Zander
CNOR Exam
Preparation Course

Zander
Perioperative
Education

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Test Taking Strategies

Objectives:
1. Apply Test Taking Strategies for the CNOR exam
2. Create a Personal Study Plan

- Registering for the exam
- Exam Format
- Time Management
- Test Taking Strategies
- AORN Recommended Practices

Exam Requirements

- Currently working full- or part-time
- Current RN license
- 2 years perioperative experience
  - At least 1 year must be intraoperative
- 2400 hours of recent surgical practice
- AORN membership is not required
- Take 2 Program
  - For initial certification
  - Two chances to pass in a 12-month period

Application Deadlines and Testing Windows

Application Approved	Testing Months	Application Approved	Testing Months
January	February, March, April	July	August, September, October
February	March, April, May	August	September, October, November
March	April, May, June	September	October, November, December
April	May, June, July	October	November, December, January
May	June, July, August	November	December, January, February
June	July, August, September	December	January, February, March

www.cc-institute.org
- CNOR Candidate Handbook
- Free, monthly CNOR webinars
- Online exam application

CNOR® Credential Fees

CNOR Exam Fee		$395
CNOR Exam Take 2		$445
Recertification: Points	1/1-7/1	$325
	7/2-12/31	$375
Emeritus (Retired) Status		$125
File for Extension		$195

After Application Approval

- Authorization to test email
  - Email From CCI with your candidate ID number
- Scheduling the exam
  - www.psiexams.com
  - Schedule online or over the phone using your candidate ID number.
  - Don't call local test center – they can't schedule
  - 24-48 hours after application before you can schedule
  - Special accommodations if you have a disability

After Application Approval

- Delaying the test
  - Don't leave a message. Talk to a human
  - Can delay to new date in same test window up to 48 hours prior to exam with no penalty
  - Cancellation is only partial refund
    - $175 member, $249 nonmember
  - Roll into next test window $100

The Day of the Exam

- Arrive on time
- What to bring with you
  - Valid ID
  - As little as possible
- Lockers
- The testing environment

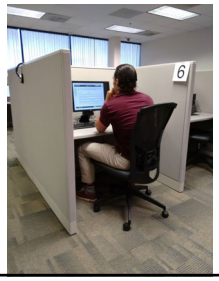
About the Exam

- 200 questions / 3 hours and 45 minutes to complete
- Multiple Choice only
- Scaled Score
  - Pass/fail notice immediately after test
  - A score of 620 is passing

Subject Area	Percent of Exam	Number of questions
1. Pre / Postoperative Assessment and Diagnosis	15%	28
2. Individualized Plan of Care Development and Expected Outcome Identification	8%	15
3. Management of intraoperative Activities a. Patient care and safety b. Management of personnel, services and materials	 25% 9%	 46 17
4. Communication and Documentation	11%	20
5. Infection Prevention and Control of environment, Instruments and supplies	16%	30
6. Emergency Situations	10%	18
7. Professional Accountability	6%	11
Total	**100%**	**185**

The Nursing Process

- The exam is presented in the nursing process
- Feel comfortable with it
  - Assessment
  - Nursing Diagnosis
  - Identification of Outcomes
  - Planning
  - Implementation
  - Evaluation

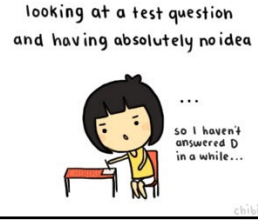


Anatomy of a Question

- The Case scenario is a description of the clinical situation
- The Stem asks the question or directs what action you should take
- Distracters are usually the wrong answer

What if you don't know?

- Umbrella answer
- Same answers are ruled out
- Opposite answers
- Odd man wins
- Repeated words
- Absolutes



Test taking tips

- Read and follow directions carefully!
- Think AORN's *Guidelines for Perioperative Practice*
- Nursing practice only!
- Consider other options before calling the supervisor
- Patient safety is top priority

Study Tips

- Assess your level of competency
- Study according to your competency level in each area
- Organize a study group if you study best that way
- Take as many practice tests as you can

Zander Perioperative Education

CNOR

CNOR

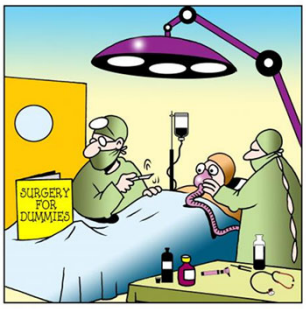
Choosing Study Aids

- Utilizes same test question structure as CNOR exam
- Covers all 7 subject areas of the exam
- Utilizes as References:
  - Berry & Kohn's Operating Room Technique 14th ed.,
  - Alexander's Care of the Patient in Surgery 16th ed.
  - AORN's 2021 Guidelines

Don't Freak out

Test Taking Strategies Quiz

- 11 Questions
- 13 Minutes



Test Taking Strategies

1. During a procedure under local anesthesia, the patient complains of circumoral numbness, blurred vision, and dizziness. What should be the **immediate** action of the perioperative nurse monitoring this patient?

   A. Obtain a 6-second ECG strip.
   B. Ensure an airway.
   C. Set the IV line to full flow.
   D. Administer 50 mg of diazepam.

2. The circulating nurse reports that the needle count is incorrect. The surgeon continues to close the wound, stating, "I know it is not in the wound and I am not going to stop to look for it." The **best** plan of action is to:

   A. accept the surgeon's response without comment and fill out an incident report.
   B. inform the surgeon of hospital policy and document subsequent actions.
   C. order X-rays regardless of the surgeon's wishes.
   D. notify the OR supervisor and ask for advice.

3. A new employee unknowingly dispensed an unsterile solution to the sterile field. The following day, the supervisor learns of the incident. The supervisor's **first** action would be to:

   A. initiate an incident report.
   B. educate the employee.
   C. counsel the employee verbally.
   D. notify the surgeon of the break in technique.

4. Due to an emergency, the perioperative nurse is unable to conduct the sponge, sharps, and instrument counts. At the conclusion of the surgery, the nurse should:

   A. ask the surgeon to sign the count.
   B. immediately notify the OR supervisor.
   C. document the absence of counts.
   D. refuse to sign the sponge count record.

5. The optimum patient position provides:

A. access and exposure, maintains circulatory and respiratory functions, and does not compromise neuromuscular structures.
B. optimum access and exposure to surgical site, with no permanent compromise to neuromuscular structures.
C. access for the surgeon, does not compromise the neuromuscular structures, and maintains an adequate airway for the anesthetist.
D. sustained circulatory and respiratory functions, does not compromise neuromuscular structures, and maintains body alignment.

6. A patient who is 8 months pregnant is to undergo an emergency laparotomy. In planning nursing care for this patient, the perioperative nurse should have available a wedge cushion or pillow to place under the patient's:

A. knees.
B. left side.
C. right side.
D. shoulders.

7. Improper deflation of a pneumatic antishock garment (PASG) could result in:

A. septic shock
B. hypovolemic shock
C. hypervolemia
D. pulmonary edema

8. During the induction of anesthesia, the perioperative nurse may notice fasciculation as a response to which of the following depolarizing muscle relaxants?

A. Tubocurarine chloride (curare).
B. Succinylcholine chloride (Anectine).
C. Atracurium besylate (Tracrium).
D. Pancuronium bromide (Pavulon).

9. The ER notifies you that it has an 18-yr-old patient who was in a sledding accident and who is accompanied by his parents. The patient is alert, oriented, in pain, has a blood pressure of 80/60, pulse of 120, and RR of 24. The abdomen is distended and tender. After being transferred to the OR bed, the patient is very apprehensive and complains of being cold. The nurse should confirm the patient's name, allergies, and operative procedure by:

A. speaking with the patient and reading the patient's chart.
B. telephone conversation with the ER nurse.
C. use of the ER record provided.
D. telephone conversation with a parent of the patient.

10. A critically injured patient requires immediate surgery, but all unassigned personnel have limited OR experience. In this situation, the charge nurse should:

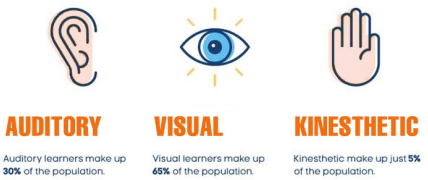
A. assist the available personnel in caring for the patient
B. reassign experienced personnel to the emergency procedure
C. personally assume care for the critically injured patient
D. call in additional personnel to handle the emergency

11. The nurse's initial response to a patient who develops signs of cyanosis during the preoperative assessment is to:

A. administer O2 and start an IV line
B. begin CPR
C. read the history and physical to determine health status
D. assess for breath sounds and airway obstruction

What is your learning style?

- How do you figure things out in an unstructured learning situation?
- Learning Style Quiz



WHAT IS YOUR LEARNING STYLE?

Here are some questions you can ask yourself to help determine the learning style you prefer. The questions are organized by which modality (kinesthetic, visual and auditory) a person prefers for different learning tasks: taking in and organizing new information, decision making, and remembering and creating.

Questions to determine the taking in and organizing preference:

1. I learn new information best by:
   - k ( ) participating in an activity myself after a short explanation
   - v ( ) reading or looking at a diagram or demonstration
   - a ( ) listening to a lecture or spoken instructions

2. When I am inactive but need to stay alert, I :
   - k ( ) find ways to move
   - v ( ) stare, watch something, or doodle
   - a ( ) listen to sounds around me, hum, or talk to myself

3. I have these qualities:
   - k ( ) Interact best by moving, doing, physical contact and like hands-on activity
   - v ( ) Connect with others through eye contact and need visual order
   - a ( ) Interact easily by talking and like lectures and discussions

4. The kind of language I most commonly use is:
   - k ( ) how do you feel about this, I can't grasp that, that is comfortable for me
   - v ( ) look at it this way, I just can't see the point, that is crystal clear to me
   - a ( ) can I tell you how I think about that, do you hear me, that sounds right to me

5. My emotions are apparent to others by:
   - k ( ) muscular state and movement
   - v ( ) facial expression
   - a ( ) voice tone

Questions to determine the decision making or sorting preference:

1. As part of my sorting process, I:
   - k ( ) use my hands to find words
   - v ( ) use writing, drawing, or visual images to find words and feelings
   - a ( ) recall information through words such as a quote or the line of a song that fits that fits the situation

2. If I am trying to make a decision, it helps me to:
   - k ( ) do something physical like go for a walk
   - v ( ) write, draw, or look at nature
   - a ( ) speak to someone or listen to something

3. I can do these things at the same time:
    k ( ) move or touch something and also feel emotions deeply
    v ( ) see things externally and also have inner visual images
    a ( ) listen to external sounds and to own thoughts, listen to radio and read

4. For me intimacy involves:
    k ( ) talking about feelings and fantasies or having total silence and eye contact
    v ( ) seeing and being seen, especially deeply receiving someone with own eyes
    a ( ) hearing and being heard, speaking slower to become more personal

Questions to determine the remembering and creating preference:

1. It takes longer for me to access:
    k ( ) physical sensations
    v ( ) visual images
    a ( ) words and sounds

2. A characteristic I have is:
    k ( ) disliking most physical competition and being able to sit still a long time
    v ( ) becoming overwhelmed by visual detail and disliking eye contact
    a ( ) "spacing out" from lots of spoken words and navigating through questions

3. Another quality I have is that I:
    k ( ) am relatively unaware of bodily sensations
    v ( ) get lost in visual material
    a ( ) get lost in conversation or listening to a lecture

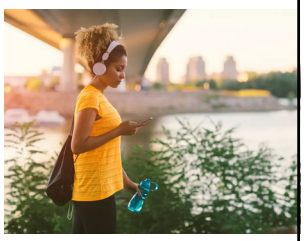
4. If I am listening to someone on the phone, I would be most distracted by:
    k ( ) someone putting their hand on my arm or massaging my shoulders
    v ( ) someone giving me something they want me to read
    a ( ) someone asking me a question or playing loud music

AVK – Must talk to learn

- Get in a Study Group
- Handheld recorder
  - Audio and visual version of notes
  - Read along with your recording
- Share what you are learning with others
- Participate in class discussion
- Read out loud

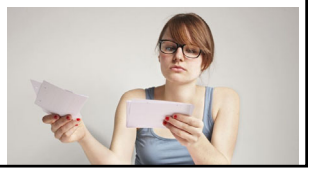
AKV – Listen while moving

- Don't be sedentary for long periods
  - Not a study group
- Handheld Recorder
  - Audio Notes directly from textbooks
  - Listen during movement
- Must get up to move about
- Memorize lists by putting to music or rhyme



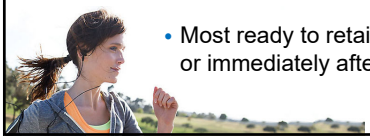
KVA – Physical activity a must

- Don't be sedentary for long periods
  - Not a study group
  - Short study sessions
  - Flash cards – visual notes on the move
- Retype notes into a word document
- Fidgeting = learning



KAV – Physical activity a must

- Hates to read directions – figures it out
- Don't be sedentary for long periods
  - Not a study group
- Handheld Recorder
  - Audio Notes directly from textbooks
  - Must be moving while listening



- Most ready to retain information during or immediately after physical activity

VAK – Must teach to learn

- Study best with minimal visual clutter
- Organize and rewrite your notes as if you are preparing to teach
- Video recording of yourself discussing the topic
- Great note taker
  - Review notes often

VKA – Traditional Learning Style

- Study groups work well for you
- Flash cards – make your own
- Make up stories about the topics you are learning
- Take notes and review them often
  - Highlight
  - Write thoughts in the margin as you study

How to study

- Tips from learning style
- Gather notes and study materials
- Assess your strengths and weaknesses
- Create study tools
- Schedule Study time

Surgical Environment

Objectives:

1. Describe the preparation of the sterile supplies for use in surgery
2. Identify measures taken by the perioperative nurse to maintain sterility of the surgical field
3. Identify measures taken by the perioperative nurse to maintain the integrity of the operative suite

- Spaulding Classification System
- Decontamination of instruments
- Sterilization of instruments
- Endoscopes
- Quality Control
- Packaging
- Surgical hand asepsis
- Surgical Attire and Drapes
- Hazards to sterility
- Skin Prep
- Documentation
- Review of incisions
- Traffic Control
- Infection Control

Spaulding Classification System

- Critical
  - Must be sterile
  - Will enter sterile tissue or the vascular system
- Semi-critical
  - Should be sterile but High-level disinfection acceptable if manufacturer's instructions
  - Contacts broken skin or mucous membrane
- Non-critical
  - Intermediate or low-level disinfection or cleaning
  - Will come in contact with skin

Spaulding Classifications Examples

- Critical
  - Instruments
  - Cutting endoscopic accessories and endoscopes Cardiac and urinary catheters
  - Needles
- Semi critical
  - Respiratory Therapy / anesthesia equipment
  - Bronchoscopes / GI endoscopes
- Noncritical
  - OR bed
  - Linens

Workflow for sterile processing

- There should be a physical separation between a decontamination and processing area
- Workflow should progress from:
  - Decontamination
  - To preparation and packaging
  - To sterilization processing
  - To clean distribution / storage

Decontamination of Instruments

- Cleaning is the most critical step to prevent infection
- Pre-treating recommended
- Disassemble anything that can be
- Brush lumens, channels, crevices and joints
- Automated cleaning
  - Ultrasonic
  - Washer

Sterilization - Steam

- Pre-vacuum autoclave (Dynamic Air-Removal)
  - Sucks air out of the chamber
  - Clean drains are essential
  - Porous/lumen items in 4 min
  - Nonporous in 3 min

- Gravity displacement autoclave
  - Steam forces air from chamber
  - Thermometer closes drain (270° F)
  - Porous/lumen items in 10 min
  - Nonporous in 3 min

Steam Sterilization – Avoiding Condensation

- Allow air flow between trays
- Remove loads immediately. Leaving the door ajar to cool increases likelihood of condensation
- Don't put hot items on a cool solid surfaces or racks
- If condensation occurs and the items are moist, they are considered non-sterile

Immediate Use Steam Sterilization

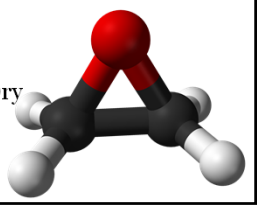
- Sterilization for immediate use
- Packaging, wrapped items and textiles are never to be used
- Must have same decontamination process including brushing and flushing lumens
- Must use a class 5 chemical integrator
- Rigid Sterilization containers with lid
- Never an implant unless emergent.- biological 1st
- Sterilization log must be kept

Sterilization - Gluteraldahyde

- "Cold sterilization"
- Point of care use only.
- Takes 10 hours of immersion
- Bad for instruments
- Suboptimal form of sterilization
  - Environmental problems
  - Poor ease of use

Sterilization – Ethylene Oxide

- For heat and moisture sensitive items
- 2-5 hours exposure
- Aeration time 8-12 hours
- Human Carcinogen
  - Exposure limited to 1 ppm in an 8-hour period
- Lumens must be completely Dry
- Environmentally hazardous



Low Temp Hydrogen Peroxide Plasma Sterilization

- Sterrad
- Used for Heat and moisture sensitive items
- No aeration cycle needed. This is Dry Sterilization
- Cycle time is 75 minutes
- Environmentally sound

Peracetic Acid

- Steris
- For items that can be immersed
- Corrosive to instruments and people
- Temp 120°-130°F
- 20-30 min
- Micron filtered tap water rinse
- For point of care use only
- Documentation

Ozone

- Low Temperature Sterilization
- Only one manufacturer in the USA
- FDA has cleared ozone for sterilization of metal and plastic.
- Exhaust is passed through a catalytic converter
- Environmentally sound
- No aeration cycle is necessary

Dry Heat

- High Temperature
- Best for heat stable powders and oils
- Dental instruments
- Burrs
- Reusable Needles
- Glassware
- Don't use tape

Endoscopes

- Leak testing is performed before placed in cleaning solutions
- Manual cleaning on the field
  - Clear lumen with water
  - Wipe exterior
- Kept damp or wet but not submerged during delay or transport to decontamination
  - Not allowed to dry
- Clean within an hour or follow delayed processing instructions

Endoscopes

- Visually inspected after manual cleaning
- Mechanical Processing according to manufacturer's instructions
  - Processor is approved for cleaning scopes
  - Do not soak scopes
  - Positioned so all surfaces come in contact with the solution
- Rinse with sterile water or alcohol after processing
  - Peracetic acid can cause irritation to the patient's mucosa if not thoroughly rinsed

Endoscopes – Storage

- Not stored in procedure rooms
- Stored in a drying cabinet
- If drying cabinet is not available:
  - Cabinet has HEPA filtered air with positive pressure
- Storage times established a multidisciplinary team
  - Infection preventionists, endoscopy nurses, processing personnel, endoscopists,
- The team should take into consideration the results of cleaning verification tests

Occupational Safety

- SDS (Safety Data Sheet) includes information on chemical hazards, special handling and exposure
- Inhalation gases are exhaled in an unchanged form
  - Can cause miscarriage, male sterility or Lymphoma.
- Use smoke evacuator for ESU and laser smoke plume

Quality Control

- Items should be traceable from the method of sterilization.
- Lot control #,load or cycle # and date and time should be documented for each item
- Sterile technique is founded in individual's surgical conscience.

Sterilization – Quality Control

- Biological Challenge (spore testing)
  - Autoclave
    - Daily biological (Ideally) for gravity displacement and Pre-vacuum
    - Daily Bowie-Dick for Pre-vacuum
      - Uniform pattern indicates that the vacuum cycle has functioned properly
    - With every implant
  - Ethylene Oxide
    - With every load
  - Sterilization Log required

Sterilizer Testing

Type of Sterilizer	Type of testing
Steam – Gravity Displacement and Prevacuum	**Geobacillus Stearothermophilus** spore testing at least weekly and preferably **daily**
Prevacuum	An air removal test like **Bowie Dick** should be done **daily** in an empty chamber. For new, renovated or moved equipment three consecutive successful air removal tests should be done before the biological
Ethylene oxide	**Bacillus atropheus** spore testing should be done with **every load**
Plasma	**Geobacillus Stearothermophilus** spore testing done at the same interval as other sterilizers in the facility
Ozone	**Geobacillus Stearothermophilus** spore testing done **daily**
Parecetic Acid	**Geobacillus Stearothermophilus daily**
Dry Heat	**Bacillus atropheus** indicators upon installation and after any repair. (Table top type monitored weekly)

Packaging

- Must work with the type of sterilization
- Must allow for identification of the contents
- Count sheets should not be placed inside wrapped sets or rigid containers
- Lint free
- Free of holes
- Sterile storage areas must not exceed 78° F or 60% humidity

Packaging and Sterilization

- No textiles, peel pouches or rubber mats inside of the tray
- Instruments disassembled
- Instruments in open, unlocked position
- Integrator in the corner of the tray
- Indicator on the inside and outside of the tray
- Count sheets on the outside of trays

Peel Pouches

- Not stacked inside of Sterilization chamber
- Write on the plastic, not on the paper
- Not for use with heavy items i.e. drills
- Double pouching:
  - With manufacturer's instructions only
  - Inner pouch fits without being folded.
  - Facing same direction.

Hand antisepsis

- Protect your hands!
- Use soap and water if hands are:
  - Visibly soiled
  - After blood or body fluid exposure
  - After care of patient with norovirus / C-Diff
- Wash hands in cool water. (70-80 degrees)
- Dry hands completely
- Use hospital approved hand lotions only
- Alcohol based hand sanitizer when able
  - Rub hands until completely dry

Hand scrub

- Agent
  - Broad spectrum
  - Fast acting
  - Persistent
  - Time is as recommended by manufacturer
  - Alcohol based
- Brushes are only for subungual area
- Primary defense for patient safety

Hand Asepsis

- Engage Patients and visitors
  - Stop anyone from touching pt. before hands cleaned
  - Provide ability to clean hands
- Must have a way to evaluate and respond to opportunities for improvement
- Auditing
  - Direct observation
  - Scanning
  - Video surveillance

Surgical Attire

- Surgical attire should be hospital laundered
- Attire should be made of spunbound polypropylene
- Dress in a designated area
- Surgical attire removed before leaving the facility
- Shirt tucked into pants, Scrub dresses over pants okay
- Personal clothing under attire according to facility policy

Surgical Attire

- Personal bags/phones
  - Cleaned before and after entering the OR
  - Never placed on the floor
- Change scrub clothes daily and when visibly soiled
- Cover coats
  - Single use
  - Hospital laundered
  - When leaving semi-restricted or restricted area

Surgical Attire

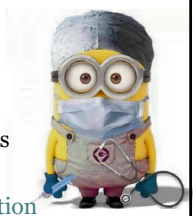
- Non scrubbed personnel should wear long sleeves while doing skin prep
- ID badges clipped (not on lanyard) and cleaned with alcohol regularly
- Stethoscopes
  - Cleaned before and after each use
  - Not worn into OR
  - Not worn around the neck

Surgical Attire

- Don't save worn hats, coats, jackets or scrubs in your locker for later use
- Head covering – hospital policy
  - Completely covers hair and scalp
  - Should not remove cap when leaving perioperative area
  - Head attire must be removed at the end of the shift or when contaminated
  - When working in the preparing and packaging area, beards must be covered

Surgical Attire

- Masks are on in restricted areas,
  - Never as a necklace
  - Change between cases
- Eye protection cleaned between cases
- Shoes
  - Covers for unavoidable contamination
  - Dedicated for use within the perioperative area
  - Must have enclosed toes and heels



Surgical Attire

- Don't gown from the back table.
- Gowns and drapes resistant to penetration by blood /body fluids.
- Double glove
- Change outer glove every 90-150 minutes and between cases

Surgical Attire

- Changing contaminated gloves.
  - Somebody else glove you
  - Change both gown and gloves yourself using closed method
- Once gloves are donned the cuff is considered contaminated

Surgical Drapes

- Drape everything within sterile field
- Don't move them about
- Perforated = contaminated
- Cover tables during high activity or delay
- Folded drapes are held higher than the back table and draped from operative site to periphery

Potential Hazards to Sterility

- Wrapped items
  - Open wrapped flap that is furthest away first Sides and nearest last
- Heavy or sharp objects
  - Trays should be no more than 25 lbs
- Pouring liquid
  - The edge of the container is considered contaminated when cap removed. Do not recap

Movement around the field

- Scrubbed persons:
  - Avoid changing levels
  - Pass each other back to back or front to front
  - Remain close to the sterile field
- Non- Sterile person:
  - Always face the sterile field,
  - Remain at least 12 inches away,
  - Do not walk between two sterile fields

Traffic Control

- Good Traffic control practices prevent cross contamination
- There are three surgical areas
  - Unrestricted
  - Semi-Restricted
  - Restricted

Traffic Control

- Only necessary personnel in restricted and semi-restricted areas
- OR s should have positive pressure in relation to corridors. OR doors should remain closed
- Supplies should be transported in covered carts with solid bottoms to semi-restricted / restricted areas
- Flow of sterile supply goes from clean core through OR to peripheral corridor

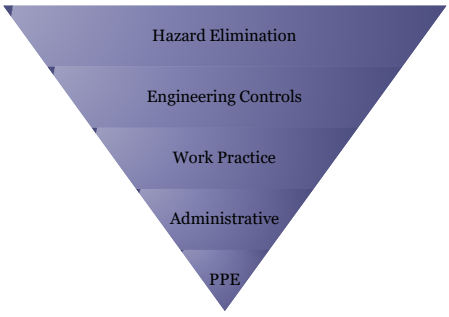
Transmission-based precautions

- Don't get any on you.
  - PPE and frequent hand washing
  - Specimens
    - Leakproof container
    - Biohazard bag
  - Don't recap needles
    - One handed if necessary
  - Eating, drinking, handling contacts, applying lip balm

Sharps Safety

- 2000 Needle-stick Safety and Prevention Act
  - Nonsurgical settings: 31.6% decrease in injury
  - Surgical Settings: 6.5% increase
- OSHA required Blood borne pathogens exposure control plan
- Annual review of exposure control plan required
  - Reflect changes in technology to reduce exposure to blood borne pathogens
  - Identify employees at high risk

Hierarchy of Controls



Proper disposal of sharps

- Puncture and leak resistant containers
  - Recognizable, visible in proximity to point of use
- Remove sharps before decontamination
- Perioperative RN's are to serve as role models for other team members.
  - Follow regulations
  - PPE
  - Timely reporting and treatment of injury
  - Hep B immunization

Airborne Precautions

- Stay out of my OR unless emergent
- N95 Mask – Fit tested
- Intubate in Isolation room
  - Bacterial filter on the ETT
- If not intubated
  - Portable industrial grade HEPA filter
  - PAS-HEPA (antechamber)
- Provide air exchanges as usual
- Room stands empty for 28 minutes after case
- Do not make room negative pressure

Droplet Precautions

- Released during, coughing, sneezing, and talking
- Does not remain suspended in the air
- PPE within 3 feet of patient

Contact Precautions

- PPE
- Precautions during transport
  - Reverse Isolation
- Adequate disinfectant and cleaning

Prions

- Creutzfeldt-Jakob Disease (CJD)
  - Brain, spinal cord, CSF, Cornea
  - Also present in low concentration in other tissue
- Use disposable instruments if possible
- Clean area with Bleach or Lye
  - Sodium Hypochlorite, Sodium Hydroxide
  - 15-minute contact time
- Instruments can be steam sterilized
  - Prevac – 18 minutes
  - Gravity displacement – 60 minutes

Environmental Cleaning

- Terminal Cleaning
  - Includes restricted and semi-restricted areas in the OR
  - Preoperative patient areas
  - Postoperative patient areas
  - Sterile Processing Department
- Environmental control temperature range
  - Unrestricted – 70°-75°
  - Semi-Restricted – 72°-78°
    - Decontamination – 60° -73 °
  - Restricted 68°-75°

Environmental Cleaning

- Remove contaminated instruments and garbage
- Cleaned with a hospital-grade germicidal agent
  - Patient transport vehicles,
  - Equipment
  - OR Furniture
- Mop the floor
  - New or freshly laundered mop head
  - New or 'never double dipped' water
  - Hospital-grade germicidal agent
  - Move the OR table
  - Clean to dirty

Multidisciplinary Team

- Who?
  - Perioperative nurses, sterile processing, environmental services, and infection prevention personnel
- What?
  - Education/competency
  - Policy and Procedure
  - Quality improvement

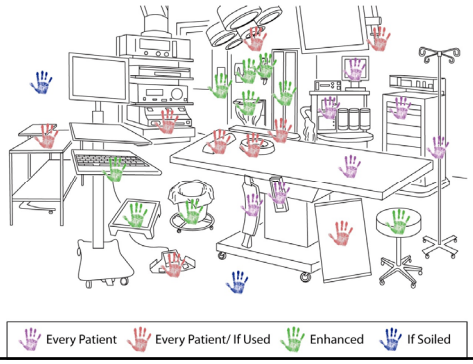
Provide Clean Safe Environment

- Any item that touches the floor must be disinfected before patient use.
  - Not just sterile stuff. (i.e. leads, safety strap)
- If it will not withstand disinfectant or is difficult to clean use a barrier or cover. i.e. Keyboard
- Insects and Vermin in health care settings carry pathogens with antibiotic resistance

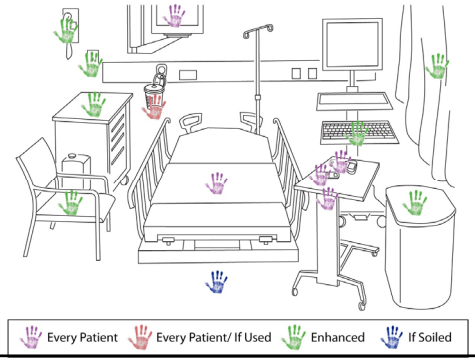
Enhanced Environmental Cleaning - MDROs

- Stay in the environment longer, difficult to control and increase morbidity and mortality
  - MRSA
  - VRE
  - Vancomycin Resistant Staphylococcus Aureus
  - Extended spectrum β-Lactamase producing bacilli
  - Clostridium difficile
  - Carbapenem resistant enterobacteriacae
  - Klebsiella Pneumoniae
- Cleaning with effective products

Reestablish a Clean Environment



Reestablish a Clean Environment



Terminal Cleaning

- Performed daily when the areas are being used
- If the area does not have ANYONE in it then you can choose not to do a terminal clean
- Completed in all restricted and semi-restricted areas in the pre, intra and post op and Sterile Processing
- Should not occur in Sterile Processing when personnel are actively decontaminating instruments

Terminal Cleaning

Cleaned with a hospital-grade germicidal agent

- Surgical lights and tracks
- Fixed ceiling mounted equipment
- Furniture and Equipment
- Handles of cabinets and push plates
- Computer /work station
- Anesthesia equipment
- Ventilation faceplates
- Horizontal surfaces
- Sub-sterile areas
- Hallways
- Scrub and utility areas and scrub sinks
- Wheels
- Telephones

Environmental Cleaning – According to an 'established schedule'

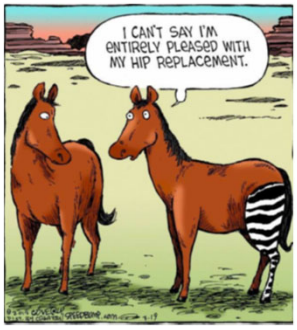
- Clean and soiled storage
- Sterile Storage
- Shelving and storage bins
- Stairwells, corridors, elevators
- Ceilings
- Closets
- Warming Cabinets
- Pneumatic tubes carriers
- Aerators on faucets
- Sinks and eye wash station
- Sterilizers
- Refrigerators
- Ice machines
- Walls
- Offices
- Lounges
- Lavatories
- Locker rooms
- Privacy curtains
- Ventilation ducts and filters
- Linen Chutes

Policies

- Must be in written form
- Reviewed annually
- Readily available to staff

Surgical Environment Quiz

- 23 Questions
- 28 Minutes



Surgical Environment

1. The circulator in Room 3 has learned she is pregnant. During surgery her friends drop by to congratulate her. Why would staff excitedly talking and moving in and out of room be a problem?

A. Disruption in airflow allows microbes to enter the airspace above the surgical site.
B. The most common contaminate in a surgical wound is staph aureus from the patient's skin so staff movement is less important.
C. The friends should assist in circulating since only people pertinent to patient care should be there.
D. The noise and activity would distract the surgeon possibly affecting patient outcomes.

2. Which one of the following perioperative nursing interventions would most effectively reduce the possibility of contamination of the sterile field?

A. Consider the gown cuff to be sterile during surgical cases.
B. The surgical field should be covered during times of high activity in the OR.
C. Gown and glove from a sectioned off portion of the back table
D. Use open-glove method to change a contaminated glove during surgery.

3. How often is it recommended to change surgical gloves during an invasive surgical procedure?

A. Every 60 minutes
B. There are no recommendations for changing gloves
C. Every 90 – 150 minutes
D. It is not necessary to change gloves during the procedure unless they become contaminated.

4. Four laparoscopic tubal ligations have been scheduled for the same day. One of the four available laparoscopes is contaminated during the preparation for the second tubal ligation. The laparoscopes will not withstand steam sterilization. In this situation, what would be the most appropriate course of action?

A. Soak the contaminated laparoscope in a high-level disinfectant for 20 min prior to use on the fourth patient
B. Inform the surgeon of the potential compromise in the fourth patient's care and explore alternate solutions
C. Inform the fourth patient that her tubal ligation can't be done due to the lack of sterile equipment
D. Sterilize the contaminated laparoscope using ethylene oxide, omit the aeration cycle, and rinse with sterile water

5. The bowie-dick test is used to determine:

A. Proper functioning of the vacuum cycle
B. The concentration of ethylene oxide gas
C. Achievement of sterilization
D. Adequate temperature requirements

6. A prosthesis is contaminated during an orthopedic case and a suitable replacement is not immediately available. How should this prosthesis be sterilized?

A. Immediate use sterilization @ 270° F for 3 min with a chemical indicator
B. Send the implant to sterile processing to be returned after the biological indicator has been read.
C. Double-wrap and autoclave @ 270° F for 30 min with a chemical indicator
D. Immediate use sterilization @ 270° F for 10 min with both chemical and biological Indicators

7. A chemical indicator included with surgical instruments processed in a gravity displacement steam sterilizer indicates that the instruments were:

A. Exposed to the sterilizing conditions
B. Free of all surface bioburden
C. Exposed to the necessary vacuum pressure
D. Sterilized by steam sterilization

8. Prior to sterilization, all items with lumens must first be flushed with:

A. distilled water
B. alcohol
C. glutaraldehyde
D. normal saline

9. When items are heat or moisture sensitive which of the following sterilization techniques may be used?

A. Dry Heat
B. Low Temperature hydrogen peroxide gas plasma
C. Gluteraldehyde
D. Saturated Steam under pressure

10. After the sterile field is set up there is a delay in the operative procedure. Which of the following is false?

A. Team members should observe for contamination.
B. Direct observation of the sterile field increases the likelihood of detecting a break in sterility
C. The sterile field should be prepared as close to the time of surgery as possible.
D. The sterility of an opened sterile field is time related

11. During the procedure the perioperative RN should maintain the integrity of the operative suite. Which of the following are appropriate actions taken by the circulating nurse?

A. The non-scrubbed team member should always face away from the sterile field
B. When the case is delayed, leave the sterile field and tape the doors before the team goes on break
C. Walk between two sterile fields if there is adequate distance to pass without accidental contamination.
D. Remain at least 12 inches away from the sterile field.

12. All personnel moving within or around a sterile field should do so with the goal of maintaining the sterile field. To best meet this goal, it is preferable that

A. The scrub person stays close to the sterile field
B. All scrubbed team members pass each other face to back
C. All unscrubbed team members maintain a 12 inch distance from the sterile field and pass facing away from it.
D. All unscrubbed team members maintain a 6 inch distance from the sterile field and pass facing
the sterile field.

13. A recommended practice to be implemented to reduce the potential for microorganisms in the bowel being transferred to sterile tissue within the surgical site is called:

A. Bowel Technique or Isolation technique
B. Infection prevention technique
C. Consolidation technique
D. Sterile tissue technique

14. Tape located on the outside of a sterilized package is considered a class ____ chemical indicator

A. V
B. II
C. I
D. VI

15. As a cost-containment measure a hospital is considering use of regular masking tape instead of indicator tape on in house packaging of OR supplies. This change would not be advisable primarily because

A. The adhesiveness of masking tape does not hold up to moisture during sterilization
B. Masking tape does not provide an external indicator of sterilization effectiveness
C. Chemical indicators will not function correctly if placed in a sterilizer along with packages sealed with masking tape
D. Masking tape has very strong adhesive properties and will require extra time to remove

16. The most effective way to reduce transmission of microorganisms is to

A. Wear gloves in lieu of hand hashing
B. Wash hands for a minimum of 15 seconds with soap and cool water
C. Use a petroleum based lotion for hand moisturizing
D. Wash hands in very hot water

17 When is it appropriate to perform hand washing with soap and water in lieu of hand sanitizer?

A. After care of a patient with a history of MRSA
B. After care of a patient with C-Diff
C. After removal of gloves
D. Before performing patient care

18. When testing sterilizer efficacy, which sterilizers below must include a biological indicator with bacillus atrophaeus spore?

A. Steam
B. Dry heat
C. Hydrogen peroxide gas plasma
D. Ozone

19. Which type of sterilizer must be tested with a Bowie-Dick chemical indicator daily?

A. Gravity displacement
B. Dry heat
C. Dynamic Air Removal
D. Ozone

20. How often should the OR be terminally cleaned?

A. Daily or if unused, as determined by a multidisciplinary team
B. There is no need to clean an unused OR
C. At the end of each 8 hour shift
D. First thing in the morning and again at the end of each day.

21. Endoscopes and related equipment should be cleaned and decontaminated

A. After the scope has been run through the washer-decontaminator
B. After the patient is in PACU
C. With a 70% - 90% alcohol solution
D. Immediately after use

22. Contamination of a sterile surface by moisture that has originated from a non-sterile surface and penetrated the protective covering of an item is called:

A. Aseptic technique
B. Sterile
C. Event related Sterility
D. Strike through

23. Endoscopes must be stored

A. In a drying cabinet or a positive pressure cabinet with a HEPA filter
B. In a cabinet in the procedure room for easy accessibility
C. Vertically for no more than 5 days
D. With accessory ports closed

Safe Anesthesia

Objectives:

1. Describe various considerations when preparing a patient for anesthesia
2. Relate possible side effects and complications of anesthesia agents
3. Define the perioperative nurse's role supporting safe administration of anesthesia

- Preoperative assessment
- Choice of anesthesia
- Pediatric Considerations
- Anesthesia Agents
- General Anesthesia
- Regional Anesthesia
- Epidural or Spinal
- Moderate Sedation
- Local
- Post op complications

Preoperative Assessment

- Determining type of anesthesia
  - Age of patient
  - Pre-existing condition
  - Type of surgery
  - Patient's request

Types of Anesthesia

- Local
- Moderate Sedation
- Monitored Anesthesia Care
- Nerve Blocks
- Neuraxial
- General Anesthesia

Preoperative Assessment

- Allergies
- Age
- Ht, Wt, BMI
- Medications/Herbals
- NPO status
- Medical History (H&P)
- Labs/diagnostic tests
- Baseline Resp/Cardiac Status
- Skin assessment
- Neuro status
- Sensory impairments
- Ability to tolerate draped surgical position
- Anxiety level
- Pain level
- Need for IV access
- Perceptions of surgery
- Complete physical acuity assessment tool

Herbal Supplements

- Liver Damage: Echinacea, Kava
- Increased bleeding: Ginger, Gingko, Garlic, Fever Few, Saw Palmetto
- Arrhythmias/Blood pressure (cardiac effects): Goldenseal, Milk Thistle, Licorice, Ginseng, Ephedra
- Prolonged emergence: Gingko, St. John's wort, Valerian

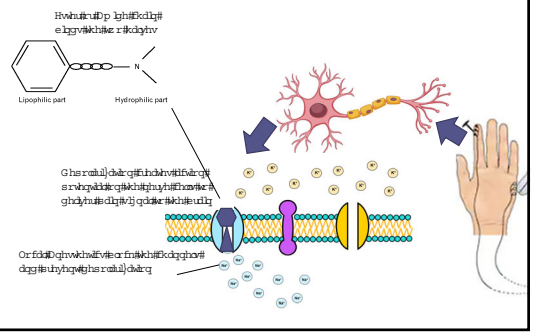
Local Anesthesia

- At baseline and every 5-15 minutes during case:
  - Heart Rate/Rhythm, Pulse, BP
  - Pulse oximetry
  - Pain, anxiety and LOC
- The monitoring nurse for a straight local case may also be the circulator

Monitoring Equipment:

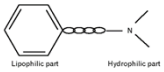
- Age/size appropriate equipment
- Functional equipment
- Emergency medications
- Oxygen
- Suction

Local Anesthesia



Local Anesthesia

- **Esters**-cocaine, procaine, tetracaine
  - Metabolized by pseudocholinesterase
    - Process releases para-aminobenzoic acid (PABA)
      - Some people are allergic to that
- **Amides**-bupivicaine, lidocaine, mepivacaine,
  - Metabolized in liver



Moderate Sedation

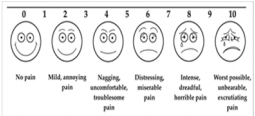
- Monitoring
  - Capnograph, depth of sedation scale, consider BIS monitoring
  - Audible alarms
- Medication
  - Dose adjustment for older adults.
  - Think about it. Be aware
- Infant / Toddler Discharge
  - May obstruct airway by head falling forward in car seat

Moderate Sedation

- Know your scope of practice
  - State Board of Nursing
  - AORN Government affairs links to State BON
- RN can do moderate sedation for ASA 1,2 & 3
  - No beards, dentures, or sleep apnea (difficult mask ventilation)
- No competing responsibilities for monitoring RN
  - 2 RNs in the room with the pt at all times
  - Brief interruptible tasks ok for monitoring RN
    - Tie gown, Open suture

Education and Competency

- Pharmacology
  - Calculation of total dose
  - Contraindications
  - Desired effect
  - Recommended dose
  - Onset and duration of action
  - Adverse effects
  - Resuscitation
- Expected sequence of events
- Completing pain assessment
  - Visual analog scale
- Patient teaching

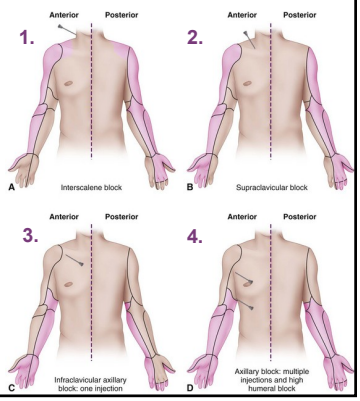


Regional Anesthesia

- Topical
  - drops or ointment
- Local infiltration
  - Injected into incision site
  - epinephrine delays absorption for post op pain control
  - 1% Lidocaine 5mg/kg per day (with epi 7mg/kg)
- Regional nerve blockade the injection of local anesthetic onto or near nerves for temporary control of pain

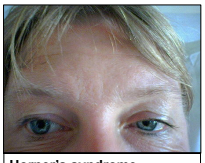
Brachial Plexus Block

1. Interscalene
2. Supraclavicular
3. Infraclavicular
4. Axillary



Brachial Plexus Block Complications

- Interscalene
  - Horner's syndrome
  - Phrenic nerve paresis common
- Supraclavicular
  - Pneumothorax
  - Phrenic nerve paresis less common
- Infraclavicular
  - Short duration
  - Good pain control
- Axillary
  - Hematoma
  - Accidental vascular injection
  - Reliability improving with ultrasound technique



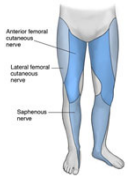
Horner's syndrome
Signs on same side as the block
- Miosis
  - Constricted pupil
- Ptosis
  - Droopy eyelid
- Anhydrosis
  - Decreased sweating

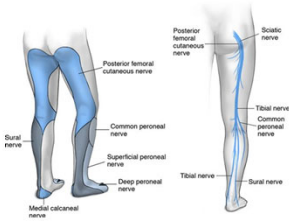
IV Regional Anesthesia – Bier Block

- Used in hand procedures
- 20 – 60 minute cases are ideal
- Bloodless field
- Rapid onset < 5 min
- Motor function returns rapidly then sensation

Femoral Block

- The femoral block is well-suited for surgery on the anterior thigh and knee, quadriceps tendon repair
- Postoperative pain management after femur and knee surgery





Local Anesthetic Systemic Toxicity (LAST)

- High Serum levels of the local Anesthetic
  - Use the lowest dose to achieve desired result
- Central Nervous System and/or Cardiovascular System complications
- Early signs usually appear around a minute after injection but can be delayed for up to 30 min
- Frequent verbal communication with patient to assess for S/S

Patients at highest risk for LAST

- Advanced age
- Heart failure, ischemic heart disease, conduction abnormalities
- Liver disease
- Low Albumin Levels
- Metabolic or respiratory acidosis
- Medications that inhibit sodium channels
- Patients with very low ejection fraction

Signs and Symptoms of LAST

1. Initial Phase:
   - Metallic Taste
   - Numb tongue and lips
   - Ringing in ears
   - Light headedness
   - Agitation
2. Excitation Phase:
   - Shivering
   - Slurred speech
   - Confusion
   - Seizures
   - Tachycardia/hypertension
3. Depression Phase:
   - Coma
   - Bradycardia/hypotension (progression)
   - Ventricular arrhythmias
   - Respiratory/Cardiac arrest

Local Anesthetic Systemic Toxicity (LAST)

- Prevention!
  - Know + calculate maximum doses of local anesthetic agent
  - Always aspirate prior to injection
  - Ask patient about symptoms after injection
  - Serial repairs of large or multiple wounds
- Oxygen, Monitors, IV fluid
  - Hyperventilate with 100% O2
  - Establish IV access if not already there
- ACLS
- 20% lipid emulsion ★
  - 1-1.5 ml/kg bolus over a minute
    - Can repeat bolus up to 3x
    - Then infusion at 0.25 ml/kg/min

Neuraxial Anesthesia
Epidurals & Spinals

- Aspirate before injection
  - Bupivacaine in the epidural vein = LAST
- Motor, sensory and autonomic block of nerve roots and spinal cord
- Position and transfer patients with care due to lack of motor/sensory function.
  - Body alignment
  - Too rapid a position change can cause severe hypotension
- Motor function returns before sensory function
- Bladder distention

Peridural or Epidural/Caudal	Subdural or Spinal / Saddle
• Medication injected into epidural space • Can be used for postoperative pain • Longer Duration achievable • Thoracic and Lumbar region • Preferred for Obstetrics • Onset in 15 – 30 minutes	• Medication injected into the spinal fluid • Lasts about two hours • Injected below L2 • Not for postoperative pain • Onset in 5 minutes

Neuraxial Anesthesia Considerations

- History of spinal malformation
- Previous spinal surgery
- Psychological status
- High skill level required in children

Neuraxial Anesthesia Contraindications

- Patient is anticoagulated
  - Bleeding disorders
  - Pharmacological
- Increased ICP
- Septicemia
  - Weigh risks and benefits
- Skin infection at the insertion site
- Pre-existing neurologic disorders
  - Considerate controversy
  - Multiple sclerosis
  - Avoid if possible
- Cancer of Brain/spinal cord
- Patient refusal

Neuraxial Anesthesia Complications

- Respiratory Depression
  - Caused by sedatives used with Regional anesthesia or high placement effecting phrenic nerve
  - Treat the underlying cause and maintain respirations
- Bladder distention
  - Sacral autonomic fibers are the last to recover Patient does not sense a full bladder
  - Assess bladder, Offer opportunity to void, Catheter if necessary

Neuraxial Anesthesia Complications

- Hypotension
  - Occurs in 1/3 of patients
  - Decreased venous return and cardiac output
    - GREATLY enhanced by hypovolemia
- Treatment
  - IVF
  - Vasopressors
  - Slight head down position (5-10°)

Neuraxial Anesthesia Complications

- Post Dural Puncture Headache (PDPH)
  - Spinal anesthesia
    - Pencil point needles preferred over beveled
  - Accidental Dural puncture in Epidural anesthesia
- Noninvasive treatments
  - HOB flat, fluids, analgesics, caffeine, and Sumatriptan
- Invasive Treatment
  - Epidural Blood patch

General Anesthesia

- Goal: Level of sedation adequate to prevent patient being awake
  - Amount of required sedation depends on intensity of stimulation
- A combination of various drugs satisfies all the desired categories and often has a synergistic effect
  - A sedative + narcotic is more potent than bigger dose of either alone

Anesthesia Induction

- Achieved by
  - Inhalation (especially in children)
  - Barbiturates
    - Brevital - ECT
  - Sedative-Hypnotics
    - Propofol
    - Etomidate
- Nurse's responsibility
  - Remain with patient
  - Limit sensory stimulation
  - Stress response can ^ BP and HR
  - Know where the emergency / difficult intubation cart and trach tray are located

Induction - Potential Concerns

- Asthmatics
  - Need to be deeper for intubation
  - Bronchodilator use prior to intubation
- Malignant Hyperthermia
- At risk for aspiration
  - GERD
  - Trauma
  - Awake intubation
  - Pregnancy / obesity
- Use Cricoid Pressure

Stages of Anesthesia

- Stage I - analgesia
  - Analgesia and amnesia; drowsy
  - Conscious, can follow simple commands
- Stage II – delirium/excitation
  - Dream, excitement
  - Unconscious
  - Risk of laryngospasm
  - Risk of cardiac arrest
  - Pupils dilated

Stages of Anesthesia

- Stage III - Surgical stage / Unable to protect airway
  - 1st plane-regular respirations
  - 2nd plane-regular respirations, no longer moving
  - 3rd plane-diaphragmatic respirations
    - Optimal for surgeon
  - 4th-irregular respirations
- Stage 4 – OVERDOSE!!
  - Respiratory paralysis
  - Deeper than necessary

Anesthesia Emergence

- Potential Concerns
- Hypoventilation (most common problem)
  - Muscle relaxants not fully reversed
  - CNS depressants
- Laryngospasm
  - Secretions / trauma
  - Stridor / coughing
  - Treat with 100% O2
  - Sedate and Paralyze if complete spasm
- Emergence Delirium

Inhalation gases

- Halothane
  - Strongest
  - Can cause arrhythmias in conjunction with epinephrine
- Isoflurane (Forane)
  - Rapid recovery (lucid in 15 – 30 min)
- Sevoflurane
  - Rapid onset and offset
- Ethrane
  - Contraindicated in people with seizures
- Desflurane
  - Fastest onset and offset
  - Coughing is common
- Nitrous Oxide
  - Only gas that is not cardiac depressant.
  - Can support combustion like oxygen.

ASA scoring system

- ASA 1 - normal healthy patient
- ASA 2 - patient with mild systemic disease
- ASA 3 - patient with severe systemic disease
- ASA 4 - patient with severe systemic disease that is a constant threat to life
- ASA 5 - near-death patient who is not expected to survive
- ASA 6 - declared brain-dead patient
  - In an emergency the number is followed by an E

Opioid Receptors

- We control our own pain with natural Endorphins
  - We have receptors for our endorphins so we can build muscle, move stuff and run from tigers
    - Sometimes the natural ability to ignore pain is a big advantage
  - The word **Endorphin** derived from the words **Endo**genous Mo**rphin**e
- Synthetic opioids can cause a histamine release in some people

Narcotics

- Hydromorphone (Dilaudid)
  - Push slowly
  - 7x more potent than Morphine
- Meperidine (Demerol)
  - Weak opioid used for shivering
- Sublimaze (Fentanyl)
  - 100X stronger than MSO4
  - Push slowly
- Morphine
  - High incidents of nausea/vomiting

Narcotic Reversal Agent

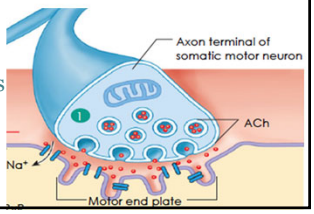
- Narcan
  - Competes for the opiate receptors
  - Dose: 0.1 to 0.2 mg at two- to three-minute intervals
  - Onset 1-2 min
  - Duration 30-45 minutes
  - Monitor for return of respiratory depression

Common IV medications

- **Benzodiazepines**
  - Versed (midazolam)
    - Short acting
    - Amnesic/anti-anxiety
  - Valium (diazapam)
    - Burns on IV administration
    - Potent respiratory depressant
  - Flumazinil (Romazicon)
    - Reverses benzodiazapines
    - Contraindicated in patients with seizures and those taking tricyclic antidepressants

Depolarizing agents (Succinylcholine)

- Succinylcholine (Anectine)
  - Used primarily for induction to facilitate tracheal intubation
    - Rapid onset 1 min
    - Duration 5-10 min
- Metabolized by Pseudocholinesterase
  - Not the normal process of acetylcholinesterase
    - Takes longer

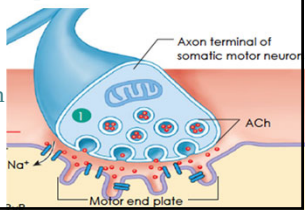


Depolarizing agents (Succinylcholine)

- Adverse reactions
  - Bradycardia
  - Increases intraocular pressure
  - Hyperkalemia
  - Oxygen depletion
- Contraindications
  - Malignant Hyperthermia family history
  - Degenerative neuromuscular disorders
- No Reversal agent
  - Effects reversed quickly by metabolism only
    - Pseudocholinesterase Deficiency

Non-Depolarizing Muscle Relaxants

- Acetylcholine competitive ***antagonists***
  - Aptly called blocking agents
  - Blocks acetylcholine
  - Does not interact with receptor
- All work slower than Succinylcholine
  - Larger doses Rocuronium come close



NDMR reversal agents:
Anticholinesterases

- Blocks acetylcholinesterase
  - Increases acetylcholine concentration in the neuromuscular junction.
  - Displaces the muscle relaxant from the acetylcholine receptor
- Numerous unwanted side effects
  - Bradycardia
  - Bronchospasm
  - Enhanced GI peristalsis
  - Enhanced oral secretions

NDMR reversal agents:
Anticholinesterases

- Typically combined with a muscarinic antagonist (anticholinergic)
  - Glycopyrrolate or Atropine
- Neostigmine
  - Always mixed with glycopyrrolate
    - Atropine effects occur before neostigmine
- Edrophonium - Enlon Plus
  - Premixed with atropine
- Sugammadex – unique neuromuscular reversal drug
  - Reverse any level of paralysis
  - Rocuronium and Vecuronium only

Aldrete

- Activity:
  - Moves extremities on command: **2**
  - Moves 2 extremities: **1**
  - Cannot move extremities: **0**
- Breathing:
  - Can breathe deeply/cough freely: **2**
  - Dyspnea: **1**
  - Apnea: **0**
- Circulation:
  - Systemic blood pressure ≠ 20% preanesthetic level: **2**
  - Systemic blood pressure 20% to 49% preanesthetic level: **1**
  - Systemic blood pressure ≠ 50% preanesthetic level: **0**
- Consciousness:
  - Fully awake: **2**
  - Arousable: **1**
  - Not responding: **0**
- Oxygen Saturation
  - 92% on room air: **2**
  - Needs supplemental oxygen to maintain saturation >90%: **1**
  - 90% even with supplemental oxygen: **0**

Pediatric Considerations

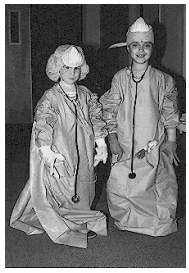
- Developmental
  - Infant (up to 18 months)
    - Sooth with pacifier,
    - hold and rock
  - Toddler (18 to 30 months)
    - Separation anxiety
    - Communicate with simple sentences
    - Sooth with distraction and familiar objects

Pediatric Considerations

- Developmental
  - Preschooler (2 ½ – 5y)
    - May believe they are in the hospital because they are in trouble
    - Fear pain and mutilation
    - Fear of abandonment
    - Provide independence when possible
    - Communicate using compound sentences

Pediatric Considerations

- Developmental
  - School age (6y – 11y)
    - Give honest gentle information
    - Able to be more cooperative
    - Give positive reinforcement for cooperative behavior
    - Watch for loose teeth!



Pediatric Considerations

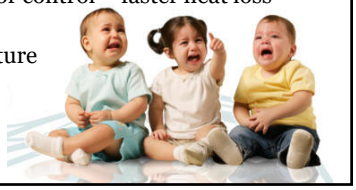
- Developmental
  - Adolescent (12y – 18y)
    - Fear loss of privacy
    - Body Image is important
  - Adolescents are hypersensitive to the opposite sex as caregivers
  - Give honest information

Pediatric Considerations

- Young infants have short tracheas. Maintain neutral neck alignment in intubated infants
- Weigh sponges to keep accurate count of blood loss in small infants
- Very sensitive to heat loss. Increase room temperature
- Don't leave them alone!

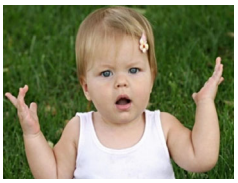
Pediatric Considerations

- Respiratory rate drives heart rate
- Decompensate more suddenly / Recover quickly
- Immature vasomotor control = faster heat loss
- Infants do have mature pain receptors



Postoperative Pediatric Considerations

- Best post-op position is lateral
- Semi-prone for oral procedures
- Swaddle an infant to maintain position and comfort
- May need safety restraints to maintain tubes and drains



Hemodynamic Monitoring

- Common types of monitoring
  - Central Venous Pressure (CVP)
  - Swan-Ganz Catheter
  - Arterial Line
- Why do hemodynamic monitoring?
  - Heart disease
  - Respiratory disease
  - High risk / type of surgery
  - Shock

Central Venous Pressure

- Pressure in the right atrium
- Normal 4-8 mmHg
- Low = Hemorrhage, venous pooling
- High = Pulmonary Hypertension, Pulmonary edema, Right ventricular failure

Swan-Ganz Catheter

- Measures
  - Cardiac output (4-8 liters/min)
  - RA (4-8 mmHg)
  - PA pressures (1/3 systemic pressure)
  - Wedge pressure (4-12 mmHg)
  - Core Temp
- Risk: Microshock

Arterial Line

- For continuous monitoring of blood pressure
- Required for infusion of Nipride or other hemodynamic drugs requiring tight control
- Frequent blood tests
- Radial artery most commonly used
- Allen test before insertion

Blood Administration

- Blood conservation is first priority
- Low Hct are tolerated more now than in the past

Estimating blood loss

Dry sponges
4x4 hold ~ 10 mL blood
Ray-techs ~ 10-20 mL blood
Lap sponges ~ 100 mL blood

Pediatric cases should have sponges & gauze weighed for blood loss

Blood Loss Replacement

Replace 1 mL blood with:

- 3 mL crystalloid (i.e. NS, Dextrose, LR)
  - 3:1 ratio
- 1 mL colloid (i.e. albumin**, Hespan®, Dextran®)
  - 1:1 ratio
- 1 mL PRBC
  - 1:1 ratio

Risks of Blood Transfusions

- Transmission of Hep B, Hep C, and HIV
- TRIM(transfusion-associated immunomodulation)
- Increased SSI risk with Banked Blood
- TRALI (transfusion-related acute lung injury)
- Incompatibility reaction

Blood Administration

- Type and screen
  - Quick (usually within 15 minutes)
  - ABO and Rh factors only
- Type and Crossmatch
  - Test for several common antibody reactions between donor and recipient
  - Takes longer (as long as 45 min.)
  - Takes 1cc of pt blood per unit requested to do the cross-match

ABO compatibility

- Pts. who are Rh+ can receive both Rh+ and Rh- blood.
- Pts. who are Rh- cannot receive Rh+ blood
  - RoGham
- Type O – No antigens
- Type A – A antigens
- Type B – B antigens
- Type AB – A and B antigens

Recipient[1]	Donor[1]							
	O-	O+	A-	A+	B-	B+	AB-	AB+
O-	✓							
O+	✓	✓						
A-	✓		✓					
A+	✓	✓	✓	✓				
B-	✓				✓			
B+	✓	✓			✓	✓		
AB-	✓		✓		✓		✓	
AB+	✓	✓	✓	✓	✓	✓	✓	✓

Autologous and Directed Donor

- Autologous transfusions
  - Patients own blood
  - Preoperative donation
  - Eliminates risk of blood borne pathogens
- Directed Donor transfusions
  - Friends and family can donate for a patient
  - Still goes through all steps of public donation
  - No statistically significant decrease in risks

Blood Salvage

- Autotransfusion is the quickest form of blood replacement in the case of an emergency
- Contraindications:
  - Dirty Bowel
  - Clotting agents
  - Amniotic Fluid
  - Bone Cement
  - Malignancy

Normovolemic hemodilution

- 1-2 units of blood removed preoperatively
- Volume replacement with Crystalloids
- Surgical bleeding happens with diluted blood
- Units reinfused with intact clotting factors

Acute Hemolytic Reaction

- Reaction to antigen or antibody
- Symptoms
  - Lumbar pain, tightness in chest, fever, chills, hemoglobinuria, shock
- Difficult to assess in surgery
  - Sudden onset of uncontrolled surgical bleeding that is unexplained.
  - Bleeding from non-surgical sites

Other Transfusion Reactions

- Delayed Hemolytic Reaction
  - More mild reaction to antigens or antibodies
  - Jaundice
  - Anemia
- Febrile reaction
  - Reaction to antigen, WBCs or Platelets
  - Fever, chills, headache, back pain
- Noncardiac pulmonary edema
  - Reaction to antigen
  - Hives, cough, fever, chills, cyanosis, shock

Uncrossmatched Blood

- Emergency Release Blood
- Only in life-threatening bleeding situations
- Draw type and cross from patient early
- Universal donor
  - O negative

Massive Transfusion

- ARDS (acute respiratory distress syndrome)
  - Microaggregates lodge in the pulmonary bed
  - Use a microaggregate filter
- Coagulopathy
  - Replace clotting factors after 4 units
- Hypothermia
  - Banked blood is refrigerated
  - Use warming devices
- Hypocalcemia
  - Citrate binds patient's circulating calcium

Blood Products

- Packed Red Blood Cells (PRBC)
  - Should only use normal saline
  - Must be ABO compatible
    - If *anything* is mislabeled send it back to the blood bank
  - Blood Warmer
- Platelets
  - Pooled from 5-10 donors
  - Stored at room temperature
  - Needs frequent gentle agitation

Blood Products

- Fresh Frozen Plasma (FFP)
  - Plasma and clotting factors
  - Used to replenish missing coagulation factors
  - Reverse the effect of Coumadin (Warfarin) in a hurry
- Cryoprecipitate
  - Contains clotting factors
    - Fibrinogen, Factors VIII and XIII and Von Willebrand's factor
  - Used to prevent or control bleeding

Pneumatic Tourniquet

- Use as wide a cuff.
  - Greater than half the diameter of the extremity
- Contoured cuffs available when needed
- Ideal cuff should allow bladder overlap
  - 3-6 inches
- Apply a wrinkle free padding
- Gentle traction of adipose tissue distal to the cuff for obese patients

Pneumatic Tourniquet

- Position at the point of maximum circumference
- Tubing on lateral aspect of extremity
- The tubing should be labeled identifying it as pneumatic tourniquet.
  - If more than one tourniquet is used it should be labeled according to the extremity.

Pneumatic Tourniquet

- Use Esmark to exsanguinate the limb before inflation.
  - Pain reduction
  - Esmark is contraindicated in patients with risk of thrombus, infection, dislocated fractures or malignancy
  - Exsanguinated by elevation only in contraindicated cases.

Pneumatic Tourniquet

- Tourniquet placement should be part of the time out process.
- Prophylactic Antibiotics infused before inflation.
  - Ideally infusion complete 20 min prior to inflation
- Nerve damage – most common injury
  - Excessive pressure / uneven padding
  - Excessive inflation time
  - Can result in permanent motor/sensory deficits

Pneumatic Tourniquet

- Time limits
  - Upper extremity
    - 60 minutes
  - Lower extremity
    - 90 minutes
  - Pediatrics
    - 75 minutes
  - Can deflate and allow reperfusion for a minimum of 10-15 min and then re-inflate for another full period

Pneumatic Tourniquet

- Ideally, pressure settings are based on *limb occlusion pressure* (LOP)
  - Use a doppler locate an artery distal to cuff
  - Slowly increase pressure until pulse stops
  - 40 mm/Hg greater for LOP < 130
  - 60 mm/Hg greater for LOP 131-190
  - 80 mm/Hg greater for LOP > 190
  - Pediatric pressure set at 50 mm/Hg greater than LOP
- At minimum the pressure is based on systolic pressure and limb circumference

Pneumatic Tourniquet Complications

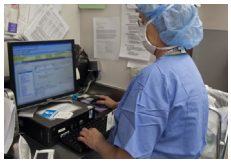
- Rapid deflation – Rush of metabolic waste and meds
  - Ringing ears, numb tingling lips/fingers, Loss of consciousness, seizures, arrhythmias
- Hyperthermia after inflation, Hypothermia after deflation
- Emboli within one minute of deflation

Pneumatic Tourniquet Complications

- Increased ICP – cerebral vasodilatation – isoflurane*
- Over pressurization – pain at tourniquet site, nerve damage
- Excessive time - ischemic injury, nerve damage
- Under pressurization – bleeding, venous congestion

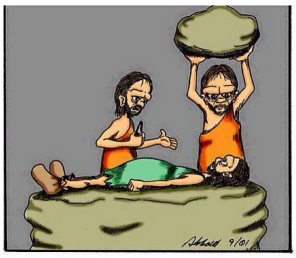
Pneumatic Tourniquet

- Documentation
  - Location of cuff
  - Skin protection measures
  - Cuff pressure
  - Limb Occlusion pressure
  - Time of inflation and deflation
  - Skin integrity before and after use
  - Distal pulse before and after use
  - ID number of tourniquet used
  - Person who applied cuff



Anesthesia Quiz

- 23 Questions
- 28 Minutes



"...and this is Ralph, your anesthesiologist."

Safe Anesthesia Quiz

1. During an outpatient procedure under local anesthesia, the patient suddenly becomes restless. The immediate response of the perioperative nurse monitoring the patient should be to:

   A. increase the rate of the intravenous fluids
   B. request additional sedation for the patient
   C. check for signs of allergic reaction
   D. check the patient's airway

2. During an abdominal hysterectomy on a patient with a hemoglobin reading of 10 and a hematocrit reading of 30, the perioperative nurse notices 600 cc of bloody fluid in the suction canister. In this case, the perioperative nurse would first:

   A. weigh the soiled sponges and add this weight to the 600-cc suction loss to calculate the blood loss.
   B. alert the anesthesia provider and the surgeon to the presence of the 600 cc in the suction canister.
   C. ask the scrub nurse how much irrigation has been used and subtract this amount from the 600 cc to estimate the partial blood loss.
   D. prepare paperwork for type and cross-match

3. During the emergency induction of anesthesia, the perioperative nurse may be requested to use the Selleck's maneuver (cricoid pressure) to:

   A. displace the larynx anteriorly for better endotracheal tube placement
   B. suppress the cough reflex
   C. facilitate the opening of the esophagus to intubation
   D. control regurgitation of stomach contents

4. A common property of all general anesthesia is:

   A. Compensatory vasoconstriction compromised
   B. Aspiration
   C. Muscle rigidity
   D. Vasovagal reflex

5. Symptoms of benzodiazepine overdose include:

   A. urinary retention and seizure
   B. confusion and decreased respiratory function
   C. nausea and vomiting and decreased respiratory function
   D. nausea and vomiting and coma

6. Your patient is about to undergo a carpal tunnel release. The anesthesia professional asks you to assist him in applying a double tourniquet. He is going to perform a:

   A. Brachial plexus nerve block
   B. Bier Block
   C. Interscalene block
   D. Intravenous catheter insertion

7. A patient who is having a breast biopsy under local anesthesia of 1% Lidocaine with epinephrine. Lidocaine anesthetizes the area. What is the rationale for the epinephrine?

   A. To shorten the effects of the lidocaine and improve post op recovery times
   B. To increase the blood pressure and heart rate
   C. For post operative pain control
   D. To counteract the cardiotonic effect of Lidocaine

8. The perioperative nurse is preparing a patient for an open reduction and internal fixation of her ankle. The surgeon requests the use of the pneumatic tourniquet. To prevent neurovascular damage, the tourniquet cuff should be positioned at the:

   A. mid-calf area
   B. middle third of the thigh
   C. point of maximum circumference
   D. distal third of the thigh

9. The pneumatic tourniquet has been applied to the upper arm. The next action taken by the perioperative nurse is to

   A. Check the limb occlusion pressure prior to inflation
   B. Set the tourniquet to 300 mmHg in preparation for inflation
   C. Verify the tourniquet is functioning properly
   D. Verify the patient’s vital signs and length of surgery

10. After transfer of a tonsillectomy patient to the transportation vehicle, in which of the following positions should the patient be placed to facilitate drainage?

   A. Trendelenburg
   B. Prone
   C. Modified Fowlers's
   D. Semiprone

11. An 8-year-old boy is being prepared for a bilateral inguinal herniorrhaphy. As the anesthesia provider is about to start the IV, the boy begins to cry. The most appropriate action at this point would be to:

    A. give the patient psychological support through tactile contact and verbal reassurance
    B. impress upon the patient how important it is to be brave and not to cry
    C. distract the patient's attention from the venipuncture by asking him if he has a pet or a hobby
    D. turn the patient's head to the side so that he cannot see the venipuncture

12. The femoral block is well-suited for which of the following surgeries?

    A. Carpel tunnel release
    B. Total hip
    C. ORIF of the ankle
    D. Quadriceps tendon repair

13. _____ is an herbal supplement that has been linked to an increased risk of bleeding

    A. Valerian
    B. Kava
    C. Ginko
    D. Ephedra

14. The patient has a Swan-Ganz catheter inserted prior to induction of anesthesia. The perioperative nurse is especially careful to ensure that all electrical safeguards have been met, because this situation represents an increased potential for:

    A. microshock
    B. thermal burn
    C. macroshock
    D. electrical burn

15. Concerning the intention to combat fluid volume deficit intraoperatively in a patient who professes to be a Jehovah's witness, which of the following interventions would be permitted by this patient's religion?

    A. Intraoperative administration of autologous blood
    B. Directed donor transfusion
    C. Blood from the blood bank
    D. Autotransfusion

16. For a patient with a ruptured abdominal aortic aneurysm, which method would provide for the safest and most immediate blood replacement?

    A. Type-specific replacement
    B. Directed donation
    C. Autologous replacement
    D. Autotransfusion

17. During the preoperative interview one week before surgery, a patient scheduled for a right hip arthroplasty expresses a fear of contracting AIDS from receiving bank blood. The perioperative nurse's first action would be to:

    A. arrange for autologous transfusion
    B. notify the surgeon
    C. notify the OR manager
    D. arrange for autotransfusion

18. During the perioperative interview the patient lists the following as current medications: Timolol meleate (Timoptic) and pilocarpine for glaucoma, and metoprolol (Lopressor) and diazoxide for hypertension. The preoperative medication ordered for Mr. P. consists of atropine, 0.4 mg; meperidine (Demerol), 25 mg; and hydroxyzine (Vistaril), 25 mg IM on call. The perioperative nurse is aware that
    A. The patient’s daily medications should be taken on the morning of surgery
    B. The patient should instill the eye medications on the morning of surgery
    C. The preoperative medication is contraindicated for this patient
    D. This preoperative medication is no longer administered for narcoleptic analgesia

19. The primary purpose of premedication before anesthesia is to sedate the patient and reduce anxiety. The drug class used to reduce anxiety is:

    A. Benzodiazepines
    B. Narcotics
    C. Hypnotics
    D. Barbiturates

20. In the instruction of an 8 year old child, reasonable grasp of the information can often be ensured by the use of

    A. Audiovisual equipment
    B. Group lectures
    C. Reading material
    D. Prepare the parents and they will instruct their child

21. Which of the following events is the best indicator that a patient is ready to be moved to the post anesthesia care unit (PACU)?

    A. The nursing documentation is completed
    B. The anesthesia care provider indicated that the patient is ready
    C. The surgery is completed, and the dressing is in place
    D. The surgeon indication that the patient is ready

22. All of the following medication used in moderate sedation / analgesia are classified as opiates except

    A. Naloxone
    B. Fentanyl
    C. Morphine
    D. Meperidine

23. Patients with which of the following American Society of Anesthesiologists (ASA) Physical Status Classifications are considered appropriate for nurse-administered sedation during a procedure.

    A. All patients in classifications P1, P2 and P3
    B. Any classification is appropriate
    C. P1 and P2
    D. Medically stable patients in classifications P1, P2 and P3

Emergencies and Complications

Objectives:

1. Identify the nurse's role in caring for patients with surgical emergencies
2. Identify the nurse's role in caring for patients with perioperative complications
3. Summarize the nurse's role in caring for surgical trauma patients

- Underlying Medical Conditions
- Complications
- Cardiac Arrest during surgery
- Trauma surgery
- Arterial Blood Gas Analysis
- Basic arrhythmias
- Fluid and Electrolyte Imbalances
- Lab values

Underlying Medical Conditions

- Liver Disease
  - Greater risk of anesthesia related complications
  - Increased risk of bleeding
- Alcohol Abuse
  - Liver changes
  - Esophageal Varices
  - Pancreatitis
  - Malnutrition
  - Alcohol withdrawal

Underlying Medical Conditions

- Latex Allergies
  - Latex risk assessment.
  - First case of the day
  - Do not remove rubber stoppers from medications.
- Increased ICP
  - Too much fluid increases ICP further
  - Too little fluid decreases BP and perfusion to brain

Underlying Medical Conditions

- Renal dialysis
  - No BP cuffs or IVs on AV fistula arm
  - Fluid and electrolyte imbalances common
  - Medications metabolized in the kidneys avoided
- Burn Patients
  - Prone to Hypothermia
  - Fluid and electrolyte imbalances are common

Underlying Medical Conditions

- Diabetes
  - Glucose control can be a challenge
  - Prone to High Blood Pressure, GERD
  - Delayed Wound Healing
  - Glucometer in room
- Diabetes Insipidus
  - Be mindful in surgeries involving the pituitary or hypothalamus or head trauma
  - Treat with fluid cc/cc urine output
  - Vasopressin or DDAVP

Underlying Medical Conditions

- Smokers
  - 7-8 weeks for ciliary function to return.
  - Stop smoking ASAP
- Cardiac Complications
  - Steady BP on the low side of baseline is the goal

Blood Pressure Categories

BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
NORMAL	LESS THAN 120	and	LESS THAN 80
ELEVATED	120 – 129	and	LESS THAN 80
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1	130 – 139	or	80 – 89
HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2	140 OR HIGHER	or	90 OR HIGHER
HYPERTENSIVE CRISIS (consult your doctor immediately)	HIGHER THAN 180	and/or	HIGHER THAN 120

Underlying Medical Conditions

- Hemophilia
  - Factor VIII deficiency
  - Synthetic Factor VIII replacement throughout surgery
- Pregnancy
  - Remember to check for pregnancy on all females of childbearing age. Guilty until proven innocent
  - Always position off of Vena Cava
  - Maintain BP for fetal perfusion
  - Have fetal heart monitor

Underlying Medical Conditions

- CHF
  - Prone to fluid overload
    - NPO and don't take the diuretic
    - Under anesthesia they dilate and need fluid
- Morbid Obesity
  - Wound healing compromised
  - Difficult intubation common
  - Positioning can make ventilation difficult

Underlying Medical Conditions

- Asthma
  - Have them bring their inhalers
  - Deeper sedation for intubation
- COPD
  - Low O_2 stimulates breathing not high CO_2
  - Take care during moderate sedation
- Do I need a post op ventilator?
  - Vt lower than 500 ml in an adult
  - $PCO_2 > 45$

Underlying Medical Conditions

- Rheumatoid Arthritis
  - Joint Immobility / Creative Positioning
  - RA causes anemia
  - Steroid Coverage puts them at risk for an impaired stress response. Hypo-adrenal Crisis
- Sickle Cell Anemia
  - Specific anesthesia management
  - Avoid triggers
    - Hypothermia, Hypotension, Hypovolemia, Hypoglycemia, Hypoxia

Post op Considerations

- Head and Neck procedures
  - Keep trach tray nearby in case of swelling
  - Wire cutters if jaw is wired closed
  - Anticipate dizziness and N/V after ear surgery
  - Send obturator with trach patients

Post op Considerations

- Orthopedic procedures
  - Fat emboli risk after long bone procedures
  - Prevent DVT
    - Sequential Compression Devices (SCDs)
    - Coumadin / Heparin
    - Early ambulation
  - Monitor for Pulmonary Emboli
    - Painful, Short of breath, sudden onset

Virchow's Triad → DVT formation

- Venous Stasis
  - Immobility during surgery
    - Sequential Compression Device
- Endothelial injury
  - Surgery interrupts vascular endothelium
- Hypercoagulability
  - Clotting cascade triggered

Post op Considerations

- Orthopedic procedures
  - Casts should be removed outside of the OR
  - Wet casts handled with palms only
  - Elevate cast and keep open to air
  - Cement (Methyl Methacrylate)
    - Avoid vapors use scavenger system
    - Let anesthesia know when placing cement into the canal
    - Dry time for cement effected by room temperature

Post op Considerations

- Flap Procedure
  - Vasoconstriction in graft areas biggest concern
  - Monitor circulation with Doppler
  - Protect site from shearing or pressure
  - Keep warm

Disseminated Intravascular Coagulation (DIC)

- Inappropriate clotting followed by hemorrhaging
- Two causes:
  - Systemic response
    - Trauma
    - Sepsis
    - Obstetrics – amniotic fluid
  - Release of procoagulant into the blood stream
    - Boney tumor

Disseminated Intravascular Coagulation (DIC)

Complications	Treatment
• Severe Bleeding • Stroke • Reduced blood flow to organs • Overload of liver and kidneys	• Correct the cause • Treat with FFP and Cryoprecipitates • Heparin sometimes used in the beginning • Volume / blood replacement

Complications - Air Embolism

Venous	Arterial
• Pressure in the right atrium is less than atmospheric pressure • Neuro procedures where the patient is sitting • Hysteroscopy and TUR procedures	• Bypass • Dialysis

Complications - Air Embolism

- Signs and Symptoms
  - Earliest sign is a drop in ETCO2
  - hypotension,
  - arrhythmias,
  - hypoxia,
  - pulmonary edema,
  - neurologic damage

Treating Air Embolism

Venous	Arterial
• 1st identify and occlude the sites of air entry • Sloppy wet sponges, irrigation syringe • Bone wax • Discontinue Nitrous Oxide • Place patient in left lateral position (Durant's maneuver) • Aspirate RA catheter	• Deep Trendelenburg position • Aspirate air from circuit

Complications - Hypothermia

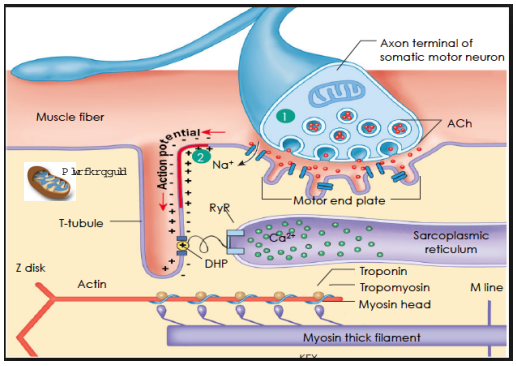
- Hypothermia is temp below 96.8° F (36° C)
- Prevention
  - Core temps preferred (98.6°F/37.0°C)
  - Patients lose 3-5 degrees under anesthesia
  - Use approved warming devices according to manufacturer's instruction
  - Intermittent use is safest
  - Warm irrigation solutions and blood products
  - Room temperature in procedure areas should be 68-75°; humidity 20-60%

Complications - Hypothermia

- Post op shivering increases O2 consumption by 400%
- Myocardial ischemia
- Cardiac arrhythmias below 90° F (32° C)
- Increased Surgical Site Infections
- Acidosis
- Increased Bleeding

Malignant Hyperthermia

- Who is at risk?
  - Malignant Hyperthermia (MH) is an inherited syndrome
  - MH has no racial boundaries although, at least in America, those most often affected are Caucasian
  - MH happens more frequently in older children and young adults
  - Consistently more frequent in men
  - Pre-Op assessment for risk factors



Malignant Hyperthermia

- Triggering an episode
  - A genetically susceptible patient
  - Succinylcholine is one of the most common triggers, especially when used in conjunction with an inhaled anesthetic such as Desflurane, Isoflurane and Halothane
  - An MH susceptible patient should never receive Succinylcholine or one of these anesthetics

Malignant Hyperthermia

- Early signs include:
  - Trismus
  - Rapid increase in body metabolism
    - This is indicated by a rise in exhaled CO_2 and metabolic acidosis
    - This is the earliest consistent indicator
  - Intense muscle rigidity
  - Increased heart rate
  - Increased blood pressure

Malignant Hyperthermia

- Late Signs include:
  - Rapidly rising body temperature
  - Change in color of soda lime
  - Hyperkalemia
  - Hypoxia
  - Myoglobinuria
  - Cardiac arrest

Malignant Hyperthermia

- Immediately discontinue all triggering agents
- Hyperventilate the patient with 100%
- Call MHAUS-1-800-MH-HYPER
- Dantrolene 2-3 mg/kg
- Sodium bicarbonate IV for metabolic acidosis
- Hyperkalemia
  - Calcium, insulin, glucose
- Myoglobinuria
  - Diuretics, bicarb, fluids

Malignant Hyperthermia

- No Calcium channel blockers
- Ice packs / hypothermia blanket
- Give iced NSS - Avoid Ringers
- Send labs - Correct electrolyte imbalances
- Monitor ECG - Correct arrhythmia
- Transfer patient to ICU when stable and monitor for 36 hours for recurrence and complications

Cardiac Arrest = Compressions

- Medical reasons
  - MI, arrhythmias, anaphylactic reactions, emboli, vagal stimulation, malignant hyperthermia, anesthesia overdose, hypoxia, laryngospasm, aspiration, hypothermia, electrolyte imbalances
- Surgical reasons
  - Hypovolemic shock related to blood loss

Cardiac Arrest

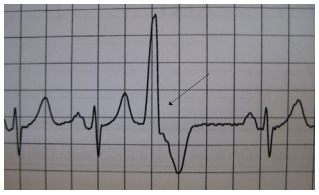
- The RN's Job
  - 1st Get help in your room
  - Get the defibrillator
  - Document
    - meds, time and dose
    - rhythms
    - time start and stop CPR
  - Know who is running the code

Cardiac Emergencies

- OMI (Oh My)
  - Oxygenation, Monitors, IV fluid
- Treating Ventricular Arrhythmias
  - Epinephrine
  - Amiodarone / Lidocaine 2nd choice
  - Defibrillate with no pulse
  - Sync cardioversion with a pulse

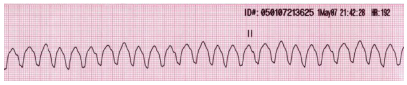
PVC Premature Ventricular Contraction

- A relatively common event where the heartbeat is initiated by the ventricles rather than by the Sino atrial (SA) node



Ventricular Arrhythmias

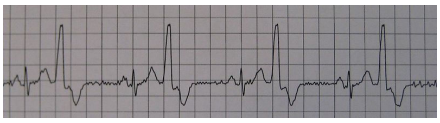
- Ventricular Tachycardia – Tachycardia with beats initiated in the ventricles



- Ventricular Fibrillation - uncoordinated contraction of the ventricles

Ventricular Arrhythmias

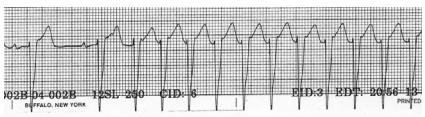
- Bigeminy – PVC every other beat



- Couplet – Pair of PVCs
- Run – Several PVCs in a row. Think of it as unsustained V-Tach

Another Arrhythmia

- Supraventricular Tachycardia (SVT) - tachycardia caused by an electrical impulse originating above the ventricles
  - Not a ventricular arrhythmia so Amiodarone is not going to work
  - Vagal Stim, Adenosine, Sync Cardioversion



Cardiac Emergencies

- Treating Bradycardia
  - Atropine
  - Pacer
  - Dopamine drip

Cardiac Emergencies

Pulseless Electrical Activity - PEA

Causes – 6 H's and 6 T's	Treatment
• Hypovolemia • Hypoxia • Hydrogen ions (Acidosis) • Hyper / Hypokalemia • Hypoglycemia • Hypothermia • Toxins (Drug overdose) • Cardiac Tamponade • Tension pneumothorax • Thrombosis (MI / PE) • Tachycardia • Trauma	• CPR • Treat the underlying cause ▫ Stuff to the left

ABG Interpretation

- Normal Values

pH	7.35 to 7.45
pO2	80 to 100
O2 Sat	≥ 98
pCO2	35 to 45 (Respiratory Acid)
HCO3	22 to 26 (Metabolic Base)

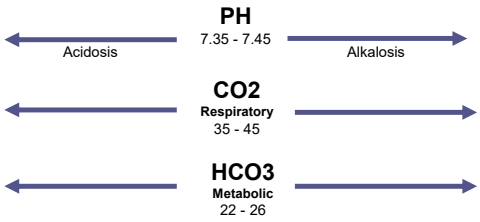
Base Excess +2 to -2 (buffer to base ratio)

R.O.M.E

- Respiratory Opposite
  - Respiratory gas (CO_2) and pH going in Opposite directions.
  - Indicates a Respiratory problem
- Metabolic Equal
  - Metabolic Gas (HCO_3) and pH going in Equal or same direction
  - Indicates a metabolic problem

ABG Interpretation

Is it a Respiratory or Metabolic Problem?



ABG Interpretation

- Respiratory Acidosis
  - Caused by decreased ventilation
  - Treat with ventilation
- Respiratory Alkalosis
  - Caused by hyperventilation
  - Treat with sedation or decreased ventilation

ABG Interpretation

- Metabolic Acidosis
  - Excess production of metabolic acids
    - Cardiac arrest
    - Sepsis
    - Ketoacidosis
    - Renal failure
  - Treat with Bicarb
- Metabolic Alkalosis
  - Acid loss
  - Upper GI loss
  - Diuretics (Potassium loss = Hydrogen Ion loss)
  - Over administration of Alkali
  - Treat the cause

Some Examples

#1
- pH 7.30
- pCO2 70
- HCO3 30

#2
- pH 7.48
- pCO2 20
- HCO3 15

#3
- pH 7.25
- pCO2 40
- HCO3 12

#4
- pH 7.50
- pCO2 45
- HCO3 35

Compensation

- Compensated
  - pH = WNL
  - CO2 = Not WNL
  - HCO3 = Not WNL
- Partially Compensated
  - pH = Not WNL
  - CO2 = Not WNL
  - HCO3 = Not WNL
- Uncompensated
  - pH = Not WNL
  - CO2
  - HCO3

One Not WNL & One is WNL

Fluid Imbalances - Patients at risk

- Burns
  - Day 1&2 - fluid shifts cause hypovolemia
  - Day 3 – fluid shifts back to vascular causing hemodilution
- Congestive heart failure
  - Prone to fluid overload
  - Tend to become vasodilated under anesthesia
- Pediatrics
  - Small volumes = small margin of error

Fluid Imbalances

- Neuro patients
  - Fluid overload will increase ICP
  - Dehydration decreases cerebral perfusion
  - Autonomic dysfunction from cord injury causes loss of vasomotor tone
- Liposuction
  - Prone to hypovolemia

Fluid Imbalances

- Diabetes Insipidus
  - Trauma/surgery to pituitary gland or hypothalamus causes decrease in antidiuretic hormone
  - Treat with Vasopressin or DDAVP
- Renal Patients
  - Prone to fluid overload

Fluid Imbalances

Signs of Fluid Overload

- Edema
- Dyspnea
- Rales
- Weight gain
- Neck vein distention
- Increased CVP and BP

Fluid Imbalances

Signs of hypovolemia

- Postural hypotension
- Decreased BP
- Increased pulse
- Dry mucous membranes
- Decreased urine output
- Dizziness or fainting

Electrolytes – Sodium

Normal value 135 - 145

- Hyponatremia:
  - Irrigation fluid absorbed into venous sinuses.
  - Results from fluid overload
  - Hysteroscopies and TUR procedures
    - Monitor I&O of irrigation on these cases
    - Report to anesthesia and surgeon if deficiency occurs
  - Glycine and Sorbitol leave behind free water after metabolism.
  - Causes fluid to shift into tissues

Electrolytes – Sodium

Normal value 135 - 145

Hyponatremia Signs and Symptoms:	Hyponatremia Treatment:
• N/V, irritability • Slowed breathing • Headache, blurred vision • Edema • Muscle twitching, cramping	• Restrict fluids • Diuretic • Hypertonic Saline solution

Electrolytes – Sodium

Normal value 135 - 145

Hypernatremia:	**S/S and Treatment:**
• Hypovolemia – Dialysis, dehydration, burns, diuretics, DI • Fluid shifts out of tissues and into the vascular system	• S/S: Thirst, concentrated urine, muscle weakness, seizures, coma • Treat with fluid

Electrolytes – Potassium

Normal value is 3.5 – 5.0

Hypokalemia:	S/S and Treatment
• Lost by diuretics, • Bowel prep, vomiting or diarrhea, laxative abuse, • alkalosis	• Symptoms include: abdominal distention, loss of bowel sounds, weakness or paralysis, severe arrhythmias, Inverted T wave • Hypotension • Treat with potassium replacement

Electrolytes – Potassium

Normal value is 3.5 – 5.0

Hyperkalemia	S/S and Treatment:
• Usually caused medically • massive crushing trauma • Potassium, Hydrogen Ion and glucose are Pals ▫ Diabetic Ketoacidosis ▫ burns ▫ Addison disease	• Symptoms ▫ Intestinal cramping, Elevated T wave, Hypertension, spastic paralysis, cardiac standstill • Kayexalate ▫ takes several hours. • D50 followed by insulin • Correction of acidosis

Electrolytes – Calcium

Normal value is 8.5 – 10.5
Normal Ionized Value is 4.5 – 5.6

Hypocalcemia:	S/S and Treatment
• Multiple banked blood transfusions – Citrate • Parathyroid disease (regulates Ca levels) • Diuretics	• Twitching • Laryngospasm • Cramping • Arrhythmias, • Positive Chvostek's sign and Trousseau's sign • Treat with replacement

Electrolytes – Calcium

Normal value is 8.5 – 10.5
Normal Ionized Value is 4.5 – 5.6

Hypercalcemia:	S/S and Treatment
• Caused Medically • Bone cancer/multiple myeloma • Sarcoidosis (increases GI absorption of Ca)	• Symptoms include neuromuscular depression, arrhythmias • Treatment: ▫ Mithramycin ▫ Phosphate replacement

Phosphorus - Hypophosphatemia

Normal value is 1-2mEq/L

- Hyperparathyroidism
  - ↓Phosphate and ↑ Ca
- Hypercalcemia
- Vomiting
- Diarrhea
- Diuresis
- Burn patients

- Symptoms
  - Bradycardia
  - Hypotension
  - Weakness
  - ↓ Deep Tendon Reflexes
  - ↓ Bowel sounds
  - Decreased LOC
- Treatment:
  - Phosphate replacement
    - Watch Calcium!

Phosphorus - Hyperphosphatemia

Normal value is 1-2mEq/L

- Hypoparathyroidism
  - ↓CA and ↑ Phosphate
- Hypocalcemia

- Symptoms
  - Twitching
  - Laryngospasm
  - Cramping
  - Diarrhea
  - Prolonged ST, QT intervals
  - Positive Chvostek's sign and Trousseau's sign
- Treatment
  - Calcium Replacement
  - Dialysis

Electrolytes – Magnesium

Normal value is 1.5 to 2.5

- Magnesium deficiency (hypomagnesemia):
  - Poor nutrition, alcoholism, pancreatitis, diuretics
  - Muscle spasms and twitching
- Magnesium excess (hypermagnesemia):
  - Sedative effect on the CNS
  - Used for premature labor, Preeclampsia,
    - Monitor mom
    - Monitor baby
  - Treatment of V-fib and Torsades de Pointes

Complete Blood Count

- RBC's
  - Normal range
    - Men: 4.3 to 5.9
    - Women: 3.5 to 5.5
  - Contains Hemoglobin
- Hemoglobin
  - Normal range
    - Men: 13.2 to 17.5
    - Women: 11.5 to 16
  - Carries Oxygen
  - Can be low even with a normal RBC

Complete Blood Count

- Anemia – Low Hematocrit
  - Normal range:
    - Men 42-52
    - Women 37-47
- Ideally treat low H&H with iron preoperatively

Complete Blood Count

- Thrombocytopenia – Low platelet count
  - Normal range 150,000-450,000 µL
  - Not a problem for most surgeries if above 50,000 µL
- Decreased
  - ETOH, chemo, DIC, HIV, viral infections, sepsis, HIT
- Increased
  - Acute blood loss, cancer, pre-eclampsia

Complete Blood Count

- White Blood Cell
  - Normal Value: 5000 – 10,000 cells/mm3
- Decrease
  - Prolonged infection
  - Bone Marrow suppression
    - Chemotherapy
    - Radiation
- Increase
  - Infection
  - Autoimmune Disease
  - Leukemia

Prothrombin Time (PT)

Normal Value: 11-12.5 sec

What it measures	What it means
• A PT test evaluates the coagulation factors VII, X, V, II, and I (fibrinogen)	• Bleeding or Clotting disorder • Liver Disease* • Warfarin Therapy* • May cancel case if unsuspected

Partial Thromboplastin Time (PTT)

Normal Value: 30-40 seconds

What it Measures	What it means
• Evaluates coagulation factors XII, XI, IX, VIII, X, V, II (prothrombin), and I (fibrinogen) as well as prekallikrein (PK) and high molecular weight kininogen (HK)	• Bleeding or Clotting disorder • Heparin Therapy* • Hemophilia* • Shortened in early stage DIC • May cancel case if unsuspected

ABC's of Trauma

- Airway
  - Intubate
  - Trach tray
- Breathing
  - Ventilate
  - Chest tubes
- Circulation
  - Two large bore IVs
  - Cardiac Rhythm
  - Stop bleeding
  - Transfuse
  - Pulses
- Disability
  - Neuro exam
- Exposure
  - Don't miss anything

Trauma Triage Order

- 1st Cervical Spine
  - C-spine immobilization top priority - immediately above airway

2nd Airway obstruction

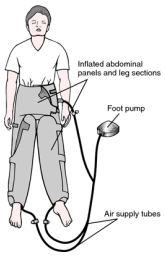
- Anticipate tracheostomy for facial injury or upper airway edema. Trach tray
- Rapid sequence intubation:
  - Pre-oxygenation,
  - Paralysis with induction,
  - Placement with proof

3rd Hemorrhage

- Surgery is not hemodynamically stabilizing to a trauma patient
  - Unless the purpose is to stop the bleeding
- Staged procedure
  - Large procedure divided into smaller surgeries

3rd Hemorrhage

- Pneumatic Antishock Garment (MAST trousers)
  - Fluid resuscitation must occur before deflated
  - Deflate slowly – (abdomen, one leg, other leg)



Hemorrhage leads to Acidosis

- Uncorrected hemorrhagic shock in trauma patients leads to profound metabolic acidosis
  - interferes with blood clotting mechanisms
  - promotes coagulopathy & blood loss

Acidosis is bad for you

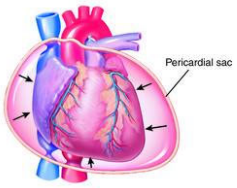
- Vasodilatation
- Myocardial depression
- Hyperkalemia
- Shift of oxyhemoglobin dissociation curve to the right
- Confusion, stupor

Metabolic Acidosis Treatment Options

- Identify cause of bleeding: mechanical vs. non-mechanical bleeding
- Warm patient to reverse coagulopathies
- Blood, FFP, and Platelet replacement
- Bicarb should not be used to treat severe metabolic acidosis unless the ventilation is adequate to remove the increased CO_2 that is formed.

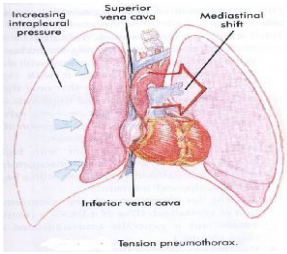
4th Cardiac Tamponade

- Fluid around heart prevents cardiac adequate output
  - Jugular vein distention
  - Narrowing pulse pressures
- Emergent treatment
  - Pericardiocentesis - Spinal needle and 60cc syringe
  - Prepare for a chest tube, sternotomy or thoracotomy according to direction



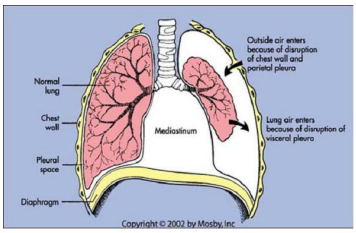
5th Pneumothorax (Tension)

- All mediastinal physiology is shifted – Life threatening.
- Closed Chest injury to the lung
- Needle the chest



5th Pneumothorax

- Sucking chest wound
- Chest tube
  - Set up
  - Secure
  - Transport



Trauma

- 6th Increased ICP
  - Increase in BP and drop in HR
  - Hyperventilate and evacuate fluid/blood
  - Prepare for Burr Hole

Neuro assessment

The Glasgow Coma Scale and Score

Feature	Scale Responses	Score Notation
Eye Opening	Spontaneous	4
	To Speech	3
	To Pain	2
	None	1
Verbal Response	Orientated	5
	Confused Conversation	4
	Words (inappropriate)	3
	Sounds (incomprehensible)	2
	None	1
Best Motor Response	Obey Commands	6
	Localise Pain	5
	Flexion - Normal	4
	Flexion - Abnormal	3
	Extend	2
	None	1
Total Coma Score		3/15 - 15/15

7th Massive burns

- Fluid deficit biggest issue:
  - Days 1&2 - fluid shifts cause hypovolemia
    - Intravascular to interstitial shift
    - Hyperkalemia
  - Day 3 – fluid shifts back to vascular causing hemodilution
    - Interstitial to intravascular shift
    - Hypokalemia

7th Massive burns

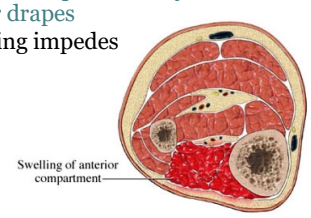
- Hypothermia
- Excision of tissue within 72 hours of burn
  - Very bloody, prepare for transfusion
- Additional trauma commonly accompanies burns

8th Spinal cord Injury

- Stabilizing the fracture
  - Log roll
  - Team effort to remove cervical collar
  - Loss of vascular tone
  - Vasodilatation and peripheral pooling
  - Neurogenic shock
    - Place in trendelenburg,
    - Vasopressors,
    - fluid replacement

9th Extremity Injury

- Repair the injury: supplies and equipment
- Monitor for compartment syndrome
  - Check for cap refill and pulses of injured extremities under drapes
- Fasciotomy if swelling impedes blood flow



Emergencies and Complications Quiz

- 18 Questions
- 20 Minutes

Emergencies and Complications

1. A 74-year-old patient is scheduled for an exploratory laparotomy. The nursing diagnosis potential for hypothermia is made. In developing a perioperative care plan for this patient, which of the following actions would be most appropriate?

A. Provide the anesthesia provider with a blood/fluid warmer.
B. Increase the operating room's ambient temperature to 26.7° C - 29.4° C (80° F - 85° F).
C. Provide the surgeon with extra drape sheets for thermal insulation.
D. Place a sequential compression device and stockings on the patient's legs to improve circulation.

2. A patient undergoing a transurethral resection of the prostate (TURP) under spinal anesthesia starts to have trouble breathing and has a bounding pulse. The electrolyte panel shows a sodium of 130 mEq/L. The most likely cause is:

A. Anesthesia overdose
B. An adverse reaction to the bladder's being filled and emptied rapidly during surgery
C. Hemorrhage
D. Absorption of irrigation fluid into the vascular system

3. During the preoperative assessment of a pt, the perioperative nurse notes a current electrolyte report of sodium = 136 mEq/L; potassium = 2.8 mEq/L; chloride = 101 mEq/L. On the basis of these data, the nurse should:

A. Inform the anesthesia provider of a low potassium value
B. Send a sample to the laboratory for repeat electrolyte analysis
C. Check the complete blood count to correlate the hematocrit with these electrolyte results
D. Recognize that these electrolyte values are normal

4. The patient condition necessitates rapid sequence intubation. The perioperative nurse anticipates the order of activity will be _____and assists accordingly

A. Paralysis with induction, pre-oxygenation, placement with proof
B. Pre-oxygenation, paralysis with induction, placement with proof
C. Paralysis with induction, placement with proof, oxygenation
D. Position, paralysis with induction, placement with proof

5. A 25-year-old male arrives to the trauma room after a high speed rollover MVA. The abdomen is distended and tender. He has a closed tib-fib fracture and multiple lacerations to his face, chest and arms.

A. Post-operative nurses will need to know where the peripheral pulse used to be
B. Bounding pulses secondary to high blood pressure should be noted
C. Poor perfusion will cool the extremity necessitating warming measures
D. This patient is at risk for compartment syndrome and she will use the mark to check for a pulse periodically during the procedure

6. Mr. S. is exhibiting unexplained tachycardia, rapid respirations, and muscle rigidity. The anesthesia team determines Mr. S. is showing early signs of Malignant Hyperthermia. In response, the perioperative nurse retrieves the MH cart and begins to reconstitute the Dantrolene Sodium with:

A. Normal Saline
B. Preservative free sterile water
C. Hydrocortisone acetate
D. A hypertonic saline solution

7. After transferring the OR bed the AAA patient experiences difficulty breathing, upper back shoulder pain and profuse sweating. In response, the circulating nurse's first action would be to

A. Assist with rapid sequence intubation and call for the patient's blood products to be brought to the room.
B. Provide a quiet unhurried environment to decrease anxiety in the patient.
C. Assess the pulses in the patient's lower extremities
D. Provides the anesthesia provider with a rapid transfuser

8. The patient is in a sitting position with a skull pin headrest when an air embolism occurs. The most important measure the perioperative nurse can take is to:

A. contact the intensive care unit and ask if the unit can arrange to have a bed available postoperatively
B. lower the head of the patient to reduce the angle of the position
C. ensure that the scrub nurse has saline for the surgeon to irrigate, detect, and occlude the vessel
D. advise the laboratory that blood gases will be sent soon and order a central venous pressure (CVP) tray

9. The hysterectomy patient received midazolam preoperatively for anxiety. She is obtunded and not taking effective breaths. The perioperative nurse maintains respirations and anticipates the need for:

A. Narcan
B. Neostigmine
C. Romazicon
D. Epinephrine

10. Understanding Virchow's triad, the perioperative nurse does which of the following?

A. Places sequential compression device on the patient
B. Places the grounding pad over a large muscle mass
C. Provides a blood fluid warmer and forced air warmer to the anesthesia provider
D. Ensures blood products are available for the patient

11. A patient admitted through the emergency department has a deep scalp laceration and maxillary and cervical fractures. After evaluating the patient, the perioperative nurse's next action should be to:

A. Prepare the fiberoptic laryngoscope
B. Apply pressure to stop bleeding from the laceration
C. Maintain head immobilization
D. Prepare for adequate suction

12. The perioperative nurse receives a patient from the emergency room. The operative consent was signed for a craniotomy by the patient's husband, who is no longer immediately available. The patient is unstable and disoriented. To identify the operative site, the nurse's most appropriate action in this situation would be to:

A. confirm the diagnosis from the emergency room physician's notes
B. consult the surgeon for confirmation of the operative site
C. evaluate the computerized axial tomography (CAT) scan
D. request advice from the manager

13. During the preoperative assessment for a patient scheduled for an emergency Caesarean section, the perioperative nurse notes that the patient's magnesium level is 6mg/dL. This places the patient at risk for:

A. seizures
B. a hypertensive episode
C. tachycardia
D. hypotensive episode

14. Criteria for the care of surgical patients with a latex allergy may include

A. Bite blocks for oral surgery
B. Egg crate padding on arm boards
C. Paper tape to secure the post op dressing
D. A bouffant cap to cover the patient's hair

15. Interpret the ABG: pH 7.25, PCO2 40, HCO3 12

A. Metabolic alkalosis
B. Metabolic Acidosis
C. Respiratory alkalosis
D. Respiratory acidosis

16. Interpret the ABG: pH 7.48, PCO2 50, HCO3 34

A. Metabolic alkalosis
B. Metabolic Acidosis
C. Respiratory alkalosis
D. Respiratory acidosis

17. Interpret the ABG: pH 7.18, PCO2 60, HCO3 26

A. Metabolic alkalosis
B. Metabolic Acidosis
C. Respiratory alkalosis
D. Respiratory acidosis

18. Interpret the ABG: pH 7.55, PCO2 20, HCO3 18

A. Metabolic alkalosis
B. Metabolic Acidosis
C. Respiratory alkalosis
D. Respiratory acidosis

Patient Safety

1. Objective: Identify the nurse's role as a patient advocate during surgery

- Wound healing
- Positioning
- Electrosurgery
- Fire Safety
- Minimally Invasive surgery
- Radiological Exposure
- Laser Safety
- Medication Safety
- Counts

Wound Healing - Phases

- Inflammatory (0-3 days)
  - Redness, edema, phagocytosis
- Proliferation (4-24 days)
  - Granulation and epithelial tissue forms
- Maturation (24 days – 1 yr)
  - Scar formation and contracture

Wound Closure - Types

- Primary Intention
  - All layers of wound are approximated
  - Most surgical wounds
- Secondary Intention
  - Granulation
  - Pressure ulcer
- Tertiary Intention
  - Delayed primary intention
  - High suspicion of contamination
  - Left open and packed

Wound Healing – Risk factors

- Nutrition
- Age
- Immunosuppression
- Circulation / Oxygenation
  - Smoking
  - COPD
  - Refrigerated blood
  - Hypothermia
- Diabetes

Wound Healing – Risk factors

- Length of surgery
- Trauma
- Prolonged Stress
- Coagulopathies

Wound Healing - Complications

- Infection
  - Redness
  - edema
  - tenderness
  - fever
  - Leukocytosis (Elevated WBCs)
- Usually a week out or more
- Defined by CMS as SSI if:
  - Deep infection or implant - occurs within 90 days
  - Superficial infection - occurs within 30 days

Wound Healing - Complications

- Separation
  - Wound edges come apart
- Dehiscence
  - Separation to the fascial layer
  - New development of Drainage
- Evisceration
  - Abdominal contents spilling out
  - Surgical emergency

Wound Surgical Classification

- Class 1 (Clean)
  - Infection rate less than 5%
  - Primary closure. No break in technique
- Class 2 (Clean / contaminated)
  - Expected infection rate 8-11%.
  - Includes cases in which GI, GU, Respiratory tract are entered under controlled conditions and without spillage
  - Bowel Resection, Hysterectomy, T&A, Cholecystectomy

www.cdc.gov

Wound Healing

- Class 3 (Contaminated)
  - Expected infection rate 15- 20%,
  - Fresh traumatic injury (<4 hours delay)
  - Break in technique/spillage
  - Appendectomy for appendicitis, cholecystectomy for Cholecystitis
- Class 4 (Infected)
  - Expected infection rate 27-40%,
  - Clinical infection, perforated viscera, necrotic tissue
  - I&D of abscess, ruptured appendix, GSW to abdomen

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Positioning

- How will the patient tolerate the planned position? Think about it
- Positioning devices should be clean and in proper working order
- Move unconscious patients using assistive devices
  - Monitor the patient's body alignment and tissue integrity

Braden Scale

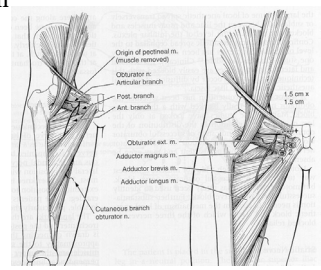
Scale	Risk Factor Scored 1-4
• Severe <10	• Sensory Perception
• High risk 10-12	• Moisture
• Moderate 13-14	• Activity
• Mild 15-18	• Mobility
	• Nutrition
	• Friction/Shear

Positioning

- Transfer/transport
  - Always check with anesthesia 1st
  - Four people to transfer
  - Remove restraints
  - Lock wheels

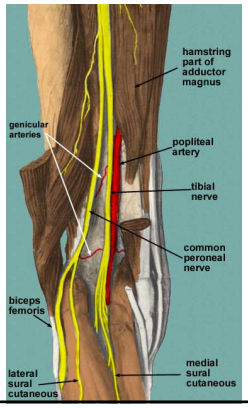
Positioning – Obturator Nerve

- The obturator nerve can be damaged during lithotomy
- devices or equipment leaning on the patient
- Pain of the inner thigh



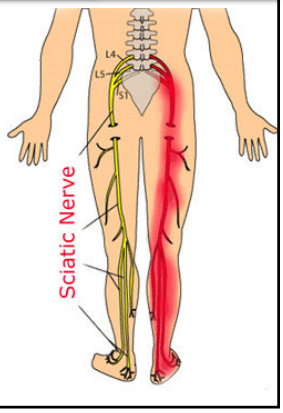
Positioning Popliteal Nerve

- Be mindful when positing the knee over boot stirrups or other such devices
- Pressure should not be on the back of the knee but on the muscle of the thigh and calf



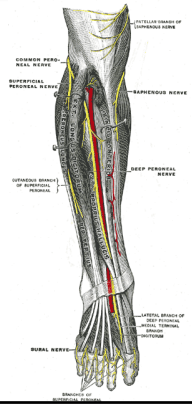
Positioning Sciatic Nerve

- Risks
- Lithotomy position
- External rotation of the hips



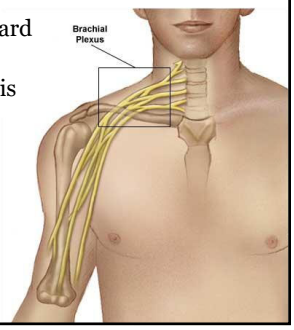
Positioning
Peroneal & Saphenous

- Peroneal runs laterally and Saphenous is medial
- Candy canes are bad for both
  - Peroneal sits against the bar
  - Saphenous is pinched in the sling
- Saphenous nerve injury is a risk during vein stripping procedures



Positioning
Brachial Plexus

- Support arm on an arm board
  - Abduction less than 90°
- Risk increases when head is turned to the side
- Lateral position
  - Support Head and dependent



Positioning - Supine

Pressure Points	Safety Precautions

• Occiput
• Scapula
• Olecranon Process
• Sacrum / Coccyx
• Heels
	• Spinal Alignment
	  ▫ Legs parallel
	  ▫ Ankles uncrossed
	• Pad the head / elbows
	• Float the heels
	Nerve precautions:
	  ▫ Brachial Plexus
	  ▫ Ulnar
	  ▫ Radial
	  ▫ Median

Positioning Supine

Reverse Trendelenburg
- Head up
- Craniotomy
- Breast reconstruction
- Neck procedures

Trendelenburg
- Head down
- Helps with difficult insertion of neck lines
- Pelvic surgery

Positioning - Lithotomy

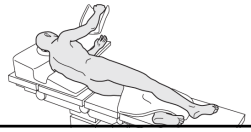
Indications
- Perineal surgery
  - Hemorrhoidectomy
- Variation = Frog leg
  - CABG for saphenous vein access

Safety Precautions
- Stirrups should be even
- Buttocks to edge of bed
- Elevate legs together
- Lower legs together
- Minimal external rotation of hips
- Place arms on abdomen or on arm boards at <90°
- Protect hands

Positioning - Lateral

Indications
- Thoracic
- Kidney

Safety Precautions
- Flex lower leg
- Pillow between knees



Safety Precautions
- Pressure points
  - Ear
  - Acromion process
  - Iliac crest
  - Greater trochanter of femur
  - Dependent knee
  - Malleolus
- Support head and upper arm

Positioning - Prone

Indications
- Spine surgery
- Arms tucked for cervical spine procedures

Safety Precautions
- Arm boards should be lower than table
- Chest roll from clavicle to iliac crest improves chest expansion

Safety Precautions
- Pressure Points
  - Face
  - Breasts
  - Iliac Crest
  - Male genitalia
  - Patella
  - Dorsum of feet
- Cervical alignment
- Protect face

Positioning - Sitting

Indications
- Craniotomies
- Shoulder

Safety Precautions
- Pressure Points
  - Scapula
  - Ischial Tuberosities
  - Heels
- Secure hands on lap
- Foot board maintains dorsiflexion

Prepare for Skin antisepsis

- Patients should shower or bathe night before and day of surgery
  - 4% CHG most effective, 2% CHG impregnated cloths good too
  - Dry with a clean towel if shower or bath
  - Shampoo twice with 4% CHG for head procedures
    - Don't put near face
  - Multidisciplinary team responsible for product selection

Prepare for Skin antisepsis

- Remove Jewelry from surgical site
- Remove Makeup
- Check for allergies

- Patients with resistant organisms
  - Hexachlorophene recommended as scrub for gram-positive MRSA
  - Chlorhexidine for VRE

Prepare for Skin antisepsis

- Verify the site before you prep
- Hair Removal at site only in select clinical situations.
  - Hair should be left in place
  - Use clippers or depilatory creams to remove hair when necessary
  - Remove outside of OR or in a manner that prevents dispersal of hair into the air
  - Disposable Clippers are preferred

Prepare for Skin antisepsis

- Wash superficial dirt and debris from skin before prep
  - Alcohol and parachoroxylenol (PCMX) cannot penetrate organic material
- Areas of greater contamination should be cleansed before prep
- Isolate highly contaminated areas with a sterile barrier drape

Apply in a Safe and Effective Manner

- Completed by non-scrubbed team member
  - Sterile gloves for sponge, non-sterile gloves for long applicator
  - Covered arms to prevent shedding
- Prep from incision to periphery
- Povidone Iodine for the perineum, eye or ear
  - Iodine allergy use PCMX (Technicare) or 3% H_2O_2 for vaginal prep and Normal Saline for eyes / ears

Apply in a Safe and Effective Manner

- Broad spectrum, fast acting and persistent
- Follow manufacturer's instructions
  - Heating
- No unprepped skin should show through the fenestration in the drape
- Surgical site mark should remain after the prep
- Prep should be removed from skin

Apply in a Safe and Effective Manner

- Highly contaminated sites
  - Prep low count area incision to periphery then Highly contaminated site last
  - Cover an ostomy in the site with a sponge soaked in prep solution

Apply in a Safe and Effective Manner

- Abdominal / Perineal Prep AORN Journal Jan 2015
  - Prep perineum first with 10% Povidone iodine extending to pubis
  - Prep abdomen with antiseptic solution
  - Apply same prep along the boarder of prepped abdomen and perineum

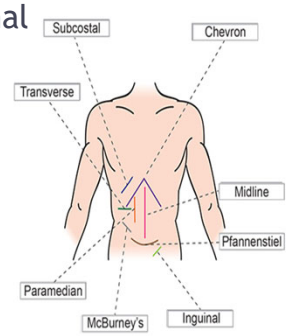
Alcohol Based scrubs and preps

- Explosively flammable
  - Storage and disposal in compliance with local, state and federal agencies
- Must dry to be effective
- Hair removal before prep recommended

Alcohol Based scrubs and preps

- Excellent Rapidity of Action
- Alcohol and CHG can cause corneal damage
  - Never on face
- No pooling or saturating electrodes, towels or drapes
  - Fire hazard
  - Chemical Burns

Review Abdominal Incisions



Nursing Documentation

- Condition of the skin at the operative site
- Method, time and area of hair removal
- Prep agent
- Any reaction to prep solution before or after surgery

Electrosurgery

- Personnel selecting ESU and accessories
  - Make decisions based on safety features
  - Minimize risks to patients
  - Burn at dispersive electrode is still the most common injury
- Personnel should demonstrate competency
  - Orientation and annual competency
  - Operating manual should be readily available

Electrosurgical Safety – ESU

- Test safety features before each use
  - Lights, alarms, volume loud enough to be heard
- Keep clean and away from spills
  - Use footswitch cover
- Confirm power settings orally
- Check Preventive Maintenance – Microshock
- Never use damaged equipment

Electrosurgery - Active Electrode

- Use non-conductive material to secure
- Prevent antenna coupling
- Do not use in the presence of flammable agents
  - Wet prep solutions
- Use the safety holster
- Remove char with scratch pad
- Disconnect contaminated active electrode
- Use according to manufacturer's recommendations

Electrosurgery – Dispersive Electrode

- Keep dispersive electrode away from implanted metal prostheses and tattoos
- Be sure the dispersive electrode is adhered in its entirety – uniform body contact
  - Avoid: Boney, scarred or hairy surfaces
- Large Muscle mass close to the surgery site
- Clean dry area, No pooling liquid
- Placed after patient positioned

Electrosurgical Safety

- Safe medical Devices Act of 1990: In the case of an incident send the ESU, active and dispersive electrode and packages to biomed
- Be prepared for fire
  - Water mist or CO_2 fire extinguishers
    - Water mist not good on liquid fires
    - CO_2 not good for paper drapes
- R.A.C.E. (Rescue. Alarm. Contain. Extinguish)
- P.A.S.S. (Pull, Aim, Squeeze, Sweep)

Electrosurgical Safety

- Don't use fire blankets in an OR
- Sponges saturated in flammable fluids must be thrown away outside of the room
- O_2 off for 1 min prior to use – head and neck
- ALL personnel should be able to turn identify and shut off medical gases

Electrosurgery Endoscopic Considerations

- Use lowest possible settings
- Don't use Hybrid Cannula (plastic and metal)
- Direct Coupling – active electrode touches another instrument
- Capacitive Coupling – electrical current passes through intact insulation to conductive material
- Insulation failure

Electrosurgical Safety

- ICD and Pacemakers (pulse generator – PNDS)
  - Use bipolar if possible
  - Keep the pacemaker out of the path of the device
  - Turn ICD off
- Use ONLY Bipolar with any nerve stimulator
- Argon
  - Prevent Gas emboli avoid direct contact with tissue

Electrosurgical Documentation

- Serial number or identification number of ESU
- Settings
- Dispersive pad placement
- Skin condition before and after surgery

Surgical Smoke is bad for you

- Hospitals should provide an environment free of surgical smoke for employees
- Evacuate all surgical smoke
  - Not determined by physician preference
- Staff must have initial and ongoing education and competency verification on surgical smoke safety
- Presence of quality / performance improvement projects to reduce surgical smoke

Radiology

- The patient should be exposed to radiation only if medically indicated
  - Use lead shield to protect fetus
  - Use lead shields to protect patient's gonads, and thyroid depending on the area being x-rayed
  - Document measures taken in patient record

Radiology

- Dosimeter
  - One worn at neck or left shoulder
  - One worn under lead
  - Dosimeter report results annually
  - Not taken home
- Pregnant staff
  - Lead should protect front and back.
  - wear 2 badges-one for baby one for you
  - wear one device at neck and other under the gown

Radiology

- Lead shield goes under patient during fluoro
- Body fluids and tissue from patients who have radionuclides may emit radiation.
- If you have questions about radiation safety you should call the radiation safety officer

Radiology – Occupational Exposure

- Stand 6 feet (2 meters) away and behind lead
- Lead aprons for those who cannot move away or behind lead
- Aprons, radioprotective gloves and thyroid collar during fluoroscopy

Radiology – Occupational Exposure

- Greatest risk at 6 feet is head, neck and hands
- Do not fold aprons to store
- Test annually
  - Label with last test date

Lasers

- Multidisciplinary Team
  - Administrator, Laser Safety Officer, Biomedical Engineer, Physicians from specialties who use lasers, Anesthesia, OR educator, Credentialing Personnel, Quality Personnel, Laser Safety Specialist
- Responsible for:
  - Laser related policies and procedures
  - Education and competency

Lasers

- Laser Safety specialist (optional)
  - Assistant to the laser safety officer. Fill in for LSO.
  - Role recommended if multiple lasers might be operating at the same time
- Laser User
  - Physician or PA with the education, credentials and privileges to operate a specific laser
- Laser Operator
  - Required for every laser case
  - Annual Competency
  - Cannot be the circulator

Lasers

- Nominal Hazard Zone
- Warning signs should be specific to the laser being used
- Appropriate Eye Protection
- Education specific to the laser should be facilitated by the laser safety officer
  - Part of orientation
  - Annual Competency
  - On file for Laser Operator and User

Lasers – Patient Safety

- Laser must be in standby mode when not in active use
- Footswitch in proper position
- Protect exposed tissue with moistened materials
- Pooled liquid can retain laser heat and cause burns
- High voltage equipment – don't set fluids on it
- Use a smoke evacuator

Laser – Patient Safety

- Protect patient's eyes too
- Fire risk assessment part of time out
- Laser resistant ETT
  - Balloon inflated with Methylene blue tented saline
- Ventilate with room air (21% O2) if possible
- Suction residual O2
- Head and neck procedures
  - O2 off for 1 min before use

Laser – Documentation

- Type of Laser in use
  - CO2
- Identification of device
  - i.e. Serial number, Biomedical number
- Patient safety measures
  - i.e. eye protection, O2, Moistened materials
- Times laser activated / deactivated

Medication Safety

- Dispense when needed
- Don't remove the rubber stoppers. Use a sterile transfer device
- Limit use of multi-dose vials
  - Good for 28 days
  - Multidose = single patient

Medication Safety

- Verify meds with ST or RNFA
- Label meds
- Keep med containers throughout case
- Relief personnel should verify all meds and labels

Counting Sponges and Sharps

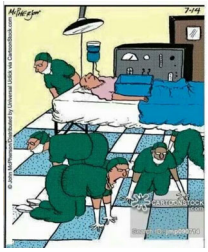
- Before the procedure
  - This should be completed before patient enters room
- Before closure of a hollow organ
- Before wound closure
- At skin closure or end of case if skin is not closed
- At time of permanent relief
- Count anything added to the field during the case
- Anytime a team member requests one

Counting Sponges and Sharps

- Scrub person should separate and point to each item as it is counted
- Visible count board in every room
  - Running count in only one place
  - Ideally only count worksheet is visible count board.
    - Be careful about transcription
  - Placed retractor / packed sponges on count board

Counting Sponges and Sharps

- If interrupted during count must recount that item
- If there is a discrepancy
  - 1st make team aware
  - 2nd recount
- Search for missing item
  - Once found, recount that item
  - Not found then radiology and surgeon look at x-ray together
- Trash not removed from room until patient leaves



Counts

- Never open sponges in a room that are not part of the count
- Hospital policy can delete counts from a specific procedure
  - Cysto, Ophthalmology, ALIF
- Package of sponges containing an incorrect number must be isolated from the field, bagged and labeled
- Don't cut sponges
- Only x-ray detectable sponges during surgery

Counts

- Scrubbed person is responsible for knowing how many sponges are inside the patient at all times
- Counts done by two persons. One must be an RN
- Count in sequence.
  - Sequence defined by facility policy
    - Surgical site, mayo stand, back table then off field

Counts

- When to count instruments
  - Anytime you open a body cavity or there is a *potential to open*
    - Initially
    - Before wound closure
    - Permanent relief
- Laparoscopy cases do initial count and subsequent only if you open

Counts

- Count instruments audibly
- Open instruments removed
  - cannot be in the OR uncounted
- Standardize instrument sets with minimum number of and types of instruments
- If something is broken it must be accounted for in its entirety

Counts

- Documentation:
  - Type and number of counts
  - Name and title of persons performing the count
  - Notification of surgeon
  - Instruments remaining with patient or sponges intentionally left as packing
  - Actions taken if there is an unresolved count
  - Rationale if counts are not performed or completed

Patient Safety Quiz

- 29 Questions
- 32 Minutes

Patient Safety

1. Documentation regarding wound classification for a patient having a vaginal hysterectomy would identify the wound as:

A. Class I
B. Class II
C. Class III
D. Class IV

2. For a very obese patient undergoing vaginal hysterectomy, additional padding will be needed at the lateral aspect of the knee to prevent compression injury to which nerve?

A. Sciatic
B. Peroneal
C. Obturator
D. Saphenous

3. The back of the electrocautery machine suddenly erupts with flame and acrid smoke. The first step taken by the perioperative nurse is

A. R.A.C.E.
B. Unplug the electrocautery machine
C. P.A.S.S.
D. Leave the area immediately

4. The RN circulator and scrub person should audibly review and confirm medications:

A. before the procedure begins
B. before the end of the procedure
C. after transfer to the sterile field
D. before transfer to the sterile field

5. A 72-year-old patient who has atherosclerosis of both legs (more severe in the right leg) is scheduled for laser-assisted balloon angioplasty under local anesthesia. After the patient has been positioned on the operating room bed, which one of the following perioperative nursing actions would be most appropriate?

A. Place a small roll in the lumbar area
B. Provide padding under the lower extremities allowing the heels to float.
C. Place a foam headrest under the occiput
D. Provide protectors for the olecranon processes

6. The patient position most likely to compromise the respiratory system is:

A. Reverse Trendelenburg
B. Lateral decubitus
C. Trendelenburg
D. Sitting

7. In the positioning of a patient in the prone position, the primary reason for using chest rolls is to provide for:

A. better exposure of the operative site
B. adequate circulation
C. unrestricted respiratory exchange
D. protection of the nervous system

8. Which of the following actions would best prevent burn injuries resulting from use of the electrosurgical unit?

A. Providing the surgeon with a hand-activated active electrode
B. Placing the active electrode tip on a moist sponge when it is not in use
C. Placing the active electrode tip in a container when it is not in use
D. Cleaning the active electrode tip with a sponge before each use

9. During a hysteroscopy procedure the patient's capnograph and pulse oximeter readings fall dramatically and the patient becomes hemodynamically unstable. Quickly the team places the patient in which position? And why?

A. Supine position; to facilitate cardio pulmonary resuscitation.
B. Left lateral position; the patient is likely experiencing a venous air embolism
C. Right lateral position; to aspirate air from the right atrium
D. Trendelenburg position; the patient is likely experiencing an arterial air embolism

10. The proper way to tuck the patient's arms at his or her sides is to place the upper flaps of the draw sheet up over the arms and tuck it under the:

A. mattress
B. bed frame
C. patient
D. sled

11. During an ORIF of the ankle fluoroscopy is to be used. The perioperative nurse understands that which of the following considerations is most important regarding patient safety?

A. Leaded shields should be placed under the patient.
B. Leaded shields should be placed over the patient's gonads
C. Fluoroscopy produces more scatter radiation and staff require greater level of protection
D. Scattered radiation is decreased during fluoroscopy.

12. Adequate eye protection for staff members and patients during laser procedures is determined by the:

A. Optical density and laser wavelength marked on the eyewear
B. Surgeon operating the laser equipment
C. Color of the eyewear
D. Laser safety officer (LSO) in charge of the specific laser

13. A patient is undergoing a skin tag removal on his chest and scalp using electrosurgical unit. The patient has received conscious sedation and 1% lidocaine to the surgical area. His face is covered with drapes and he reports feeling 'smothered'. To alleviate the patient's discomfort, it is appropriate for anesthesia to:

A. Provide a nasal cannula at a low flow rate
B. Redrape the patient between the removal on the chest and scalp to allow his face to remain uncovered.
C. Provide an oxygen mask with 30% or less O2
D. Tell the patient the procedure will be very quick, and the drapes will be removed soon.

14. The type of wound closure expected after the debridement of a decubitus on the patient's sacrum is:

A. Silver impregnated dressings
B. Wet to dry
C. Primary wound closure
D. Secondary wound closure

15. During the course of the surgical procedure, the surgeon has requested increased power settings from the expected range in the electrosurgical generator. Which of the following factors would contribute to the request for increased power?

A. Obese patient
B. Position of the patient
C. Patient dispersive electrode is on a large muscle mass
D. Minimal bleeding at the operative site

16. Skin burns from the electrosurgical unit are most likely due to:

A. Low skin resistance
B. High voltage
C. High current on a small area of contact
D. High leakage current

17. The patient has right and left hip implants and is coming for a left inguinal hernia repair. The perioperative nurse should place the dispersive electrode where?

A. Left quadriceps
B. Right quadriceps
C. Right torso outside of the surgical prep area
D. Left deltoid

18. To prevent complications after cataract surgery, the patient should be instructed to:

A. Bend over only for short periods
B. Sleep on the affected side
C. Refrain from heavy lifting
D. Read as much as possible

19. Patient postoperative instructions following an outpatient procedure for endometrial ablation are for the patient to:

A. Expect no vaginal bleeding and to contact the surgeon for follow-up in 1 week
B. Contact the surgeon if she feels severe pain, bleeds excessively, or experiences a rise in temperature above 100° F
C. Resume normal activities and not use tampons for at least 6 weeks
D. Douche daily and not use tampons for 6 weeks

20 Just before the transfer of a patient with a fractured femur, the surgeon is called to the telephone. In response to this situation, the circulating nurse should:

A. Wait for the surgeon to return to assign responsibility for supporting the fracture
B. Call the supervisor to request assistance with the transfer
C. Take responsibility for supporting the fracture
D. Call for another person and proceed to transfer the patient

21. Which one of the following describes the proper application of a prone positioning principle

A. When turning the patient, the head is appropriately supported with the neck in alignment with the spinal column
B. The breasts are supported by the body rolls extending across the chest
C. The iliac crests rest on a pillow to increase abdominal pressure
D. The arms are supported on arm boards with the elbow straight and the hands supinated at the wither side of the head.

22. The patient scheduled for Inguinal Herniorrhaphy has a pacemaker with internal cardiac defibrillator. The anesthesiologist notifies the preoperative nurse that the device settings can not be changed due to complete heart block. What is the best choice of electrocautery for the procedure?

A. Monopolar
B. Bipolar
C. Argon
D. Harmonic Scalpel

23. The process of cataract removal in which the cataract is broken up by ultrasonic vibration and then aspirated is called

A. Cryoextractor
B. Diathermy coagulation
C. Laser therapy
D. Phacoemulsification

24. A thyroid lobectomy is an excision of

A. Both lobes
B. 5/6 of the thyroid gland
C. An entire lobe
D. The entire thyroid gland

25. Potential adverse effects of the supine position include:

A. Skin breakdown at the heels, sacrum and elbows
B. Vasoconstriction in the lower extremities
C. Increased mean arterial pressure
D. Retinal detachment or cerebral edema

26. Equipment used to provide a continuous indication of arterial oxygen saturation is the

A. Pulmonary artery catheter
B. Flowmeter
C. Capnometer
D. Pulse oximeter

27. Which of the following has the highest tensile strength?

A. Monocryl 3.0
B. Silk 3.0
C. Prolene 4.0
D. Vicryl 2.0

28. A trade name for Midazolam is

A. Valium
B. Sublimaze
C. Duramorph
D. Versed

29. The regulatory agency responsible for surveying facilities' compliance with Universal Protocol is:

A. Institute of Medicine IOM
B. The Joint Commission TJC
C. National Quality Forum NQF
D. Occupational Safety and Health Administration OSHA

Professional Responsibility

Objectives:

1. Describe how the perioperative nurse maintains regulatory compliance for patient safety as a nursing professional.
2. Identify the periopertive nurse's role in maintaining legal integrity during surgery

- Tissue Banking
- Organ Donation
- Specimens
- Product Selection
- Nursing Process
- Nursing Diagnosis
- Documentation
- Universal Protocol
- Informed Consent
- Legal implications

Surgical tissue banking

- Work together to provide oversight and standards
  - American Association of Tissue Banks (AATB)
  - Joint Commission (JC)
  - Food and Drug Administration (FDA)
- Points to know
  - Autologous tissue should be separated from allografts.
  - Expiration time of tissue
  - Refrigerator and freezer have limited access and temperature monitoring with an alarm

Surgical tissue banking

- Records are kept for 10 years
  - Consent
  - Donor assessment
  - Procurement processing
  - Preservation, Labeling and Storage
  - Quarantining
  - Testing, Releasing and Distribution
  - Quality control

Uniform Anatomical Gift Act 1968 – Tissue procured from suitable donors

- Free from infection
- Free from autoimmune disease (lupus)
- Neurological disease
- Bone disease
- Systemic medication use (chemotherapy)
- Exposure to toxic substances
- Patient cannot have been ventilator dependent or immobile form more than 7 days prior to brain death
- Normothermic for the week prior to brain death
- Exclude patients at high risk for blood borne pathogens
- State Registries

Dropped the tissue

- Soak in povidone-iodine, antibiotic solution or both
- Steam Sterilization of Bone not recommended

Or

- Discard and use artificial materials
- Always report to infection prevention personnel

Autologous tissue storage - Pass tissue off the field immediately

- Nurse must confirm:
  - Pt's identity using two unique identifiers
  - Originating source of tissue including laterality if applicable
  - Type of tissue
  - Diagnosis and any pertinent clinical information
- Label must include
  - "For Autologous Use Only" and "Not Evaluated for Infectious Substances"
  - Two pt. identifiers as determined by facility policy
  - Procedure, date of recovery and surgeon
  - Person who packaged and labeled the autograft
  - Method of preservation
  - Time placed into storage
  - Recommended temperature range

Specimens - Labeling

- Accuracy is expected
  - Correct patient name + Correct specimen name = correct diagnosis
- Confirm all specimens with the surgeon
- Label multiple specimens on sterile field
- Ask for spelling if you are unsure

Specimens

- Pathology – examines pieces of tissue. Fresh, frozen and preserved
- Cytology – Examines cell types of fluid
- Microbiology – Examines for microbial growth

Product Selection

- A mechanism for product and medical device standardization and evaluation is in place
  - Select functional and reliable products
  - Safe, cost effective, environmentally conscious
  - Avoid duplication and 'fads'
- Product and medical device evaluation based on criteria specific to the item's use
  - Safety, ease of use, compatibility with other products
  - Impact on quality patient care
  - Cost, can we sterilize it, environmental impact

Product Selection

- A clinical evaluation should be based on an identified need or opportunity
  - Don't waste time or money in a clinical trial
  - All departments affected should participate in trial
  - Trial should have time and scope parameters
  - Education and instruction before trial
- Personnel selecting ESU and accessories
  - Make decisions based on safety features
  - Minimize risks to patients

Nursing Process

- Nursing Process
  - Assessment
  - Nursing Diagnosis
  - Identification of Outcomes
  - Planning
  - Implementation
  - Evaluation

Nursing Process

Assessment

- Purpose is to formulate nursing diagnosis
- Collection of data

Nursing Diagnosis

- Purpose is to identify and classify data collected in the assessment
- Human response
- Actual or Potential
- Nursing treatment is capable of correcting the issue
- NANDA

Preoperative Patient Assessment

- Baseline Vital Signs
- Medical History
- Medications
- Mobility
- Communication Barriers
- Diagnostic Results
- Allergies
- NPO status
- Detrimental Behavior
- Educational needs
- Diversity / Cultural considerations

Nursing Process

Identification of Outcomes

- Purpose is to describe the desired condition achievable through nursing care
- Criteria by which nursing interventions are measured
- Goals = How will we evaluate?

Planning

- Purpose is to select interventions to meet desired outcome
- Individualized plan of care
  - Write client goals
  - Select interventions
  - Communicate plan to
    - Patient and family
    - Interdisciplinary team
    - Change of shift

Nursing Process

Implementation

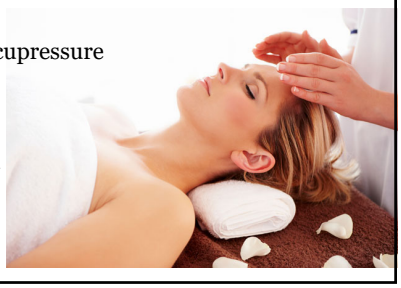
- Purpose is to carry out the plan of care
- Nursing actions:
  - Promote wellness
  - Prevent disease
  - Restore health
  - Cope with altered functions

Evaluation

- Purpose is to identify if goal was met
- Steps
  - Was the goal met or not met?
  - What factors were met or not met?
  - Modify plan of care accordingly

Complementary Therapy Holistic Care

- Music
- Massage
- Acupuncture/Acupressure
- Aromatherapy
- Hypnosis
- Reiki
- Guided Imagery



Universal Protocol

- Pre-procedural verification
  - H&P and Anesthesia assessment are complete
  - Blood, Implants and special equipment are available
  - Consent is accurate, signed and witnessed
- Site marking
  - Done outside of the OR
  - Consistent mark used throughout hospital
  - Patient is not sedated and participates
  - Medical person will be participating in the procedure
  - Site verification of child happens with the parents

Universal Protocol

- Time Out
  - Prior to procedure and ideally prior to anesthesia
  - Done by a designated person, in a standardized manner defined by the organization
  - Two way conversation. Information given and acknowledged as correct or not
  - The process for reconciling discrepancy is defined
  - One time out is performed for each procedure

Informed Consent

- Elements of a Valid Consent
  - Knowledge of the procedure
  - Understand possible complications
  - Understand the alternatives to surgery
  - Competent to give consent
  - Patient wants the procedure
- Consent may be withdrawn at any time

Informed Consent

- Perioperative nurse's responsibility
  - Ensure there is a consent on the chart
  - Is the patient
    1. knowledgeable
    2. willing
    3. competent
  - Consent is properly signed and witnessed
- Two witnesses sign if
  - patient is unable to sign
  - telephone consent

Informed Consent

- Competent to sign
  - Legal Adult
  - Minors require parent or guardian
  - Emancipated minor
    - Married
    - In Armed Forces
- Exceptions to consent (implied consent)
  - Pt is unable to give consent and there is a threat to life, limb, function or organ
  - Must have documentation of emergency in staff notes

Ethical Nursing Care

- Nurse practices with compassion & respect for every person
- Primary commitment to patient
- Protect rights of patient
- Accountable & responsible for delegation of nursing activities.

Ethical Principles in Nursing

- Autonomy
- Beneficence
- Nonmaleficence
- Justice
- Veracity
- Fidelity

Legal Principles

- **Statutory law** – made by legislative branch
- **Common law** – derived from principles rather than rules & regulations
- **Civil law** – based on rules & regulations, compensation
- **Tort law** - civil wrong, allows compensation
- **Criminal law** – harmful to society

Negligence

- Doing or not doing something a reasonable person would or would not do in similar situation
- Deviation from standard of care

Malpractice

- Professional negligence
- Misconduct or lack of skill in carrying out job

Elements of Malpractice

1. Duty owed patient
2. Breach of duty owed patient
3. Causation – most difficult to prove
4. Injury/Damages

Intentional Torts

- Violating patient's rights
- No actual harm necessary
- Most common:
  - Assault
    - Place person in fear of being touched
  - Battery
    - Touch without permission
  - False imprisonment
    - Unjustified detention

Quasi Intentional Torts

- No intent to injure or cause distress to another person
  - Intentional action that causes injury or distress
- Patient abandonment
- Defamation of character
- Invasion of privacy
- Breach of Confidentiality

Documentation

- The purpose is to provide goal directed care
  - Preoperative assessment
  - Nursing interventions
    - When, where and by whom
  - Reflects continuous evaluation
    - Of nursing care
    - Of patient's responses
  - Patient outcomes
- No unacceptable abbreviations
- Draw a single line through errors. Do not erase

Documentation Requirements

- When there is an electronic record, document as close to real time as possible
- Hand offs must have documentation of who care was released from and given to
- Perioperative Nursing Data Sets (PNDS)
  - Standardized vocabulary for perioperative nursing
  - Recognized by the ANA since 1990

DNR / AND

- End of life wishes
- Not automatically suspended
- Conversation between MD and Patient to make a plan for surgery
- Cannot be altered by a nurse

References

- AORN. *Recommended standards, practices, and guidelines*. (Denver: AORN, 2018).
- CB Drain, ed. *Perianesthesia Nursing: a Critical Care Approach, Seventh* Ed (St Louis: Elsevier 2017).
- J C Rothrock, ed. *Alexander's Care of the Patient in Surgery,* 16th Ed. (St. Louis: Mosby 2017).
- Nancymarie Phillips, Berry Kohn's Operating Room Technique, 13th Ed. (St. Louis, Elsevier 2017)

Professional Responsibility Quiz

- 17 Questions
- 19 Minutes

"Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the 'Are you totally lost?' icon."

Professional Responsibility

1. Informed consent occurs when the patient has an understanding of the:

    A. intended procedure and proposed anesthesia.
    B. potential risks and consequences of the intended procedure.
    C. preoperative, intraoperative, and postoperative phases of the intended procedure.
    D. intended procedure, alternatives available, and risks involved.

2. A patient requiring emergency surgery for a life-threatening condition arrives in the OR without a signed consent form. In this situation, the perioperative nurse should:
    A. attempt to contact the patient's next of kin.
    B. proceed with set-up for the procedure.
    C. call the nurse manager on duty.
    D. ask the physician to sign the consent form.

3. The perioperative nurse confirms with the chart and the parents of a 1-year-old boy that a right inguinal herniorrhaphy is to be performed. After the induction, the surgeon discovers bilateral inguinal defects and indicates that he will do bilateral inguinal hernia repairs. In response to the surgeon's decision, the nurse's first consideration should be to:

    A. request that the surgeon talk with the parents and obtain a second consent
    B. notify the operating room manager of the change in schedule and obtain the manager's advice
    C. alert the parents to the surgeon's decision and obtain a second consent
    D. document the surgeon's decision on the operative nurses' notes and prepare an incident Report

4. A patient is scheduled for a hysterectomy. She informs you that she wants to receive no blood products because of religious preferences. What ethical principle is the patient demonstrating?

    A. Justice
    B. Autonomy
    C. Fidelity
    D. Beneficence

5. During an emergency procedure, the patient's condition becomes unstable, and the surgeon requests that there be no sponge count. The immediate action of the circulating nurse would be to:

A. inform the surgeon of hospital policy regarding sponge counts.
B. instruct the scrub nurse to assist with the count.
C. call the supervisor for instructions.
D. document the omitted count.

6. A young male automobile accident victim with no identification was brought to the emergency room. He had a flat electroencephalogram upon arrival, and died soon afterward. This patient does not meet the criteria for organ donation, because:

A. the exact age of the patient is unknown.
B. a history cannot be obtained.
C. a valid donor card had not been found.
D. no one may give consent for an unknown.

7. When developing selection criteria for a new product for potential use in the OR, it is most important to consider:

A. performance.
B. ease of use.
C. hidden costs.
D. ethylene oxide compatibility.

8. Failing to perform a surgical skin prep with an approved solution is an example of what? This act of omission can contribute to injury to the patient. This can result in a civil tort action lawsuit.

A. battery
B. negligence
C. assault
D. a sentinel event

9. The three parts of the preoperative assessment process are:

A. collection of data, identification of a nursing diagnosis, documentation.
B. patient interview, observation, evaluation.
C. problem identification, selection of interventions, implementation.
D. patient identification, interview, teaching needs.

10. Which of the following situations best illustrates the implementation phase of the nursing process?

A. Documenting nursing-care activities performed in the OR.
B. Providing a mechanism for peer review in the OR.
C. Checking records to determine the surgeon's preference for suture material.
D. Reviewing the results of preoperative laboratory work.

11. After transferring a hernia patient to the PACU, what is important to provide in your hand off communication to the PACU nurse?

A. Patient identifiers, type and amount of injection, implantation of mesh and time for questions
B. Patient identifiers, type of anesthesia, any complications, and family location
C. a written report left at the bedside, amount of local injection, and type of mesh implant
D. patient identifiers, family location, amount of local and implants used

12. A 2-year-old boy is undergoing an orchiopexy. In evaluating the intraoperative nursing-care plan, the perioperative nurse focuses on the statement "The patient will maintain normal body temperature." This statement is an example of a(n):

A. nursing assessment
B. quality improvement measure
C. nursing diagnosis
D. outcome criteria

13. The planning phase of the nursing process is characterized by such activities as:

A. putting identified interventions into practice
B. using new data to reassess nursing actions and patient goals
C. reviewing the patient record for data collection and data analysis
D. establishing nursing activities, and evaluation criteria

14. The authoritative organization responsible for delineating the accepted list of nursing diagnoses is:

A. NANDA
B. TJC
C. ANA
D. AORN

15. Obligation to prevent harm to patient is the ethical principle of:

A. Autonomy
B. Nonmaleficence
C. Beneficence
D. Justice

16. Consulting the surgeon on the surgical approach and required positioning for the upcoming procedure is an example of:

A. assessment
B. diagnosis
C. planning
D. evaluation

17. A patient who is scheduled for surgery exhibits signs of severe anticipatory anxiety reaction. Interventions for this patient should focus on:

A. confronting the patient's inappropriate behavior
B. providing a quiet unhurried environment with soothing mannerisms
C. setting limits for his behavior in a firm responsive manner
D. assuring the patient he or she has nothing to worry about

What to do next

- Schedule your exam
- Look in the back of the book and follow the study plan for your learning style
- Work the study plan

Practice Test

- 25 Questions
- 28 Minutes

"Hey. When he wakes up, how 'bout I talk but you make the faces."

Practice Quiz

1. An appendectomy performed for acute, unruptured appendicitis is classified as which type of wound?
   A. Class 1 (clean)
   B. Class 2 (clean contaminated)
   C. Class 3 (contaminated)
   D. Class 4 (dirty)

2. During a laser procedure, the disposable paper drapes ignite and begin to burn. What type of extinguisher should be used on this fire?

   A. Halon Fire extinguisher
   B. CO2 Extinguisher
   C. Water Mist
   D. Class ABC

3. Monica Smith, 11 years old, has just undergone a closed reduction of her fractured radial and ulnar bones under general anesthesia. A plaster cast is applied. What should the perioperative nurse do to prevent complications in the immediate postoperative period?

   A. Check fingers for temperature and color
   B. Keep arm at same height as body
   C. Handle cast with fingertips only
   D. Keep arm covered with blanket to promote cast drying

4. A 49-year-old firefighter with 60% second- and third- degree burns on his torso and lower extremities is undergoing tangential excision and split thickness skin graft repair. Which nursing diagnosis is **most** important to this particular patient during the intraoperative period?

   A. Potential for knowledge deficit
   B. Potential for compromise in skin integrity
   C. Potential for fluid and electrolyte imbalance
   D. Potential for elevated body temperature

5. A 79-year-old patient undergoing laparoscopic cholecystectomy is being induced under general anesthesia. The anesthesiologist notices an unexplained tachycardia, tachypnea, and jaw tightness. The capnograph shows an elevated end tidal CO2. What is the immediate action the perioperative nurse should take to treat this suspected malignant hyperthermia incident?

A. Call for the MH cart and dantrolene
B. Initiate cooling measures
C. Administer sodium bicarbonate
D. Change the soda lime canister

6. Mr. Smith is undergoing a Transurethral Resection of the Prostate. Which preoperative lab result is of most concern?

A. Hematocrit 48%
B. Platelets 300,000/mcL
C. Potassium 2.5mEq/L
D. White blood cell count 8,000/mcL

7. Which incision would likely be used for a splenectomy?

A. McBurney
B. Right subcostal
C. Left subcostal
D. Pfannenstiel

8. The perioperative nurse explains how the surgical site will be prepared for surgery after induction. This is an example of what part of the nursing process?

A. Assessment
B. Planning
C. Implementation
D. Outcome Identification

9. The leak testing of an endoscope should be performed:

A. after mechanical processing and before storage
B. on the surgical field, immediately after use
C. after handing off the field, prior to processing
D. before every use

10. When gas cylinders are used during a patient transport, recommendations include

A. securing them to the transport cart or bed in holders designed for this purpose
B. placing the gas cylinder horizontally to one side of the patient in the stretcher
C. the transporter carrying the gas cylinder
D. placing the cylinder between the patient's legs on the stretcher

11. A patient undergoing a hernia repair using 1 % Lidocaine for local anesthesia is being monitored by the perioperative nurse. The nurse should remember that the recommended total amount of 1% lidocaine should not exceed:

A. 1000 mg
B. 500 mg
C. 350 mg
D. 50 mg

12. When positioning a patient's arm on an arm board, it is important to prevent abduction of the arm at an angle greater than_____ degrees to prevent injury to the_____

A. 60; ulnar nerve
B. 90; brachial plexus
C. 90; peroneal nerve
D. 45; brachial plexus

13. Your patient is under general anesthesia. The purpose of lowering the legs slowly from the lithotomy to the supine position is to:

A. promote cerebral flow
B. prevent hypotension
C. provide privacy
D. prevent circulatory overload

14. What is the purpose of a colorless prep solution for donor site when preparing a patient for a skin graft?

A. To allow the surgeon the ability to properly visualize the skin, while taking the graft.
B. To prevent tattooing the removed skin with pigment from the colored solution
C. This is an individualized physician's preference only
D. Colorless solutions are more effective at reducing microorganisms on the skin during graft procedures

15. The total weight of an instrument containment device, including contents, should not exceed

A. Weight is irrelevant as long as the integrator has changed
B. 25 pounds
C. 35 pounds
D. 40 pounds

16. You are caring for a parathyroidectomy patient in the post anesthesia care unit. The patient begins to experience muscle twitching, cramping, and paresthesia. Which electrolyte imbalance do you suspect?

A. calcium
B. magnesium
C. potassium
D. sodium

17. Emily Jones, 94 years old, is scheduled for a left hemiarthroplasty. She arrives to the holding area accompanied by her daughter. The patient is disoriented. Her daughter states her mother is always like this. Which statement concerning informed consent is applicable to this situation?

A. Only the patient may give consent.
B. The patient must be competent to give consent.
C. No, consent is necessary because this is an emergency situation.
D. The patient cannot sign the consent because she received sedation.

18. The best position for placement of a dispersive pad on a patient with a left metal hip prosthesis undergoing a left mastectomy is:

A. left upper thigh
B. left calf
C. right calf
D. right upper thigh

19. During a laser procedure, which of the following is an appropriate laser safety measure?

A. Applying eye pads moistened with lacrolube to patient's eyes
B. Posting warning signs at all exits from the room
C. Using polyvinyl chloride endotracheal tube
D. Performing a fire risk assessment as part of the time out

20. While a scalpel blade is being changed during a hemicolectomy, the blade snaps and breaks into several pieces. The scrub nurse is unable to find a small piece of the blade. Which statement regarding counts is true?

A. The count is considered correct because the blade broke on the back table and not near the wound.
B. The count is considered incorrect unless the entire blade is found.
C. The count is considered correct after the room and sterile field are searched.
D. The count is considered incorrect even if the entire blade is found.

21. Which item according to the Spaulding Classification System is considered critical and therefore must be sterile?

A. laparoscope
B. cystoscope
C. bronchoscope
D. colonoscope

22. Which of the following contribute to preventing inadvertent hypothermia in a surgical patient:

A. use of room-temperature irrigating solutions
B. adjustment of room temperature between 68-70 degrees
C. increasing time between prepping of the skin and draping
D. use of a forced air warmer during the procedure

23. During an exploratory laparotomy on a blunt force trauma patient the patient's BP is 97/40, HR 122, RR, 16 on the ventilator. The patient's ABG is as follows: pH 7.32, CO2 35, HCO3 19. The circulating nurse understands the appropriate treatment for this ABG is to:

A. increase the respiratory ventilation rate.
B. stop the bleeding and treat with sodium bicarbonate IV.
C. decrease the respiratory ventilation rate
D. perform cardiopulmonary resuscitation

24. When prolonged tourniquet time is desired during a procedure on a lower extremity, how often should the tourniquet be released to allow for reperfusion of the limb?

A. Every 30 minutes for 5 minutes
B. Every 60 minutes for 5 minutes
C. Every 60 minutes for 15 minutes
D. Every 90 minutes for 15 minutes

25. Which is **NOT** considered to be a triggering agent for malignant hyperthermia?

A. Succinylcholine
B. Thiopental sodium
C. Halothane
D. Enflurane

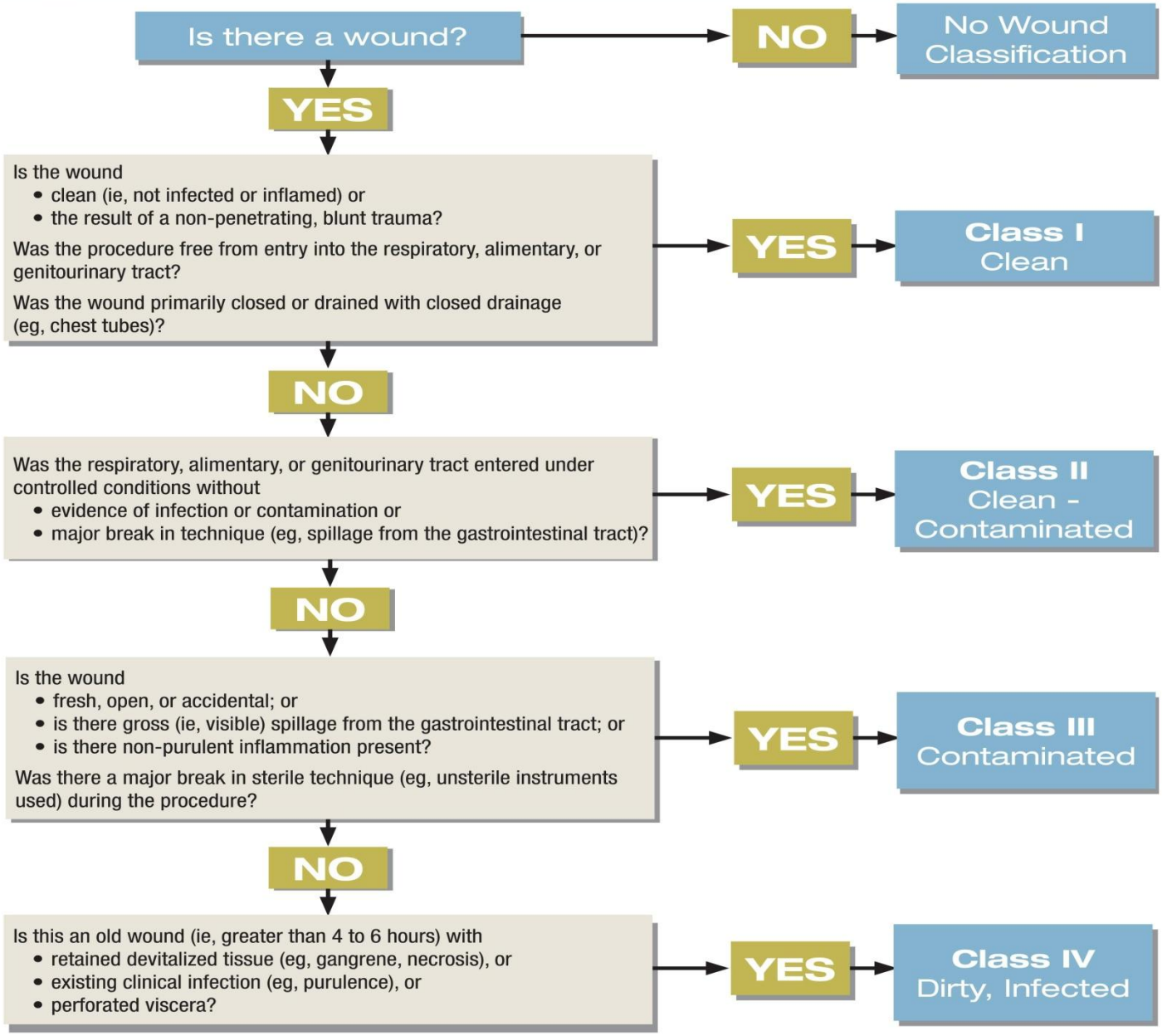
Type of Sterilizer	Type of testing
Steam – Gravity Displacement and Prevacuum	**Geobacillus Stearothermophilus** spore testing at least weekly and preferably **daily**
Prevacuum	An air removal test like **Bowie Dick** should be done **daily** in an empty chamber. For new, renovated or moved equipment three consecutive successful air removal tests should be done before the biological
Ethylene oxide	**Bacillus atropheus** spore testing should be done with **every load**
Plasma	**Geobacillus Stearothermophilus** spore testing done at the same interval as other sterilizers in the facility
Ozone	**Geobacillus Stearothermophilus** spore testing done **daily**
Peracetic acid	**Geobacillus Stearothermophilus** spore testing **daily**
Dry Heat	**Bacillus atropheus** indicators upon installation and after any repair. (Table top type monitored weekly)

BRADEN SCALE FOR PREDICTING PRESSURE SORE RISK

Patient's Name_____ Evaluator's Name_____ Date of Assessment

SENSORY PERCEPTION Ability to respond meaningfully to pressure-related discomfort	**1. Completely Limited** Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation. OR limited ability to feel pain over most of body.	**2. Very Limited** Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	**3. Slightly Limited** Responds to verbal commands, but cannot always communicate discomfort or the need to be turned OR has some sensory impairment which limits ability to feel pain or discomfort in one or two extremities.	**4. No Impairment** Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.				
MOISTURE Degree to which skin is exposed to moisture	**1. Constantly Moist** Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	**2. Very Moist** Skin is often, but not always moist. Linen must be changed at least once a shift.	**3. Occasionally Moist** Skin is occasionally moist, requiring an extra linen change approximately once a day.	**4. Rarely Moist** Skin is usually dry, linen only requires changing at routine intervals.				
ACTIVITY Degree of physical activity	**1. Bedfast** Confined to bed.	**2. Chairfast** Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	**3. Walks Occasionally** Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.	**4. Walks Frequently** Walks outside room at least twice a day and inside room at least once every 2 hours during waking hours.				
MOBILITY Ability to change and control body position	**1. Completely Immobile** Does not make even slight changes in body or extremity position without assistance.	**2. Very Limited** Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	**3. Slightly Limited** Makes frequent though slight changes in body or extremity position independently.	**4. No Limitation** Makes major and frequent changes in position without changes.				
NUTRITION Usual food intake pattern	**1. Very Poor** Never eats a complete meal. Rarely eats more than ⅓ of any food offered. Eats two servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement OR is NPO and/or maintained on clear liquids or IVs for more than 5 days.	**2. Probably Inadequate** Rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only three servings of meat or dairy products per day. Occasionally will take a dietary supplement OR receives less than optimum amount of liquid diet or tube feeding.	**3. Adequate** Eats over half of most meals. Eats a total of four servings of protein (meat, dairy products) per day. Occasionally will refuse a meal, but will usually take a supplement when offered OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs.	**4. Excellent** Eats most of every meal. Never refuses a meal. Usually eats a total of four or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.				
FRICTION & SHEAR	**1. Problem** Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures, or agitation leads to almost constant friction.	**2. Potential Problem** Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints, or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	**3. No Apparent Problem** Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair.					
				Total Score				

Surgical Wound Classification Decision Tree



RESOURCES

1. Mangram AJ, Horan TC, Pearson ML; Hospital Infection Control Practices Advisory Committee. Guidelines for prevention of surgical site infection, 1999. *Am J Infect Control*. 1999;27(2):97-132.
2. Garner, JS. CDC guideline for prevention of surgical wound infections, 1985. Supercedes guideline for prevention of surgical wound infections published in 1982. (Originally published in 1985). Revised. *Infect Control*. 1986;7(3):193-200. http://wonder.cdc.gov/wonder/prevguid/p0000420/p0000420.asp. Accessed July 31, 2011.
3. Altemeier WA. Surgical infections: incisional wounds. In: Bennett JV, Brachman PS, eds. *Hospital Infections*. Boston, MA: Little, Brown and Co; 1979:287-306.
4. Howard JM, Barker WF, Culbertson WR, et al. Postoperative wound infections: the influence of ultraviolet irradiation of the operating room and various other factors. *Ann Surg*. 1964;160(Suppl2):1-192.

NOTE: These are the original source documents for development of the CDC surgical wound classification system.

AORN

Zander Perioperative Education

The Glasgow Coma Scale and Score

Feature	Scale Responses	Score Notation
Eye Opening	Spontaneous	**4**
	To Speech	**3**
	To Pain	**2**
	None	**1**
Verbal Response	Orientated	**5**
	Confused Conversation	**4**
	Words (inappropriate)	**3**
	Sounds (incomprehensible)	**2**
	None	**1**
Best Motor Response	Obey Commands	**6**
	Localise Pain	**5**
	Flexion - Normal	**4**
	Flexion - Abnormal	**3**
	Extend	**2**
	None	**1**
Total Coma Score		**3/15 - 15/15**

AVK

You need to talk to learn. Reading out loud and reading along are very effective ways to retain information.

What you need

1. A study group
2. A hand held recorder
3. The recordings of class
4. A Perioperative nursing text book (Alexanders 16th ed, Berry or Kohn 13th ed.)
5. 2020 AORN Guidelines (Preferred) or Guidelines Essentials from AORN website
6. Blank Notebook

What to do

1. Schedule your exam. Everyone works better with a deadline.
2. This learning style does well with a study group. If you have the opportunity to belong to one make an effort to attend.
3. You should have marked your slides to identify your areas of weakness as you took notes. You may want to listen through the recordings again with no other thought than to mark the slides with content that you think you may answer incorrectly.
4. Next look those things up in the Perioperative text book that you've chosen to use. Take notes in a separate notebook on the topics you marked.
5. Make sure you check each topic with the Guidelines to make sure your information from the text is current. This takes a long time. It's work. And it's very effective.
6. Once you have worked through the whole class. You've looked up every topic you mark as an area of weakness and taken notes on the information. Now it's time to record. Read your notes from your notebook into the recorder. This takes a little time but not nearly as laborious as writing it.
7. Once you have the notes and the recordings you will listen to them over and over. Preferably you will be reading the notes at the same time you are listening. This will engage both your auditory and visual learning at the same time. Also, listen to the recordings from class but remember your own notes are more important. If English is not your first language, it's okay for your recording to be in your first language if that makes it easier for you to remember.
8. Study for about an hour a day for 4-6 weeks before your exam.
9. Use the apps with practice questions. My favorites are the flashcards from CCI or the CNOR Pocket Prep App. Check out the CNOR Prep Facebook page. The others apps mentioned in class are good too
10. Email me at Wendy@periop-ed.com if you have any questions. I am here to help you. Remember I can share a copy of the recorded class with you one final time. I ask that you have scheduled your exam before I send you this final set. I record at least one class every month. The recordings are available for two months from the day they are recorded. So I can send them to you about two months before your exam date.

AKV

For an AKV the worst thing you can do is review written notes and read books... You're not a visual learner so that's the most ineffective way to retain information. You can do it, it's just harder. A study partner that will get up and move with you is okay but not a study group.

What you need

1. A hand held recorder
2. The recordings of class
3. A Perioperative nursing text book (Alexanders 16th ed, Berry or Kohn 13th ed.)
4. 2020 AORN Guidelines (Preferred) or Guidelines Essentials from AORN website

What to do

1. Schedule your exam. Everyone works better with a deadline.
2. You should have marked your slides to identify your areas of weakness as you took notes. You may want to listen through the recordings again with no other thought than to mark the slides with content that you think you may answer incorrectly.
3. Next look those things up in the Perioperative text book that you've chosen to use. Record those things you look up into your hand held recorder.
4. Make sure you check each topic with the Guidelines to make sure your information from the text is current. If you see something different or new than what was in the text book read that information into your hand held recorder too.
5. You'll have the recordings I'll send to you and now you have your focused recordings too. Now listen to these at least an hour a day while you are doing something physical. Clean the house, walk the dog, or do some laundry. I also like to listen while I am driving. It can be anything as long as you're not lying down or curled up resting. If English is not your first language, it's okay for your recording to be in your first language if that makes it easier for you to remember.
6. Study for at least an hour a day for 4-6 weeks before your exam.
7. Use the apps with practice questions. My favorites are the flashcards from CCI or the CNOR Pocket Prep App. Check out the CNOR Prep Facebook page. The others apps mentioned in class are good too
8. Email me at Wendy@periop-ed.com if you have any questions. I am here to help you. Remember I can share a copy of the recorded class with you one final time. I ask that you have scheduled your exam before I send you this final set. I record at least one class every month. The recordings are available for two months from the day they are recorded. So I can send them to you about two months before your exam date.

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KVA

A study partner that will get up and move with you is okay but not a study group. You need physical activity but written books and notes work better than an audio version.

What you need

1. A hand held recorder
2. The recordings of class
3. A Perioperative nursing text book (Alexanders 16th ed, Berry or Kohn 13th ed.)
4. 2020 AORN Guidelines (Preferred) or Guidelines Essentials from AORN website
5. Laptop or computer

What to do

1. Schedule your exam. Everyone works better with a deadline.
2. You should have marked your slides to identify your areas of weakness as you took notes. You may want to listen through the recordings again with no other thought than to mark the slides with content that you think you may answer incorrectly.
3. Next look those things up in the Perioperative text book that you've chosen to use. Take notes in a separate notebook on the topics you marked.
4. Make sure you check each topic with the Guidelines to make sure your information from the text is current. This takes a long time. It's work. And it's very effective.
5. Once you have worked through the whole class. You've looked up every topic you mark as an area of weakness and taken notes on the information. Now, copy those notes onto flashcards
6. Set your notebook up on a treadmill and program it to a slow walk while you review your notes.
7. Divide the flashcards by topic and pick a topic a day to carry with you. Read through some of them if you get a minute.
8. You may want to retype them into a word document. Copying the information will help you retain it.
9. If you want to review your notes while sitting it's okay but only in short bursts. Sit and study for no more than 15-20 minutes and then get up and be active at least that long. Then sit down and study for another 15-20 minutes.
10. If English is not your first language, it's okay for your notes to be in your first language if that makes it easier for you to remember. Take notes in the language you think in.
11. Study for about an hour a day for 4-6 weeks before your exam.
12. Use the apps with practice questions. My favorites are the flashcards from CCI or the CNOR Pocket Prep App. Check out the CNOR Prep Facebook page. The others apps mentioned in class are good too
13. Email me at Wendy@periop-ed.com if you have any questions. I am here to help you. Remember I can share a copy of the recorded class with you one final time. I ask that you have scheduled your exam before I send you this final set. I record at least one class every month. The recordings are available for two months from the day they are recorded. So I can send them to you about two months before your exam date.

KAV

For a KAV the worst thing you can do is review written notes and read books... You're not a visual learner so that's the most ineffective way to retain information. You can do it, it's just harder. A study partner that will get up and move with you is okay but not a study group.

What you need

1. A hand held recorder
2. The recordings of class
3. A Perioperative nursing text book (Alexanders 16th ed, Berry or Kohn 13th ed.)
4. 2020 AORN Guidelines (Preferred) or Guidelines Essentials from AORN website

What to do

1. Schedule your exam. Everyone works better with a deadline.
2. You should have marked your slides to identify your areas of weakness as you took notes. You may want to listen through the recordings again with no other thought than to mark the slides with content that you think you may answer incorrectly.
3. Next look those things up in the Perioperative text book that you've chosen to use. Record those things you look up into your hand held recorder.
4. Make sure you check each topic with the Guidelines to make sure your information from the text is current. If you see something different or new than what was in the text book read that information into your hand held recorder too.
5. You'll have the recordings I'll send to you and you have your focused recordings too. Now listen to these at least an hour a day while you are doing something physical. Clean the house, walk the dog, or do some laundry. It can be anything as long as you're not sitting down or lying down. KAV's retain information most readily during mild physical activity. If English is not your first language, it's okay for your recording to be in your first language if that makes it easier for you to remember.
6. Study for at least an hour a day for 4-6 weeks before your exam.
7. Use the apps with practice questions. My favorites are the flashcards from CCI or the CNOR Pocket Prep App. Check out the CNOR Prep Facebook page. The others apps mentioned in class are good too
8. Email me at Wendy@periop-ed.com if you have any questions. I am here to help you. Remember I can share a copy of the recorded class with you one final time. I ask that you have scheduled your exam before I send you this final set. I record at least one class every month. The recordings are available for two months from the day they are recorded. So I can send them to you about two months before your exam date.

VAK

Must teach to learn. You are high visual learners so clutter doesn't work well for you. You are the people that go into the OR and have to clean and straighten it before you start the day. Study in a place with minimal visual clutter.

What you need

1. A video camera or smartphone with video recording capability
2. The recordings of class
3. A Perioperative nursing text book (Alexanders 16th ed, Berry or Kohn 13th ed.)
4. 2020 AORN Guidelines (Preferred) or Guidelines Essentials from AORN website
5. Blank Notebook and flashcards

What to do

1. Schedule your exam. Everyone works better with a deadline.
2. You should have marked your slides to identify your areas of weakness as you took notes. You may want to listen through the recordings again with no other thought than to mark the slides with content that you think you may answer incorrectly.
3. Next look those things up in the Perioperative text book that you've chosen to use. Take notes and create an outline for yourself so you can record a short presentation for each topic.
4. Make sure you check each topic with the Guidelines to make sure your information from the text is current. This takes a long time. It's work. And it's very effective.
5. Once you have worked through the whole class. You've looked up every topic you mark as an area of weakness and taken notes on the information.
6. Divide your notes by topic and pick a topic. Read through and rehears until you can present this topic to your video camera. Record yourself presenting. Work your way through each topic.
7. By doing this you are dividing up the material into smaller chunks and then absorbing them one at a time.
8. Once you get through recording all of the topics. You study by watching them. You can also watch the recordings I will send to you. *Your own recordings are more useful though.*
9. If English is not your first language, it's okay for your video to be in your first language if that makes it easier for you to remember. Present the information in the language you think in.
10. Study for about an hour a day for 4-6 weeks before your exam.
11. Use the apps with practice questions. My favorites are the flashcards from CCI or the CNOR Pocket Prep App. Check out the CNOR Prep Facebook page. The others apps mentioned in class are good too
12. Email me at Wendy@periop-ed.com if you have any questions. I am here to help you. Remember I can share a copy of the recorded class with you one final time. I ask that you have scheduled your exam before I send you this final set. I record at least one class every month. The recordings are available for two months from the day they are recorded. So I can send them to you about two months before your exam date.

VKA

You are a traditional learner so reviewing your notes is the best way to study. What is most important for you is to have the RIGHT information. The best thing you can do is to focus your study on your personal areas of opportunity

What you need

1. A study group
2. The recordings of class
3. A Perioperative nursing text book (Alexanders 16th ed, Berry or Kohn 13th ed.)
4. 2020 AORN Guidelines (Preferred) or Guidelines Essentials from AORN website
5. Blank Notebook

What to do

1. Schedule your exam. Everyone works better with a deadline.
2. This learning style does well with a study group. If you have the opportunity to belong to one make an effort to attend.
3. You should have marked your slides to identify your areas of weakness as you took notes. You may want to listen through the recordings again with no other thought than to mark the slides with content that you think you may answer incorrectly.
4. Next look those things up in the Perioperative text book that you've chosen to use. Take notes in a separate notebook on the topics you marked.
5. Make sure you check each topic with the Guidelines to make sure your information from the text is current. This takes a long time. It's work. And It's very effective.
6. Once you have worked through the whole class. You've looked up every topic you mark as an area of weakness and taken notes on the information. Now, copy those notes onto flashcards
7. Divide the flashcards by topic and pick a topic a day to carry with you. Read through some of them if you get a minute.
8. Flash cards work really well for you. Reading while pacing about works for you to and is easy to do with flashcards
9. You may want to retype them into a word document. Copying the information will help you retain it.
10. If you want to review your notes while sitting it's okay but only in short bursts. Sit and study for no more than 30-45 minutes and then get up and be active at least that long. Then sit down and study for another 3-40 minutes. You can do long study sessions but you are most efficient for the first 30 minutes
11. Once you have the notes and the recordings you will listen to them over and over. Preferably you will be reading the notes at the same time you are listening. This will engage both your auditory and visual learning at the same time. Also, listen to the recordings from class but remember your own notes are more important. If English is not your first language, it's okay for your recording to be in your first language if that makes it easier for you to remember.
12. Study for about an hour a day for 4-6 weeks before your exam.
13. Use the apps with practice questions. My favorites are the flashcards from CCI or the CNOR Pocket Prep App. Check out the CNOR Prep Facebook page. The others apps mentioned in class are good too
14. Email me at Wendy@periop-ed.com if you have any questions. I am here to help you. Remember I can share a copy of the recorded class with you one final time. I ask that you have scheduled your exam before I send you this final set. I record at least one class every month. The recordings are available for two months from the day they are recorded. So I can send them to you about two months before your exam date.

Zander Perioperative Education