END-1450: INTERMEDIATE ELECTROENCEPHALOGRAPHY (EEG)

Cuyahoga Community College

Viewing: END-1450 : Intermediate Electroencephalography (EEG)

Board of Trustees:
November 2019

Academic Term:
Fall 2020

Subject Code
END - Electroneurodiagnostic

Course Number:
1450

Title:
Intermediate Electroencephalography (EEG)

Catalog Description:
Discussion of clinical significance of epileptiform patterns, pharmacological effects on EEG recordings, EEG correlation of infection, and vascular and structural disease. Presentation and discussion of criteria for specialized recording techniques used in prolonged EEG recordings and specialized areas of the hospital, such as intensive care and operating room. Discussion of EEG signal analysis.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
2

Requisites

Prerequisite and Corequisite
END-1350 Introduction to EEG, or departmental approval.

Outcomes

Course Outcome(s):
Discuss the clinical significance of various localized, generalized, and specific epileptiform activity.

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):
1. Discuss typical clinical signs noted in localized EEG abnormalities.
2. Discuss typical clinical signs noted in generalized EEG abnormalities.
3. Discuss typical clinical signs noted with specific epileptiform patterns.

Course Outcome(s):
Discuss patient assessment and intervention in regards to performing EEGs with focal slow waves, generalized synchronous slow waves, bilateral synchronous slow waves, localized and lateralized changes in amplitude: asymmetries, and symmetrically generalized changes.

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):

1. Discuss importance of assessing and documenting patient physiological state during EEG recording (wake, drowsy, asleep).
2. Discuss importance of assessing and documenting patient clinical state during EEG recording. (lethargy, stupor, coma).
3. Discuss intervention techniques in cases of various seizure types.
4. Discuss importance of documentation of clinical signs in various seizure types.

Course Outcome(s):

Discuss EEG correlates of infection, vascular and structural disease.

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):

1. Recognize various EEG patterns noted with specific infectious diseases.
2. Describe the clinical correlations noted with various infectious diseases.
3. Recognize various EEG patterns noted with specific vascular diseases.
4. Describe the clinical correlations noted with various vascular diseases

---

Course Outcome(s):

Recognize pharmacological effects in the EEG recordings.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Discuss the use of various antiepileptic medications in EEG.
2. Identify the various types of antiepileptic medications.
3. Describe the classifications of medications that are effective in control of various seizure types.

Course Outcome(s):

Discuss specialized recording techniques.

Essential Learning Outcome Mapping:

Not Applicable: No Essential Learning Outcomes mapped. This course does not require application-level assignments that demonstrate mastery in any of the Essential Learning Outcomes.

Objective(s):

1. Discuss the use of additional surface electrodes over and above the standard 10-20 placements (10-10 placement).
2. Discuss the use of Sphenoidal (needle) electrodes.
3. Discuss the use of Depth (needle) electrodes.
4. Discuss the use of Grid & strip electrodes.

Course Outcome(s):

Explain the application of recording techniques in specialty units.

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):

1. Discuss specific modifications to recording techniques in the ICU & CCU settings.
2. Discuss specific modifications to recording techniques in the Neuro Intensive Care.

3. Discuss specific reasons for utilizing the services of Long term Epilepsy Units.
4. Discuss specific modifications to recording techniques and proper etiquette in the OR setting.
5. Discuss specific modifications to recording techniques in the ER.

Course Outcome(s):

Describe various EEG signal analysis measures.

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):

1. Discuss and demonstrate the use of EEG computer system amplitude and frequency measurement tools.
2. Discuss automated spike detection software.
3. Discuss Q-EEG analysis systems.

Methods of Evaluation:

1. Quizzes
2. Exams
3. Comprehensive final
4. Laboratory worksheet
5. Laboratory competencies
6. Laboratory comprehensive final exam

Course Content Outline:

1. Review electro-physiology and the theory and application of specialized technical monitoring criteria
2. Epilepogenic correlates to EEG tracings
    a. Localized epileptiform patterns
        i. description of patterns
        ii. clinical significance of focal epileptiform activity
        iii. other EEG abnormalities associated with focal epileptiform activity
        iv. grading of focal epileptiform activity
        v. mechanism underlying focal epileptiform activity
        vi. specific disorders causing focal epileptiform activity
    b. Generalized epileptiform patterns
        i. description of patterns
        ii. clinical significance of generalized epileptiform activity
        iii. other EEG abnormalities associated with generalized epileptiform activity
        iv. mechanism underlying generalized epileptiform activity
        v. specific disorders causing generalized epileptiform
    c. Special epileptiform patterns
        i. periodic complexes
        ii. ictal patterns without spike and sharp waves
        iii. pseudo-epileptogenic patterns
3. Specific abnormal patterns
    a. Local slow waves
    b. Generalized asynchronous slow waves
    c. Bilaterally synchronous slow waves
    d. Localized and lateralized changes of amplitude: asymmetries
    e. Symmetrically generalized change
4. EEG correlations of infection, vascular and structural diseases
5. Pharmacological management and their effects on neurodiagnostic recordings
6. Special techniques
    a. Use of special electrodes
        i. sphenoidal electrodes
        ii. nasoharyngeal electrode recording
        iii. naso-ethmoidal electrodes

   iv. electrocorticographic recordings
   v. intracerebral electrode recording
b. Recording in specialty units (Intensive Care)
c. Overnight sleep recordings
d. Prolonged EEG recording on ambulatory patients
e. Telemetry
   i. modulation systems
   ii. radio Telemetry
   iii. network systems
f. Biological feedback and the EEG
g. Monitoring EEG in operating room
h. Criteria for recording electro-cerebral silence recordings
i. 10-20 scalp electrode placement

7. EEG signal analysis
   a. Analogue and digital methods
   b. Measurement and wave indices
   c. Frequency analysis-theoretical basis
   d. Frequency analysis analogue method
   e. Frequency analysis digital
   f. Correlation analysis
   g. Coherence analysis
   h. Spatial analysis
   i. Computerized EEG analysis (CEAN)

Resources

(1986) American Electroencephalographic Society Guidelines in EEG and Evoked Potentials. *Journal of Clinical Neurophysiology*, Vol. 3, Supplement 1. Raven Press.

American Society of Electroneurodiagnostic Technologists. *Drugs Their Effects on Neurodiagnostic.* ASET 1-57797-010, 1996.

American Society of Electroneurodiagnostic Technologist. *EEG Clinical Correlatives, Vol 1, Epilepsy.* ASET, 1996.

American Society of Electroneurodiagnostic Technologist. *Intraoperative Monitoring, Vol I-II.* ASET 1-57797-02508, 1996.

Blume, W.T., Holloway, G.M., Kaibara, M., & Young, G.B. (2011) *Blume's Atlas of Pediatric and Adult Electroenechalography*, Philadelphia, PA: Lippincott Williams & Wilkins.

Daley, D. D., and Pedlety, T. A. (1990) *Current Practices of Clinical Electroencephalography (2nd ed.)*, New York, NY: Raven Press.

Ebersole, J.S. (2014) *Current Practice of Clinical Electroencephalography (4th ed.)*, Philadelphia, PA: Wolters Kluwer Health.

La Roche, S.M., & Haider, H.A. (2018) *Handbook of ICU EEG Monitoring (2nd ed.)*, New York: Springer Publishing Company.

Libenson, M.H. (2010) *Parctical Approach to Electroencephalography*, Philadelphia, PA: Saunders.

Spehlmann, R. (1999) *EEG Primer (3rd ed.)*, New York, NY: Elsevier Biomedical Press.

Tyner, F. S., Knott, J. R., Mayer, W. B. (1989) *Fundamentals of EEG Technology, Clinical Correlates*, Raven Press.

Top of page
Key: 1791