Neurology
Clerkship
Pocket
Syllabus
Neurology Clerkship

Identifying Data

Name: ____________________________
Dates of clerkship: _____/_____/____ to _____/_____/____
Location: ____________________________

Clerkship Website: https://courses.washington.edu/neural

Goals and Objectives

1. Learn and demonstrate an organized approach to interviewing, physical exam, and clinical decision-making in neurology.
2. Encourage self-directed learning.
3. Deliver clear and concise oral presentations.
4. Prepare a clear and concise written document
5. Perform a neurologic exam and distinguish normal from abnormal findings. (Appendices 1 & 2)
6. Localize the likely site in the nervous system that could produce the patients’ symptoms and signs.
7. Formulate a differential diagnosis.
8. Know when to order and how to interpret common tests used in diagnosing neurologic disease.
9. Understand the management principles for common neurologic diseases.
10. (Ideally) Perform a lumbar puncture.

Learning Objectives

Neurology can be taught by emphasizing localization, symptoms, or specific diseases. Each has its pros and cons and so this course will try to combine all three approaches.

This syllabus is to aid in your study of neurology. It is not intended to be all-inclusive, but rather is a minimal understanding expected for graduating medical students. Feel free to dive deeper into an interesting subject, especially if you are trying to work-up or manage a patient. The final exam may contain questions from any of these areas.

Resources to accomplish these learning objectives include general medical and neurology textbooks, the recommended text for this course, didactic lectures, attendings/residents/students, and web based information (referenced).

Names and Numbers

Attending ____________________________ #
Attending ____________________________ #
Chief resident ____________________________ #
Junior resident ____________________________ #
Resident ____________________________ #
Intern ____________________________ #
Intern ____________________________ #
Student ____________________________ #
Other 1. ____________________________ # 6. ____________________________ #
2. ____________________________ # 7. ____________________________ #
3. ____________________________ # 8. ____________________________ #
4. ____________________________ # 9. ____________________________ #
5. ____________________________ # 10. ____________________________ #
Localization of signs and symptoms

Try and think about neurological problems from an anatomical point-of-view. Split the nervous system up into parts and ask yourself, “Could the patient’s symptoms be produced by this part of the nervous system?” You will usually find that this approach can easily eliminate a long differential list. Keep in mind that there are exceptions to every rule in neurology.

<table>
<thead>
<tr>
<th>Anatomy</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain</td>
<td>Motor and sensory</td>
</tr>
<tr>
<td></td>
<td>Language</td>
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<tr>
<td></td>
<td>Visual acuity</td>
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<td></td>
<td>Memory</td>
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<td></td>
<td>Behavior</td>
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<tr>
<td></td>
<td>Consciousness</td>
</tr>
<tr>
<td></td>
<td>Often unilateral</td>
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<tr>
<td>Brain stem</td>
<td>Motor and sensory</td>
</tr>
<tr>
<td></td>
<td>Cranial nerves: diplopia, vertigo, hearing, tongue, swallow</td>
</tr>
<tr>
<td></td>
<td>Consciousness</td>
</tr>
<tr>
<td></td>
<td>Cerebellar</td>
</tr>
<tr>
<td></td>
<td>Often unilateral</td>
</tr>
<tr>
<td>Spinal cord</td>
<td>Motor and sensory</td>
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<tr>
<td></td>
<td>Bilateral symptoms common</td>
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<tr>
<td></td>
<td>Bowel and bladder</td>
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<tr>
<td>Motor neuron</td>
<td>Motor only</td>
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<tr>
<td></td>
<td>Proximal and distal</td>
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<tr>
<td></td>
<td>Slowly progressive</td>
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<tr>
<td></td>
<td>Asymmetric bilateral</td>
</tr>
<tr>
<td></td>
<td>Fasciculations</td>
</tr>
<tr>
<td>Peripheral nerve</td>
<td>Motor and/or sensory</td>
</tr>
<tr>
<td></td>
<td>Usually distal in stocking/glove distribution</td>
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<tr>
<td>Neuromuscular junction</td>
<td>Motor only</td>
</tr>
<tr>
<td></td>
<td>Proximal and distal</td>
</tr>
<tr>
<td></td>
<td>Fatigable weakness and eye involvement in MG</td>
</tr>
<tr>
<td>Muscle</td>
<td>Motor only</td>
</tr>
<tr>
<td></td>
<td>Usually proximal and symmetric</td>
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</tbody>
</table>

**Symptom approach**

Patients present to clinic and emergency room with symptoms more often than with a disease. A differential diagnosis is based on symptoms and then pared down as testing makes things more or less likely.

1. Weakness
2. Numbness or paresthesias
3. Gait disturbance
4. Dizziness
5. Vision loss
6. Diplopia
7. Headache
8. Involuntary movements
9. Acute mental status change
10. Dementia
11. Aphasia
12. Sleep disorder
13. Episodic focal symptoms
14. Urinary incontinence
15. Developmental disorders
**Procedures and specific diseases**

**Procedures**
- Lumbar puncture (observed by)
  1. ____________________________  3. ____________________________
  2. ____________________________  4. ____________________________
- EEG/evoked potentials
- EMG/NCV
- MRI - [http://spinwarp.ucsd.edu/NeuroWeb/Text/br-phys.html](http://spinwarp.ucsd.edu/NeuroWeb/Text/br-phys.html)
- CT

General web sites to find everything below. Other sites listed under specific disease.
- [http://www.emedicine.com/neuro](http://www.emedicine.com/neuro) (Almost any topic is available. Excellent site)
- [http://www.uptodate.com](http://www.uptodate.com)
- [http://www.mayoclinical.com/index.cfm](http://www.mayoclinical.com/index.cfm)

**Movement disorders**
- Tremor
- Parkinson's disease

**Epilepsy/seizure**
- Partial onset
- Generalized onset
- Status epilepticus

**Disorders of vision**
- Patterns of visual loss

**Neuromuscular disease**
- [http://www.neuro.wustl.edu/neuromuscular/](http://www.neuro.wustl.edu/neuromuscular/)
- Motor neuron disease/ALS - [http://www.neuro.wustl.edu/neuromuscular/spinal/als.htm](http://www.neuro.wustl.edu/neuromuscular/spinal/als.htm)
- Peripheral nerve: Guillain-Barre syndrome, Carpal tunnel syndrome, Bell's palsy, Length dependent neuropathy
- Myasthenia gravis
- Myopathy: Polymyositis, Muscular dystrophy

**Dizziness**
- Vertigo - [http://www.wfubmc.edu/neurology/lectures/slcTalks/slcvertigo/index.htm](http://www.wfubmc.edu/neurology/lectures/slcTalks/slcvertigo/index.htm)
- Presyncope
- Dysequilibrium

**Cerebrovascular disease**
- Stroke: Embolic, Lacunar, Transient ischemic attack, Hemorrhagic

**Multiple sclerosis**
- Relapsing-remitting
- Primary progressive

**Head trauma**
- Concussion and post-concussive syndrome
- Subdural and epidural hematoma

**Altered consciousness**
- Delirium
- Coma
- Brain death

**Dementia**
- Alzheimer's
Aphasia
- Fluent (Wernicke's)
- Non-fluent (Broca's)

Headaches - [http://www.upstate.edu/neurology/haas/index.html](http://www.upstate.edu/neurology/haas/index.html)
- Migraine
- Tension
- Cluster
- Subarachnoid hemorrhage
- Giant cell arteritis - [http://www.medinfo.ufl.edu/cme/grounds/bhatti/index.html](http://www.medinfo.ufl.edu/cme/grounds/bhatti/index.html)

Brain tumors
- Primary
- Metastatic

Spinal disorders
- Radiculopathy
- Cervical stenosis
- Lumbar stenosis
- Epidural abscess
- Cauda equina syndrome
- B12 subacute combined degeneration

Infections
- Encephalitis
- Meningitis
- HIV related

Alcohol related disorders
- Delirium tremens
- Wernicke's encephalopathy
- Korsakoff's dementia

Sleep Medicine - [http://www.nhlbi.nih.gov/about/ncsdr/](http://www.nhlbi.nih.gov/about/ncsdr/)
- Sleep apnea
- Restless leg syndrome
- Narcolepsy

Child neurology
- Childhood specific epilepsy
- Enlarging head circumference
- Cerebral palsy

- Depression
- Bipolar disorder
- Conversion disorder

Anatomy web sites
[http://medstat.med.utah.edu/kw/sol/sss/](http://medstat.med.utah.edu/kw/sol/sss/)

Physical exam web sites
[http://courses.temple.edu/neuroanatomy/lab/index.htm](http://courses.temple.edu/neuroanatomy/lab/index.htm) (Video of entire exam)

Quiz yourself
[http://umed.med.utah.edu/neuronet/](http://umed.med.utah.edu/neuronet/) (Reasonable quiz questions)
[http://www.bcm.tmc.edu/neurol/](http://www.bcm.tmc.edu/neurol/) (Cases of the month are challenging)
**Patient Log**

You will be recording each patient encounter by logging in their disease or symptom (inpatient or clinic, your evaluation or just observing). You will submit your patient data online each day. This form is for you to write notes on-site. The online log and instructions on how to record information are at: [http://catalyst.washington.edu/webtools/webq/survey.cgi?user=neural&survey=17](http://catalyst.washington.edu/webtools/webq/survey.cgi?user=neural&survey=17).

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100. ___________________________________________________________
Appendix 1: Neurological Examination

A. Mental and communication status
   1. Education level
   2. Level of consciousness
      Alert    Delirium   Obtunded   Stupor   Coma
   3. Mood and psychomotor activity
   4. Orientation (time, place, person, body parts, left-right, awareness of illness)
   5. Calculation, spelling
   6. Speech function (fluency, comprehension, repetition, naming, reading, writing)
   7. Memory (immediate, short term, long term)
   8. Ability to follow complex commands
   9. Mini-mental status examination (MMSE)  See appendix 2

B. Cranial nerve functions
   1. Olfactory (aromatic smell)
   2. Optic
      a. Acuity (Snellen card, corrected?)
         Example 1: acuity (near, corrected) 20/20 OU
         Notation means normal vision in both eyes
         Example 2: acuity (near, uncorrected) 20/100 OD, 20/50 -2 OS
            In left eye, two of six numbers were missed on the 20/50 line
      b. Fundi (vessels, disc border, cup/disc ratio)
      c. Visual fields
3, 4, 6. Oculomotor, Trochlear, Abducens
   a. Pupillary reaction (light, accommodation, afferent pupillary defect)
      Example 1: PERRLA = Pupils Equal Round Reactive to Light and Accommodation
      Example 2: The right pupil is large with no response to direct or consensual light but will accommodate.
         This example is consistent with a tonic (Adie’s) pupil.
   b. Eye movements
      Example 1: EOMI = ExtraOcular Movements Intact
      Example 2: No abduction of the left eye with gaze left.
         This example is consistent with a left abducens palsy.
   c. Nystagmus
      Example: A right beating nystagmus is seen in all directions of gaze.
      The direction of nystagmus is defined by its fast component.
5. Trigeminal
   a. Muscles of mastication
   b. Sensation of face (test all 3 divisions) and cornea
   c. Sensation of mucous membranes and noxious smell
   d. Jaw jerk
7. Facial
   a. Muscles of facial expression, palpebral fissures
   b. Taste anterior 2/3
8. Acoustic
   a. Cochlear (finger rub, tuning fork)
   b. Vestibular (nystagmus, past pointing)
9, 10. Glossopharyngeal, Vagus
   a. Palate rise to phonation (say “ah”) and gag
   b. Voice and articulation
   c. Taste posterior 1/3
11. Spinal accessory
   a. Sternocleidomastoid
   b. Upper trapezius
12. Hypoglossal
   a. Tongue movement
   b. Bulk

C. Motor function
   1. Strength
      a. Direct testing
         Grades: 0 No muscle contraction
                  1 Trace visual or palpable movement
                  2 Movement with gravity eliminated
                  3 Movement against gravity but not resistance
                  4 Movement against resistance but can be overcome
                  5 Normal

         Example 1: strength 5/5 all muscles
         Example 2:

         |     | delt | bic  | tric | w flex | w ext | grip | interosseous |
         |-----|------|------|------|--------|-------|------|--------------|
         | R   | 5    | 5    | 5    | 5      | 5     | 5    | 5            |
         | L   | 3    | 4+   | 4    | 4      | 3     | 3    | 1            |

         |     | h flex | h ext | quad | ham | f dorsiflex | f plantarflex |
         |-----|--------|-------|------|-----|-------------|---------------|
         | R   | 4+     | 5     | 5    | 5   | 5           | 5             |
         | L   | 2      | 4     | 4    | 4   | 2           | 4             |

      b. Functional testing
         i. Walking on toes and heels
         ii. Deep knee bend
         iii. Hopping on one foot
         iv. Arm drift

   2. Tone
      a. Spasticity
      b. Rigidity (lead-pipe, cogwheel)
      c. Hypotonic or flaccid

   3. Bulk

D. Reflexes
   1. Deep tendon
      Grades: 0 No response
             Tr Reinforcement required
             1 Diminished
             2 Normal, average
             3 Brisker than normal
             4 Clonus

         Use “+ or -” to indicate smaller differences

   2. Abdominal
   3. Babinski
   4. Hoffman
   5. Frontal lobe (glabellar, snout, palmomental)
   6. Other (cremasteric, bulbocavernous)
Example:

E. Sensory function (use sensory maps and draw pictures as needed)
   1. Primary (thalamic) sensation
      a. Light touch
      b. Pain
      c. Temperature
      d. Vibration
      e. Proprioception
   2. Discriminative (cortical) sensation
      a. Stereognosis
      b. Graphesthesia
      c. Two-point discrimination
      d. Point localization
      e. Extinction with double simultaneous stimulation (DSS)
   3. Romberg - evaluation of balance with eyes closed and feet together reflects proprioceptive and touch function in the legs and feet
      Example 1: Light touch, pinprick, and vibration are reduced distally in the hands and feet consistent with a stocking/glove distribution of sensory loss.
      This example would be consistent with peripheral neuropathy.
      Example 2: All left side primary sensory modalities are mildly reduced, and there is extinction on DSS.
      This example would be consistent with right parietal lobe dysfunction.

F. Cerebellar function, station, and gait
   1. Balance on one foot with eyes open
   2. Walking
      a. Wide or narrow base
      b. Normal or reduced arm swing
      c. Tandem gait (heel-to-toe)
      d. Ataxia
   3. Rapid alternating movements (RAM)
   4. Finger-nose-finger (FNF) and heel-knee-shin (HKS) tests
      Example 1: The patient can’t stand still with eyes open or closed, has markedly poor balance on one foot, a wide based ataxic gait, can’t tandem walk, slow RAM, and dysmetria on FNF and HKS.
      This example would be consistent with cerebellar dysfunction.
      Example 2: The patient has a positive Romberg, mildly poor balance on one foot, slightly wide based non-ataxic gait, can take five steps in tandem, normal RAM, and no dysmetria on FNF and HKS.
      This example would be consistent with peripheral neuropathy.
G. Abnormal movements
   1. Tremor (note predominant component)
      a. Rest (Parkinsonian)
      b. Postural
      c. Kinetic (action)
   2. Involuntary movements (dystonia, chorea, tic)
   3. Bradykinesia

H. Meningeal and mechanical signs
   1. Neck stiffness
   2. Brudzinski’s sign
   3. Kernig’s sign
   4. Straight leg raising
   5. Pressure tenderness of bone, muscle, and nerves

I. Vascular status
   1. Auscultation of head and neck
   2. Auscultation of heart
   3. Palpate extremity vessels

Appendix 2: Mini-mental status examination (MMSE)

<table>
<thead>
<tr>
<th>Maximum Score</th>
<th>Orientation</th>
<th>Registration</th>
<th>Attention and Calculation</th>
<th>Recall</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>What is the (year) (date) (day) (month) (season)?</td>
<td>Name 3 common objects (e.g. apple, table, penny)</td>
<td>Spell &quot;world&quot; backwards. The score is the number of letters in correct order: D____ L____ R____ O____ W____</td>
<td>Ask for the 3 objects repeated above. Give 1 point for each correct answer.</td>
<td>Name 2 objects (e.g. pencil, watch)</td>
</tr>
<tr>
<td>5</td>
<td>Where are we: (state) (county) (city) (hospital) (floor)?</td>
<td>Take 1 second to say each. Then ask the patient to say all 3. Give 1 point for each correct answer. Repeat exercise until they have learned all 3 words.</td>
<td></td>
<td></td>
<td>Follow a three stage command: (e.g. &quot;Hold up your right thumb, put out your left leg, and stick out your tongue.&quot;)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Write a sentence.</td>
</tr>
</tbody>
</table>

Total score __________  Normal 25-30
                     Abnormal <25