POST ANESTHESIA CARE MARCH 23, 2012

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Objectives

- Have a basic comprehension of different anesthetic approaches
- Understand common post anesthesia complications and treatments
- Understand appropriate post anesthesia focused assessments
- Understand the use of the Aldrete Score
- Understand PACU discharge criteria
- Be able to answer the question: "Is the patient recovered?!??!!?"

Facility Specific

- Tertiary Care Centers
  - Higher acuity, more resources
- Critical Access Hospital
  - No designated PACU after hours
  - Non traditional PACU settings

History of Post Anesthesia Care

- Need recognized within the last 50 years
- Specialized nursing care required
- WW II
- Increasingly Complex
- Sicker Patients
- ICU
- Inpatient vs. Outpatient

Ever Evolving

- Changes to procedures
  - Open vs. Laparoscopic/Arthroscopic
- Ambulatory vs. inpatient
- Changes to anesthetics
  - Propofol
  - Volatile Anesthetics
  - Regional Anesthesia

ANESTHETIC REVIEW

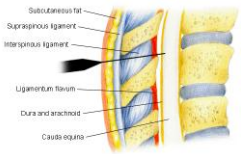
General Anesthesia

ENDOTRACHEAL TUBE INTUBATION

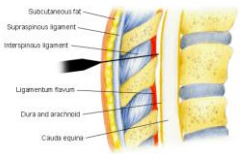
LARYNGEAL MASK AIRWAY

Neuraxial Anesthesia

SPINAL ANESTHESIA



EPIDURAL ANESTHESIA



Regional Anesthesia

- Peripheral Nerve Blocks
  - Primary Anesthetics
    - Used as the sole anesthetic
  - Adjuncts for pain relief
    - Used in conjunction with other anesthetics
    - Decreases "wind up"

Monitored Anesthesia Care

- Not the same as Sedation/Analgesia
- Deeper level of sedation
- Always administered by an anesthesia provider
- Incremental doses
- Benzodiazepines
- Propofol
- Opioids
- Alpha Agonists

Patient Report

GENERAL REPORT

- Patient identification
- Age
- Surgical procedure
- Diagnosis
- Summary of PMH
- Allergies
- Medications
- Preoperative vital signs
- Specific features such as deafness, psychiatric issues, or language barriers

Patient Report

PHARMACOLOGICAL REPORT

- Location and size of IV catheters
- Premedication
- Antibiotics
- Anesthetic drugs for induction and maintenance
- Opioids
- Muscle relaxants
- Reversal agents
- Vasoactive drugs
- Bronchodilators
- Other relevant medications

Patient Report

PROCEDURAL REPORT

- Exact nature of the surgical procedure
- Relevant surgical issues
- Circulating RN report

Patient Report

ANESTHETIC REPORT

- Emphasis on problems that may impact the immediate postoperative course:
  - Lab values
  - Difficult IV access
  - Difficult intubations
  - Intraoperative hemodynamic instability
  - Electrocardiogram changes
- PACU orders

POST OPERATIVE ASSESSMENTS , COMPLICATIONS and INTERVENTIONS

Hemodynamic Complications

Respiratory Complications

Renal Complications

Neurological Complications

Primary PACU Assessment

1. Airway—Is it patent?
2. Breathing—Respiratory rate and rhythm, oxygen administration
3. Mental Status—level of consciousness
4. Surgical Incision Site/Dressing/Drains
5. Vital Signs
6. Intravenous Fluids
7. Other Tubes: Foley, NG tube, suction, amount and type of drainage

Continuous Assessment/Monitoring

- Level of Consciousness
- Breathing Pattern
- Peripheral Perfusion
- Vital signs
  - Non invasive
  - Invasive
  - Appropriate intervals
    - Q5m x first 30 minutes, q15m x4, q30m x 2, q4h
- Throughout all assessments you need to think globally!

Focused Respiratory Assessment

- Airway
- Breathing
  - Lung Sounds
  - Work of Breathing
  - SpO_2

Respiratory Complications

- Hypoxemia
  - Atelectasis
  - Hypoventilation
  - Diffusion hypoxia
  - Upper airway obstruction
  - Bronchospasm
  - Gastric aspiration
  - Pulmonary edema
  - Pneumothorax
  - Pulmonary embolism

Respiratory Complications

- Hypoventilation
  - Decreased ventilatory drive
  - Pulmonary and respiratory muscle insufficiency
    - Preexisting respiratory disease
    - Inadequate reversal of neuromuscular blockade
    - Upper airway obstruction
    - Inadequate analgesia
    - Bronchospasm
    - Pneumothorax

Respiratory Complications

- Intubated Patients
  - Delayed emergence from general anesthesia
  - Inadequate reversal of neuromuscular blockade
  - Inadequate gas exchange
  - Potential for airway obstruction
  - Full stomach
  - Hemodynamic instability
  - Hypothermia

Respiratory Interventions

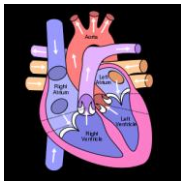
- Supportive Treatments
- Consult Respiratory Colleagues
  - BiPAP/CPAP
- Reintubation?

Extubation Criteria

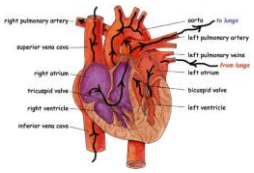
- Adequate arterial PaO_2 or SpO_2
- Adequate breathing pattern
- Adequate level of consciousness
- Recovery of muscle strength
- Prepare for reintubation!

Focused Circulatory Assessment

- Heart rate
  - Rhythm
  - Blood pressure
  - Rhythm strip
- Perfusion
  - Capillary refill
  - Pulses
  - Color and temperature of nail beds and skin



Focused Circulatory Assessment



- Monitor for hemorrhage
  - Increased bleeding (surgical site) or other places
  - Decreased blood pressure
  - Increased respirations
  - Weak, thready pulses
  - Cool clammy, pale skin
  - Restlessness

Circulatory Complications

- True Hypovolemia
- Relative Hypovolemia
- Vasodilation
- Decreased Inotropy

Circulatory Complications

- Hypertension
  - Most commonly in patients with preexisting disease
  - Multifaceted
  - Presentation
  - Important to verify accuracy!

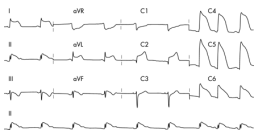
Circulatory Complications

- Hypertensive treatment goal: Restore blood pressure to the preprocedure level
- Resuming of chronic antihypertensive treatment is ideal, but some fast acting treatments are:
  - Beta Adrenergic Blockers
  - Calcium Channel Blockers
  - Vasodilators/Nitrates
  - Alpha Adrenergic Blockers

Circulatory Complications

- Arrhythmias
  - Many different causes
  - PAC's and Unifocal PVC's
  - Paroxysmal Supraventricular Tachycardias
  - Sinus Bradycardia
  - Stable Ventricular Arrhythmias
  - Unstable VT and VF

Circulatory Complications



- Myocardial Ischemia and Infarction
  - T Wave Changes
    - Very common postoperatively
  - ST Segment
    - Elevation or Depression
    - Highly specific measure for myocardial ischemia or infarction
  - Interventions

Focused Temperature Assessment

- Many different ways to assess patient's temperature
  - Axillary
  - Oral
  - Temporal
  - Rectal
  - Foley Catheter
  - Esophageal
  - Nasal
- Hypothermia: OR and PACU are at a lower temperature
  - Certain patients at a higher risk

Variations in Body Temperature

- Hypothermia/Shivering
  - Hypothermia: increases the average PACU stay by 40-90 minutes
  - Result of intraoperative hypothermia or effects of anesthetic agents
  - Normally directly related to duration of surgery and amount of volatile anesthetic used
  - Body's efforts to increase temperature
  - Due to the impaired response of the body, can have adverse effects

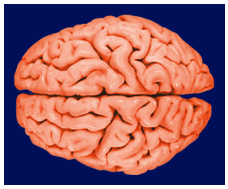
Variations in Body Temperature

- Hyperthermia
- Malignant Hyperthermia
  - True anesthesia emergency
  - Genetic deletion
  - Causes increased Calcium secretion out of cells
  - Can occur anytime in the perioperative period

Fluid and Electrolytes Assessment

- Monitor lab values
  - Sodium
  - Potassium
  - Chloride
  - Glucose
  - Hemoglobin
  - Hematocrit
- Assess hydration status
- Assess Fluid balance
  - Amount positive or negative
  - Type
  - Rationale of fluid replacement
  - Urine output
  - Estimated fluid loss
  - Estimated blood loss.

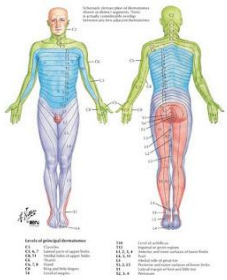
Focused Neurological Assessment



- Level of consciousness
  - Progression of changes
- Pupillary reflexes
- Gag reflexes
- Hand grips
- Movement of extremities
- Orientation
  - Person, Place, Time, Current Events

Focused Neurological Assessment

- Variations depending on anesthetic
  - Regional Blocks
  - Neuraxial
    - Dermatones



Neurological Complications

- Delayed awakening:
  - Persistent effects of anesthesia: most common
  - Decreased cerebral perfusion
  - Metabolic
- Neurological Damage
  - Stroke
    - Thromboembolic or hemorrhagic
- Emergence Delirium
- Peripheral Neurologic Lesions

Neurological Interventions

- Assess, Assess, Assess
- Blood glucose
- Report to provider
- Radiological studies

Agitation

- Postoperative restlessness – pain manifestation
- Can be triggered by many other serious systemic disturbances
- Significant agitation may require restraints to prevent self injury
- Marked preop anxiety can trigger postop agitation
- Adverse drug effects
- Persistent agitation may require sedation

Focused Gastrointestinal Assessment

Anesthetics slow gastric motility

- Bowel Sounds
  - Faint or absent immediately post-op
  - Assess for distention
  - Paralytic ileus
    - From bowel handling/anesthesia
- Nasogastric/orogastric tube
  - Assess patency, color, and amount of drainage

Gastrointestinal Interventions

- NPO until alert
  - Ice chips then clear liquid and progress
- NPO for 2-3 days or greater for GI surgery
- Mouth care if NPO - ice chips if allowed
- Emesis basin within reach
- Anti-emetics for nausea

Focused Genitourinary Assessment

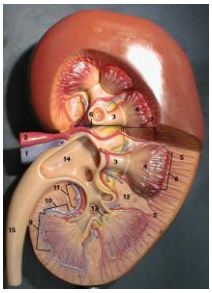
- Urinary output – 30-50 ml/hr or void within 8-12 hrs
  - Color
  - Odor
- Urge to void
- May have bloody urine post-op for urinary tract surgery
- Neuraxial Anesthesia

Genitourinary Interventions

- Maintain foley patency
- Palpate for bladder distention
- Bladder Scan
  - No need to straight cath!
- Catheterize if needed
- Report your findings

Renal Complications

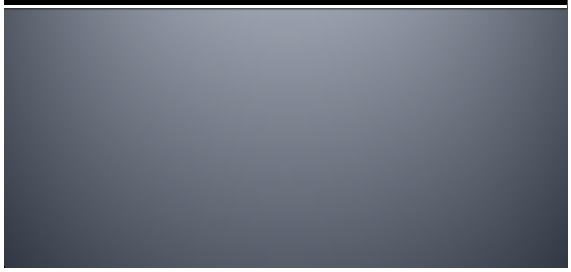
- Oliguria: Urine output of less than 0.5 ml/kg/hr
  - Prerenal
  - Intrarenal
  - Postrenal
- Polyuria
- Electrolyte Disturbances



Incidental Trauma

- Ocular injuries and visual changes
- Hearing impairment
- Oral, pharyngeal, laryngeal injuries
- Nerve injuries
- Soft tissue and joint injuries

Recovery Phase



Phase I vs. Phase II

PHASE I

- Immediate
- Intensive Care Level
- During Emergence and Awakening

PHASE I PATIENTS ARE:

- Somnolent
- Hemodynamically unstable
- Require supplemental oxygen/airway adjuncts
- Need pain interventions
- Need nausea interventions
- Unstable surgical sites

Phase I vs. Phase II

PHASE II

- Lower Level of Care
- Ensures that the patient is fit to go home
- Fasttracking

PHASE II PATIENTS ARE:

- Awake or easily arousable
- Hemodynamically stable
- On RA with adequate SpO_2
- Minimal pain
- Minimal nausea
- Stable surgical site

Aldrete Score

- Post Anesthesia Risk Score (PARS)
- A scoring system that identifies when clients are ready for discharge from the post anesthesia care unit (PACU)
- Score must be 8 to 10 before discharge from the PACU
- Evaluates: activity, respiratory, circulation, consciousness, O2 saturation

Aldrete Score

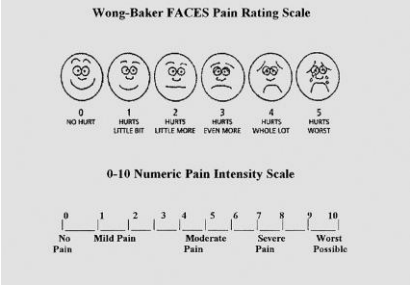
Parameter	Description of patient	Score
Activity level	Moves all extremities voluntarily/on command	2
	Moves 2 extremities	1
	Cannot move extremities	0
Respirations	Breathes deeply and coughs freely	2
	Is dyspneic, with shallow, limited breathing	1
	Is apneic	0
Circulation (blood pressure)	Is 20 mm Hg > preanesthetic level	2
	Is 20 to 50 mm Hg > preanesthetic level	1
	Is 50 mm Hg > preanesthetic level	0
Consciousness	Is fully awake	2
	Is arousable on calling	1
	Is not responding	0
Oxygen saturation as determined by pulse oximetry	Has level >90% when breathing room air	2
	Requires supplemental oxygen to maintain level >90%	1
	Has level <90% with oxygen supplementation	0

Maximum total score is 10; a score of ≥9 is required for discharge.

Pain Management

- Adequate analgesia begins in the OR and continues in PACU.
- Nonopioid analgesics
- Non steroidal Anti-inflammatory Drugs (NSAIDs)
  - Cox I and Cox II inhibitors
  - Selective Cox II
- Opioids: Mainstay of perioperative pain management
  - Fentanyl
  - Morphine
  - Dilaudid
  - Demerol
- Opioid Agonist Antagonists: rarely used
- Anxiolysis
  - Benzodiazepines
- Regional Anesthesia
- Patient Controlled Analgesia

Pain Assessment



Post Op Nausea Vomiting

- #1 reason why patients get admitted post op for anesthesia
- Four receptors
  - Histamine
  - Opiate
  - Serotonergic ($5HT_3$)
  - Dopaminergic

PONV Risk Factors

- Patient factors
  - Young age
  - Female gender, particularly if menstruating on day of surgery or in first trimester of pregnancy
  - Large body habitus
  - History of prior postoperative emesis
  - History of motion sickness
- Postoperative factors
- Postoperative pain
- Hypotension
- Anesthetic techniques
  - General anesthesia
  - Drugs
  - Opioids
  - Volatile agents
  - Neostigmine
- Surgical procedures
  - Strabismus surgery
  - Ear surgery
  - Laparoscopy
  - Orchiopexy
  - Ovum retrieval
  - Tonsillectomy

PONV

- Medications
  - Propofol
  - Ondansetron (Zofran): very effective prophylactically and as rescue
  - Metoclopramide (Reglan): less effective but acceptable alternative
  - Transderm-Scop Patch: great pretreatment
  - Dexamethasone (Decadron): Great when combined with other treatments
  - Droperidol: Great treatment
- Nonpharmacological Treatments:
  - Adequate hydration: 20 ml/kg
  - Acupuncture: P6 wrist point
- Controversy
  - All patients with multiple risk factors should receive treatment
  - Two or more agents is more effective than one
  - Outcome studies suggest little or no difference between prophylaxis and treat as needed strategies.

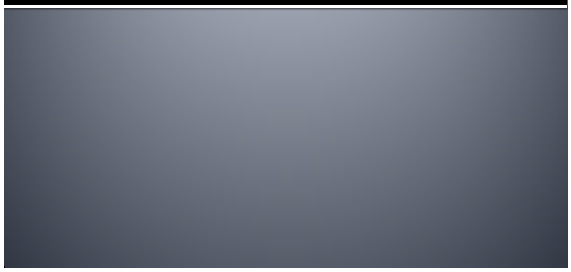
General Anesthesia Recovery

- Time of great physiological stress
- Recovery from inhalational based anesthetics
  - Emergence is directly proportionate to alveolar ventilation but inversely proportionate to the agent's solubility.
  - Hypoventilation delays awakening
  - Laryngeal Mask Airways: Lighter anesthetic load than ETT.
- Recovery from IV anesthetics
  - Functions of the pharmacokinetics.
  - Preoperative medications

Regional Anesthesia Recovery

- Uncomplicated
- Peripheral Nerve Blocks
- Neuraxial
  - Spinal/Epidural

"Is the patient recovered?!?!?"



PACU Discharge Criteria

- Easily arousable and oriented
- Hemodynamically stable
- Normothermic
- Maintain adequate ventilation
- Protect airway
- Nausea and pain control adequate

Discharge Criteria

- Voiding
- Ambulating
- Adequate oral intake
- No excess bleeding or drainage
- Received and UNDERSTOOD written discharge instructions and prescriptions.
- Patient and responsible party verbalize an understanding of instructions
- Discharge with responsible adult

Discharge Instructions

- Signs and symptoms of infection
- Medications: dose, schedule, purpose
- Activity restrictions
- Hygiene
- Diet
- Wound care
- Follow-up appointment
- List of contact phone numbers in case or questions or emergency
- Emergency instructions

Standards of Care (ASA)

- Standard I:
  - All patients who have received general anesthesia, regional anesthesia, or monitored anesthesia care shall received appropriate postanesthesia management.
- Standard II:
  - A patient transported to the PACU shall be accompanied by a member of the anesthesia care team who is knowledgeable about the patient's condition. The patient shall be continually evaluated and treated during transport with monitoring and support appropriate to the patient's condition.

Standards of Care (ASA)

- Standard III:
  - Upon arrival in the PACU, the patient shall be re-evaluated and a verbal report provided to the responsible PACU nurse by the anesthesia provider who accompanies the patient.
- Standard IV:
  - The patient's condition shall be evaluated continually in the PACU.
- Standard V:
  - An anesthesia provider is responsible for the discharge of the patient from the PACU.

Questions?

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