Practical Neurophysiology

د. هدى جبار البديري

الاسبوع الاول

Case 1

A 32-year-old housewife experienced an attack of blurred vision. She had trouble reading texts and using her phone. She made an appointment with her ophthalmologist but her vision cleared on its own so she was canceled the appointment. Eight months later, the blurred vision returned, this time with other symptoms like “pins and needles” sensation and severe weakness in her legs.
Then she was referred to a neurologist, who ordered a series of test, MRI of the brain revealed signs of multiple sclerosis.

1- How is the action potential propagated in nerves ?
2- What is the effect of myelination on the conduction velocity ?

الاسبوع الثاني

Case 2

A 23-year-old teacher experienced over the last 8 months some “strange” symptoms. She had severe eyestrain when she read for longer than 15 min. She became tired when she chewed her food, brushed her teeth, or dried her hair; and she had extreme fatigue on the job. She could not carry the heavy equipment.
She was evaluated by her physician, who suspected myasthenia gravis. While awaiting the results of a serum antibody test, the physician initiated a trial of pyridostigmine, an acetylcholinesterase inhibitor. She

immediately felt better while taking the drug; her strength returned to almost normal. Meanwhile, the results of the antibody test were positive, confirming the diagnosis of myasthenia gravis.

1- What are the steps involved in neuromuscular transmission ?
2- Explain why severe muscle weakness occurs in myasthenia gravis ?
3- What is the effect of the drug “Pyridostigmine” in this condition ?
4- What is the function of Calcium channels in this process ?

الاسبوع الثالث

1

Case 3

An 8-month-old boy presented with frequent and severe vomiting. At first, his mother noticed an increase in his head size and appeared larger in comparison to the body. He was referred to the pediatrician, who suspected hydrocephalus. The examination revealed macrocephaly, thin scalp with prominent veins, enlargement and bulging of the anterior fontanel with splitting of cranial sutures. Brain MRI showed triventricular hydrocephalus.

1- What is the site of formation of CSF ?
2- What is the pathway of CSF ?
3- What is the site of doing lumber puncture for CSF sampling ?

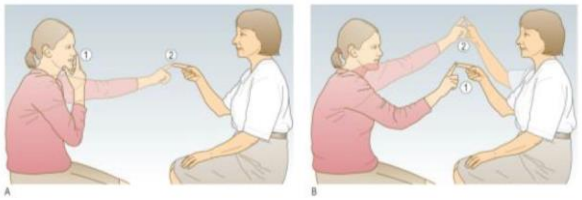
Neurophysiology

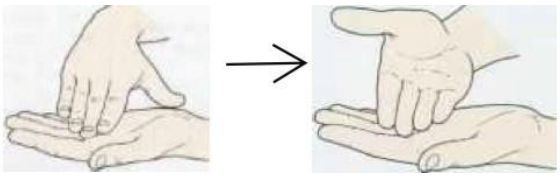
الاسبوع الرابع

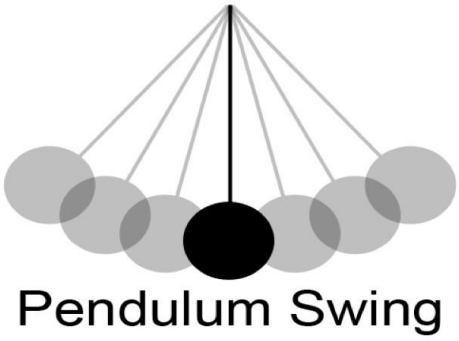
Cerebellum Examination

*** Start from up to down**

What to examine	How to do it
1. Assess the eye movements	
* Check for Nystagmus (Involuntary, rapid, repetitive eye movement)	Ask the patient to follow your finger with their eyes. Move your finger horizontally from one side to another. Finding : Jerky horizontal nystagmus
2. Assess the speech	
* Check for dysarthria (Difficult or unclear articulation of speech , irregular separation of syllables)	Ask the patient to read any sentences Finding : Slurred scanning speech ~> prolonged speech with pauses in wrong places
3. Assess the Upper Limb	
A. Assess the tone	Finding : Hypotonia A state of low muscle tone. Check the tone at the shoulder, elbow and wrist
B. Assess the coordination	

With finger nose test look for : - **Dysmetria :** Inability to measure the distance for reaching specific target (overshooting or undershooting) - **Intention tremor :** A tremor that increases as the target is approached.	(A) Ask the patient to touch the tip of her nose and then your finger. (B) Move your finger from one position to another towards and away from the patient, as well as from side to side. 

With rapid alternating movement test look for : **Dysdiadochokinesia** : inability to do alternate opposite movement rapidly. Eg. Supination and pronation	Ask the patient to tap alternately the palm and back of one hand on the other hand or thigh. * Make sure the patient takes full range of movement while doing the test. * The sound that the patient's hands make alone can help you detect any abnormalities. 
With the rebound test look for : **- Rebound phenomenon**	Incoordination of antagonist and agonist action causes the patient to be unable to stop the arms.
4. Assess the Lower limb	
A. Assess the tone	Finding : Hypotonia A state of low muscle tone.

B. Assess the knee reflex	Finding : Pendular knee jerk. It is a sign of lower limb hypotonia. 
C. Assess the coordination	
Inability to perform the heel-shin test	Ask the patient while lying down to run the heel of one foot over the shin of the other foot. 

5. Assess the Gait	
A. Ataxic gait	Patient is unsteady while standing and staggering while walking
B. Heel-toe walking	Inability to walk heel to toe

الاسبوع الخامس

Growth Hormone-Secreting Tumor: Acromegaly

A 41-year-old woman's sister had notice that her physical appearance had changed—her features had become coarse, her lower jaw was protruding, and her teeth had separated.
They were concerned that she might have a health problem, and one of the colleagues volunteered to have a talk with her.
She disclosed that her menstrual periods had suddenly stopped,5 years ago; that her hat, shoe, and glove size had increased; and that her fingers had enlarged so much that her rings no longer fit. Every night, she had been getting up several times to urinate. She
decided to see a physician for evaluation of these strange symptoms.
Physical examination revealed a woman with coarse facial features, a prominent jaw, and large hands and feet. Her blood pressure was elevated at 170/110. The results of laboratory studies are summarized in the Table

Glucose, fasting	250 mg/dL	(Normal, 70–100 mg/dL)
Growth hormone, fasting	90 ng/mL	(Normal, 2–6 ng/mL)
IGF-I	Elevated	
FSH	Decreased	
TSH	Normal	
T_4	Normal	
Prolactin	Elevated	

Magnetic resonance imaging (MRI) of brain showed a large intrasellar
mass that was pushing upward on the roof of the sella turcica.
The physician diagnosed her with acromegaly, caused by a pituitary adenoma that was secreting growth hormone.

Questions

1. A significant feature of acromegaly, is widening of bones in the skull, hands, and feet. What is responsible for this widening?
2. she did not exhibit increased *linear* growth of her long bones. Why not?
3. What explanation can you provide for the increased fasting blood glucose level?
4. Why did she have increased urination?