Postanesthesia Care Unit (PACU)

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Overview

• Purpose and “phases” of a PACU stay
• Criteria for PACU discharge
• Common and uncommon PACU problems
• Checklist for a safe and effective PACU transfer

Why a PACU?

• Majority of post-op pts require a period of physiologic stabilization
• A relatively high incidence of potentially life-threatening resp and circulatory complication
  – Phase 1 – Monitoring and staffing ratio equivalent to an ICU
  – Phase 2 – Transition to floor or home
• Some patients are admitted directly to the ICU
• “PACU Bypass”
Aldrete Score

Discharge from Phase 1

Score ≥ 8

PACU Bypass or “Fast tracking”

- Anesthetics with rapid offset or sedation
- Regional anesthetic techniques
  - Modified Aldrete Score: ≥ 12 for discharge

Potential Issues in the PACU

- Ventilation Problems
- Hemodynamic Instability
- Postop pain, nausea and vomiting
- Delayed emergence
- Oliguria
- Hypothermia
- Agitation (emergence delirium)
Most Common Ventilatory Issues

• Upper Airway Obstruction
  – Pharyngeal – tongue
  – Laryngeal – laryngospasm, edema

• Arterial Hypoxemia
  – PaO₂ < 60 mmHg
  – Atelectasis, dec. FRC, alveolar hypoventilation

• Hypoventilation
  – PaCO₂ > 45 mmHg
  – Residual anesthetic or muscle relaxant; opioids
  – Co-existing COPD, pain, surgical site, positioning

• Postop intubation...

Extubation Criteria

• State of consciousness
• VC greater than 15 ml/kg
• Inspiratory force greater than -20 cmH₂O
• Acceptable pH and ABG at 40% FiO₂

Special Considerations

• Difficult intubations
• Obstructive sleep apnea
• Reactive airway disease
• Aspiration
• Pneumothorax
• Pulmonary edema
• Pulmonary embolus
Approach to Respiratory Emergencies

- Supplemental O₂ plus ensure airway patency
  - Simple chin lift, neck extension
  - Oral/nasal airway
  - Mask ventilation/CPAP/Reintubation
  - Bronchoscopy
- Bronchoconstriction - Inhaled beta-agonist
- Chest X-ray
- Diuretics
- Chest tube insertion for symptomatic pneumothorax or > 20%

Cardiovascular Issues

- Hypo- or Hypertension
- Tachycardia
- Arrhythmias
- Myocardial ischemia

Hypertension and Tachycardia

- Hyperdynamic phase is common
- Most often:
  - PAIN
  - Essential hypertension
  - Hypoventilation/hypercarbia
  - Hypothermia and shivering
  - Bladder distention
Hypertension and Tachycardia

- Maintain a broad differential diagnosis:
  - Hypoxemia
  - Fever
  - Anemia
  - Hypoglycemia
  - Tachydysrhythmias
  - Withdrawal
  - Myocardial ischemia
  - Medications

- Rarely:
  - Hyperthyroidism
  - Pheochromocytoma
  - Malignant hyperthermia

Hypotension

- Hypovolemia #1 cause
- Surgical blood loss/anemia
- Ongoing hemorrhage
- Heart failure
- Dysrhythmias
- Ischemia
- Sepsis/anaphylaxis
- Tension pneumothorax

Treatment of Hypotension

- Assess intravascular volume
- Fluid bolus – ? Response
- Communicate with surgeon
- Vasopressor or inotropic support
- Failure to respond → invasive monitoring
- ? Cardiac dysfunction or valvular disease
- Tension pneumothorax requires immediate treatment
Delayed Emergence or “Slow to Awaken”

- Failure to progress beyond protective airway reflexes and minimal conscious awareness
- Review medical history and surgical procedure
- ABC’s
  - Hypoxia
  - Hypercarbia
  - Hypocarbia

- Medication Effect
  - Premeds
  - Neuromuscular blockade
  - Anesthetics
  - Other meds
  - Substance abuse

- Metabolic
  - Hyponatremia
  - Hypoglycemia
  - Hypothermia
  - Hepatic encephalopathy
  - Hypothyroidism
  - Addison’s/Cushing’s

- Neurologic
  - Ictal or post-ictal state
  - CVA
  - Cerebral edema and elevated ICP

- Baseline condition
Oliguria
- Urine output < 0.5 ml/kg/hr
- Prerenal
  - Hypovolemia, hypotension & hypoperfusion
- Renal
  - ATN – ischemia, toxins, myoglobin
  - Intrinsic disease
- Postrenal
  - Obstructed catheter, BPH
- Baseline condition??

Hypothermia
- Core body temp < 36 °C
- Physiologic effects of 33 °C
  - HTN tachycardia
  - Increased oxygen consumption
  - Hyperventilation
  - Prolonged drug metabolism
- MAC decreases 5-7%/°C fall in body temp

Agitation or Emergence Delirium
- ABC’s
  - Hypoxia
  - Hypercarbia
- Medication effect
  - Premeds
  - Home meds
  - Withdrawal
- Bleeding
- Pain
- Anxiety
- Discomfort
- Disorientation
- Distended bladder
- Movement disorder
- Baseline
Nausea and Vomiting
• Most common postop problem – 20-30% pts
• Risk factors:
  1. H/o PONV or motion sickness
  2. Female
  3. Non-smoker
  4. Anesthetic factors (opioids, nitrous oxide, volatiles)

Pain
• #1 cause for treatment in PACU
• Causes multiple issues
  – HTN, tachycardia, hypoventilation, agitation, N/V
• Multimodal therapy –
  – Opioids
  – NSAIDs
  – Local anesthetic infiltration
  – Regional anesthesia

Incidental Trauma
• Ocular injuries and visual changes
  – Corneal abrasions
  – Ischemic optic atrophy – prone, hypotension, anemia, long surgery
• Oral and pharyngeal injuries
  – Dental, lip, tongue, hoarseness, sore throat
• Nerve injuries - ulnar
PACU ADMISSION CHECKLIST

PACU Admission Checklist

• Patient identification (name, age, sex, language or comprehension limits such as hard of hearing/blindness)
• Diagnosis, surgical procedure and surgeon
• Brief medical history

PACU Admission Checklist

• Allergies and daily medications
• Anesthetic course, technique, agents used, complications
• Intraoperative meds (time and dose): antibiotics, muscle relaxation agents, reversal agent, antiemetics, beta-blockers and pain meds
PACU Admission Checklist

• Intubation and extubation problems
• Anticipated need for pain medications
• Intraoperative fluid balance, types of fluid, blood loss and replacement
• Intraoperative laboratory data

PACU Admission Checklist

• Intraoperative line placement and management plan (PAC, CVP, A-line)
• Airway management plans for the intubated patient
• Anticipated problems

PACU Admission Checklist

• Postanesthetic orders (e.g. oxygen administration, ventilator settings, fluid administration, antiemetic and analgesic treatment)
**Antiemetics**

- Prochlorperazine (Compazine) 5 mg administer IV, may repeat x__ for a total of__ mg PRN N/V
- Ondansetron (Zofran) 4 mg administer IV, may repeat x__ for a total of 8 mg PRN N/V **(OR and PACU doses combined)**
- Metoclopramide (Reglan) 10 mg IV, may repeat x__ for a total of__ mg PRN N/V **(Give slowly over 3-4 minutes)**
- Dexamethasone __mg IV **ONE TIME ONLY**

**Analgesics**

- Morphine (mg)__ IV every__ minutes for__ mg total dose
- Hydromorphone(mg)__ IV every__ minutes for__ mg total dose
- Fentanyl (mcg)__ IV every__ minutes for__ mcg total dose
- Meperidine ___mg IV one time only, use for SHIVERING

**Antihypertensive Therapy**

- Labetolol __mg every __ minutes for total of __mg for BP >
- Hydralazine __mg every __minutes for total of __mg for BP >
- Metoprolol __mg every __minutes for total of __mg for BP > __ or HR >