EEG

Resident Level: PGY-3 or PGY-4

Setting: Residents will be trained to read EEG and EP studies including routine studies of both types, inpatient short and long-term studies, ambulatory EEG, and have exposure to intraoperative monitoring.

Elective Rotation Co-Directors:

David Spencer  pager 14237  office 4-5682
Siegward Elsas  pager 11956  office 4-4018

Goals: The EEG elective rotation is designed to complement the required Epilepsy rotation, and to focus specifically on electrophysiology including electroencephalography and evoked potential studies.

Objectives

By the end of the rotation, the resident should have basic competence in EEG and EP interpretation, and have familiarity with the following concepts:

EEG

I: Neurophysiologic Basis of the EEG
1) Action potentials, synaptic transmission, EPSPs, IPSPs
2) Generation of EEG rhythms, generation of epileptiform activity
3) Volume conductor theory in EEG

II: Basic mechanical principles of EEG
1) The source of the EEG signal
2) Recording electrodes
3) Digital and analog EEG instruments
4) EEG recording methods
5) EEG artifacts

III: Approach to EEG analysis
1) Definition of normal EEG
2) Ontogeny of normal EEG
3) Benign EEG variants and patterns of unclear significance

IV: Abnormal EEG patterns
1) Abnormal slow activity
2) Interictal and ictal abnormalities
3) Pseudoperiodic patterns
4) Drug effects

V: The EEG in the medical setting
1) EEG and syncope
2) Diffuse encephalopathies
3) Coma and unresponsiveness
4) Brain death EEG

VI: Long term monitoring
1) Indications, recording methods
2) Problems of interpretation
3) Activation procedures
4) Cortical localization: extracranial, intracranial
5) Ambulatory EEG monitoring

Evoked Potentials

I. Neurophysiologic processes underlying generation of evoked potentials

II. Pathophysiology of abnormal evoked potentials

III. Evoked potential recording techniques
A. Stimulation, recording montages, amplification, averaging, artifact rejection
B. Peak identification and measurement

IV. Types of evoked potentials and specifics of each modality
A. Visual evoked potentials, brainstem auditory evoked potentials
1. Stimulation techniques
2. Recording montages
3. Components
4. Clinical interpretation
B. Somatosensory evoked potentials
1. Stimulation techniques, upper limb vs. lower limb
2. Recording montages
3. Components
4. Calculation of conduction velocities
5. Clinical interpretation

V. Clinical interpretation of evoked potentials
A. Normal ranges, adult and pediatric
B. Measurement of absolute latencies and calculation of interpeak intervals
C. Comparison of evoked potentials to left- and right-sided stimulation
D. Correlation of clinical question to evoked potential results

VI. Intraoperative monitoring using evoked potentials
A. Effects of anesthesia on evoked potentials
B. Patient serves as his/her own control, looking for changes
C. Types of surgery where evoked potential monitoring is useful

**Instructional Methods and Rotation Specific Information:**
Daily EEG/EP Reading Schedules and Expectations
The Daily EEG/EP reading is the core of the EEG elective experience, and provides the critical experience of EEG interpretation and visual training that cannot be obtained from reading EEG texts.

- Residents are expected to pre-read EEG/EP studies whenever possible.
- Residents are encouraged to commit themselves to a typed EEG/EP interpretation in the EEG database. The EEG reader may later modify this.
- The resident will page the EEG reader of the day to arrange a reading time for that day (preferred method). Please see schedule and pager list below. Alternatively, the resident will place a note on the EEG reader station asking the EEG reader to page the resident when he is reading.
- In addition to daily reading, there is an EEG review session the third Friday of each month from 8-9 am. Attendance at this meeting is expected.
- Dr. Elsas will focus on EP interpretation in the Friday reading sessions.

Important Numbers and Schedules

EEG readers

<table>
<thead>
<tr>
<th>Day</th>
<th>Reader</th>
<th>Pager</th>
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<tbody>
<tr>
<td>Monday</td>
<td>Barry Oken</td>
<td>10486</td>
</tr>
<tr>
<td>Tuesday</td>
<td>David Spencer</td>
<td>14237</td>
</tr>
<tr>
<td>Wednesday</td>
<td>Martin Salinsky</td>
<td>11955</td>
</tr>
<tr>
<td>Thursday</td>
<td>Karen Dellinger</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>Siegward Elsas</td>
<td>11956</td>
</tr>
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Pediatric EEG readers (page to arrange reading time). Residents are encouraged to read pediatric EEGs as often as possible, but a minimum of once per week during the rotation

<table>
<thead>
<tr>
<th>Reader</th>
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<tbody>
<tr>
<td>Colin Roberts</td>
<td>10502</td>
</tr>
<tr>
<td>Amy Kao</td>
<td>15832</td>
</tr>
</tbody>
</table>

EEG Lab

Maxine Heard | 4-8117 |
Structured Reading List

The required text for this rotation is Fisch and Spehlmann’s “EEG Primer” 3rd Ed. You will be given a copy of the text for the duration of the rotation by contacting Carolina Mann (4-5753). Please do not remove Dr. Oken’s copy of this book from the EEG reading area.

Week 1 Part A: Technical Background

Week 2 Part B: Normal EEG

Week 3 Part C: Abnormal EEG

Week 4 Evoked potential readings (Dr. Elsas to provide)