END-2421: INTERMEDIATE INTRAOPERATIVE MONITORING

Cuyahoga Community College

Viewing: END-2421 : Intermediate Intraoperative Monitoring

Board of Trustees:
January 2023

Academic Term:
Fall 2023

Subject Code
END - Electroneurodiagnostic

Course Number:
2421

Title:
Intermediate Intraoperative Monitoring

Catalog Description:
Intermediate discussion of principles of intraoperative monitoring of the nervous system structure and function integrity during surgical procedures. Emphasis on various types of surgery, decision making on the modality, signal improvement, in-depth discussion of variables and co-morbidities, surgical outcomes.

Credit Hour(s):
3

Lecture Hour(s):
2
Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
END-2401 Intraoperative Monitoring for Electroneurodiagnostic Technologisits; or departmental approval.

Outcomes

Course Outcome(s):
Apply advanced concepts of intraoperative monitoring in setting up SSEP monitoring.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):
a. Review advanced science and instrumentation of intraoperative monitoring.
b. Relate advanced intraoperative concepts of anatomy and physiology of the nervous system and its structures. Obtain clearly resolved waveforms.
c. Obtain two replications demonstrating consistency of latency and amplitude measurements.
d. Demonstrate use of additional electrode derivation, alternate electrode placement and other techniques as needed to enhance or clarify abnormality.
e. Demonstrate the appropriate recording and stimulus parameters.
f. Demonstrate display of obligate peaks displayed according to recommended standards.
g. Establish acceptable baselines.
h. Correlate the pathology, surgical procedure, appropriate monitoring procedures and their execution, and potential risks as reflected on monitoring for various types of surgery where SSEP would be utilized.
i. Associate preoperative and intraoperative factors for multiple variables.

Course Outcome(s):

Apply advanced concepts of intraoperative monitoring in setting up MEP, EMG, BAER and EEG monitoring.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

a. Review advanced science and instrumentation of intraoperative monitoring.
b. Relate advanced intraoperative concepts of anatomy and physiology of the nervous system and its structures.
c. Obtain patient history to establish indication and contraindication for specific modality.
d. Demonstrate the appropriate recording and stimulus parameters.
e. Use montages appropriate for obtaining responses for specific modality.
f. Establish acceptable baselines.
g. Correlate the pathology, surgical procedure, appropriate monitoring procedures and their execution, and potential risks as reflected on monitoring for various types of surgery where MEP, EMG, BAER or EEG would be utilized.
h. Associate preoperative and intraoperative factors for multiple variables.

Course Outcome(s):

Verify the integrity of the evoked potential instrumentation.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

a. Accurately assess the integrity and proper instrumentation set-up.
b. Demonstrate the input proper montage and electrode derivations for assigned procedure.
c. Demonstrate the practice of proper electrical safety and equipment/patient grounding.

Course Outcome(s):

Demonstrate the ability to distinguish changes on intraoperative waveforms as compared to pre-established baselines

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

a. Demonstrate a comparison of EP responses based to pre-established baselines.
b. Explain criteria for a significant change.
c. Relate advanced concepts of effects of homeostasis, pharmacology, and pathology on the structures of the nervous system.
d. Demonstrate identification of locations of abnormality and/or change based on EP responses and knowledge of neural pathways.
e. Identify source of a significant change.
f. Distinguish a significant change from artifact

Methods of Evaluation:

a. Quizzes
b. Exams
c. Comprehensive final
d. Case study
e. Worksheets

Course Content Outline:

a. Advanced science and instrumentation of intraoperative monitoring
   i. Effect of improper use of filters on correct interpretation of recordings
   ii. Improving signal averaging
   iii. Advanced stimulus techniques
b. Advanced intraoperative concepts of anatomy and physiology of the nervous system and its structures
   i. Brain
   ii. Brain stem
   iii. Cranial nerves
   iv. Vertebral column
   v. Spinal cord
   vi. Peripheral nerves
c. Advanced concepts of effects of homeostasis, pharmacology, and pathology on the following structures of the nervous system
   i. Brain
   ii. Brain stem
   iii. Cranial nerves
   iv. Vertebral column
   v. Spinal cord
   vi. Peripheral nerves
d. Advanced recording concepts, preoperative, and intraoperative factors for:
   i. Electrode sites
   ii. Stimulations sites
   iii. Stimulation troubleshooting
   iv. Equipment settings
e. Vertebral column surgery (cervical, thoracic, lumbosacral)
   i. Pathology
   ii. Surgical procedure
   iii. Appropriate monitoring methods
   iv. Surgical outcomes-reflection on monitoring
   v. Advanced review of cases
      1. Setup
      2. Waveform review
      3. Change vs. artifact
      4. Advanced discussion of settings (time base, sensitivity, filters)
      5. Improving recording (SNR discussion, stimulus adjustment)
f. Spinal cord surgery (tumor, tethered cord)
   i. Pathology
   ii. Surgical procedure
   iii. Appropriate monitoring methods
   iv. Surgical outcomes-reflection on monitoring
   v. Advanced review of cases
      1. Setup
      2. Waveform review
      3. Change vs. artifact
      4. Advanced discussion of settings (time base, sensitivity, filters)
      5. Improving recording (SNR discussion, stimulus adjustment)
g. Peripheral nerve surgery
   i. Pathology
   ii. Surgical procedure
   iii. Appropriate monitoring methods
   iv. Surgical outcomes-reflection on monitoring
   v. Advanced review of cases
      1. Setup
      2. Waveform review
      3. Change vs. artifact
      4. Advanced discussion of settings (time base, sensitivity, filters)
      5. Improving recording (SNR discussion, stimulus adjustment)
h. Cerebellopontine angle surgery (tumor, microvascular decompression)

i. Pathology
ii. Surgical procedure
iii. Appropriate monitoring methods
iv. Surgical outcomes-reflection on monitoring
v. Advanced review of cases
1. Setup
2. Waveform review
3. Change vs. artifact
4. Advanced discussion of settings (time base, sensitivity, filters)
5. Improving recording (SNR discussion, stimulus adjustment)

i. Vascular surgery (thoracic aneurysm, cerebral aneurysm, carotid endarterectomy)
i. Pathology
ii. Surgical procedure
iii. Appropriate monitoring methods
iv. Surgical outcomes-reflection on monitoring
v. Advanced review of cases
1. Setup
2. Waveform review
3. Change vs. artifact
4. Advanced discussion of settings (time base, sensitivity, filters)
5. Improving recording (SNR discussion, stimulus adjustment)

j. Brain surgery (mapping)
i. Pathology
ii. Surgical procedure
iii. Appropriate monitoring methods
iv. Surgical outcomes-reflection on monitoring
v. Advanced review of cases
1. Setup
2. Waveform review
3. Change vs. artifact
4. Advanced discussion of settings (time base, sensitivity, filters)
5. Improving recording (SNR discussion, stimulus adjustment)

Resources

Deletis, V., Shils, J., Sala, F., Seidel, K. . (2020) *Neurophysiology in Neurosurgery: A Modern Approach*, San Diego, CA: Academic Press.

Husain MD, A. (2014) *A Practical Approach to Neurophysiologic Intraoperative Monitoring*, New York: Demos Medical Publishing.

Jahangiri, F. (2012) *Surgical Neurophysiology,*Unknown.

Jahangiri, Faisal. (2021) *Mapping of the Brain*, Columbia, SC: Global Innervation LLC.

Loftus, C., Biller, J, Baron, E. (2014) *Intraoperative Neuromonitoring*, New York: McGraw-Hill Education.

Møller, A. (2011) *Intraoperative Neurophysiological Monitoring,*New York: Springer.

Russell, G. Rodichok, L. (1995) *Primer of Intraoperative Neurophysiologic Monitoring,*Boston: Butterworth-Heinemann.

Simon MD, M. (2018) *Intraoperative Neurophysiology*, New York: Demos Medical Publishing.

Zouridakis, G. Papanicolaou, A. (2001) *A concise guide to Intraoperative Monitoring,*Boca Raton: CRC PRess.

Husain, Atif M. (2018) *Illustrated Manual of Clinical Evoked Potentials*, New York: Springer Publishing Company Demos Medical Medical Publishing.

American Clinical Neurophysiology Society. "Guidelines in Evoked Potentials, Guidelines in EEG, Evoked Potential and Polysomnography"

Resources Other

a. www.aset.org
b. www.asnm.org
c. *American Journal of Electroneurodiagnostic Technology (AJET)* by the ASET; 4 issues annually; which reflects most recent changes and updates in the field.

Top of page

Key: 5090