

ANESTHESIA: How it Affects Nursing Care and Patient Outcomes

POSTOPERATIVE CARE OF THE ANESTHESIA PATIENT

Pre-Admission Assessments


▶ Health History

- Medical
- Surgical
- Anesthetic



- ## ▶ Medications
- (including herbals, prns, and illicit drugs or hx of substance abuse)
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- ## ▶ Allergies
- (medications, food, latex and environmental)
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- ## ▶ Teaching
- (procedure, expectations, NPO guidelines, medications to take or hold, special preparations, need for a ride home)

Preoperative Assessment

- ▶ **History and Physical**– within 30 days along with day of surgery update
 - ▶ **Consent**
 - ▶ **Advanced Directives**
 - ▶ **Important tests**– UPT for all women of childbearing age, BG for diabetics
 - ▶ **Preparation of patient**– IV, removal of jewelry, piercings, contact lens, hearing aid, dentures, etc., postop needs, supplies, education and preop medication orders.
 - ▶ **Site verification and marking by physician**
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Sedation/Moderate Sedation

- ▶ **Minimal Sedation (anxiolysis)**

Drug induced but Pt. is able to respond normally to verbal commands.

CV and respiratory functions unaffected.

Used for CT, MRI's, minor surgical procedures.

- ▶ **Moderate sedation**

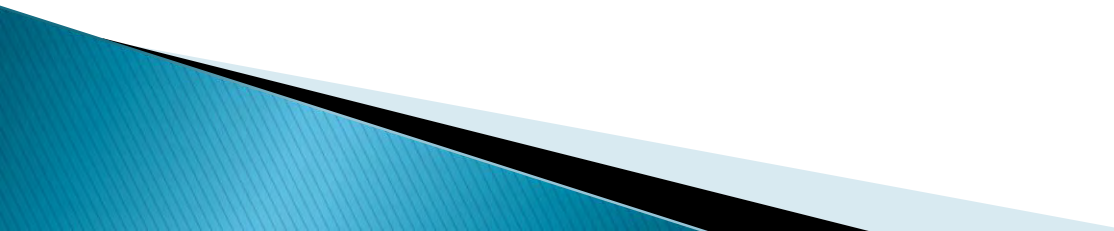
Drug induced, LOC is depressed but Pt is able to still respond purposefully to commands or light stimulation.

CV and respiratory function maintained
(colonoscopy, endoscopy, cardiac tests)

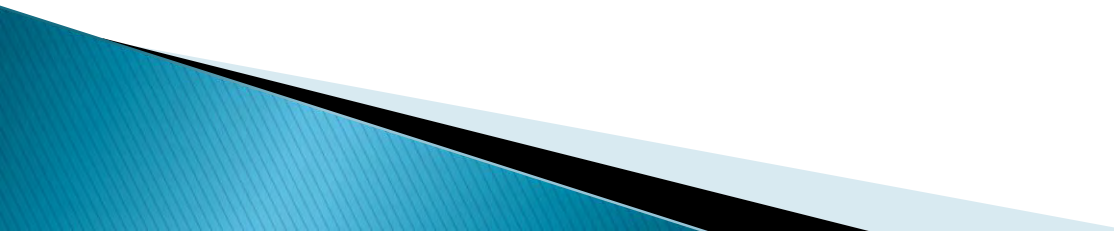
Deep Sedation/Anesthesia

- ▶ **Monitored Anesthesia Care (MAC)**
 - IV sedation –often combined with local infiltration of medication/nerve blocks.
(Propofol, Fentanyl, Midazalam)
("caines" for blocks)
 - Usually patient does not require intubation
 - Airway may be impaired and spontaneous respiration may be inadequate. Risk for aspiration or obstruction is present.
 - CV function is usually maintained

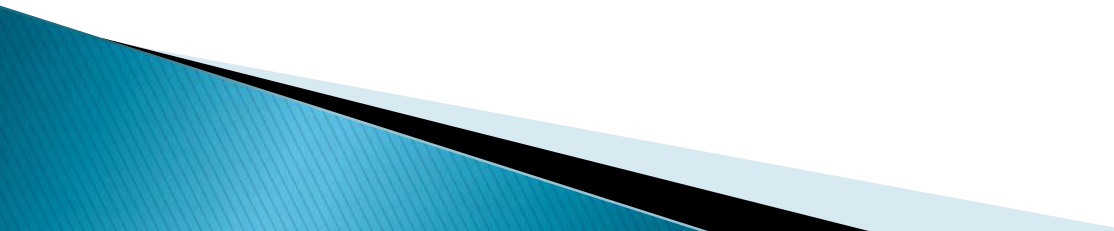
General Anesthesia

- ▶ A drug induced loss of consciousness in which the patient is unarousable even with painful stimuli.
 - ▶ The ability to maintain ventilatory function is impaired and will require assistance in maintaining airway patency.
 - ▶ Somatic, autonomic and endocrine reflexes are eliminated, skeletal muscle relaxation is achieved.
 - ▶ A combination of inhalation anesthetics, intravenous anesthetics, benzodiazepines, opioids, muscle relaxants and reversal agents are used.
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General Anesthesia Goals

- ▶ Anesthesia (lack of awareness)
 - ▶ Akinesia (keeping the patient still)
 - ▶ Muscle relaxation (paralysis)
 - ▶ Autonomic control (preventing dangerous surges in hemodynamics).
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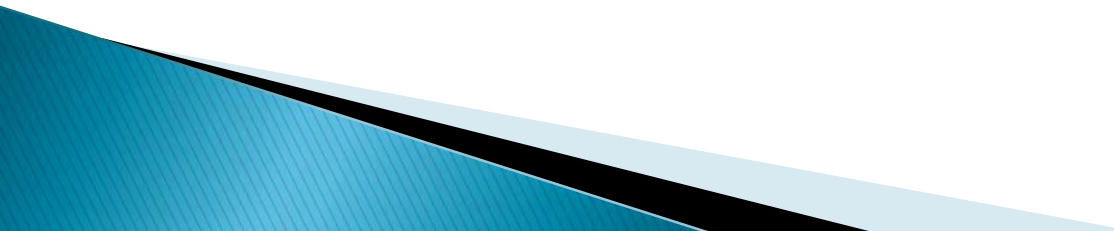
Four Stages of Anesthesia

- ▶ Stage I: Amnesia/Induction – Begins with initiation & ends with loss of consciousness. Able to maintain protective reflexes.
 - ▶ Stage II: Delirium/Excitement – Starts with loss of consciousness and irregular respirations. Phase where patient can exhibit most untoward responses such as vomiting, laryngospasm and emergence delirium.
 - ▶ Stage III: Anesthetized – Known as the stage of surgical anesthesia. Absence of eyelid, blink and swallow reflexes. Lasts from onset of regular breathing to cessation of respiration.
 - ▶ Stage IV: Overdose – Depression of vital functions; respiratory cessation and cardiac collapse.
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Emergence from Anesthesia

- ▶ Remember this occurs in the reverse order from that of induction.
 - Stage III: Surgical Anesthesia
 - Stage II: Delirium (PACU)
 - Stage I: Anesthesia effects & Amnesia
- ▶ How the patient emerges is influenced by the length of anesthesia, other drugs used, individual patient health & co-morbidities.


Anesthesia Medication Terms

- ▶ **“Simple” anesthesia**– inhalation agents alone
 - ▶ **“Balanced” anesthesia**– Various classes of agents used (opioids, neuromuscular blocking drugs, nitrous). The combination reduces the amount of inhaled gases needed.
 - ▶ **TIVA**–Total Intravenous Anesthesia (Propofol).
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IV Induction Agents

- ▶ Barbituates: Pentothal, Brevital
- ▶ Non-Barbituates: Propofol, Ketamine, Etomidate (used with CVD, N/V common)
- These agents have a quick onset/brief duration, quick recovery.
- Cessation of spontaneous ventilation, loss of laryngeal reflexes– risk of aspiration.
- No analgesia effect– rapid emergence may hasten pain awareness.
- Side effects include vasodilation, myocardial & respiratory depression (depth more than rate)
- Laryngospasm if cords are stimulated

Ketamine

- ▶ Dissociative agent
 - ▶ Depending on dose, can be used as an induction agent, a sedative and /or pain control.
 - ▶ Provides profound analgesia.
 - ▶ Can produce vivid hallucinations post-op.
 - ▶ More than half of adults over 30 experience excitement and delirium.
 - ▶ Under NYS Law must be administered by a anesthesia provider; CRNA or MD
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Intubation of the Patient

- ▶ ENDOTRACHEAL INTUBATION–
- ▶ placement of ETT directly into trachea
- ▶ Nasotracheal – nasal insertion
- ▶ Orotacheal – oral insertion



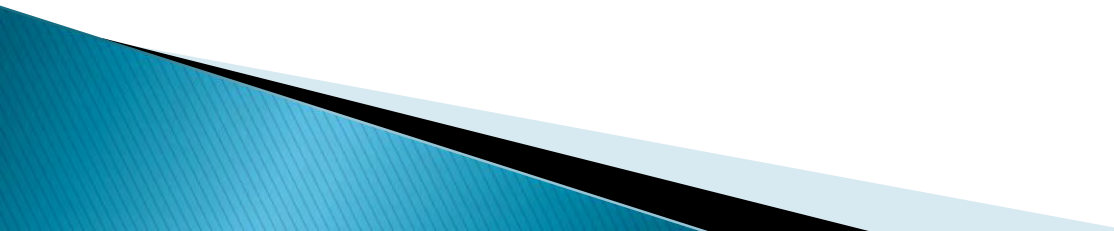
Laryngeal Mask Airway-LMA



- ▶ Alternate method of airway management that is intermediate in invasiveness between mask & ETT
- ▶ Commonly used for patients with spontaneous breathing during anesthesia
- ▶ Well tolerated in lightly anesthetized pt.

Inhalation Agents

The choice of agent depends on patient age, history, co-morbidities and provider preference.

- Two groups: gaseous and volatile
 - Administered through airway device ETT or LMA.
 - High Safety and efficacy.
 - Eliminated by exhalation, less reliance on drug metabolism.
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Inhalation Agents



Nitrous Oxide

- ▶ **Inhaled Gaseous Agent:** Can be administered alone or in combination with various agents.
- Non-toxic and non-irritating with low CV effects.
- Increased incidence of post-operative N/V
- Post-op hypoxia can occur-related to the outpouring of nitrous from the blood stream into the lungs-displacing the O₂ in the alveoli.
- Care may include O₂ mask, deep breathing, sighing from the pt helps eliminate the nitrous.
- Offset of effects can be in as little as 5-10 min.

Inhalation Agents

- ▶ Effective inducing &/or maintaining anesthesia.
- ▶ **Inhaled Volatile Liquids**– These agents store as liquid at room temperature, but evaporate easily for inhalation use as anesthesia vapors they include:
 - Isoflurane
 - Sevoflurane
 - Desflurane
 - Enflurane (rarely used anymore)
 - Halothane (rarely used anymore)

These Volatile agents have the potential for triggering a Malignant Hyperthermia Crisis.

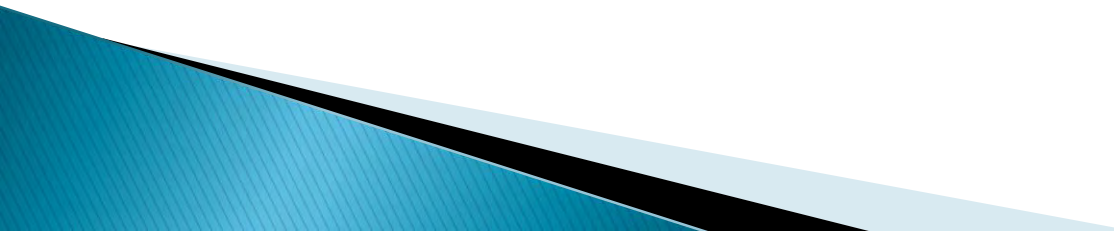
Inhalation Agents

ISOFLURANE

- Used for maintenance, too irritating for mask induction.
- Produces respiratory depression & skeletal muscle relaxation.
- Doesn't sensitize myocardium; less chance of dysrhythmia.
- Rapid recovery and emergence: awakes promptly—usually lucid within 15–30 min after termination of agent.
- Advantages include: CV stability, good neuromuscular relaxation, no CNS excitatory effects.
- Post-op shivering can occur due to vasodilation.

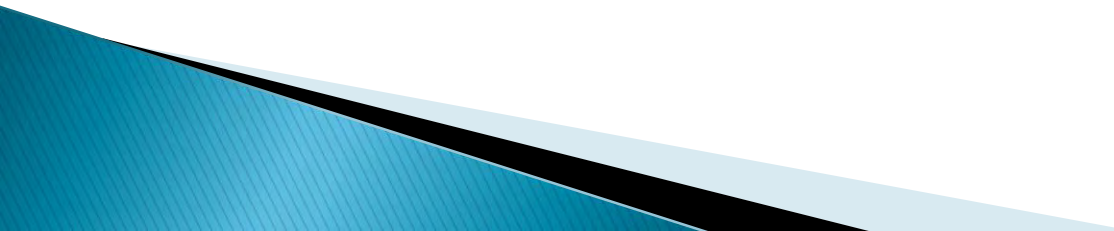
Inhalation Agents

SEVOFLURANE:

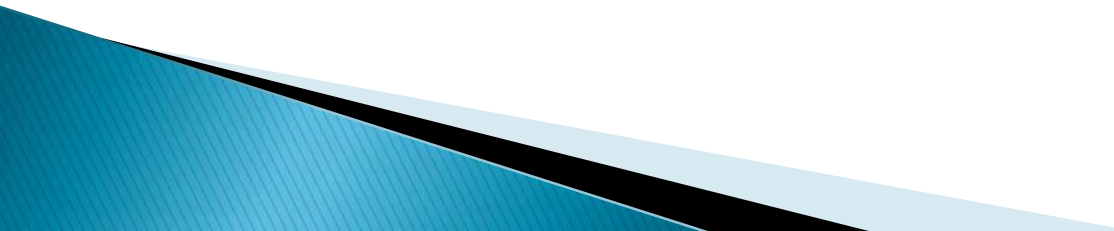
- Rapid acting agent/pleasant smelling
 - Used for Mask inductions
 - Patients emerge in minutes when used as sole agent & will need analgesia in post op setting
 - Least irritating to respiratory tract
 - Does not predispose arrhythmias
 - Enhances action of skeletal muscle relaxants
 - Rapid elimination – speeds up emergence in PACU
 - Little effect on heart rate
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Inhalation Agents

DESFLURANE:

- Can cause airway irritation, not recommended for pediatric population or pts with a smoking history.
 - Not suitable for face mask induction.
 - Patient emergence is rapid leading to shorter stay.
 - Dose related decrease in BP and cardiac output slightly greater than Isoflurane.
 - Low rate of dysrhythmias.
 - May need supplemental pain medication shortly after emergence.
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IV Anesthetics

- ▶ IV anesthesia induction does not involve anesthetic stages.
 - ▶ Better recovery.
 - ▶ If airway issues occur, emergency medications can be given and intubation can occur.
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IV Anesthetics

Benzodiazepines: Midazolam (Versed)

- Provides reduction in anxiety. Used for premedication, induction of anesthesia and intraoperative adjunct for inhalation anesthesia.
- Pt sedation, anxiolysis and amnesia
- Short acting, dose is usually 1–2 mg to start.
- Acts quickly within 1–2 minutes and can last 15–90 min depending on dose and subsequent doses
- Can have respiratory depression, confusion, euphoria, headache.

Reversal agent : ROMAZICON (FLUMAZENIL)

DOSE –Concentration 0.1 /ml. Initial 0.2 mg –over 15 seconds

May repeat at 1 minute intervals x 4. Maximum total dose 1 mg

Be alert for Re-sedation 40–80 min.

IV Anesthetics

Non barbiturate : Propofol (Diprivan)

- Used as induction agent or for continuous IV sedation.
- Lower incidence of post-op complications, early emergence and rapid recovery– early ambulation and discharge.
- Has antiemetic effect.
- Does not have analgesic effect.
- There is no reversal agent.
- Avoid in patients with allergy to eggs or soy.

Must be administered in NYS by an anesthesia provider:
CRNA or MD



Opioids

Adjunct for anesthesia & analgesic

- **Morphine**–CV stability, but respiratory depression
- **Fentanyl**
 - 100 times more potent than morphine–dosed in micrograms.
- **Hydromorphone (Dilaudid)**
 - 7–8 times more potent than morphine, peaks in 30 min, 2 hour duration.
 - Best for renal patients
- **Meperidine (Demerol)**
 - Problematic b/c of many metabolites–not recommended for analgesia
 - Still used for post-op Shivering

Reversal Agent: Naloxone (Narcan)

Dose: Concentration 0.4 mg/ml. IV 0.1 –0.2 mg every 2–3 minutes

Repeat doses may be needed in 1–2 hour intervals if patient re-sedates

Neuromuscular Blocking Agents

Used as adjuncts to inhalation agents to facilitate intubation and produce relaxation.

DEPOLARIZING AGENTS: rapid skeletal muscle relaxation.

Succinylcholine

- Rapid onset and short duration; used for intubation.
- Side effects can include bradycardia, myalgia, increased K⁺ levels.
- There is NO reversal agent.
- Pt may require longer ventilatory support post-op until muscular activity is normal and reflexes have returned.
- These pts may require reassurance, sedation/analgesia.
- **Succinylcholine is also a triggering agent for malignant hyperthermia**

Neuromuscular Blocking Agents

NONDEPOLARIZING AGENTS: Provides neuromuscular blockade. Extent of paralysis depends on dose.

- Onset is 60–90 sec.
- Sequence of paralysis—eyes, jaw, hands, limbs and neck, intercostal muscles, diaphragm.
- Recovery is the reverse order
- Shorter acting agents (30–40 min) include: **Atracurium, Vecuronium**
- Intermediate action agent (45–70 min): **Rocuronium**
- Long acting agent(1 80 min +): **Pancuronium**

REVERSAL AGENTS: **Neostigmine, Atropine, Glycopyrrolate**

Assessment of Patient Post NMBA

- Anesthesia may use nerve simulator to assess degree of reversal.
- RN clinical assessment should include the following abilities of the patient:
 - Able to open eyes
 - Able to sustain firm hand grasp > 5 sec.
 - Able to sustain head lift > 5 sec.
 - Able to stick out tongue > 5 sec.
 - Has adequate Vital signs including temperature and depth of respirations.
 - Minimal secretions.

Regional Anesthesia

Spinal

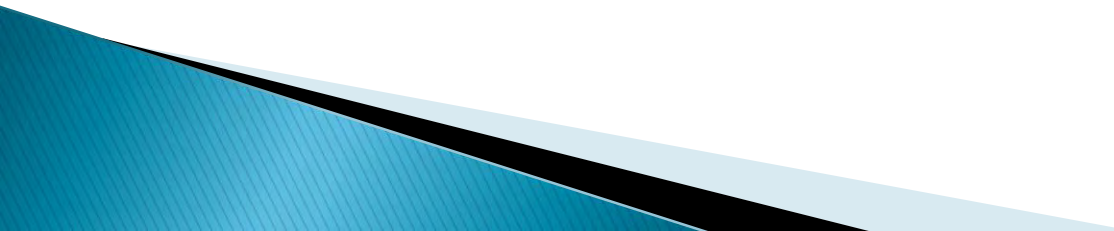
- Local injected into intrathecal space.
- Sequence of loss of function: sense of temperature > pain > touch > movement > proprioception.
- Return of function occurs in reverse order.
- Complications include: hypotension, bradycardia, postdural puncture headache, difficulty voiding, respiratory effects if spinal moves too high.

Epidural

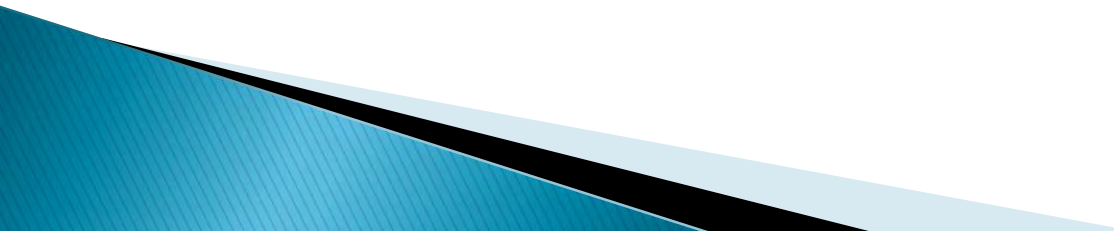
- Local injected into epidural space
 - Less blockade than spinal but greater chance of local anesthetic toxicity.
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Regional Anesthesia

Regional Blocks

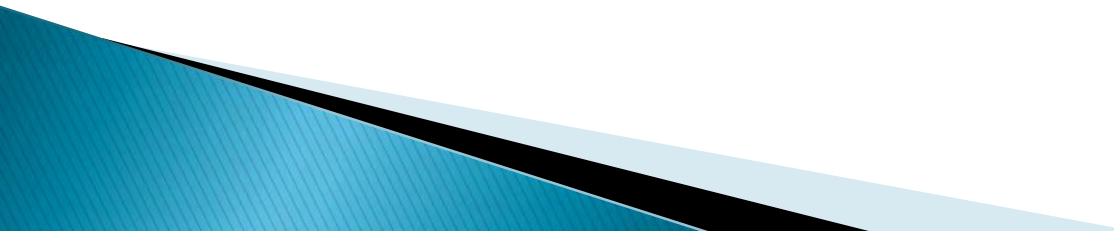
- Local anesthetic injected around a nerve.
 - Bier blocks, peripheral nerve blocks, brachial plexus blocks– performed under ultrasound guided insertion of needle.
 - Complications depend on where block occurs.
 - Local/lidocaine toxicity when excessive absorption occurs. Symptoms include: tinnitus, blurred vision, dizziness and metallic taste in mouth. May cause ventricular dysrhythmias and even cardiac arrest.
 - Intralipid IV infusion should be readily available in any area where regional anesthesia is performed.
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ASPAN Scope of Practice Involves

- ▶ “Assessment, diagnosis, intervention, and evaluation of physical and psychosocial issues along with risks and associated problems that may result from the administration of sedation/analgesia or anesthetic agents and techniques.”
 - ▶ The Perianesthesia nurse has a responsibility to the patient to provide safe, quality care.
 - ▶ The Perianesthesia nurse “communicates pertinent information as the patient progresses through the continuum of perianesthesia care.”
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Post Anesthesia Care

Initial post anesthesia care should be standard ABC's


- ▶ Airway assessment and management are vital to provide safe care to post operative patients.
 - ▶ Patient's predisposing factors can affect patency of post surgical airway: OSA, snoring, smoking, asthma, ENT hx
 - ▶ Cardiovascular assessment includes blood pressure monitoring, heart rate and rhythm along with overall condition of the patient including skin color, tissue perfusion and any recent blood loss.
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Post Anesthesia Care– Transfer of Care

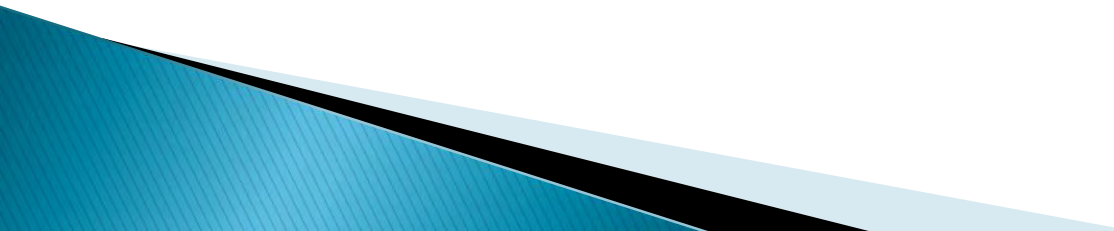
- ▶ Relevant pre-op status including review of patient history
- ▶ Anesthesia/sedation agents used – note time of reversal agents
- ▶ Pain management interventions
- ▶ Times of medications administered
- ▶ Type of procedure & length
- ▶ EBL/fluids administered
- ▶ Any complications and treatments
- ▶ Opportunity to ask questions



Nursing considerations Postop

- ▶ Monitor for respiratory depression/airway obstruction. Provide supplemental O₂ as indicated and encourage deep breathing
 - ▶ Monitor vital signs– Temp, BP, HR, RR, O₂ sat.
 - ▶ Assess for post-op pain and N/V and provide interventions as needed.
 - ▶ Assess surgical site incision/dressing for bleeding or abnormalities.
 - ▶ Monitor for complications.
 - ▶ Provide a safe patient care environment.
 - ▶ Involve patient and family in care and discharge planning as much as possible.
 - ▶ Communicate and document all pertinent information to providers and in the medical record.
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Postanesthesia Complications

- Respiratory/Airway Issues: bronchospasm, laryngospasm.
 - Hypothermia
 - Shivering
 - PONausea/Vomiting
 - Pain
 - Cardiovascular; hemodynamics, dysrhythmias
 - Anaphylactic reactions
 - Emergence disorders
 - Malignant Hyperthermia
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Indications for Airway Obstruction

Tongue and epiglottis fall back on the post pharyngeal wall causing airway occlusion.

Symptoms include:

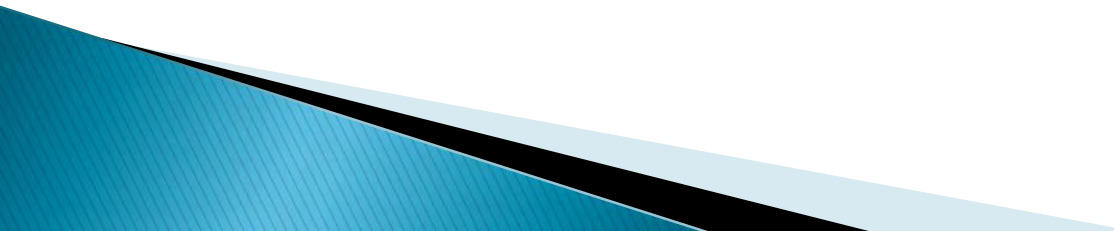
- ▶ Increase in respiratory effort
- ▶ Retraction of respiratory muscles
- ▶ Abnormal/Absent breath sounds
- ▶ Cyanosis
- ▶ Decrease in oxygen saturation

Treatment of Airway Obstruction

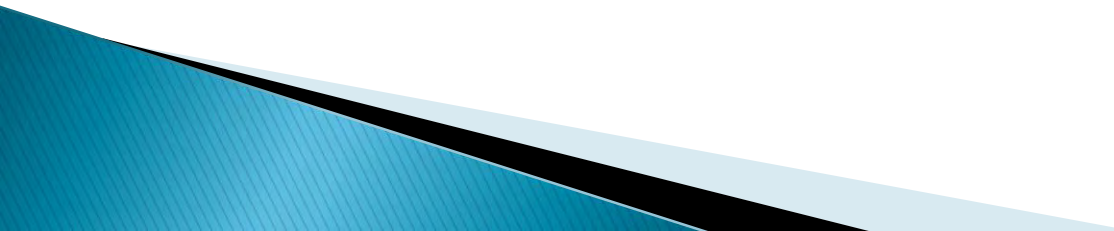
- ▶ Oxygen
- ▶ Placement of patient supine with head chin lift
- ▶ Insertion of airway:
 - oral – for heavily sedated
 - nasal – for semiconscious
- ▶ Reversal Agents
- ▶ Reintubation



Laryngospasm

- ▶ Involuntary partial or complete closure of vocal cords, caused by secretions or irritation of laryngeal reflexes during emergence.
 - ▶ Usually occurs soon after extubation.
 - ▶ Symptoms include: agitation, wheezing, stridor, crowing (partial obstruction), paradoxical chest or abdominal movements, absence of ventilation and hypoxia.
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Treatment of Laryngospasm

- ▶ Airway maneuvers; chin lift/jaw thrust
 - ▶ HOB elevated
 - ▶ Positive pressure ventilation
 - ▶ Removal of secretions
 - ▶ Readiness of emergency airway management and possible reintubation
 - ▶ Assess readiness for extubation as irritable airway can make reintubation difficult
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Bronchospasms

Narrowing of bronchi from smooth muscle contraction

- ▶ Causes: pre-existing asthma, anaphylaxis, aspiration, pulmonary edema, mucous plugging,
- ▶ Signs and Symptoms: coughing, expiratory wheeze, dyspnea, tachypnea, use of accessory muscles.
- ▶ Treatment: Removal of cause, oxygen administration, inhaled bronchodilators, epinephrine, antihistamine or dexamethasone

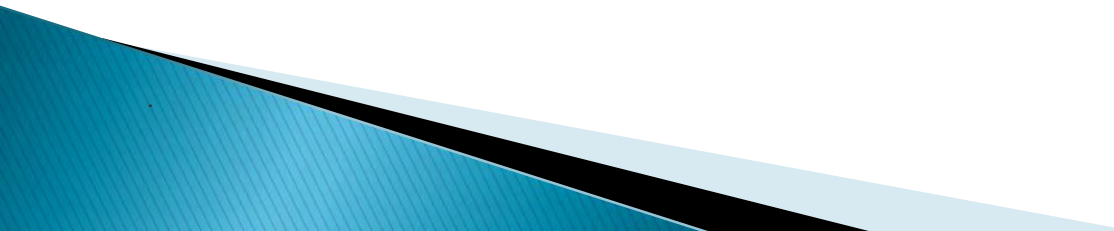
Emergence Delirium

A dissociated state of consciousness demonstrated by responsive or unresponsive agitation which usually last less than 10 min but can last as long as 45 min.

- ▶ Seen in less than 10 % of adults but pediatrics can have an incidence of 12–30%.
- ▶ Symptoms can include: agitation, combativeness, periods of excitement alternating with disorientation and lethargy, use of profanity, difficulty with cognition, orientation and thought process.
- ▶ Often difficult to console– especially the pediatric patient.
- ▶ Always rule out hypoxemia, medicate only when O2 demands are met.
- ▶ Treatment includes: providing a safe, quiet environment with precautions taken as necessary and assessing for any physiological or pharmacological causes.

Post-Operative Nausea and Vomiting- PONV

Risk factors – 3 categories:

1. Patient Specific – female, non smokers, h/o PONV, motion sickness
 2. Anesthesia Related – volatile anesthetics, nitrous oxide, post op opioids
 3. Surgery Related – duration of surgery and type of surgery
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TREATMENT OF PONV

- ▶ Non-pharmacologic: adequate hydration, aromatherapy (alcohol swab), deep breathing, cool washcloth, encouraging words
- ▶ Pharmacologic: use if previous ineffective.

Common agents used:

Famotidine (Pepcid) given pre-op

Scopalamine patch applied pre-op

Dexamethasone (Decadron)

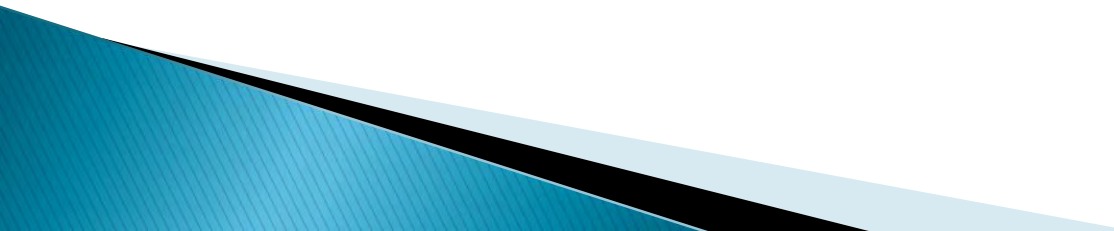
Metoclopramide (Reglan)

Ondansetron (Zofran)

Promethazine (Phenergan)

Haloperidol (Haldol)

Post-Operative Pain Management

- ▶ Important to have a preoperative pain assessment along with instruction on use of pain scale.
 - ▶ Educate patient on post op expectations; absence of pain not realistic but acute pain will be treated
 - ▶ Post op pain can be both surgical & non surgical – attempt to minimize stimuli such as bright lights, loud noises....soothing environment
 - ▶ Objective assessment of patient upon admission along with time of analgesia given in OR.
 - ▶ Further pain assessment and re-assessment (within 30–60 min) will determine need for intravenous narcotic or oral narcotic administration keeping in mind discharge as final outcome.
 - ▶ Use of multimodal therapy – opioid and non opioid
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Malignant Hyperthermia



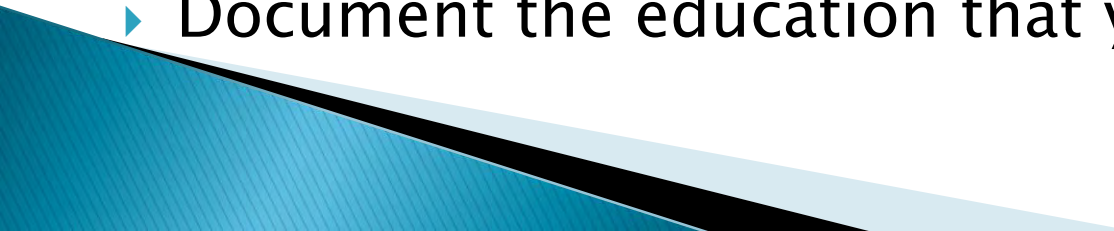
- ▶ Remember the Triggering Agents?
- ▶ Who is at Risk?
- ▶ Most cases occur in the OR–potential highest first hour after triggering agent used but can occur up to 24 hours after.
- ▶ Symptoms: increased ETCO₂, Muscle rigidity, tachycardia/tachypnea, elevated temp, mixed resp and metabolic acidosis.
- ▶ Most important treatment in Post–op is to notify anesthesia immediately, obtain Dantrium kit and help from PACU/OR to administer.
- ▶ Administer 100% O₂, cooling pt., monitor VS, urine output. Transfer care to a higher level.

Discharge Criteria

- ▶ It is the nurse's responsibility to ensure that all discharge plans are in place. Discharge planning should begin in the pre-operative setting.
- ▶ Discharge criteria that need to be met include: vital signs, level of consciousness, comfort, activity level, surgical site instructions, support of a responsible adult and hydration
- ▶ Phase II discharge criteria met and cleared by provider(s).



Patient Education

- ▶ Include the patient and significant other in all teaching. Assess the pts. ability to understand the instructions.
 - ▶ Obtain Interpreter services if the patients preferred language is not English.
 - ▶ Provide discharge instructions/ teaching in the preoperative phase as the likeliness for recall postop will be minimal.
 - ▶ Provide written materials along with verbal instructions whenever possible to enhance learning.
 - ▶ Use the Teach-Back method when assessing understanding.
 - ▶ Document the education that you have provided.
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REFERENCES

- ▶ American Society of PeriAnesthesia Nurses (ASPAN). *A Competency Based Orientation and Credentialing Program for the Registered Nurse in the Perianesthesia setting (CBO)*. 2014 edition. Cherry Hill, NJ.
- ▶ American Society of PeriAnesthesia Nurses (ASPAN). *Perianesthesia Nursing standards and Practice recommendations 2010-2012*. Cherry Hill, NJ.
- ▶ Drain, Cecil, & Jan Odom-Forren. *Perianesthesia Nursing*. 5. Louisville, KY: Saunders, 2009.
- ▶ Godden, Barbara. *2008-2010 Standards of Perianesthesia Nursing Practice*. Cherry Hill NJ:ASPAN Standard Committee,2008. 43. Print.
- ▶ Strauss, Penelope. 2015, OR Nurse 2015. *Identifying and Treating postanesthesia emergencies*. Vol 9, 6, p24-31.