بسم الله الرحمن الرحیم

Post Anesthesia Care Unit."PACU"

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PACU

- Post Anesthesia Care Unit is the area designated for the monitoring and care of patients who are recovering from the immediate physiologic derangements produced by anesthesia and surgery

- Recovery room

PACU

- Bridges the period leading to:
  - full return of conciousness
  - full return of protective airway reflexes
  - resumption of cardiovascular stability

- Monitoring of bleeding, nausea, hypothermia

- Pain relief

- 1-2 hour stay

Post Anesthesia Care Unit

PACU – requirements/personel

- Central nursing station
- 1 : 1 ratio good
- 1 : 3 ratio acceptable for busy OR’s

PACU – requirements/<u>equipment</u>

- Monitors:
  - ECG
  - Pulse oximeter
  - $EtCO_2$
  - Non invasive BP
  - Invasive pressure monitor
  - Temperature

PACU – requirements/equipment

- Tray with labeled Emergency drugs
- Airway maintenance kit:
  - Laryngoscope (all size blades)
  - Endotracheal tubes (all sizes)
  - Face masks, Airways, Ambu Bag, Venturi masks
  - Cricothyroidotomy set
  - Tracheostomy set
  - Transport ventilator

Criteria for shifting from OR---to---PACU

Patient is:

– Conscious, awake, responds to simple commands
– Haemodynamically stable
– Maintains oxygen saturation
– Clinical evaluation for NM blockade recovery
– Normothermic

Post Anesthesia Care Unit

Common PACU Problems

- **Airway obstruction**
- **Hypoxemia**
- **Hypoventilation**
- **Hypotension**
- **Hypertension**
- **Cardiac dysrhythmias**
- **Hypothermia**

- **Bleeding**
- **Agitation**
- **Delayed recovery**
- **Post Operative Nausea &Vomiting**
- **Pain**
- **Oliguria**

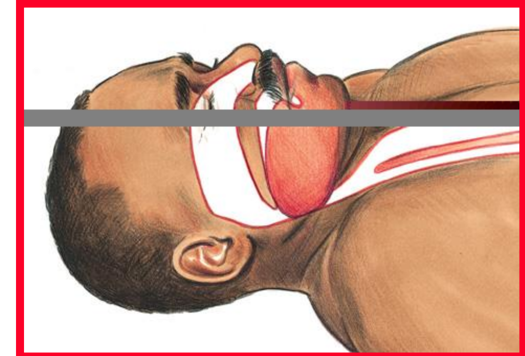
Postoperative complications

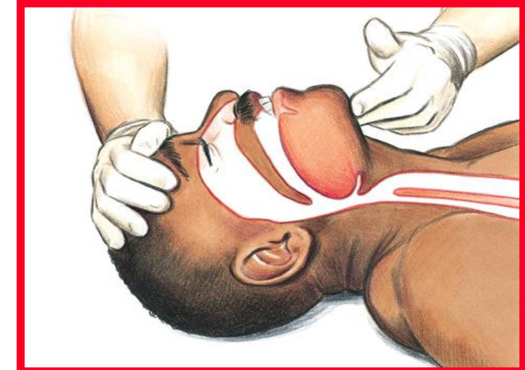
Respiratory complications

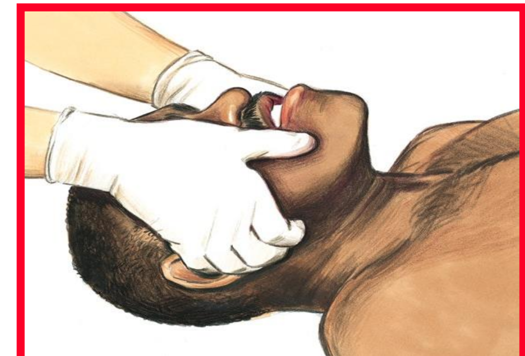
- 2/3 of major anesthesia-related incidents may be respiratory
- Airway obstruction
    - Secretions
    - Sagging tongue: treated with triple maneuver
- Laryngeal Spasm:
    - Due to secretions
    - Due to irritable airways (smokers)
        - Rx: 100% Oxygen through face mask
        - Hydrocortisone 100 mg IV
        - If no improvement rapid intubation to secure the airway (succinylcholine)

Airway Obstruction

- **Most common tongue in posterior pharynx**
- **May be foreign body**
- **Inadequate relaxant reversal**
- **Residual anesthesia**







Management of Airway Obstruction

- **Patient's stimulation,**
- **Suction,**
- **Oral Airway,**
- **Nasal Airway,**
- **Others:**
  - **Tracheal intubation**
  - **Cricothyroidotomy**
  - **Tracheostomy**

Postoperative complications

Respiratory complications

- Hypoxemia
  - Hypoventilation
    - Inadequate N.M. blockade recovery
    - Respiratory depressant effect of volatile agents, narcotics, benzodiazepines
    - Upper abdominal incisions – pain!

Postoperative complications

Respiratory complications

- Hypoxemia
  - Increased Right to Left Shunt:
    - Atelectasis
      - Inadvertent endobronchial intubation
      - Ateclectasis of the lung
      - Blockage of brochus by blood or mucous plug
  - Pneumothorax:
    - following rib injury
    - following CVP placement
      - Chest X-ray routinely done in the PACU
    - Post laparoscopic surgery

Postoperative complications

Respiratory complications

- Th:
  - O_2 10 L/min
  - See the patient!
  - Assess vital signs and respiratory rate.
  - Evaluate the airway. R/o obstruction or foreign body.
  - Mask ventilate with Ambu if necessary.
  - Intubate and secure the airway.
  - Look for causes of hypoxia.
    - Send ABG, CBC, BMP. Get CXR.

Postoperative complications

Circulatory Complications

Hypertension:

- Pre-existing poorely controled hypertension!
- Pain
- Hypercapnia
- Hypothermia
- Hypoxemia

Th: analgetics, metoprolol (MAP and HR ↓) , labetalol (MAP↓), hydralazine

Postoperative complications

Circulatory Complications

Hypotension

- Decreased preload
  - *Increased blood loss*
  - *Increased III space loss*
  - *Septicemia*
- Decreased myocardial contractility
  - *Depressant effect of GA drugs*
  - *Pre-existing ventricular dysfunction*
  - *Perioperative Myocardial infarction!!*

Postoperative complications

Circulatory Complications

Myocardial ischemia

- *Increased risk*:
    - History of CAD
    - CHF
    - Smoker
    - HTN
    - Tachycardia
    - Severe hypoxemia
    - Anemia
- *Same risk if the patient has GA or regional anesthesia.*

Postoperative complications

Circulatory Complications

Treatment (ACS)

- Oxygen, ASA, NTG, morphine if needed
- 12 lead EKG
- History
- Consult cardiology

Postoperative complications

Nausea and Vomiting

- Most common complication in the PACU
- May be more frequently seen after
  - laparoscopic surgeries
  - strabismus surgeries

Postoperative complications

Nausea and Vomiting

- DDX:
  - Narcotics/ volatile anesthetics/ etomidate
  - Hypoxia
  - Hypotension
  - Pain
  - Anxiety
  - Infection
  - Chemotherapy
  - Gastrointestinal obstruction
  - Movement
  - Vagal response
  - Pregnancy
  - Increased ICP
- Do:
  - IV fluids
  - Medications – Zofran (ondansetron)/ dexamethasone / diphenhydramine/ promethazine/prochlorperazine
  - Metoclopromide 0.15mg/kg IV

Postoperative complications

Shivering

- Not uncommon – 65% with GA, 33% with EPA
- Mechanism – decrease in body temp., uninhibited spinal reflexes (clonic activity)

Th:

- Warm cotton blankets applied as necessary
- Warm air blanket may be utilized
- Medication is used for extreme shivering - *Inj. meperidine 12.5-25mg IV*

Postoperative Pain Management

- Pain is a common occurrence and should be anticipated
  - NRS - Numeric Rating Scale

    0-10

  - The PACU nurse will treat pain until comfort is obtained (NRS 3-5)
    - fentanil, hydromorphone
    - PCA
    - Regional anesthesia
  - **Pain free – unrealistic!**

Family presence in PACU

- Over 14 years of age
- Limit visit to 5 minutes
- Feel comfortable in a medical setting
- Are willing to follow directions from PACU staff
- Use hand sanitizers as enter and leave PACU

PACU Length of Stay

- Average length of stay is 1 - 3 hours
- Will vary - dependent upon several factors:
  - type of surgery
  - patient's response to surgery and anesthesia
  - medical history
- Longer stays may be necessary to meet discharge criteria
- Criteria depends on where the patient is sent – ward, ICU, home

PACU Length of Stay

Discharge criteria

- General anesthesia – awake
- Spinal – moving (bend knees) and able to feel legs

  - Vital signs stable
  - Pain controlled
  - Nausea and vomiting controlled if present
  - Body temperature normal

- Discharged by anesthesiologist when criteria met !

Table 48–3. Postanesthesia discharge scoring system (PADS).[1,2]

Criteria	Points
Vital signs	
Within 20% of preoperative baseline	2
Within 20–40% of preoperative baseline	1
> 40% of preoperative baseline	0
Activity level	
Steady gait, no dizziness, at preoperative level	2
Requires assistance	1
Unable to ambulate	0
Nausea and vomiting	
Minimal, treated with oral medication	2
Moderate, treated with parenteral medication	1
Continues after repeated medication	0
Pain: minimal or none, acceptable to patient, controlled with oral medication	
Yes	2
No	1
Surgical bleeding	
Minimal: no dressing change required	2
Moderate: up to two dressing changes	1
Severe: three or more dressing changes	0

Discharging home after ambulatory surgery

- Patient should be able to stand & take a few steps (sit on bed if C/ I for standing)
- Should be able to sip fluids
- Should be able to urinate
- Should be able to repeat post-operative management
- Should be able to identify the escort (cognitive function)

Discharge criteria

- Aldrete Score:
  - Simple sum of numerical values assigned to activity, respiration, circulation, consciousness, and oxygen saturation.
  - A score of 9 out of 10 shows readiness for discharge.

- Postanesthesia Discharge Scoring System:
  - Modification of the Aldrete score which also includes an assessment of pain, N/V, and surgical bleeding, in addition to vital signs and activity.
  - Also, a score of 9 or 10 shows readiness for discharge.