

Neuroanesthesia: Goals and Objectives

Goal

1. CA1-2 residents are assigned to Neurosurgical Cases for 1 to 2 months to develop competency in the *routine* perioperative anesthetic management of *uncomplicated* Craniotomies, Spine surgery, Neuroradiologic, and Neurovascular procedures.
2. The ability to independently practice neuroanesthesia with an experienced care team is the expected outcome of this rotation.

Objectives

1. Patient Care

- a. Evaluate a patient's risk for developing increased ICP perioperatively using:
 - i. CT scan or MRI
 - ii. Physical symptoms
 - iii. History
 - iv. ICP monitor
 - v. Regional anesthetic techniques
- b. Manage increased ICP intraoperatively using various methods
 - i. Decrease CBF
 - ii. Decrease venous pressure
 - iii. Other measures to decrease intracerebral pressure
- c. Evaluate and manage a patient with a history of seizures
 - i. Manage pre-operative anti-seizure medication
 - ii. Evaluate the risk of peri-operative complications based on the type of seizure
- d. Evaluate a Comatose patient
 - i. Determine Glasgow Coma Scale
 - ii. Determine etiology and adjust pre-op plan accordingly
 1. Infectious
 2. Metabolic
 3. CVA
 4. Cerebral hypoxia
- e. Monitor a patient for venous air embolism using
 - i. Pre-cordial doppler
 - ii. ET CO₂
- f. Adjust fluid administration during craniotomy based on
 - i. ICP
 - ii. Electrolyte changes
 - iii. Hemodynamics
- g. Manage blood pressure in a spine surgery patient at risk for spinal cord ischemia
- h. Turn patient from supine to prone while maintaining head-axial spine stability
- i. Evaluate pressure points in prone position

- j. Perform the following technical skills
 - i. Interpret MRI or CT of head in patient with brain tumor and identify
 - 1. Tumor density
 - 2. Cerebral edema
 - 3. midline shift
 - 4. ventricular compression
 - ii. Attach and test pre-cordial doppler
 - iii. Observe various techniques of neurophysiologic monitoring
 - 1. EEG
 - 2. SSEP's
 - 3. MEP's
 - iv. Place an arterial line using aseptic technique
 - v. Manage airway in a patient with an unstable cervical spine
 - vi. Perform fiberoptic intubation
 - 1. in a topically anesthetized patient or
 - 2. in a simulated patient

2. Medical Knowledge

- a. Reading Assignments: Miller Chapter 52 (19, 26, 35, 76)
- b. Articles from the Neuroanesthesia handout
- c. Specific Cognitive Objectives
 - i. Define Cushing's triad
 - ii. List the mechanism of action, dose, mode of elimination, side effects, and contraindications of the following medications used to treat Increased ICP
 - 1. Pentobarbital
 - 2. Decadron
 - 3. Mannitol
 - 4. Lasix
 - iii. List the monitors used to detect VAE and indicate what change is detected
 - iv. Indicate the frequency ranges for delta, theta, alpha, and beta waves on an EEG
 - v. Define EEG burst suppression
 - vi. List four methods of treating increased ICP immediately before induction of anesthesia

3. Interpersonal and Communication Skills

- a. Establish and maintain professional relationships with the neurosurgical patients, their families and the operating room staff involved with their care.
- b. Identify the special needs of spinal cord injury patients in dealing with both the acute and chronic aspects of their condition.
- c. Identify the special needs of neurosurgical patients who may have difficulty or be unable to communicate with their caregivers.

4. Practice-Based learning and Improvement

- a. Describe an evidenced-based approach to the treatment of postoperative nausea and vomiting
- b. Justify placement of a CVP for VAE during craniotomy based on the results of a literature review

- c. Self-monitor the effectiveness of arterial line placement and make adjustments in technique to improve success rate

5. Professionalism

- a. Maintain focus on patient care activities during stressful times
- b. Treat patients with respect at all times
- c. Maintain honesty at all times

6. Systems-based Practice

- a. Indicate how your selection of anesthetic technique for managing patients having neurophysiologic monitoring is a part of a team approach geared toward patient safety
- b. Justify the expense of using an intra arterial line during craniotomy for tumor extraction