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)

- **Allergies** (medications, food, latex and environmental)

- **Teaching** (procedure, expectations, NPO guidelines, medications to take or hold, special preparations, need for a ride home)
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
**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)
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.
General Anesthesia Goals

- Anesthesia (lack of awareness)
- Akinesia (keeping the patient still)
- Muscle relaxation (paralysis)
- Autonomic control (preventing dangerous surges in hemodynamics).
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.
Remember this occurs in the reverse order from that of induction.
- Stage III: Surgical Anesthesia
- Stage II: Delerium (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.
“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).
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 an anesthesia provider; CRNA or MD
Intubation of the Patient

- ENDOTRACHEAL INTUBATION –
- placement of ETT directly into trachea
- Nasotracheal – nasal insertion
- Orotacheal – oral insertion
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.
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.
**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
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.
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.
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
Adjunct for anesthesia & analgesic

- **Morphine**–CV stability, but respiratory depression
- **Fentanyl**
  - 100 times more potent than morphine–dosed in micrograms.
- **Hydromorphine (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**
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 (180 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.
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.
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.”
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.
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.
Postanesthesia Complications

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