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# PACU, Module 1 - Pharmacology of Anesthesia

Presented by:  
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## PACU - Pharmacology of Anesthesia

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### Objectives

- At the end of the program the participant will be able to:
  - List five categories of drugs used by anesthesia
  - Identify at least one drug from each category
  - List two non-depolarizing agents
  - Identify two reversal agents
  - Describe rapid sequence induction
  - List at least four narcotics

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### Types of Anesthetic Agents

- Sedatives/Hypnotics
- Benzodiazepines
- Opioids
- Analgesics
- Induction Agents

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**Preop**

- Versed or Valium - Complimented by narcotics
- Morphine can cause histamine release
- Nausea blocked with other agents- anti-emetics
- History – Previous anesthetic record
- Pain treat with narcotics
- Demerol - N&V, good for postop shivering
- Convection & Conduction = heat & fluid loss
- Lose most of heat through head especially in children

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**Pharmacology of Anesthesia**

- Neuromuscular blocking agents
  - Depolarizing
  - Non-depolarizing
- Inhalation agents
- Local Anesthesia
- Reversal agents

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**Depolarizing Agents**

- Succinylcholine
  - Works within 1 minute, lasts 10 minutes
  - Loss of reflexes
  - Constant contraction
  - Peripheral nerve stimulator to monitor twitch and tetanus

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**Non-Depolarizing Agent**

- Blocks muscle blockade at plate
- Wears off over time

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**Inhalation Agent**

- Usually given with oxygen diluted 30%-40%
- Rarely give 100%
- Air, helium or nitrous oxide can also be used to dilute inhalation agent
- Vaporized in closed system

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**Narcotics**

- Fentanyl (sublimaze)
- Sufentanyl (sufenta)
- Alfentanil (alfenta) fast acting
- Remifentanil (ultiva) super fast acting
- Morphine/Astramorph/Duramorph
- Meperidine (Demerol) good for postop shivering

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**Induction Agents**

- Barbiturates
  - Sodium thiopental (pentathol)
  - Methohexital (brevital) ultra fast
- Propofol (diprivan)
- Etomidate (amidate)
- Ketamine (ketalar)

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**Depolarizing Neuromuscular Blocking Agent**

- Succinycholine (anectine)
  - Advantages
  - Disadvantages
  - Current thoughts

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**Non-Depolarizing Muscle Relaxants (NDMR)**

- Short acting
  - Mivacurium (mivacron)
- Ultra short acting
  - Repacuronium (replon)

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**Non-Depolarizing Muscle Relaxants**

- Intermediate acting
  - Vecurium (norcuron) marked cv stability
  - Atracurium (tracrium) small histamine release
  - Rocuronium (zemuron)
  - CisAtracurium (nimbex) minimum cardiovascular effects

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**Non-Depolarizing Muscle Relaxants**

- Long lasting
  - Pancuronium (Pavulon) can cause tachycardia
  - Pipecuronium (ardum) more stable
    - These agents need to be reversed

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**NDR Reversal Agents  
(Anticholinesterase)**

- Neostigmine (protigmine)
- Edrophonium (tensilon)
- Pyridostigmine (regonol)
  - Anticholinergic Agents
- Atropine
- Glycopyrrolate (robinul)

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**Inhalation Agents**

- Nitrous Oxide
- Isoflurane (forane)
- Enflurane (ethrane)
- Halothane (fluothane) cause bronchial dilation
- Sevoflurane (ultane)
- Desflurane (suprane) quick acting, short lasting

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**Local Anesthetics**

- Amides
  - Bupivacaine (Marcaine)
  - Etidocaine (duraest)
  - Lidocaine (xylocaine)
  - Mepivacaine (cantocaine)
  - Prilocaine (citarest)
  - Kopivacaine (naropin)
- Epinephrine increases uptake, cause to be longer lasting
- Esters
  - Cocaine
  - Chloroprocaine (nesacaine)
  - Procaine (novacaine)
  - Tetracaine (pontocaine)
- Epinephrine increases uptake, cause to be longer lasting

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**Anti-Emetics**

- Metaclopramide (reglan)
- Droperidol (inapsine)
- Dalansetron (anzemet)
- Alcohol ? inhaled

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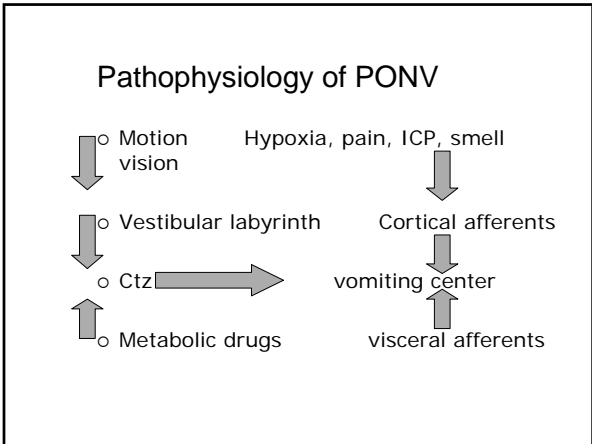
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- ### Risk Factors for PONV
- Patient Characteristics unmodifiable
    - Age
    - Gender
    - Pregnancy
    - Prior PONV
    - Motion sickness
  - Surgical procedure
    - Breast
    - Gyn
    - Laparoscopy (air in peritoneal space)
  - Modifiable
    - Gastric volume
    - Anxiety
    - Hydration status
    - Obesity
    - Menstrual cycle
  - Surgical procedures
    - ENT
    - Ophthalmology
    - Strabismus

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- ### Risk Factors for PONV Anesthetic Management
- Unmodifiable
    - Duration of surgery
    - Opioids
    - Etomidate
    - Muscle relaxant reversal
  - Modifiable
    - Bag/valve mask ventilation
    - ?nitrous oxide
  - Postoperative interventions
    - Adequate analgesia
    - Postural hypotension
    - Patient movement
    - Oral fluid consumption

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**Pharmacology – “Others”**

- Antibiotics
- Anticoagulants
- Steroids
- Insulin
- Diuretics
- Nitrates
- IV contrast

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**Adjunct Agents**

- Pressors
  - Ephedrine
  - Phenylephrine (nesoynephrine)
- Beta Blockers
  - Esmolol (breviboc)
  - Labetolol (trandate)
  - Metoprolol (Iopressor)

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**Reversal Agents**

- Naloxone (narcan)
- Physiostimine (antilirium)
- Mazicon
- Nubain

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### Rapid Sequence Induction

- Full stomach
- Trauma
- Emergency surgery
- Avoid regurgitation
- Done using Cricoid pressure (Sellick's maneuver) during intubation

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