ophthalmic
- Hypovolemic
Associated Anesthetic Risk Factors

- Use of volatile anesthetics or nitrous oxide
- Perioperative Opioid Administration
- Type of Approach
Consequences

- Physiological-surgical site disruption, fatigue, dehydration, electrolyte imbalance, airway compromise with aspiration, ↑ICP, ↑intraorbital pressure

- Delay oral nutrition and drug therapy
  interference with diabetic and antihypertensive drugs

- Increased costs-
  delayed discharge, cost of treating, nursing time, unplanned admissions

- Patient satisfaction
  PONV is among the top ten undesirable outcomes of surgery.
Multimodal Management

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Prophylactic Treatment

- Hydration
- TIVA (Propofol and Oxygen)
- Medication
Medications

Serotonin Receptor Antagonists (5-HT3)
  Ondesetron, dolasetron, granisetron

Dopamine Receptor Antagonists (D2)
  Droperidol, Prochlorperazine, Metoclopramide

Histamine Receptor Antagonists
  Promethazine, Diphenhydramine

Muscarinic Receptor
  Atropine, Glycopyrolate, Scopolamine patches

NK1-Substance P
  Aprepitant

Dexamethasone is often used in combination with 5-HT3 or D2 blocking agent
Rescue Treatment

- Drug used for prophylaxis should not be used for rescue in immediate postop period
- Select an agent with a different receptor blocking ability
- Prochloperazine, Promethazine
Non Pharmacologic Interventions

Ginger

Aromatherapy (essential oils-peppermint, isopropyl alcohol)

Accupressure, accupuncture

Supplemental oxygen
Nursing Interventions

- Know patient’s risk factors
- Environment of care-decrease stimulation
- Ensure hydration
- Move patients slowly
- Provide adequate analgesia
- Patient education
Thermoregulation
Unplanned Perioperative Hypothermia (UPH)

- Unexpected core temperature decrease to less than 36° C as a result of surgery or other procedure.

- May be present regardless of patients temperature if shivering, peripheral vasoconstriction or piloerection.

- Generalized depression of the metabolism
Unplanned Perioperative Hypothermia (UPH)

Radiation - loss of energy through radiant electromagnetic waves (no direct contact-warm to cool-limit skin exposure, warming blankets, head covering)
Convection - transfer of body heat to cooler air (fan, laminar flow)
Conduction - transfer of heat through direct contact with cooler objects (OR table, IV fluids)
Evaporation - transfer of heat when a liquid is changed to a gas (respirations, gases, exposed viscera)
Risk Factors

- Every patient undergoing surgery
- Age
- Female Gender
- BMI
- Procedure duration
- Body surface uncovered
- Anesthesia duration
- General or Regional Anesthesia
Consequences

- Patient discomfort-shivering, feels cold
- Increase in serum catecholamines
- Untoward cardiac events
- Coagulopathy
- Altered drug metabolism
- Impaired wound healing/surgical site infections
- Increased hospital costs
- Increased LOS
Patient Management

- Monitor pre, intra and postoperatively
- Implement passive warming
- Maintain ambient room temperature
- Institute active warming for hypothermic patients
- Consider preoperative warming
Malignant Hyperthermia

- Biochemical chain reaction response in susceptible individuals by anesthetics
- Leads to hypermetabolic state
MH

- Incidence-1:100,000 surgeries/adults
  1:30,000 surgeries/children
- Many undetected cases
- Males > Females
- Mean age 15
- Genetically inherited-autosomal dominant gene
Risk Factors

- History of anesthesia complications
- Unexplained family history of periop fever or muscle rigidity
- Unexplained death during surgery of a family member
- Patients with preexisting muscle disease
- Developing cola color urine postoperatively
Triggers

Agents
- Depolarizing muscle relaxants-
  - SUCCINYLCHOLINE
- ALL volatile inhalation agents

Situations
Emotional stress, strenuous exercise, trauma, heat stroke
Malignant Hyperthermia

exposure to volatile inhalation agents or succinylcholine

↓

abnormal release of calcium from the skeletal muscle

↓

sustained muscular contraction (damage and destruction of muscle cells)

↓

hypermetabolic state (↑ energy utilization and ↑ heat)

↓

systemic hypoxemia

↓

acidosis

↓

↑K+, ↑ myoglobin
Clinical Manifestations

- Hypercarbia and Hypoxia
- Tachycardia and Dysrhythmias
- Tachypnea
- Muscle Rigidity
- Hyperkalemia
- Temperature Elevation
- Acidosis
- Coagulopathy
- Rhabdomyolysis
- LVH
Treatment

- Recognition
- Remove all triggering agents
- Stop procedure ASAP
- Administer 100% Oxygen
- Dantrolene
- Cooling
- Maintain Fluid and electrolyte balance
- Monitor Cardiac Status-avoid calcium channel blockers
Dantrolene

Reconstituted with 60 ml of sterile preservative free water

Dosage

- 2.5/mg/kg IVP rapidly up to total of 10 mg/kg (initial)
- Repeat 4 mg/kg in divided doses every 4-6 hours (IVP or orally) up to 48 hours
Testing for MH

- Testing usually reserved for those with family history of MH
- Most accurate and reliable test - Caffeine Halothane contracture test
- Patient and Family teaching and support through MHAUS
Pain

• ASPAN’s Pain and Comfort Guidelines

• Assessment Scales

• Pharmacologic and NonPharmacologic Approaches to Pain Management

• Patient Teaching and Education
Cleveland Clinic

Every life deserves world class care.