**Ministry of Health, Labour and Social Protection of the Republic of Moldova**

**NICOLAE TESTEMITANU STATE UNIVERSITY OF MEDICINE AND PHARMACY**

Facultyof Medicine

**Department of neurology no.1**

**ADULT NEUROLOGY**

**Edition I, translated from Romanian**

*Learning guide for practical work and seminars*

*for the 4th- year students, Faculty of Medicine*

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**ADULT NEUROLOGY**

*Learning guide for practical work and seminars*

*for 4th year students, Faculty of Medicine*

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# INTRODUCTION

Neurology holds an important place among medical disciplines, considering the fact that the pathology of the nervous system enables multiple disorders of the human body functions, often determining the evolution and the prognosis of the disease. It is well known that there are almost no somatic diseases in the pathogenesis of which the nervous system is not involved. In its turn, the somatic diseases cause different conditions of the central and peripheral nervous system, resulting in a large array of somatic neurological syndromes. Knowing the basics of clinical neurology is extremely important for general practitioners, future family doctors and specialists in various fields of medicine. This is determined by the need of knowing the role of the nervous system in the norm and in pathology, being able in consequence to approach especially the diseases of medical-social importance, as are the demyelinating diseases, stroke, peripheral nervous system disorders (radiculopathies, polyneuropathies) and other diseases that are frequently encountered in medical practice. The neurological training within the faculty offers the necessary knowledge background in order to provide medical assistance in case of neurological emergencies: coma caused by cerebral strokes, neuroinfections, craniocerebral traumas, status epilepticus as well as pain syndromes of various origins (trigeminal neuralgia, discogenic radiculopathy, etc.).

Currently, neurology is considered one of the clinical disciplines with an impressive scientific development. At the present stage of the development of medical techniques, paraclinical exploration methods have become an integral part of the diagnostic process of neurological diseases. Therefore, it is necessary a doctor not only to know the methods of neurological examination of the patient, but also to apply appropriate laboratory investigations useful for the localization as well as for the identification of the type of the pathological process of the nervous system.

The main goal of the course is to study the physiological and pathological changes of the nervous system depending on the connection between the neural substrate and the triggering factors, multilateral examination of relevant relationships between internal structures and organization of the nervous system and the law of syndromology and topical diagnosis. Studying the discipline will ensure:

1. acquiring practical skills of examining a neurological patient in order to recognize pathological signs with their semiotic localization assessment and identifying the nature of the pathological process;
2. adequate evaluation of the information obtained from the additional investigations: electrophysiological, radiological, biochemical, immunological etc.
3. making the clinical diagnosis of neurological diseases frequently encountered in the medical practice, which offers the possibility of introducing appropriate treatment and effective prophylactic measures;
4. knowing various alternations of the nervous system within different somatic diseases, their early diagnosis, treatment, prophylaxis and prognosis.

***Theme 1.* THE SUBJECT OF CLINICAL NEUROLOGY. HISTORICAL DATA OF NEUROLOGY. NEUROLOGICAL EXAMINATION. COMPLEMENTARY AND LABORATORY INVESTIGATIONS USED IN NEUROLOGY AND NEUROSURGERY. SENSITIVITY. FORMS AND TYPES OF SENSATION DISTURBANCES. PAIN – A COMPLEX CLINICAL PHENOMENON, NEUROLOGICAL APPROACH**

***Purpose:*** To study the anatomical and physiological features of the sensitivity. To learn the symptoms and syndromes of sensitivity lesion and examination methods

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. Data regarding the history of neurology. Innovations in neurology.
2. Definition of sensitivity.
3. Superficial and deep sensitivity pathways.
4. The semiology of sensitivity disturbances.
5. Forms and types of sensation disturbances.
6. Examination techniques of sensitivity.
7. Sensitive syndromes.
8. Definition of pain and the afferent pathways of pain, clinical aspects of the pain.
9. Antinociceptive pathways.
10. The gate control theory of pain.
11. General principles of pain treatment.
12. The complementary and laboratory techniques used in neurology and neurosurgery.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with sensory disturbances.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied  (CT, MRI, ENG).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** the teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to know the important data regarding the history of neurology
* to know the anatomical and physiological features of the sensitivity
* to know the clinical manifestations of superficial and deep sensitivity disorders
* to apply diagnostic methods (clinical, objective neurological status, paraclinical) of the diseases associated with sensitivity impairment
* to evaluate the results of additional diagnostic investigations in order to appreciate the functional state of sensitivity
* to determine the topical diagnosis of the pathological process based on the sensitivity disturbances
* to evaluate the results of the objective methods of examination of the superficial, deep and complex sensitivity
* to know the complementary and laboratory techniques used in neurology and neurosurgery

**Clinical cases**

**Case no. 1**

A 64-year-old woman complains of a "burning" severe pain in her left hemithorax.

Neurological examination revealed an algic hyperesthesia on the projection of the ThXII dermatomer on the left. In 4 days, bullous eruptions appeared on the same surface where the pain was projected. Radiological and laboratory examinations were within normal limits.

**Indicate:**

A. The type of sensory disturbances.

B. The principle of clinical examination used to detect this type of sensory disturbances.

C. The topical diagnosis (which level and structure of nervous system is affected).

D. The name of the disease.

E. The recommended treatment.

F. The differential diagnosis.

**Case no. 2**

A 53-year-old man reported progressive weakness in the lower extremities over the past 6 months. At the same time he periodically had nausea and vomiting, permanently - anorexia.

Objective examination revealed pallor of the skin and nails, weakness in both lower extremities, brisk (3+) patellar and achilles reflexes, the positive Babinski sign bilaterally, and a selective decreased vibration sense in both legs.

Hyperchromatic macrocytic erythrocytes were detected in the blood smear test. The Shilling test confirmed the diagnosis.

**Indicate:**

A. The type of sensitivity involved in the pathological process.

B. The affected anatomical substrate, which led to vibration sense disturbance.

C. How to examine the vibration sense.

D. The name of the disease.

E. The treatment.

F. The differential diagnosis.

**Case no. 3**

A 23-year-old nurse went to the emergency department for burns on her right hand obtained while working with the autoclave.

Neurological examination revealed a bilateral loss of pain and thermal sensation in the area of CIV-ThI dermatomers and Horner syndrome on the left eye. At the age of 2, the patient was operated for dysraphism of the hard palate.

The diagnosis was confirmed by magnetic resonance imaging.

**Indicate:**

A. The variant and the type of sensory disturbance in this patient.

B. The method of temperature sensation examination.

C. The anatomical substrate of sensory disturbances in this patient.

D. The name of the disease.

E. The differential diagnosis.

***Tema 2.* MOTILITY. THE PYRAMIDAL SYSTEM (CORTICOSPINAL TRACT). CENTRAL MOTOR NEURON SYNDROME, PERIPHERAL MOTOR NEURON SYNDROME. SPHINCTER DISORDERS OF NEUROLOGIC ORIGIN. MOTOR NEURON DISEASE. EMG EXAMINATION: PRINCIPLES AND CLINICAL UTILITY**

***Purpose:*** To study the anatomical and physiological features of the pyramidal system. Checking and consolidating students' knowledge of the motility system. Acquiring practical skills for clinical examination of the motility system. Development of clinical reasoning in making the topical diagnosis of localization of the injuries, based on theoretical knowledge and clinical observations

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. The notion of motor unit and the pathway of the voluntary motility.
2. The notion of paresis and paralysis.
3. Clinical and electrophysiological symptoms of peripheral motor neuron syndrome.
4. Clinical symptoms of central motor neuron syndrome.
5. Nosological entities that are manifested by central motor neuron syndrome and peripheral motor neuron syndrome.
6. Anatomical and functional features and clinical manifestations of central and peripheral type sphincter disorders.
7. The semiology of spinal cord injury in the transverse hemisection at the following levels: upper cervical, cervical intumescence, thoracic, lumbar intumescence, below the lumbar intumescence.
8. Clinical manifestations of total transverse spinal cord injury at the following levels: upper cervical, cervical intumescence, thoracic, lumbar intumescence, below the lumbar intumescence.
9. The definition of motor neuron disease. Clinical manifestations, diagnosis, treatment.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skill lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with motor disturbances.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied.  (ENG, CT, MRI)  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** the teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to be able to define the clinical syndromes affecting the central and peripheral motor neurons
* to differentiate between the damage of the central motor neuron (central paralysis) and the peripheral motor neuron (peripheral paralysis)
* to know the technique of the voluntary motility examination
* to know the semiology of spinal cord suffering at different levels in transverse hemisection (Brown Sequard syndrome) and in full transverse section
* to apply the algorithm of diagnosis of the symptoms and signs of the peripheral motor neuron syndrome and central motor neuron syndrome in assessing patients with motility disorders
* to assess correctly the management of peripheral and central type sphincter disorders
* to know the etiology, clinical manifestations, diagnosis and treatment of motor neuron disease
* to define the principles and the utility of the electrophysiological examination by electromyography (EMG) in the diagnosis of nervous system diseases

**Clinical cases**

**Case no. 1**

A 68-year-old man, who had been suffering from severe low back pain all the time during two weeks, developed a weakness in his legs with impossibility to move. At the same time, he lost the ability to control urination and defecation.

Neurological examination revealed a lower spastic paraparesis, accompanied by loss of superficial and deep sensation below L1.

Per rectum examination of the prostate found the presence of solid and hard nodules.

Spondylography of the thoracic region found a hyperintensity of the Th11 and Th12 vertebrae. An increased alkaline and acid phosphatase level was detected.

Skeletal bone scintigraphy and magnetic resonance examination of the spine and thoraco-lumbar spinal cord contributed significantly to the diagnosis.

**Indicate:**

**A.** The clinical signs of spastic paraparesis.

**B.** The manifestations of the conductive type of sensory disturbances.

**C.** The mechanism of sphincter disorders.

**D.** The location (topographic) diagnosis.

**E.** The clinical and differential diagnoses.

**Case no. 2**

A 35-year-old woman complained of a pain in the left half of her spine and weakness in her left leg for a period of one year. Six months before the hospitalization, she was treated by the family doctor for the diagnosis of „spinal spondilosis”. One month before the hospitalization, she was treated for pyelonephritis and she has had urinary incontinence since then.

Neurological examination revealed moderate spastic monoparesis of the left leg, foot clonus on the left, decreased vibration and myoarthrokinetic (position) sense in the left leg starting from the inguinal line, decreased pain and temperature sensation, starting from the level of ThVII on the right.

Magnetic resonance imaging confirmed the diagnosis.

**Indicate:**

**A.** The manifestations of spastic monoparesis of the left leg.

**B.** The name of the topographic spinal cord injury syndrome in this patient.

**C.** The location of the pathological process.

**D.** The differential diagnosis.

**Case no. 3**

A 38-year-old trumpeter mentioned difficulties with voluntary lip movement, swallowing disturbances for solids and liquids during the last two months.

Neurological examination revealed weakness, hypotrophy, and fasciculations of the muscles of the face, tongue, sternocleidomastoid muscles, and bilateral trapezoid; dysarthria; hyperreflexia on the hands and feet, bilateral positive Babinski sign.

Brain and cervical magnetic resonance examination, cerebrospinal fluid analysis and other laboratory tests were within normal limits.

The electromyographic examination with needle-electrode contributed essentially to making the diagnosis.

**Indicate:**

**A.** The anatomical substrate of the disease.

**B.** The described clinical syndromes.

**C.** The name of the disease.

**D.** The typical manifestations detected at the electromyographic examination with needle electrode, specific to this disease.

**E.** The prognosis.

**F.** The drug that is thought to slow the progression of the disease.

**G.** The differential diagnosis.

***Theme 3.* MOTILITY. EXTRAPYRAMIDAL SYSTEM. HYPERTONIC-HYPOKINETIC SYNDROME. PARKINSON’S DISEASE. HYPOTONIC-HYPERKINETIC SYNDROME. TICS. CEREBELLUM: ANATOMICAL AND PHYSIOLOGICAL PRINCIPLES OF CONSTITUTION, CLINICAL EXAMINATION, CLINICAL MANIFESTATIONS OF IMPAIRMENT. ATAXIAS**

***Purpose:*** To study the anatomical and functional features of the extrapyramidal system and the cerebellum; to learn the symptoms and syndromes affecting the extrapyramidal system and the cerebellum, the examination methods of the extrapyramidal system and the cerebellum

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. Anatomical and physiological features of the extrapyramidal system.
2. The notion of hypertonic-hypokinetic syndrome.
3. The notion of hyperkinetic-hypotonic syndrome.
4. Semiology of involuntary movements: (Parkinsonian, attitude, action tremor), chorea, athetosis, dystonia, iatrogenic dyskinesias, tics, facial hemispasm, myoclonus, hemibalism.
5. Parkinson`s disease: pathogenesis, clinical manifestations, treatment.
6. Sidenham chorea: etiology, clinical manifestations, treatment.
7. Huntington chorea. Etiology, clinical manifestations, treatment.
8. Tics.
9. Cerebellum: anatomical and physiological principles of the constitution, clinical examination, clinical manifestations.
10. Spinocerebellar ataxias: clinical manifestations, diagnosis.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with Parkinson’s disease or hypotonic-hyperkinetic syndrome or cerebellar disorders.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the topic studied.  (ENG, CT, MRI)  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to define the anatomical and physiological features of the extrapyramidal system
* to define the hypertonic-hypokinetic syndrome and the hyperkinetic-hypotonic syndrome
* to know the semiology of involuntary movements: tremor (Parkinsonian, of attitude, action tremor), chorea, athetosis, dystonia, iatrogenic dyskinesias, tics, facial hemispasm, myoclonus, hemibalism
* to know the pathogenesis, clinical manifestations, treatment of Parkinson disease
* to know the etiology, clinical manifestations, treatment of Sidenham chorea, tics, Huntington chorea.
* to define the anatomical and physiological principles of constitution of the cerebellum
* to know the semiology of cerebellar damage: ataxia, dysmetria, asinergia, adiadochokinesis, intention tremor, language and writing disorders
* to know the methodology of the clinical cerebellum examination
* to know the semiology of gait disorders and the clinical features of topical and etiological diagnosis

**Clinical cases**

**Case no. 1**

A 50-year-old teacher complains of writing difficulties and shaking of his right hand for the past two months.

Neurological examination determined the presence of hypomimia, the resting tremor of the right hand and slightly of the left hand, as well as walking with small steps and forward leaning the body.

The computed tomography examination did not show any substantial abnormalites.

**Indicate:**

**A.** The lesion of the nervous system that could lead to tremor in the hand.

**B.** The name of such type of gait.

**C.** The tissue density units used for measurment in computed tomography examination.

**D.** The name of the disease.

**E.** The differential diagnosis.

**Case no. 2**

A 39-year-old man complains of involuntary movements in the upper extremities, trouble walking.

Neurological examination revealed choreic hyperkinesia of the mimic muscles and hands, gait with specific deviations of the body trunk, slowness in reasoning, decreased attention.

Computer tomography of the brain found the dilation in the form of a "butterfly" of the lateral cerebral ventricles.

The results of laboratory tests and other complementary investigations were within normal limits.

The patient's father died at the psychiatric clinic at the age of 45.

**Indicate:**

**A.** The definition of hyperkinesis.

**B.** The nerve responsible for innervating the mimic muscles.

**C.** The name of the disease.

**D.** The total number of cerebral ventricles.

**E.** The differential diagnosis.

**Case no. 3**

Patient B., 12 years old, who suffers from chronic tonsillitis, began to complain of headaches; parents and teachers noticed strange gestures and grimaces, bizarre movements of the fingers. These movements were particularly aggravated by emotions and disappeared during sleep.

Objective examination: Diffuse muscular hypotonia. Decreased deep tendon reflexes, S=D. Bilateral positive Babinski sign. At rest, spontaneous, short movements are observed, sometimes of large amplitude in the extremities, illogical, in different muscle groups, at first on the face and hands, exaggerated by mental effort.

General blood test: leukocytosis with lymphocytosis.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The name of the involuntary movements observed in this patient.

**C.** The therapeutic measures.

**D.** The complementary investigation plan.

**E.** The differential diagnosis.

***Theme 4.* THE BRAINSTEM AND THE CRANIAL NERVES: ANATOMICAL AND PHYSIOLOGICAL PRINCIPLES OF CONSTITUTION, CLINICAL EXAMINATION, CLINICAL SIGNS AND SYMPTOMS OF IMPAIRMENT. ALTERNATING SYNDROMES: DEFINITION AND TOPOGRAPHIC CLASSIFICATION. BULBAR AND PSEUDOBULBAR SYNDROME. VERTIGO. FACIAL NEURITIS/NEUROPATHY. TRIGEMINAL NEURALGIA**

***Purpose:*** To study the anatomical and functional features and lesions of the brainstem and cranial nerves. Evaluation and consolidation of students' knowledge about the anatomy of cranial nerves. To learn the technique of the clinical examination of the function of the cranial nerves. Development of clinical reasoning in making the diagnosis of localization based on theoretical knowledge and clinical observations

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. Anatomical and physiological features of the brainstem.
2. Criteria of classifying the cranial nerves.
3. Generalities of the constitution and functioning of the sensitive-sensory cranial nerves.
4. Generalities of the constitution and functioning of the motor cranial nerves.
5. Semiology of cranial nerve injury.
6. General features of the brainstem alternating syndromes.
7. Clinical manifestations of the bulbar and pseudobulbar syndromes.
8. Clinical manifestations and treatment principles of benign paroxysmal position vertigo.
9. Clinical manifestations and treatment principles of facial neuritis and neuropathy.
10. Clinical manifestations and treatment principles of trigeminal neuralgia.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10. | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theory and assessment of students’ understanding.  **C**ase presentation of two patients with disorders of cranial nerve function.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied.  (CT, MRI, ENG)  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to know the algorithm of diagnosing the signs and symptoms of cranial nerve damage
* to apply the knowledge accumulated by the students at the preclinical subjects about the anatomy and physiology of the cranial nerves
* to know the technique of the clinical examination of the function of the cranial nerves
* to identify correctly and to know the management of the bulbar and pseudobulbar disorders.
* to know the definition and the topographic classification of the alternating syndromes
* to know the general notions of vertigo
* to know the clinical manifestations and the treatment principles of: benign paroxysmal position vertigo, neuritis/facial neuropathy, trigeminal neuralgia
* accumulation of personal clinical experience regarding the pathology of the cranial nerves by the students

**Clinical cases**

**Case no. 1**

A 42-year-old woman complained of headache located in the right frontal region for the past three years. Eight months before the hospitalization, the patient's husband noticed that "the right eye became larger than the left one." Three months ago, the patient noticed left-handed diplopia.

Neurological examination found exophthalmos of the right eye, optic papillary stasis on the right, partial limitation of motility of the right eyeball up, down and medial, mydriasis on the right, lazy photoreaction of the right pupil, as well as slowing of the pupillary accommodation reaction, dicrease of the right corneal reflex.

Conventional craniography found an increased density of the right orbit and a reduction in the size of the right sphenoid bone. The diagnosis was confirmed by computed tomography examination.

**Indicate:**

A. The examination method used to detect optical papillary stasis.

B. The cranial nerve that is responsible for the movement of the eyeball up, down and medially.

C. The cranial nerve which is a part of the afferent portion of the pupilar light reflex arc (photoreaction).

D. The cranial nerves involved in the corneal reflex.

E. The topographic (topical) diagnosis.

F. The differential diagnosis.

**Case no. 2**

A 54-year-old patient B., sought medical care due to a pain in the right side of his face. She is considered to be ill for 15 years. The attacks were very rare before that.

The last 6 months the attacks were repeated with a frequency several times a day. The pain appears suddenly, has an acute burning character, lasts up to 15 seconds. The pain usually occurs during speech, chewing, swallowing, washing the face, touching the right nostril. The pain begins in the region of the right upper lip and spreads to the upper teeth and right zygomatic bone. During the paroxysm of pain, the spasm of the mimic muscles of the face on the right is observed, the skin on the right hemiface turns red.

During the free fit period the patient feels pain on palpation of the right infraorbital region, skin hyperaesthesia in the right maxillary region. The corneal reflexes are present, equal. The function of other cranial nerves is preserved.

**Indicate:**

A. The preliminary diagnosis.

B. The name of the trigeminal trigger points.

C. The therapeutic measures.

D. The complementary investigation plan.

E. The differential diagnosis.

**Case no. 3**

A 62-year-old patient, retired, consulted the doctor due to a violent pain in the throat with irradiation in the right ear and mandibular teeth. The pain appears in the form of short paroxysms, several times a day during meals or speech.

On examination: Facial sensitivity is not disturbed, including in the Zelder zone areas.

The palpation of the emergent points of the trigeminal nerve branches on the face is not painful. The tonsils are of normal size. The pressure on the root of the tongue caused a painful attack, which lasted 5-7 seconds.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The meaning of the Zelder zone areas.

**C.** The therapeutic measures.

**D.** The complementary investigation plan.

**E.** The differential diagnosis.

**Case no. 4**

A 30-year-old man, an abusive smoker, goes to the family doctor because in the morning his wife noticed that his face is "crooked". He has the feeling that the face on the right is bigger. During breakfast he noticed that the tongue on the right did not feel the taste of the food, during chewing the contents of the oral cavity tended to appear on the right side of the oral cavity.

Neurological examination: asymmetry of the face with flattened right nasolabial fold and drooping corner of the mouth on the right. The right eyelid fissure is larger than the left. Positive Bell sign on the right. Loud sounds in the right ear cause unpleasant sensations in the patient. Hyperlacrimation in the right eye.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** Bell's sign manifestations.

**C.** The therapeutic measures.

**D.** The complementary investigation plan.

**E.** The differential diagnosis.

***Theme 5.* AUTONOMIC NERVOUS SYSTEM AND THE LIMBIC-RETICULAR COMPLEX. CLINICAL SIGNS, SYMPTOMS AND SYNDROMES OF IMPAIRMENT. HEADACHE: CLASSIFICATION, DIAGNOSTIC CRITERIA OF PRIMARY HEADACHES**

***Purpose:*** To study the anatomical and physiological features of the autonomic nervous system. To learn the symptoms and syndromes of damage and methods of examination of the autonomic nervous system.

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. Anatomical and clinical physiological features of the sympathetic and parasympathetic autonomic nervous system; suprasegmental and segmental structures of the autonomic nervous system.
2. Classification of the autonomic disorders.
3. Methods of investigation of the autonomic nervous system: clinical and instrumental.
4. Peripheral autonomic neuropathy. Etiological factors and clinical aspects.
5. The reticular formation of the brainstem.
6. Anatomical and physiological features, syndromes of reticulate formation damage: narcolepsy, idiopathic hypersomnia and dyssomnias.
7. Anatomical and physiological features of the hypothalamus and hypothalamic dysfunction syndromes.
8. Panic attacks, diagnostic criteria, treatment.
9. Headache: classification, diagnostic criteria of primary headache.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**opic presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theory and assessment of students’ understanding.  **C**ase presentation of two patients with primary headache or autonomic dysfunction.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied.  (CT, MRI, ENG)  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to know the anatomical, physiological features of the autonomic nervous system
* to know the classification of the autonomic disorders
* to know the clinical manifestations of the suprasegmental and segmental autonomic nervous system damage
* to apply diagnostic methods (clinical, objective neurological status, paraclinic) of the autonomic nervous system disorders
* to evaluate the results of additional diagnostic investigations in order to evaluate the functional status of the autonomic nervous system
* to evaluate the results of the applied diagnostic methods of the autonomic nervous system disorders
* to evaluate the evolution of the physiological processes and the etiology of the pathological processes of the autonomic nervous system
* to evaluate the role of the autonomic nervous system in the pathogenesis of psychosomatic diseases
* to know the notion of headache: the classification and the diagnostic criteria of primary headaches.

**Clinical cases**

**Case no. 1**

A 31-year-olds female patient frequently suffered from angina (tonsillitis) in childhood. At the age of 20 she suffered rheumocarditis. She frequently complained of headaches, heart palpitations accompanied by fear of death since the age of 25. She lost his appetite and lost more than 10 kg. The menstrual cycle changed, menstruation was of different duration, irregular.

Over the past year, 1-2 times a month during headache attacks and heart palpitations the blood pressure increased up to the values of 160/100 mm Hg. The attacks last 20-30 minutes, sometimes - up to 1 hour, and they end with polyuria, chills. After fit, the patient becomes apathetic and indisposed throughout the day, has no desire to do anything.

**Indicate:**

**A**. The preliminary diagnosis.

**B.** The names of the attacks that the patient suffers from.

**C.** The therapeutic measures.

**D.** The complementary investigation plan.

**E.** The differential diagnosis.

**Case no. 2**

Patient M., a 21-year-old student, complains of severe headache. Headache attacks occurred about five years ago. They usually begin in the right frontotemporal region, intensify rapidly and spread to the entire right hemicrania, including the eyeball, are accompanied by repeated vomiting. The patient's condition improves by washing her head and sleeping. The fits last from 6 to 12 hours. The patient's mother and older sister suffer from headaches too.

On examination: pale, the patient is lying with her eyes closed, daylight and eyeball movements intensify the headache. Rhythmic pulse, 90 beats per minute. There are no other neurological focal symptoms and no meningeal signs. Blood pressure 110/70 mm Hg.

**Indicate:**

**A**. The preliminary diagnosis.

**B.** The therapeutic measures.

**C.** The complementary investigation plan.

**D.** The differential diagnosis.

**Case no. 3**

Patient D., 35 y.o., was admitted to the neurology department with complains of violent throbbing pain in the left half of her head, nausea.

She has had a headache since she was 15 years old. The headache appears as an attack, having the same type: she feels darkness in front of the eyes, sometimes up to amaurosis lasting a few seconds, then "rainbow" circles appear in front of the eyes, she sees only half of the surrounding objects. The fit ends with a violent headache, sometimes with vomiting.

On examination: the patient is lying on her back with her eyes closed, her skin is pale. Blood pressure 140/75 mm Hg. Pulse 86 beats per minute. The movements of the eyeballs are painful, the convergence is diminished. No other neurological signs.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The definition of amaurosis.

**C.** The complementary investigation plan.

**D.** The therapeutic measures.

**E.** The list of diseases used for the differential diagnosis.

**Case no. 4**

A 55-year-old man, a worker at the construction site, consulted a doctor for the headache fit in the frontal region on the right with the character "as if an electric current passes and burns me". He reports that he had two attacks a day last week. Each crisis lasts about an hour. The patient noticed that during the crisis there is tearing and redness of the right eye, as well as a congestion of the nostril on the same side. The neurological examination reveals the Claud Bernar-Horner sign on the right, slightly manifested.

**Indicate:**

**A.** The presumptive diagnosis.

**B.** The signs of Claud Bernar-Horner syndrome.

**C.** The therapeutic measures.

**D.** The complementary investigation plan.

**E.** The list of diseases used for the differential diagnosis.

***Theme 6.* INTRODUCTION TO CLINICAL NEUROPSYCHOLOGY. THE CEREBRAL CORTEX. SIGNS, SYMPTOMS AND SYNDROMES OF AFFECTION. DEMENTIAS. MAGNETIC RESONANCE INVESTIGATION: PRINCIPLES, CLINICAL VALUE**

***Purpose:*** To study the anatomicaland physiological features of the cortical analyzers, the superior functions of the cerebral cortex (language, praxis, gnosis, writing, calculation, etc.) and signs of impairment; to learn the methods of examining the superior cerebral functions in order to evaluate correctly the clinical diagnosis and to administer the appropriate etiopathogenic therapy

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. Cortical analyzers and signs of damage of the cortical analyzers.
2. The main functions of the cerebral cortex (language, praxis, gnosis, writing, calculation, etc.).
3. Signs of cortical analyzers impairment, major syndromes: aphasia, apraxia, agnosia.
4. Localization of cortical analyzers of taste, smell, hearing, vision.
5. Clinical methods for examining the cortical analyzers.
6. Clinical neuropsychology and changes in intellectual, perceptual, memory and personality abilities that may occur in organic brain lesions.
7. Vascular and degenerative dementia, clinical manifestations, differential diagnosis and treatment.
8. Principles and clinical value of the magnetic resonance examination.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

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| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with signs of impairment of cortical analyzers.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied (CT, MRI, ENG).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any last questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to know the cortical analyzers and to evaluate the signs of impairment of the cortical analyzers
* to know the superior functions of the cerebral cortex (language, praxis, gnosis, writing, calculus, etc.) and the signs of their impairment
* to define aphasia
* to define agnosia
* to define apraxia
* to define amnesia
* to know the clinical methods of examination of the cortical analyzers
* to know the concepts of clinical neuropsychology and to analyze the changes in the intellectual, perceptual, memory and personality abilities that may occur in organic brain lesions
* to apply methods of examination of superior brain functions in order to make the correct clinical diagnosis and to administer the appropriate etiopathogenic treatment
* to know the concept of vascular and degenerative dementia, clinical manifestations, differential diagnosis and treatment
* to define the principles and clinical value of the magnetic resonance examination

**Clinical cases**

**Case no. 1**

A 65-year-old woman was hospitalized due to memory and mental function disorders with periodic episodes of acute disorientation in time and space, the symptoms mentioned by her relatives the last three years. Three months before the hospitalization, the patient lost ability to self-manage, requiring permanent external help, she had urinary incontinence.

Neurological examination found a severe disorientation in time and space, mixed aphasia, apraxia, positive oral automatism reflexes, positive grasping reflex on the right, exaggerated deep tendon reflexes on the hands and feet, more manifested on the right.

Magnetic resonance imaging found severe dilation of the cerebral ventricles and diffuse atrophy of the cerebral cortex.

**Indicate:**

**A.** Define the clinical neurological syndrome including the signs of oral automatism.

**B.** The grasping reflex examination.

**C.** The name of the disease.

**D.** The differential diagnosis.

**Case no. 2**

A 72-year-old man had a severe bitemporal headache and a slight weakness in his right hand and forearm after physical exercise. The next morning the patient's wife found him unable to speak, with reduced active movements in the right extremities.

The neurological examination detected a motor aphasia, the patient keeping the conversation through "yes - no" gestures. Objectively, there was a mimetic paresis of the central type on the right, hemiparesis on the right (severe in the hand, moderate in the leg), decreased vibration sense on the right.

The diagnosis was confirmed on the basis of Doppler ultrasonography of the cervicocerebral vessels and computed tomography angiography of the brain.

**Indicate:**

**A.** The manifestations of motor aphasia.

**B.** The manifestation of the central type of mimetic paresis.

**C.** The location (topographic) diagnosis.

**D.** The name of the disease.

**E.** The list of diseases used for the differential diagnosis.

**Case no. 3**

A 28-year-old woman with rheumatic valvulopathy and atrial fibrillation consulted a doctor for a sudden onset of thedeficit of left half of the visual field and an acute occipital headache.

Objective examination revealed a homonymous left hemianopsia with intact pupillary photoreaction.

Brain MRI confirmed the diagnosis.

**Indicate:**

**A.** The light reflex arc.

**B.** The manifestations of homonymous hemianopsia.

**C.** The location (topographic) diagnosis.

**D.** The name of the disease.

**E.** The list of diseases used for the differential diagnosis.

***Theme 7.* EXAMINATION OF THE UNCONSCIOUS PATIENT. COMA. VEGETATIVE STATE, AKINETIC MUTISM, LOCKED-IN SYNDROME, PSYCHIC AREACTIVITY. CEREBRAL DEATH. COMPUTER TOMOGRAPHY EXAMINATION: PRINCIPLES, CLINICAL VALUE**

***Purpose:*** To study the anatomical and physiological features of consciousness and consciousness disorders. Understanging clinical manifestations, examination algorithm, diagnostic methods and management of comatose and pseudocomatose conditions

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. Definition of coma. Etiopathogenesis of comas.
2. Classification of comas.
3. Differential diagnosis of neurogenic and metabolic coma.
4. Clinical examination of the patient without consciousness. Glasgow scale.
5. Paraclinical diagnosis of comatose states.
6. Principles of treatment of comatose states.
7. Pseudocomatose states: definition, causes, pathological physiology of vegetative status, akinetic mutism, locked-in syndrome.
8. Brain death.
9. Examination by Computer Tomography: principles, clinical value.

**Recommended literature:** **A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

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| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with consciousness disturbances.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied.  (CT and clinical scores - Glasgow scale).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* + to define the normal and modified state of consciousness
  + to know the anatomical substratum of consciousness
  + to know the etiopathogenetic mechanisms of coma
  + todemonstrate skills of examining the unconscious patient
  + to apply the information obtained to differentiate between different states of consciousness disorder
  + to interpret the results of imaging and laboratory investigations in the diagnosis of comatose states
  + to understand the usefulness of the Glasgow scale in assessing consciousness
  + to interpret the results of the Glasgow scale
  + to know the treatment principles of comatose states according to their etiologies
  + to know the protocol used for the diagnosis of brain death
  + to have notions of medical ethics in the context of communicating the diagnosis of brain death
  + to know the principles and indications of the examination by computed tomography
  + to interpret the results of investigations by computed tomography

**Clinical cases**

**Case no. 1**

Patient D., 59 years old, suffers from diabetes for 19 years, had hyperglycemic and hypoglycemic crises, for which she was administering additional insulin or dietary sugar. The patient controled blood sugar on her own, ignored medical examination. The doctor was called urgently.

Objective examination: the state of consciousness is missing. Generalized tonic seizures alternate with chills. Frequent, shallow breathing. Heavy sweating. Narrow pupils, photoreaction is missing. Deep tendon reflexes are absent. Negative meningeal, pathological signs.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The determination of the crisis type.

**C.** The therapeutic measures.

**D.** The complementary investigation plan.

**E.** The list of diseases used for the differential diagnosis.

**Case no. 2**

Patient P., aged 82, participant in World War II, after a severe craniocerebral trauma mentioned a stable increase in blood pressure. The last 5-6 years of drug therapy, sanatorium treatment and other measures have contributed to the decrease of blood pressure only up to 180/100 mm Hg. He frequently complains of diffuse headache, noise in the head. He is impulsive, excitable, in a state of affection he becomes brutal, uncontrollable, even aggressive. During a family quarrel he suddenly fell, lost consciousness, vomited, had tonic convulsions in his hands and legs, involuntary urination.

Objective examination: scarlet-red face, rare Ceyne-Stokes breathing, pulse of 120 beats per minute, blood pressure 220/100 mm Hg. Narrow pupils, reaction to light is missing. His right cheek "smokes a pipe." Spontaneous movements are not observed in the left extremities, pathological synkinesias are observed in the right hand. Periodically, stiffness is installed by decerebration, after which breathing worsens, perspiration increases. Body temperature - 39 C.

**Indicate:**

**A.** The preliminaryd iagnosis.

**B.** The location (topographic) diagnosis.

**C.** The manifestations of Ceyne-Stokes respiration.

**D.** The definition of coma.

**E.** The clinical manifestation of decerebration and its cause.

**F.** The first medical maneuvers.

**G.** The list of diseases used for the differential diagnosis.

**Case no. 3**

Patient M., aged 59, was hospitalized in the neurological ward due to loss of consciousness. He is known to have suffered from hypertension for many years.

Objective examination: severe general condition, coma. Stuttering breathing, followed by Biot-type breathing. Anisocoria D> S. Negative doll’s eyes test. Bilateral pharyngeal reflex abolished. Diffuse muscle hypotonia. Osteotendinous reflexes invigorated predominantly on the right. Bilateral positive Babinski sign. Negative meningeal signs. Blood pressure 140/100 mm Hg. Pulse 110 beats per minute, rhythmic.

**Indicate:**

**A.** The presumptive diagnosis.

**B.** The manifestations of Biot-type respiration and its causes.

**C.** The meaning of a negative doll's eyes test response.

**D.** The first medical gestures.

**E.** The complementary investigation plan.

**F.** The list of diseases used for the differential diagnosis.

**Case no. 4**

Patient L., aged 26, was hospitalized in an emergency room without consciousness, periodically vomiting. The disease started today with generalized convulsive syndrome.

The patient works at a metal smelting factory with a gas burner, which hose was defective. The patient suddenly began to complain of headaches, "blows inside the skull", blurry vision and lost consciousness.

Objective examination: frequent breathing, vomiting, pulse 110 beats per minute of poor filling. BP 90/60 mm Hg.

Stuporous, diffuse muscular hypotonia, diminished osteotendinous reflexes. Bilateral positive Babinski sign. Kernig sign and slightly identified occipital stiffness. During the clinical examination he developed a generalized tonic-clonic seizure.

**Indicate:**

**A.** The presumptive diagnosis.

**B.** The type of coma: primary (cerebral) or secondary (metabolic).

**C.** The therapeutic measures.

**D.** The complementary investigation plan.

**E.** The list of diseases used for the differential diagnosis.

***Theme 8.* CEREBROVASCULAR DISEASES. EPIDEMIOLOGY, RISK FACTORS, CLASSIFICATION. ISCHEMIC STROKE. ACUTE TREATMENT, PRIMARY AND SECONDARY PROPHYLAXIS**

***Purpose:*** To study the risk factors that lead to strokes. Learning the clinical manifestations, the algorithm for examining and sorting patients with stroke, paraclinical diagnostic methods and treatment principles in acute ischemic stroke in and out of the therapeutic window

***Duration of the practical work / seminar:*** *225 minutes.*

**Questions for individual preparation**

1. What is cerebrovascular disease?
2. What are the risk factors for cerebrovascular disease?
3. What are the features of cerebral vascularization and clinical vascular syndromes?
4. What is the ischemic cascade and the penumbra?
5. What are paraclinical and laboratory investigations in ischemic stroke?
6. What is the acute treatment of ischemic stroke?
7. How is secondary prophylaxis performed in ischemic stroke?
8. What are the principles of neurorecovery after a stroke?

**Recommended literature: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
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| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with ischemic strokes and risk factors, demonstration of NIHSS score.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied (CT, CT angiography, MRI, Doppler Ultrasonography).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* + to define stroke and its types
  + to define non-modifiable and modifiable risk factors and their significance for stroke
  + to know the causes of the stroke
  + to know the vascularization of the brain and the self-regulatory mechanisms
  + to know the clinical manifestations of the stroke
  + to demonstrate abilities to identify disorders of motility, sensitivity, cranial nerves and higher cognitive functions in the patient with stroke
  + to interpret the imaging changes of the stroke on the images by computed tomography and magnetic resonance imaging
  + to know the principle of the method by Doppler Ultrasonography and its significance for a patient with cerebrovascular pathology
  + to define the notion of “therapeutic window” and its significance in the management of the patient with acute stroke
  + to understand the usefulness of the NIHSS score in assessing the severity of stroke
  + to know the principles of intravenouse and mechanical thrombolysis, indications and contraindications of procedures
  + to make an optimal decision during the acute period of the stroke and to know the management at the pre- and intra-hospital stage
  + to demonstrate communication skills with the patient in order to explain the cause of the stroke, the risk factors and the ways to influence them
  + to know the principles of neurological recovery of the patient with stroke
  + to prescribe drugs for the primary and secondary prophylaxis of cerebrovascular diseases

**Clinical cases**

**Case no. 1**

A 69-year-old man complained of periodic weakness in his right extremities lasting 15 minutes to 4 hours in the last six months. The day before the hospitalization the patient mentioned a worsening of visual acuity in the left eye, which appeared and progressed within four hours. On the same evening, the weakness in the right extremities reappeared, which increased and persisted until the hospitalization in the neurology department. The patient suffers from high blood pressure and diabetes.

The objective examination found a narrowing of the retinal vessels, the pallor of the left optic nerve papilla, a yellow-green spot in the region of the left macula, a 20% reduction in visual acuity of the left eye, a concentric narrowing of the visual field of the left eye. In addition, mimic paresis of the central type on the right could be observed, a moderate right hemiparesis with a positive Babinski sign.

Complementary examinations by three-dimensional Doppler ultrasonography, computer-tomo-angiography contributed essentially to making the diagnosis.

**Indicate:**

**A.** The definition of periodic hemibody weakness attacks.

**B.** The manifestations of central type mimetic paresis.

**C.** The Doppler ultrasonography principle.

**D.** The name of the disease.

**E.** The list of diseases used for the differential diagnosis.

**Case no. 2**

A 57-year-old woman suddenly had an unpleasant sound in her right ear, dizziness, pain in her right face.

Neurological examination revealed horizontal nystagmus to the right, partial upper eyelid ptosis on the right, miosis on the right, perceptual hearing loss on the right, intentional tremor on the index finger and heel-knee test on the right, hemihypoaesthesia on the right face, falling to the right in the Romberg position.

Clinical examination was confirmed by Doppler ultrasonography and cerebral magnetic resonance imaging.

**Indicate:**

**A.** The definition of vertigo.

**B.** The definition of miosis.

**C.** The manifestations of perceptual hearing loss.

**D.** The name of the disease.

**E.** The list of diseases used for the differential diagnosis.

**Case no. 3**

A 69-year-old left-handed man suddenly lost strength in his left leg, tripped and fell.

Neurological examination found confusion, disorientation, speech disorder, flaccid paresis of the left foot (positive lower Barré test on the left), slightly manifested weakness of the left hand, positive Babinski sign on the left.

Three-dimensional Doppler ultrasonography and cerebral magnetic resonance imaging confirmed the diagnosis.

**Indicate:**

**A.** The structure within the nervous system involved in the pathological process.

**B.** The localisation of the cortical motor speech analyzer.

**C.** The examination method of the lower Barré sign.

**D.** The name of the disease.

**E.** The list of diseases used for the differential diagnosis.

**Case no. 4**

A 39-year-old woman, who suffered from recurrences of sinusitis, usually located on the right, briskly developed hyperthermia, headache in the frontal region on the right and edema of the periorbital region on the right.

The neurological examination: edema of the periorbital tissues on the right, chemosis, ptosis, exophthalmos and complete ophthalmoplegia on the right. In addition, the abolition of the corneal reflex on the right, venous stasis on retinoscopy of the right eye were detected.

Analysis of the cerebrospinal fluid found the meningitis syndrome with 100% neutrophils. Despite massive antibiotic therapy, the patient died two days after the hospitalization.

**Indicate:**

**A.** The cranial nerves involved in the pathological process.

**B.** The definition of ophthalmoplegia.

**C.** The lumbar puncture procedure.

**D.** The name of the disease.

**E.** The list of diseases used for the differential diagnosis.

**Case no. 5**

Patient C., 54 years old, librarian, was walking up the stairs with a few books in her hand when she suddenly felt a weakness in her left hand, she hardly managed to take the books to their destination. Within 30-40 minutes, the weakness in the left hand progressed significantly, so that the patient was unable to hold anything in it. She came to the polyclinic alone, she did not mention any walking difficulties. It is established based on the anamnesis that she has been suffering from angina pectoris for 5 years; 1 year ago after a physical and psycho-emotional overload she had a weakness in her left leg, which lasted about 24 hours. It was then that for the first time the blood pressure increase to 160/100 mm Hg was mentioned.

Objective examination: rhythmic pulse, 78 beats per minute, blood pressure - 150/100 mm Hg. Visual acuity of the right eye is diminished. The expression of the left nasolabial fold is diminished. A slight deviation of the tongue to the left, a slight dysarthria. Left hand with decreasing power up to 2 points, hypotonia in her left hand, osteotendinous reflexes were exaggerated. Normal strength in both legs, normal muscular tonus, with a predominance of the expression of the reflexes on the left leg. Pathological and meningeal signs were negative.

**Indicate:**

**A.** The definition of dysarthria.

**B.** The method of muscle tone examination.

**C.** The preliminary diagnosis.

**D.** The complementary investigation plan.

**E.** The necessary therapeutic measures.

**F.** The list of diseases used for the differential diagnosis.

***Theme 9.* HEMORRHAGIC STROKE. PRINCIPLES OF NEUROREHABILITATION. DOPPLER ULTRASONOGRAPHIC EXAMINATION OF CERVICO-CEREBRAL MAGISTRAL VESSELS: PRINCIPLES AND CLINICAL UTILITY. NEUROLOGICAL MANIFESTATIONS IN SOMATIC DISEASES**

***Purpose:*** To study the risk factors in the occurrence of hemorrhagic strokes. Assimilation of the clinical picture of hemorrhagic strokes in subarachnoid hemorrhages and spontaneous intracerebral hematomas. Learning the paraclinical and imaging modalities in the diagnosis of hemorrhagic strokes and specific features of the treatment

*Duration of the practical work / seminar: 225 minutes.*

**Questions for individual preparation**

1. What are the risk factors for hemorrhagic strokes?
2. What is the clinical picture of hemorrhagic strokes?
3. Classification of hemorrhagic strokes, Hunt-Hess scale.
4. What complementary investigations can be used to make the diagnosis of stroke?
5. What are the therapeutic and interventional measures for the treatment of hemorrhagic stroke?

**Recommended literature: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

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| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with hemorrhagic strokes with intracerebral hematoma or subarachnoid hemorrhage.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied  (CT, CT angiography, MRI, Doppler Ultrasonography).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to know the clinical manifestations of the stroke
* to demonstrate abilities to identify disorders of motility, sensitivity, cranial nerves and higher cognitive functions in the patient with stroke
* to interpret the imaging changes of the stroke on the images by computed tomography and nuclear magnetic resonance to define the stroke and its types
* to define modifiable and non-modifiable risk factors and their significance for stroke development
* to know the causes of the stroke to demonstrate communication skills with the patient in order to explain the cause of the stroke, the risk factors and the ways to influence them
* to know the principles of neurological recovery of the patient with stroke
* to prescribe drugs for the primary and secondary prophylaxis of cerebrovascular diseases

**Clinical cases**

**Case no. 1**

Patient R., aged 33, porter at the food market. He was transported to the hospital by an ambulance. It was found out that R. considers himself healthy, abuses alcohol, for which reason the family fell apart, according to the persons who accompanied him. That day, after a physical and psycho-emotional overload, the patient began to complain of an acute headache, that woke him and he "was trembling all over". He drank 1/2 glass of vodka, his condition worsened even more: his headache intensified, he started vomiting again, an ambulance was urgently called.

Objective examination: hyperemic face, moist skin. Rhythmic pulse 110 beats per minute. Rhythmic breathing, 40-44 per minute. Body temperature 37.50 C.

The stuporous state of consciousness, he is not able to tell anything about himself, disoriented in time and space. Neck stiffness rated at 3 fingers, the Kernig`s and Brudzinski`s signs are positive. Preserved cranial nerve function. Maintained motor function, examination of sensitivity disorder cannot be obtained. Equally increased osteotendinous reflexes, positive bilateral Babinski sign.

**Indicate:**

**A.** The group of signs to which neck stiffness, Kernig and Brudzinski signs refer to.

**B.** The group of signs to which Babinski sign refers to and its cause.

**C.** The preliminary diagnosis.

**D.** The complementary investigation plan.

**E.** The necessary therapeutic measures.

**F.** The list of diseases used for the differential diagnosis.

**Case no. 2**

Patient Z., aged 56, teacher, has been suffering from hypertension for many years. The last two years she has had hypertension attacks up to 240/120 mm Hg. The last 10 days she was on sick leave due to hypertensive crisis, she was administering diuretics and hypotensive drugs, with a temporary effect, but her headache and poor general health condition continued to bother her. In the evening, after the bath, the condition suddenly worsened: the headache intensified, she started vomiting again, stopped recognizing the people around her, she did not understand what she was said when she was addressed, then she lost her consciousness.

Objective examination: noisy breathing at a rate of 50 per minute. Heartbeat, rhythmic, 96 beats per minute. Blood pressure 260/140 mm Hg. Moist skin. Body temperature 37.80 C. Consciousness is lacking, she does not react to pain excitations. Stiffness of the neck rated at 3 fingers, positive bilateral Kernig sign, positive upper Brudzinski sign on the left. The head and eyeballs deviated to the right. Positive "mast" sign on the right. Preserved pharyngeal reflex. The right hand droppes faster that the left hand. Osteotendinous reflexes D> S. Babinski sign positive on the right.

**Indicate:**

A. The preliminary diagnosis.

B. The location (topographic) diagnosis.

C. The reason of the head and eyeball deflection to the right.

D. The type of coma (primary or secondary).

E. The necessary therapeutic measures.

F. The complementary investigation plan.

G. The list of diseases used for the differential diagnosis.

**Case no. 3**

Patient S., aged 28, was hospitalized for a headache located in the frontal and occipital region manifested sharply, very violently "as if he had been hit with something in the head", nausea, repeated vomiting. On the day of hospitalization there was an acute headache and vomiting in the morning. He did not lose consciousness, he has no paresis.

Objective examination: somatic healthy, blood pressure 120/80 mm Hg. Anisocoria S> D, lazy pupillary photoreaction, the right nasolabial fold is erased. Tone and muscle strength within normal limits. Invigorated osteo-tendon reflexes, D>S. There are no pathological sings. Kernig`s and Brudzinski`s signs and the stiffness of the neck are marked. Assessed grade II on the Hunt-Hess scale.

Analysis of cerebrospinal fluid: high pressure, red, cloudy, 0.1 g / l proteins, fresh erythrocytes cover the field of view in a thin layer.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The definition of anisocoria.

**C.** The manifestations corresponding to grade II Hunt-Hess scale.

**D.** The complementary investigation plan.

**E.** The necessary therapeutic measures.

**F.** The list of diseases used for the differential diagnosis.

**Case no. 4**

A 44-year-old man, known as an old alcoholic, was brought to the hospital in a state of stupor.The objective examination found: bilateral mydriasis with lazy photoreaction; severe limitation of eyeball movements; not following simple instructions. The next morning the patient's attention was better, but a mild dysarthria developed, the patient complained of diplopia. Complete ophthalmoplegia was found.

All results of laboratory and complementary examinations were found to be normal. In 36 hours after initiating the treatment with thiamine, ophthalmoplegia was reduced to normal eyeball movements.

**Indicate:**

**A**. The definition of mydriasis.

**B.** The definition of diplopia.

**C.** The synonym of thiamine.

**D.** The name of the disease.

**E.** The list of diseases used for the differential diagnosis.

***Theme 10.* Infectious diseases of the nervous system. General information, classifications. Meningitis and encephalitis. HerpeS SIMPLEX encephalitis. Rheumatic encephalitis. INFLUENZA encephalitis. Lumbar puncture. Examination of the cerebrospinal fluid. CSF changes/syndromes**

***Purpose:*** To obtain theoretical and practical skills in order to make the diagnosis of the infection of the nervous system and to manage it properly.

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. Definition of meningitis and encephalitis. Classification.
2. Clinical manifestations of meningitis.
3. Acute bacterial meningitis. Ethiopathogenesis. Clinical manifestations. Diagnosis. Treatment.
4. Aseptic meningitis. Ethiology and pathogenesis. Clinical manifestations. Diagnosis. Treatment.
5. Encephalitis: definition. Classification. Ethiology.
6. Herpes Simplex encephalitis. Ethiology and pathogenesis. Clinical manifestations. Diagnosis. Treatment.
7. Rheumatic encephalitis. Ethiology and pathogenesis. Clinical manifestations. Diagnosis. Treatment.
8. Influenza encephalitis. Ethiology and pathogenesis. Clinical manifestations. Diagnosis. Treatment.
9. Paraclinical examinations of neuroinfections.
10. Specific and symptomatic treatment.
11. Complications of meningitis and encephalitis.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **Nr. d/o** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with meningeal syndrome.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied (CSF analysis).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives  feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to define meningitis and encephalitis
* to know the principles of meningitis and encephalitis classification
* to know the causal agents of bacterial and aseptic meningitis
* to know the etiology of encephalitis
* to understand the pathogenesis of meningitis and encephalitis
* to know the meningitis triad
* to know the clinical manifestations of meningitis and encephalitis
* to demonstrate good skills in the correct assessment and interpretation of the meningeal signs
* to know the evolutionary clinical features of meningitis according to the causal agent
* to identify the topographic diagnosis of cerebral lesions in patients with encephalitis
* to know the technique of lumbar puncture, the indications and contraindications for the procedure
* to be able to name the cerebrospinal fluid changes/syndromes
* to be able to interpret the result of the cerebrospinal fluid examination
* to know the complementary imaging and laboratory methods needed to diagnose neurological infections
* to prescribe the treatment for meningitis and encephalitis
* to know the complications of meningitis and encephalitis

**Clinical cases**

**Case no. 1**

The neurologist was invited to see a patient hospitalized in the internal medicine department for pneumonia. A night before the patient experienced a severe headache, nausea, repeated vomiting, photophobia.

General examination revealed an altered mental state, moaning, the retroflexion of the neck. Three fingers nuchal rigidity, Kernig and Brudzinski signs were positive. The temperature was 380 C.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The topographic diagnosis.

**C.** The manifestations of *meningismus*.

**D.** The planned paraclinical examinations.

**E.** The treatment.

**F.** The differential diagnosis.

**Case no. 2**

A 35- year-old patient, female, was admitted to the hospital with severe headache, vertigo, repeated vomiting. The symptoms developed during the last 3 days, being preceded by some catarrhal symptoms. The first symptom was a severe headache, followed by the sensation of spinning of the objects around horizontally from left to right. The vertigo is increased by the movement of the head and eyes. General examination did not reaveal any abnormalities. BP 115/75 mm Hg.

Neurological examination: right side nistagmus, instability in Romberg position, the finger-nose and sole-knee maneuvers were made with some inaccuracy. Tendon reflexes were increased, D=S. The Babinskii sign is positive in both sides. No paresis or meningeal signs were found.

CT exam of the head and the CSF exam were normal.

MRI was the most usefull to make the diagnosis.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The topographic diagnosis.

**C.** How to examinethe finger-nose and sole-knee maneuvers.

**D.** The treatment.

**E.** The differential diagnosis.

**Case no. 3**

A 65-year-old patient, female, was admitted to the hospital. She is known to have arterial hypertension for many years. She was experiencing severe headache for the last 2-3 days. In the afternoon before the admission she felt weakness in her right limbs, that progressed to hemiplegia during the night.

General examination: pale skin, BP 110/60 mmHg, Ps 96 b/min, rhythmic.

The patient is alert, she complains of headache, nausea. Meningeal signs – negative. An assimetry of the right lower part of the face was noticed, the tongue moved to the right. Hemiplegia and hemihypoalgesia on the left side. Reflexes were increased on the left. In several hours meningeal signs became positive, blood pressure decreased to 90/50 mmHg. ECG did not reaveal any heart ischemic events.

A lumbar puncture was performed: pressure 260 mmH2O, yellow-greenish color, cells 6350/3 (90% neutrophils), proteins 2.5 g/l.

**Indicate:**

1. The preliminary diagnosis.
2. The cause of the blood pressure drop.
3. The name of the CSF changes.
4. The treatment.
5. The plan of the paraclinical exams.
6. The differential diagnosis.

**Case no. 4**

Patient M., 10 y.o., was admitted to the neurological department with severe headache, photophobia, vomiting, severe fatigue.

His mother said that the night before the admission to the hospital her son had complained of headache, fatigue, fever 39.80 C, repetead vomiting. The past medical history revealed chronic suppurative otitis.

The general examination: the patient is apathetic, he is lying on the right side with his head turned on his back, with his legs flected in knees and coxofemoral joints. His temperature was 40C, BP 120/75 mm Hg, pulse 98 b/min, rythmic.

Neurological examination: no abnormalities in the cranial nerves and motor system, reflexes – symmetrical, generalized hyperesthesia, nuchal rigidity 4 fingers, Brudzinski`s sign positive both sides.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The topographic diagnosis.

**C.** The group of signs to which nuchal rigidity and Brudzinski`s sign belong to.

**D.** The plan of the paraclinical examinations.

**E.** The treatment.

**F.** The differential diagnosis.

**Case no. 5**

A 48-year-old patient, male, complains of occipital headache, diplopia. During the last 6 months he noticed episodes of chills, an increased temperature, night sweats.

Neurological examination revealed: optic papilla stasis on fundoscopy, imposibility to move the right eyeball to the right, absent right conjunctival reflex, impossibility to close completely the right eye, „*racket sign*” (flattening of the nasolabial fold) on the right, left hypoacusia, nuchal rigidity 4 fingers.

CSF analysis: meningitic syndrome, the proportion of lymphocytes to neutrophils - 70:30%, low glucose and chlorides.

The diagnosis was confirmed by the bacteriologic exam and sputum analysis.

**Indicate:**

1. The significance of the „handle” in the „*racket sign*”.
2. The group of signs to which nuchal rigidity belongs to.
3. Where is the lesion in case of unilateral hypoacusia.
4. The meningitic syndrome in CSF.
5. The name of the disease.

***Theme 11*. MYELITIS. POLIOMYELITIS. VASCULAR DISEASES OF THE SPINAL CORD. NEUROSYPHILIS. DAMAGE OF THE NERVOUS SYSTEM IN HIV/AIDS. NEUROBORRELIOSIS**

***Purpose:*** To learn the infectious, autoimmune and vascular causes of the spinal cord involvment and to understand the pathogenetic mechanisms of the damage. To apply the clinical and paraclinical criteria for the differential diagnosis. To learn the clinical manifestations in neurosiphilis, neuroborreliosis and neuro-HIV/AIDS infection

***Duration of the practical lesson / seminar:*** *225 minutes*

**Questions for individual learning**

1. Definition of myelitis.
2. Classification.
3. Ethiology. Pathogenesis.
4. Clinical manifestations of myelitis.
5. Paraclinical diagnosis of myelitis. Principles of treatment.
6. Poliomyelitis. Ethiology. Pathogenesis. Clinical manifestations
7. Paraclinical diagnosis.Treatment and prophylaxis.
8. Spinal cord infarction. Definition. Classification.
9. Ethiology and pathogenesis of spinal cord infarction.
10. Clinical manifestations of spinal cord infarction.
11. Paraclinical diagnosis. Principles of treatment of spinal cord infarction.
12. Chronic vascular myelopathy. Ethiology. Pathogenesis. Clinical manifestations.
13. Paraclinical diagnosis. Treatment of chronic vascular myelopathy.
14. Neurosiphilis. Ethiology. Pathogenesis.Clinical manifestations
15. Paraclinical diagnosis of neurosiphilis.
16. Treatment of neurosiphilis.
17. Definition of HIV-AIDS infection.Classification.
18. The causes of nervous system damage in HIV-infected person.
19. Clinical forms. Paraclinical diagnosis. Principles of treatment.
20. Definition of Lyme neuroborreliosis.
21. Ethiology and pathogenesis of neuroborreliosis.
22. Clinical manifestations of neuroborreliosis.
23. Paraclinical diagnosis, treatment and prophylaxis of Lyme disease.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **Nr. d/o** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with spinal cord deseases.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied (MRI, CSF exam).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to define myelitis, to know the classification of myelitis
* to know the etiological factors of myelitis
* to understand the mechanisms of pathogenesis of myelitis according to the cause
* to know the clinical manifestations of myelitis
* to identify the topical diagnosis of the medullary lesion in a patient with myelitis
* to know the paraclinical methods used in the diagnosis of myelitis and to argue their usefulness
* to interpret the results of laboratory and imaging examinations that are suggestive for myelitis
* to know and to justify the differential diagnosis of myelitis
* to know the principles of treatment of myelitis
* to define poliomyelitis and post-polio syndrome
* to know the clinical manifestations of poliomyelitis
* to demonstrate practical skills for the assessment of the peripheral paresis and meningeal signs
* to know the principles of treatment of poliomyelitis and post-polio syndrome and the importance of the prophylactic measures
* to define acute and chronic medullary vascular diseases and their clinical forms
* to know the features of vascularization of the spinal cord
* to define the risk factors and their role in the development of medullary vascular diseases
* to know the causes of medullary stroke
* to know the clinical manifestations of medullary stroke and of chronic vascular myelopathy
* to show the ability of identifying the motility, sensitivity and sphincter disorders in patients with medullary vascular diseases
* to interpret the imaging changes of a medullary stroke on Nuclear Magnetic Resonance imaging
* to demonstrate the ability of differentiating between the medullary vascular disease with other spinal cord diseases
* to know the principles of medicamentous and rehabilitational treatment in patients with medullary vascular disease
* to define neurosyphilis, to tell and to understand the pathogeny of neurosyphilis
* to know the clinical signs of different clinical forms of neurosyphilis
* to be able to apply the MMSE (Mini Mental Status Examination) to assess the cognitive impairment in patients with neurosyphilis
* to interpret the results of cerebrospinal fluid, serology investigations and imaging laboratory of the patients with neurosyphilis
* to prescribe the treatment for patients with neurosyphilis
* to define HIV/AIDS, to know the classification of HIV infection
* to know the pathogeny of the NS involvement in HIV infection
* to know the clinical forms of nervous system involvement in the infected HIV patients and the evolutionary features of each form
* to interpret the results of paraclinical investigations in HIV-infected patients with lesions of the nervous system
* to demonstrate good communication skills while announcing the diagnosis of a HIV-AIDS patient
* to know the principles of treatment of the HIV-infected patient with various NS lesions depending on the clinical form
* to define the Lyme disease and neuroborreliosis
* to understand the pathogenesis of the disease and its prophylaxis
* to know the classification of neuroborreliosis
* to know the clinical signs of neuroborreliosis
* to demonstrate the skills for assessing the neurological deficit in a patient with neuroborreliosis
* to demonstrate the skills in selecting the necessary paraclinical diagnostic methods for making the diagnosis of neuroborreliosis
* to interpret the laboratory, electrophysiological and imaging results of a patient with neuroborreliosis
* to prescribe the treatment for patients with a confirmed diagnosis of neuroborreliosis

**Clinical cases**

**Case no. 1**

Patient I., aged 22, complains of backache, heaviness in his legs. The onset was acute a day before with heat sensation, chills, hypertermia 37.80 C. In the morning the fever was 390 C, he noticed a backache, the impossibility to stand up because of the backpain, heaviness and numbness in his legs.

His past medical history was unremarkable, except measles and rubella in the childhood.

General examination: the patient is alert, hyperemia of the skin is noticed, no rush. In the right infrascapular region - signs of skin damage after a spot.

Neurological examination: severe pain in the interscapular region occurs when the head is tilted to the chest, positive Kernig sign, pain is noticed on palpation of the thoracic paravertebral segment of the spine, spastic paresis in both legs with positive Babinski sign. Hypoesthesia for superficial and deep sensation below the Th4 level, difficulties of micturition.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The topographic diagnosis.

**C.** The type of sensory disturbance.

**D.** The plan of the paraclinical examinations.

**E.** The treatment.

**F.** The differential diagnosis.

**Case no. 2**

Patient U., aged 30, has a severe fatigue, some catarrhal symptoms during the last 3 days. On the third day he noticed some tinglings in his feet. The next morning he lost active movements in his legs.

His past medical history revealed only mumps and measles in the childhood.

General examination: The patient is alert, photohobia, no abnormalities regarding cranial nerves. Paralysis in both legs with the Babinski sign, loss of all sensations below groin, urinary retention.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The topographic diagnosis.

**C.** The positive Babinski sign manifstation.

**D.** The plan of the paraclinical examinations**.**

**E.** The treatment.

**F.** The differential diagnosis.

**Case no. 3**

A 38 –year-old man came to the neurologist for a progressive weakness in his right limbs, tinglings in both legs during the last 6 months. The patient’s wife noted the fact that during the last 2 years he was mostly depressive, apathetic without any interest to his work. She remembers that he took penicillin for generalized rash five years ago.

Neurologic examination: positive Argyll Robertson syndrome, muscle strentgh in the right hand 3-4 points, hypotrophy and fasciculations of the right deltoid and intercostal muscles, increased right patellar and achilian reflexes, positive right Babinski sign, decreased vibration and myoarthrokinetic sensations (position sense) in the right limbs, tactile anesthesia in the Th1 left segment. CSF analysis revealed positive Wasserman test.

**Indicate:**

**A.** The Argyll-Robertson syndrome manifestations.

**B.** The definition of muscle fasciculations.

**C**. The topographic diagnosis.

**D.** The positive Babinski sign manifestation.

**E.** The treatment.

**F.** The differential diagnosis.

**Case no. 4**

A 56-year-old patient was receiving treatment for severe pain in the leg and swelling of the right knee joint administered by his general practitioner . He was told that it is a severe arthritis. Two months before the hospitalization he started to have difficulties in walking in darkness.

Neurological examination: positive Argyll-Robertson sign, deformation of the knee joints (Charcot joint), loss of patellar and achilian reflexes, loss of vibration and myoarthrokinetic sensations (position sense) in both legs, atactic gait, the impossibility of staying and walking with closed eyes.

CSF analysis for Wasserman test was positive.

**Indicate:**

1. The type of ataxia that is present in the patient.
2. The topographic diagnosis.
3. The name of the disease.
4. The differential diagnosis.

**Case no. 5**

A 2-year-old previously healty child was found by his mother without any active movement in all limbs in the morning. The night before he was naughty, had no appetite and had liquid stool twice.

General examination: the child is alert, the body temperature 37.20 C, no rush was noted, the palpation of his belly is painful.

Neurological examination: flaccid paralisis in all limbs with arephlexia. Sensibility cannot be tested properly. No sphyncter disturbancies.

**Indicate:**

1. The preliminary diagnosis.
2. The topographic diagnosis.
3. The plan of the paraclinical exams.
4. The treatment.
5. The differential diagnosis.

**Case no. 6**

A 21-year-old patient was admitted to the hospital with severe headache, vomiting, diplopia. He became sick 10 days before with severe fatigue and mild headache, subfebrile temperature. In 6 days his headache became more severe, diplopia was noted.

Neurological examination: 3 fingers nuchal rigidity, positive Kernig and Brudzinski signs, anisocoria S>D, ptosis of the left eyelid, divergent strabismus.

CSF analysis: lymphocytic pleocytosis, low glucose level.

**Indicate:**

* 1. The preliminary diagnosis.
  2. The cranial nerve involved in the pathological process.
  3. The topographic diagnosis.
  4. The plan of the paraclinical examinations.
  5. The treatment.
  6. The differential diagnosis.

**Case no. 7**

A 15-year-old patient was admitted to the neurological department with diffuse constant headache, cervical spine pain, vertigo, decreased appetite, fatigue, weight loss. The disease started about 3 weeks ago with chills, headache, catarrhal symptoms, nausea, vomiting. She noted that 2 days before the beginning of the symptoms she had been in the forrest area for a party.

General examination: on her left thigh is present an erythema of about 20 cm, with more expressed red-purple borders, a painless lymphatic node was detected in the inghinal region.

Neurological examination: painfull Walleix points on the face, nystagmus when looking to the right, diminished reflexes S=D, nuchal rigidity 3 fingers, positive Kernig sign.

Fundoscopy: bilateral edema of the optic nerve papilla.

CT of the brain: without abnormalities.

CSF analysis: clear, proteins 1,98 g/l, cells - 290 (limphocites 88%, neutrophils 12%).

**Indicate:**

1. The preliminary diagnosis.
2. The location of the Walleix points on the face.
3. The plan of the paraclinical exams.
4. The treatment.
5. The differential diagnosis.

**Case no. 8**

After lifting a heavy object on the 5th floor, the patient O., aged 60, felt a violent pain in the lumbar region. He hardly went to bed. During the next two hours, a flaccid inferior paraplegia ocurred, with the disappearance of the patellar and Achilles reflexes, bilateral loss of sensitivity below the Th12-L1 level. Negative pathological signs. Urine retention.

**Indicate:**

1. The preliminary diagnosis.
2. The topographic diagnosis.
3. The plan of the paraclinical exams.
4. The treatment.
5. The differential diagnosis.

***Theme 12.* MULTIPLE SCLEROSIS. MYASTHENIA GRAVIS. PARANEOPLASTIC SYNDROME. EVOKED POTENTIALS, ELECTROMYOGRAPHIC NERVE CONDUCTION STUDY: PRINCIPLES, CLINICAL UTILITY**

***Purpose:*** To study demyelinating and autoimmune diseases of the nervous system. To know the usefulness of electroneuromyographic diagnostic methods in patients with various disorders of the nervous system

***Duration of the practical lesson / seminar:*** *225 minutes*

**Questions for individual learning**

1. Definition of Multiple Sclerosis.
2. Ethiopatogenesis of Multiple Sclerosis.
3. Clinical manifestations and clinical forms of Multiple Sclerosis.
4. Diagnostic criteria of Multiple Sclerosis (McDonald 2010).
5. Treatment of relapses in Multiple Sclerosis.
6. Immunomodulator, immunosupresant and symptomatic treatment in Multiple Sclerosis.
7. Definition of Myasthenia gravis.
8. Physiopathogenic mechanisms in Myasthenia gravis.
9. Clinical manifestations of Myasthenia gravis.
10. Diagnosis of Myasthenia gravis.
11. Principles of treatment of Myasthenia gravis.
12. Myashenic crysis.
13. Emergency treatment of Myashenic crysis.
14. Definition of paraneoplastic syndrome.
15. Pathogenesis of paraneoplastic syndrome.
16. Neurological paraneoplastic syndromes.
17. Diagnosis of neurological paraneoplastic syndromes.
18. Evoked potentials: principles and clinical use.
19. Electromyographic stimulodetection examination: principles and clinical use.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **Nr. d/o** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with Multiple Sclerosis and/or Myasthenia gravis.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied (EMG, CT and MRI, CSF exam for oligoclonal bands, blood tests for anti-AChR and anti-MuSK antibodies).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to define multiple sclerosis
* to explain the pathogenesis of multiple sclerosis
* to know the McDonald diagnostic criteria
* to describe the characteristic imaging changes in multiple sclerosis
* to interpret electrophysiological tests in multiple sclerosis (evoked potential signals)
* to describe the clinical forms of multiple sclerosis
* to know the symptomatic treatment of multiple sclerosis
* to know the possibilities of immunomodulatory treatment in multiple sclerosis
* to define myasthenia gravis
* to explain the pathogenesis of myasthenia gravis with anti-AChR and anti-MuSK antibodies
* to describe the clinical signs in myasthenia gravis
* to interpret the electrophysiological tests in myasthenia gravis (EMG decrement)
* to define the myasthenic crisis and the cholinergic crisis
* to know the principles of treatment of myasthenia gravis
* to define the paraneoplastic syndrome
* to explain the pathophysiological mechanisms of paraneoplastic syndrome
* to know the forms of the central and peripheral nervous system involvement in paraneoplastic syndromes
* to know the principles of serological and imagistic diagnosis in paraneoplastic syndrome

**Clinical cases**

**Case no. 1**

A 18-year-old patient, female, felt a sudden weakness in her legs, disturbed visual acuity, mostly in her right eye.

An episode of sudden loss of visual acuity in her left eye was recorded in the past history. The diagnosis of retrobulbar neuritis was made and was followed by a 10-day treatment.

Neurological examination: conductive hypoalgesia below Th6 on the right and Th10 segments on the left. Spastic hypertonus in both legs and hyperreflexia, R>L, bilateral Babinski sign, absent abdominal reflexes, muscle strenghth in the arms – 5 points, in the legs: the right – 3 points, the left – 4 points, bilateral intentional tremor on finger-nose maneuver, urine retention.

Fundoscopy: bilateral temporal pallor of optic disc.

**Indicate:**

1. The preliminary diagnosis.
2. The method of abdominal reflex examination.
3. The plan of the paraclinical examinations.
4. The treatment.
5. The differential diagnosis.

**Case no. 2**

A 29-year-old patient states to have been experiencing recurrent episodes of instability during the walk, vertigo, diplopia for the past year. One week before going to the neurologist he noticed a black stain in his left visual field.

Neurological examination revealed a paracentral scotoma in his left visual field, left headed nystagmus, difficulties in concomitant eyes movements, left perception hypoacusia, dysdiadocokinesia and tremor of the left hand, ataxia and hyperreflexia in right limbs.

The diagnosis was confirmed by somatosensitive evoked potentials, visual evoked potentials, CSF analysis for oligoclonal bands and brain MRI.

**Indicate:**

1. The definition of nistagmus.
2. The typical lesions found on brain MRI.
3. The name of the disease.
4. Variants of clinical course of the disease.
5. The differential diagnosis.
6. The treatment.

**Case no. 3**

A 22-year-old patient, male, was admitted to the hospital with decreased visual acuity, headache. He states to have been suffering from headache, fatigue and hypertermia for several days. A day before the hospitalization he noted a „blurred vision”, difficulty in distinguishing letters, dizziness.

Neurological examination: he could count fingers not far from 3 meters distance, can not distinguish colors. Central scotoma in both eyes was detected. No sensory or motor abnormalities were found.

Fundoscopy: pallor of the optic nerve, fresh retinal hemorrhages.

Blood analysis: lymphocytosis.

CSF analysis: no abnormalities.

Brain MRI: thickening of the optic chiasma.

**Indicate:**

1. The preliminary diagnosis.
2. The topographic diagnosis.
3. The definition of scotoma.
4. The name of the device used to perform fundoscopy.
5. The treatment.
6. The differential diagnosis.

**Case no. 4**

A 26-year-old patient, female, a school teacher, came to the neurologist for fatigue during eating: she has difficulties in chewing and swallowing solid food. She also complains of changing her voice after explaining lessons.

General and neurological examination did not reveal any abnormalities.

Being hospitalized she experienced a worsening of her condition after going up the stairs to the third floor: she had dyspnea, 40 / min, pale skin, cyanotic lips, pulse 120 b/min, BP 160/90 mm Hg. The speech was unintelligible, dysphonic, she could not swallow, weakness in all limbs were noted, most evident in distal parts. Muscle hypotonia. Reflexes were diminished, D=S.

**Indicate**:

1. The preliminary diagnosis.
2. The definition of the crisis type.
3. The plan of the paraclinical exams.
4. The treatment.
5. The differential diagnosis.

**Case no. 5**

A 24-year-old patient, male, complains of his voice change and speech difficulties that happen mostly in the afternoon and in the evening. In the morning these symptoms are absent.

Pyridostigmin was given and after 30 min the patient became pale, with stomachache, hypersalivation, BP 80/40 mmHg, ps – 42 b/min, small pupils, D=S.

**Indicate:**

1. The preliminary diagnosis.
2. The definition of the crisis type.
3. The treatment.
4. The plan of the paraclinical exams.
5. The differential diagnosis.

***Theme 13.* EPILEPSY. STATUS EPILEPTICUS. INTENSIVE TREATMENT. EEG: PRINCIPLES AND CLINICAL UTILITY. CEREBRAL PARALYSIS**

***Purpose:*** To understand the clinical, electrophysiological manifestations and diagnostic principles of partial and generalized epileptic seizures. Knowledge of the principles of acute and supportive treatment in epilepsy. Study of clinical symptoms, methods of diagnosis and treatment of infantile cerebral palsy

***Duration of the practical work / seminar:*** *225 minutes.*

**Questions for individual preparation**

1. Classification of epilepsy and epileptic seizures.
2. Clinical and electrophysiological manifestations of generalized epileptic seizures.
3. Clinical and electrophysiological manifestations of partial seizures.
4. Temporal lobe epilepsy. Clinical manifestations, diagnosis, treatment.
5. Principles and algorithm of treatment of epilepsy.
6. Epileptic disease. Intensive treatment.
7. Infantile cerebral palsy: etiology, clinical forms and treatment.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with epilepsy or epileptic seizures. Alternatively, the presentation of standardized clinical cases.sensory disturbances.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on theme studied (EEG, video-EEG monitoring).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to define seizures
* to define epilepsy
* to know the classification of seizures
* to understand the mechanisms of epileptogenesis
* to know the clinical manifestations of epilepsy
* to be able to make the differential diagnosis of consciousness states
* to explain the electrophysiological changes of generalized and focal seizures
* to define the notion of status epilepticus
* to know the treatment algorithm of status epilepticus
* to know the principles and algorithm of epilepsy treatment
* to define the temporal lobe epilepsy
* to name the clinical changes in temporal lobe epilepsy
* to prescribe the treatment for the temporal lobe epilepsy
* to define the infantile cerebral palsy
* to know the etiology and the clinical forms of infantile cerebral palsy
* to demonstrate skills for identifying motility, sensitivity, cranial nerves and higher cognitive functions disorders in a patient with infantile cerebral palsy.

**Clinical cases**

**Case no. 1**

Patient M., aged 34, was transported to the emergency room by an ambulance. Every 1.5-2 minutes, the patient develops convulsive attacks, which begin with the rotation of the head and eyes to the left, contractions of the left corner of the mouth, followed by tonic convulsions in the hand and foot on the left. The attacks last about two minutes. In the short period between seizures, the patient does not regain consciousness completely: he does not open his eyes, he does not answer questions, he keeps his right hand, raised passively, at the insistent instruction. The left hand falls loosely.

The anamnesis: 1 year ago, for the first time in his life, sitting at the table at work he suddenly fell face down on the table, had convulsions. The attack lasted a few minutes. He did not bite his tongue, he had no involuntary urination. Later he frequently had headaches, which the patient explained by excessive fatigue.

Objective examination: Somatic pathology was not detected. On the right frontoparietal region an angioma of 1.5x1.5 cm is found. According to his wife, the angioma has been there from an early age, but it has grown in size in the last 2-3 years. A slight asymmetry of the face due to the flattening of the nasolabial fold on the left. During the interictal period, spontaneous movements in the left hand are missing. Diffuse muscle hypotonia. The patient moves his right hand, straightens the sheet, puts his hand on the forehead. Diminished osteotendinous reflexes, S<D. Stiffness of neck - 2 fingers, positive bilateral Kernig sign.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The type of mimetic paresis accompanied by the flattening of the nasolabial fold, with the preservation of movements in the rest of the mimic muscles of the face.

**C.** The therapeutic measures.

**D.** The complementary investigation plan.

**E.** List of diseases used for the differential diagnosis.

**Case no. 2**

Patient S., aged 31, an engineer, was admitted to the hospital. He is in the state of obnubilation (in the state of blurred consciousness), answers questions late, laconic. He does not know what happened to him. He remembers that he was going to work, some unpleasant feeling appeared in the epigastric region on the right.

It is known that he lost consciousness, his breathing was noisy, he had foam in his mouth, convulsions in his hands and feet.

Objective examination: He has no somatic pathology. Pulse 68 beats per minute. Blood pressure 120/70 mm Hg. On the left edge of the tongue the signs of a recent bite. Meningeal signs negative, no focal neurological deficit.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The definition of unpleasant feeling in the right epigastric region before loss of consciousness.

**C.** Therapeutic measures.

**D.** The complementary investigation plan.

**E.** List of diseases used for the differential diagnosis.

**Case no. 3**

Patient M., aged 42, a locksmith, was admitted to hospital in a coma.

The patient's wife states that 5 years ago he suffered a head trauma in a car accident, he was treated for a long time in a hospital. Eight months after the trauma, he had a seizure with loss of consciousness, biting of the tongue, involuntary urination for the first time. Such seizures repeated 2-3 times a month. The patient became irritable, angry at any trifle, sometimes aggressive. Last night he had three attacks with an interval of 10-15 minutes between them. He had four more attacks in the ambulance and in the emergency department. All attacks had a stereotypical course: noisy breathing, foaming at the mouth, tonic and clonic convulsions in the extremities, without difference of parts. Dilated pupils, equal, the reaction to light is missing. Consciousness is missing.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The definition ofcrisis.

**C.** Therapeutic measures.

**D.** The complementary investigation plan.

**E.** List of diseases used for the differential diagnosis.

**Case no. 4**

Patient Ţ., aged 37, a driver, was transported to the inpatient ward with the diagnosis "Condition after a seizure". The patient is conscious, slightly overwhelmed. He answers questions with a slight delay, appropriately.

From the talk with the patient it was found that during the last 6 months there were periodic tingling and numbness first on the left face, which then "goes down" on the hand, the body and ends on the foot on the same side. The attack lasts no more than 3-4 minutes, it is repeated 2-3 times a week. Today after the attack he felt weakness in his left hand for the first time.

Objective examination did not reveal focal neurological deficit.

**Indicate:**

**A.** The preliminary diagnosis.

**B.** The definition of crisis.

**C.** Therapeutic measures.

**D.** The complementary investigation plan.

**E.** List of diseases used for the differential diagnosis.

***Theme 14.* PERIPHERAL NERVOUS SYSTEM DISORDERS. DISCOGENIC RADICULOPATHIES. GUILLAIN-BARRE SYNDROME. POLINEURO-PATHY. BRACHIAL PLEXOPATHY. THE UPPER AND LOWER LIMB NEUROPATHIES. TUNNEL SYNDROMES. ELECTRONEUROGRAPHY (NERVE CONDUCTION STUDY): PRINCIPLES AND CLINICAL VALUE**

***Purpose:*** To study the principles of anatomical and physiological organization of the peripheral nervous system. To know the clinical forms, etiology and pathophysiological mechanisms of the peripheral nervous system affection, diagnosis and treatment principles

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. The anatomic and physiological features of the peripheral nervous system (PNS) organization.
2. Brachial plexopathy. Definition. Clinical forms. Etiology. Clinical manifestations. Paraclinical diagnosis and treatment.
3. The upper and lower limb neuropathies. Tunnel syndromes. Etiology. Clinical signs. Paraclinical diagnosis and treatment.
4. Discogenic radiculopathy. Etiology. Clinical picture. Paraclinical diagnosis and treatment.
5. Polyneuropathies: diabetic, alcoholic, organophosphorus compounds poisoning. Etiology. Pathophysiology. Clinical signs. Paraclinical diagnosis and treatment.
6. Guillain-Barre syndrome. Etiology. Pathophysiology. Clinical picture. Paraclinical diagnosis and treatment.
7. Electroneurography (ENG): principles and clinical value.

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

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| --- | --- | --- |
| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with the peripheral nervous system deseases.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied  (ENG).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to know the etiology and clinical manifestations of upper and lower limb neuropathies
* to know the etiology and clinical manifestations of discogenic radiculopathy
* to define polyneuropathies and to know their classification
* to know the etiology and the pathophysiological mechanisms of peripheral nerve damage
* to know the clinical manifestations of polyneuropathy
* to assess the usefulness of the cerebrospinal fluid examination in the diagnosis of acute inflammatory demyelinating polyneuropathy (Guillain-Barre syndrome)
* to demonstrate topographic diagnosis skills in peripheral nervous system disorders
* to demonstrate practical skills while assessing the peripheral paresis
* to define the principles and value of electrophysiological examination by electroneurography in the diagnosis of peripheral nervous system disorders
* to integrate the results of the clinical and paraclinical examination in determining the diagnosis of peripheral nervous system disorders
* to know the principles of the medical treatment and the neurorehabilitation of the peripheral nervous system disorders.

**Clinical cases**

**Case no. 1**

A 32-year-old man complains of weakness and numbness in his hands and feet, more marked in his right leg and left hand.

The neurological examination found the pain sensation disturbances of the "socks" and "gloves" type, the absence of the reflexes on the hands and feet, which was associated with a bilateral facial palsy of the peripheral type. The elongation signs were positive.

Examination of cerebrospinal fluid found the increase of proteins to 2.56 g / l with a normal number of cellular elements.

The electroneuromyographic examination contributed to making the diagnosis.

**Indicate:**

A. The variant and the type of sensory disturbances in this patient.

B. The clinical examination maneuver, which allows the detection of "socks" and "gloves" sensory disturbances.

C. The anatomical structure impairment that led to sensory disturbances in this patient.

D. The name of the disease.

E. The differential diagnosis.

**Case no. 2**

A 9-year-old girl developed diarrhea, vomiting and hyperthermia. The patient's condition was diagnosed as "viral gastroenteritis". The treatment was supervised by the family doctor. After 4 days the child became drowsy, a flaccid paralysis of the right hand and foot was found.

The number of cellular elements in the cerebrospinal fluid exceeded 810/3, pressure was 280 mm of the H2O column. The consulting neurologist found the absence of all deep tendon reflexes.

The electromyographic examination with a needle-electrode helped to establish the diagnosis.

**Indicate:**

A. Clinical signs of flaccid paresis.

B. Important anamnestic data, missing in the case report.

C. The affected anatomical structure that conditioned the neurological manifestations present in the patient.

D. The name of the disease.

E. The possible signs detected during the electromyography examination with needle-electrode which could contribute to making the diagnosis.

F. List of diseases used for the differential diagnosis.

**Case no. 3**

Patient V., 26 years old, teacher, recently has had "a flu". Two weeks later she noticed weakness in her legs, then in her hands. The disease has a progressive evolution, the patient was sent to a neurologist.

Somatic examination showed no pathological changes. Neurological examination: cranial nerves without dysfunction. Tetraparesis with hypotrophy of the distal muscles of the hands and feet. Areflexia. "Gloves" and "socks" hypoalgesia. The elongation signs are positive. Negative meningeal signs.

Analysis of cerebrospinal fluid (CSF) revealed albuminocytological dissociation.

At night, the patient developed dyspnea, her face became cyanotic. On inspiration, the cervical muscles tense. Chest travel is severely reduced. Breathing rate 40 per minute. Phonation disorders, no swallowing disorder. Bilateral living pharyngeal reflex.

**Indicate:**

A. The preliminary diagnosis.

B. The topical (location) diagnosis.

C. The manifestation of the CSF syndrome of albuminocytological dissociation.

D. The complementary investigation plan.

E. Therapeutic measures.

F. The differential diagnosis.

**Case no. 4**

A 33-year-old worker felt an acute pain in the lumbar region of the spine with irradiation on the posterior surface of his left thigh, when lifting a heavy object.

Neurological examination found: right lumbar scoliosis, reduction of dorsal flexion of the left toe, reduction of the Achilles reflex on the left, hypoalgesia on the outer surface of the left foot, including the heel of the foot and dorsal surface of the toe, Lasségue sign positive at 600, violent pain when bending the body forward and to the right and on the percussion of the posterior apophysis of the lumbar vertebra V.

Magnetic resonance examination of the lumbosacral spine performed in an emergency department confirmed the diagnosis.

The patient underwent emergency neurosurgery.

**Indicate:**

A. The name of the postural disorder of the spine in the patient.

B. The diagnosis.

C. The indications for emergency neurosurgical treatment.

D. The differential diagnosis.

**Case no. 5**

A 58-year-old woman complains of weakness, numbness and unpleasant sensations in both hands within four weeks.

The neurological examination showed decreased vibration sense in both legs, "socks" and "gloves" hyperesthesia, hypotrophy of the interosseous muscles in both hands with limited movement in the fingers, lack of bilateral Achilles reflex.

Blood glucose value 7.2 mmol / l.

Electroneuromyographic examination confirmed the diagnosis.

**Indicate:**

A. The medical term for the unpleasant sensations in the hands that the patient had.

B. Indicate the type and variant of sensory disturbances in the extremities.

C. The diagnosis.

D. The possible changes in such cases, detected on the electroneuromyography examination.

E. List of diseases used for the differential diagnosis.

F. The main therapeutic measures.

**Case no. 6**

Patient A., 48 years old, while lifting a heavy object, felt pain in the lumbar region of the spine with irradiation in his left leg, so that he cannot even bend. The pain increases when the patient coughs and sneezes.

Objective examination: Severe orthostatic disturbances, lumbar lordosis is flattened, long back muscles are tense. The patient cannot lift his left leg outstretched, cannot bend forward. The paravertebral points in the lumbar region are painful on palpation. Hyperalgesia in L5 and S1 dermatomers on the left. Lasségue sign is positive on the left. The Achilles reflex on the left is dicreased.

**Indicate:**

A. The preliminary diagnosis.

B. The variants of the segmental type of sensitivity disorder.

C. Therapeutic measures.

D. Complementary investigation plan.

E. List of diseases used for the differential diagnosis.

***Theme 15.* NEUROLOGICAL DISEASES WITH HEREDITARY TRANSMISSION (PREDISPOSITION): PROGRESSIVE MUSCULAR DYSTROPHIES, NEURAL AMYOTROPHY, MYOTONIAS. WILSON DISEASE. STRUMPELL DISEASE**

***Purpose:*** To study the neurological diseases with hereditary transmission. Recognition of transmission patterns of hereditary diseases. Learning the utility of medical genetics tests in making the diagnosis and prognosis of neurological hereditary diseases

***Duration of the practical lesson / seminar:*** *225 minutes.*

**Questions for self-directed learning**

1. The definition of hereditary diseases.
2. The types of transmission of hereditary diseases.
3. Muscular dystrophies, clinical manifestations, methods of diagnosis, treatment and prognosis.
4. Charcot-Marie neural amyotrophy. Type of transmission. Clinical signs. Paraclinical investigations, genetic tests.
5. Myotonias, clinical features, mode of transmission, diagnosis and treatment.
6. Human body copper metabolism, Wilson's disease.
7. Strumpell disease, the type of transmission, diagnosis and treatment.
8. The investigations used in neurology for the diagnosis of hereditary diseases (laboratory tests, genetic tests, electrophysiological examinations).

**Recommended reading: A: 1, 2 B: 1, 2.**

**The method of conducting the practical work and the seminar**

|  |  |  |
| --- | --- | --- |
| **No.** | Practical lesson structure | **Duration (min)** |
| 1.  2.  3.  4.  5.  6.  7.  8.  9.  10**.** | **T**heme presentation and practical skills lesson plan.  **W**ritten test.  **Q**uestions and Answers session, additional explanations.  **D**iscussion on the theme and assessment of students’ understanding.  **C**ase presentation of two patients with hereditary disorders, or, alternatively, clinical cases.  **P**ractical skill training under the supervison and guidance of the teacher (students work in pairs).  **B**edside training under the supervison of the teacher.  **A**dditional relevant investigations on the theme studied  (Electromyography, genetic testing).  **A**ssessment of practical skills.  „**L**ocalising the lesion” session.  **Round-up discussion:** teacher answers any questions and gives feedback on each individual student’s performance. | 3  30  10  40  30  15  45  10  20  15  7 |

**Learning outcomes**

* to know the classification of the hereditary diseases of the nervous system
* to define the types of transmission in various hereditary diseases of the nervous system
* to know the clinical forms of myopathies, neuronal amyotrophies, myotonias
* to know the clinical forms of Wilson’s disease
* to demonstrate practical skills for assessing peripheral and central paresis, signs of basal ganglion involvement, clinical maneuvers for identifying muscle disease (myopathy, myotonia)
* to make the differential diagnosis of progressive muscular dystrophies, neural amyotrophies (sensory-motor neuropathies), myotonia
* to make the differential diagnosis of extrapyramidal disorders in Wilson’s disease with other hereditary and acquired extrapyramidal diseases
* to define the investigations used in neurology for the diagnosis of hereditary diseases (laboratory tests, genetic tests, electrophysiological examinations)

**Clinical cases**

**Case no. 1**

A 16-year-old girl has been complained of "crawling" her soles and "weak legs" while walking for the past eight months. Her father died of some "foot" disease at the age of 30.

The neurological examination revealed hypotrophy and weakness in the hands and feet, the legs "hanging"; "socks" and "gloves" hypoalgesia, dicreased vibration, myoatrokinetic and tactile sense below the knees. Deep tendon reflexes - diminished in the hands and absent in the legs.

The electroneuromyographic examination contributed essentially to making the correct diagnosis.

**Indicate:**

A. Type and variant of sensory disturbances.

B. Functional state of the motility system.

C. The diagnosis.

D. The list of diseases used for the differential diagnosis.

**Case no. 2**

A 14-year-old boy sought medical care because his scapula "came off the rib cage like wings". The taken anamnesis stated that last year the patient noticed a weakness in the extremities, which forced him to give up swimming. The boy's uncle, suffering from a hereditary disease, died at a young age.

The neurological examination revealed the following clinical manifestations: "tapir’s lips", "scapulae alatae", "waddling gait", positive Gowers maneuver, absence of all deep tendon reflexes.

Morpho-histological analysis of muscle bioptate, electromyographic examination with needle electrode confirmed the clinical diagnosis.

**Indicate:**

A. The name of the disease.

B. The anatomical location of the pathological process.

C. The complementary investigations, apart from muscle biopsy and electromyography examination with needle-electrode, that can be useful in making the diagnosis.

D. The specific manifestations detected on the electromyographic examination with electrode needle, specific to this disease.

E. The medical specialist, which will be involved mandatory in the consultation of the patient.

F. The treatment options.

G. The list of diseases used for the differential diagnosis.

**Case no. 3**

A 16-year-old man noticed sudden movements and progressive tremor in the upper extremities three months before the hospitalization. Relatives stated fits of laughter in inappropriate circumstances, swallowing disturbances.

During the neurological examination, grimaces of the mimic muscles, dysarthria, rigidity, tremor and choreic movements of both upper extremities were found.

The ophthalmologic examination with a slit lamp found the presence of the Kaizer-Fleischer ring. The diagnosis was confirmed by the analysis of blood caeruloplasmin and urine copper, brain magnetic resonance examination and liver biopsy.

**Indicate:**

A. The neurological (medical) name of laughter attacks.

B. The characteristics of the Kaizer - Fleischer ring.

C. The name of the disease.

D. The absent alfaglobuline in the patient's blood plasma, responsible for transporting copper into the body.

E. The list of curable diseases used for the differential diagnosis.

**RECOMMENDED READING:**

1. ***Mandatory:***
2. Harrison`s Neurology in Clinical Medicine. Editor: Stephen L. Hauser; Associate Editor: Scott Andrew Josephson. Third edition. 2013, 896 p. Varianta electronică a ediției.
3. Neurological examination. Made Easy. Editor: Geraint Fuller. Fourth edition. Churchill Livingstone, 2008, 532 p.

***B. Additional:***

1. Mumenthaler, Mark. Fundamentals of neurology an illustrated guide. – Stuttgart, 2006
2. Rohkamm, Reinhard. Color atlas of neurology / R. Rohkamm. - Stuttgart : Thieme, 2014

***Internet sources:***

1. <http://accessmedicine.mhmedical.com>
2. <http://hinari.usmf.md>
3. <http://www.wipo.int/ardi/en/>
4. <http://accessmedicine.mhmedical.com/>
5. https://reference.medscape.com/

**Note:** The specified manuals are available both in the Medical Scientific Library of Nicolae Testemitanu SUMPh and in the electronic version of the editions at the department of neurology no.1.