METHODICAL INSTRUCTIONS
FOR THE INDEPENDENT WORK OF STUDENTS
FOR PREPARATION TO PRACTICAL CLASSES
AND DURING PRACTICAL CLASSES

<table>
<thead>
<tr>
<th>Educational discipline</th>
<th>Neurosurgery</th>
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</thead>
<tbody>
<tr>
<td>The module №</td>
<td>1</td>
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<tr>
<td>Employment theme</td>
<td>Craniocerebral trauma</td>
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<tr>
<td>Course</td>
<td>V</td>
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<tr>
<td>Faculty</td>
<td>Foreign students training (medicine)</td>
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Poltava 20___
1. **Actuality of the theme:** neurotraumatism is one of the important sections of modern medicine. Trauma of CNS constitutes 30-40% in the general structure of traumatism, and death rate in the young and middle age considerably exceeds vascular and oncological diseases in peace, time, and also is a principal cause of death in wartime. This problem has not only medical, but also a big social significance as the level of traumatism tends to grow staidly.

2. **Specific objectives.** To determine the etiology, pathogenesis, classification, clinical picture of craniocerebral trauma; to define methods of clinical and instrumental diagnostics depending on the type of craniocerebral trauma; to evaluate the results of laboratory and instrumental examination of patients with craniocerebral trauma; carry out a preliminary assessment of the severity of the condition of patients with craniocerebral trauma; differentiate different types of craniocerebral trauma; determine the algorithms of emergency care for patients with craniocerebral trauma; determine the algorithms of conservative and surgical treatment, depending on the type of craniocerebral trauma; to determine the indications for urgent surgical interventions in case of severe craniocerebral trauma and to explain the basic principles of these interventions; determine the prognosis after a craniocerebral injury, explain the development of major complications and possible consequences of craniocerebral trauma; to explain the principles of postoperative treatment and rehabilitation of patients with craniocerebral trauma; demonstrate the ability to provide emergency medical care in emergency conditions in patients with the pathology of the vessels of the brain and spinal cord. Be able to provide first aid to a patient with CCT. Be able to conduct medical sorting of the wounded with CCT.

3. **Basic level of preparation.**

<table>
<thead>
<tr>
<th>The name of the previous disciplines</th>
<th>The skills</th>
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<tbody>
<tr>
<td>Anatomy</td>
<td>To know an anatomical constitution main and a spinal cord, a brain tunic, liqor conductive pathes, anatomy of bones of a skull, a column.</td>
</tr>
<tr>
<td>Histology</td>
<td>To know a histological composition of a brain, a constitution of peripheral nerves, concepts of a neuroglia.</td>
</tr>
<tr>
<td>Neurology</td>
<td>To know procedure of neurologic survey of the patient, localisation of functions in a cortex and a brain fulcrum, principles of an establishment of the topical diagnosis.</td>
</tr>
<tr>
<td>Physiology</td>
<td>To know physiology of generation and transmission of nervous impulse, concept of excitability of the nervous cell. To know procedure of recording</td>
</tr>
<tr>
<td>Area</td>
<td>Description</td>
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<tr>
<td><strong>Topographical anatomy</strong></td>
<td>To know an interrelation of structures of a brain among themselves, brain pots, and osteal structures of a skull and a column, plan of Kronlein.</td>
</tr>
<tr>
<td><strong>Operative surgery</strong></td>
<td>To know trepanation views (bone-plastic, excision), to the technician of carrying out of trepanation and laminectomy. A constitution and a principle of operation of the stereotaxic apparatus.</td>
</tr>
<tr>
<td><strong>Pharmacology</strong></td>
<td>To know drugs and bunches of drugs with the indicating of their dose which are used for treatment of painful syndromes, hyperkinesias, an epilepsy, a children's cerebral paralysis.</td>
</tr>
<tr>
<td><strong>Immunology, fetology</strong></td>
<td>The nobility of the cause of response of a graft rejection (HLA - system), mechanisms of the immune answer, an embryogenesis and principles of formation and differentiation of the nervous tissue.</td>
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</table>

4. **Task for self-study during the preparation for the lesson.**

4.1. List of main terms, parameters, characteristics that students must learn in preparing for lesson: brain stem, focal symptomatology, dislocation, coma, sopor, intracranial pressure, perfusion pressure, mean arterial pressure, penetration furrow, Wilisium circle, trepanation, subdural hematoma, epidural hematoma, intraventricular hemorrhage, subarachnoid hemorrhage, liquorrhoea, Diffuse axonal injury, mass-effekt, edema-swelling of the brain, osmolarity, bruise of the brain.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td><strong>Brain detritus</strong></td>
<td>Crushed brain tissue in the form of porridge, in which there are particles of gray and white matter of the brain, bone fragments, as well as small foreign bodies (scraps of headgear tissue, hair, etc.)</td>
</tr>
<tr>
<td><strong>Dislocation syndrome</strong></td>
<td>Focal symptom complexes resulting from impaired function of a part of the brain that is located at a certain distance, sometimes significant, from the primary pathological focus, which is associated with the dislocation (displacement) of the brain due to pressure differences in different cavities of the craniovertebral space and its alignment.</td>
</tr>
<tr>
<td>Term</td>
<td>Description</td>
</tr>
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<tr>
<td>Cranioplasty</td>
<td>Surgical intervention, the purpose of which is to restore the integrity of the cranial box after traumatic and surgical defects of the skull bones.</td>
</tr>
<tr>
<td>Cerebral edema</td>
<td>An increase in the water content in brain tissues arising as a result of increased vascular permeability of the blood-brain barrier and accompanied by the release of plasma and its components into the intercellular space from the lesion, where the tissue pressure is higher, into the underlying white matter.</td>
</tr>
<tr>
<td>Brain swelling</td>
<td>An increase in brain volume due to an increase in its blood supply in the acute period of traumatic brain injury</td>
</tr>
<tr>
<td>Milling hole</td>
<td>Method for surgical diagnosis of traumatic intracranial hematomas, the initial stage of craniotomy. It is used in cases of impossibility of preoperative verification of the causes of the provided brain compression using modern diagnostic methods (CT, MRI, carotid angiography, etc.)</td>
</tr>
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</table>

4.2. Theoretical questions to the lesson:
1. The causes of a compression of the brain of a traumatic genesis.
2. The basic clinical signs of epidural haematoma.
3. The basic clinical signs of subdural haematoma.
4. The radiological characteristic of the pressed-in fracture of bones of the arch of the skull.
5. The clinical characteristic of intracerebral and intra-ventricular traumatic haemorrhage.
6. Early complications of CCT.
7. Late complications of CCT.
8. The basic clinical signs of a posttraumatic abscess of the brain.
9. Combined CCT. Classification, rendering the specialized medical aid.
11. Primary factors of biomechanics of destructive action on brain tissue.
15. Diffuse axonal damage.
18. Primary surgical treatment for traumatic brain injuries.
19. Types of trepanation, technique, indications.
21. Levels of consciousness, Glasgow com scale.
22. Criteria for determining the severity of the patient's condition.
23. Cronlane scheme.
Emergency care for patients with gunshot head injuries.

4.3. Practical work (task) that run in class:
1. Investigation of the general-somatic and neurological status.
2. Registration of medical documentation.
3. Lumbar puncture.
4. Interpretation of CT, MRI.
5. Ability to carry out resection and bone-plastic trepanation (theoretically).
6. Ability to conduct PCW of head wounds.
7. Definition of the projection of the main trunk of the middle shell artery, the main grooves of the brain according to the Cronlein scheme.

Content of the topic:
Craniocerebral trauma
1. Anatomy-physiological features of the nervous system
Division of the nervous system into the central nervous system and peripheric nervous system. The central nervous system
   - Brain
     ▪ Constitution of an end brain
     ▪ Localization of functions in a cortex of a brain
     ▪ Constitution of a fulcrum of a brain
     ▪ Leading pathes

   - Peripheric NS
     ▪ Segmentary constitution of a spinal cord
     ▪ Metameric constitution of the person
     ▪ Leading pathes

   - Spinal cord
     ▪ Roots of a spinal cord
     ▪ Spinal ganglions
     ▪ Spinal nerves
     ▪ Plexus
     ▪ Peripheral nerves

2. Liquor conductive pathes
   - Brain ventricles
   - Arachnoidal tanks
   - Liquor circulation
   - Function and liquor composition
   - Brain tunic
3. Topographical anatomy
   - Skull constitution
   - Constitution of the backboned canal
4. Blood supply main and a spinal cord:
   - Brain
     - Basin of an intrinsic carotid artery
     - Vertebrobasilar circle
     - Viliziev circle
     - Venous system of a brain
     - brain Sines
   - Spinal cord
     - Spinal arterial tracts
     - Additional arteries (arteries of Adamkevich, Deprozh-Gotterona)

5. Pathophysiological aspects of the nervous activity
   - Intracranial pressure components
   - Methods of measuring ICP
   - Brain perfusion
   - Dislocation - development mechanisms, views

6. Clinical implications
   - Cerebral symptoms
   - Focal symptoms (primary focal and secondary focal):
     - irritation symptoms
     - Symptoms of abaissement (function)
   - Consciousness levels
   - Measure of definition of a state of gravity of the patient

7. The basic methods of surgical interventions
   - Craniotrypesis
   - Bone-plastic
   - Excision
   - Laminectomy

8. Clinical implications
   - Hyperkinesias
   - Children's cerebral paralysis
   - Painful syndromes

9. Neurosurgical methods of the functional and regenerative neurosurgery
   - Stereotaxic operations
   - Electrostimulating methods
   - Transplantation of founder cells

Craniocerebral trauma is a type of head trauma in which soft tissues of the head, skull and intracranial contents (brain, brain membranes, vessels, cranial nerves) are damaged by mechanical energy. Craniocerebral trauma plays a dominant role in the disease and mortality of the population of economically developed countries, it is a global problem not only of neurosurgery, it is a multidisciplinary problem of medicine in general and the whole social sphere.
Annually statistics fix craniocerebral trauma in the range of 200 cases per 10000 population. It is the main cause of death and disability of patients under the age of 45 years. Of the 4 lethal cases due to injuries of all localizations - one is the result of a craniocerebral injury.

**Complications of CCT.**

**Abscess** - a cavity filled with pus and delimited by a capsule from the brain substance.

**Layers of the abscess:**
- zone of disintegration;
- granulation a layer (vessels are located radially in it);
- fibrous (several circularly located vessels);
- perifocal zone.

The capsule is formed from vessels, hence, the deeper the abscess is located in the white substance, the thinner is it capsule. The capsule is the thickest in the cortex.

**Microbes:** more often it is staphylococci (the thickest capsule), diplococci, coli facillus.

**Pathogenesis:** an embolus - ischemia - microbes with walls of the vessel - vasculitis - perivasculitis - distribution of the abscess.

**Kinds of abscess perforation:**
- microperforation - abscesses as "cluster of grapes";
- macroperforation - abscesses can perforate in the brain substance, in ventricles of the brain, in to the subarachnoidal space.

By terms of occurrence there are early (till 3 months) and late (after 3 months) abscesses. The capsule of the abscess is formed not earlier than 3-6 weeks. Till this time it is possible to wash it out with solutions of antiseptics and antibiotics (Canamycin, Levomycetin, Gentamycin) through a fistula and drainage. As a result of it the cavity is formed which is then removed, or the cavity is closed gradually by itself and pushes out a drainage. This tactics is acceptable in deeply located abscesses.

**Kinds of a surgery:**
- drainage;
- puncture;
- total removal.

The clinical picture of the early abscess develops from general brain and focal symptoms.

Late abscesses have a course as:

**apoplexies:** sudden development of general brain symptoms. More often death occurs the first 24 hours. Blood and the eye fundus can not react in any way.

By the course there are acute the period, latent, marked clinical manifestation (or - early manifestation, latent manifestation of the abscess, terminal. The latent period is a silent course of the abscess).
*pseudotumorous variant of the course.* Blood does not react. On the eye fundus stagnation is determined. The general brain and focal manifestations gradually grow.

More than 50% of all abscesses are accompanied by epileptic attacks. In 30% of cases they are first signs of the abscess. They have s course as the general and focal generalized attacks. There is marked polymorphism of attacks (multifoci in a trauma and growth of the abscess).

**Diagnostics:**
- examination of the head;
- anamnnesis;
- R-graphy of the skull;
- Echoencephalography;
- investigation of the eye fundus;
- EEG - in development of seizures (only for lateralization of the process);
- angiography, CT-SCAN, MRI, scintigraphy.

**LATE COMPLICATIONS OF CCT - THE POSTTRAUMATIC EPILEPSY**

**Epilepsy** is a pathological excitation of the brain accompanying by convulsive or convulsive-free attack.

**Factors:**
- convulsive readiness of the brain;
- presence of the epileptogenic center - cicatrices (cerebral, meningeal - cerebral, it is cutaneous - meningeal-cerebral);
- consequences of the inflammatory process;
- development of subarachnoidal cysts (inflammation, subarachnoidal haemorrhages);
- presence of foreign bodies (a bone, a bullet, splinters, soft tissues);
- hydrocephalus of the brain.

**Structure of epileptic attacks:**
- great
- **the general the patient** - suddenly loses consciousness, falls, the face reddens, the tonic spasms passing in to clonicoues, cyanosis of integuments, involuntary urination.
- **the focal** - always there is an aura (motor, sensor, psychosensor, vegetative)
- **Jackson** attacks without loss of consciousness and without generalization of spasms (motor and sensor) - convulsive discharge in some group of muscles, paresthesias in some extremity. It upper parietal lobule is affected the attack proceeds by hemitype.
- **psychosensor equivalents** - petit mall - short-term, loss of consciousness for 20-30 seconds without any convulsive component and without falling down.

**Phases of formation of the cicatrix of the brain:** glial, argirophil, collagenic.

**Examination of the patient with seizures:**
- R-graphy of the skull in two projections;
- EEG - acute wave are determined in the focus. In irritation (by light, sound, hyperventilation, bemegrid 1 ml, thyopental sodium - slower waves are determined
Indications to the operation:
- morphological
- cicatrices;
- abscesses;
- foreign bodies;
- the pressed-in fractures;
- adhesive or cystic arachnoiditis
- clinical
- absence of effect of medicamentous treatment at often attacks;
- progredient course of the disease;
- increasing degradation of the personality.

Contra-indications to the operative intervention:
- massive adhesive processes;
- multiple wounds (fraction);
- processes in the vital sections of the brain.

**COMBINED CCT**
The combined trauma - simultaneous injury by one kind of mechanical energy of two or more anatomical-topographical systems (craniovertebral, cranio-transabdominal).

Multiple trauma - simultaneous injury by one kind of damaging energy of one body, or several bodies of one system (multiple contusions of the brain, multiple fractures of the lower extremity).

The combined affection - injury of the organism by various damaging factors working simultaneously (mechanical, thermal, radial energy).

Classification:
- damages of the facial skeleton
- damages of the thorax and respiratory organs
- damages of the abdominal cavity
- damages of the spine and spinal cord
- cranial damages

Classification of combined CCT by a degree of severity:
- severe CCT and severe extracranial (shock in 70 %)
- severe CCT and not severe extracranial (shock in 14-15 %)
- not severe CCT and severe extracranial (shock in 40-50 %)
- not severe CCT and not severe extracranial (shock in 4-5 %)

The leading part in development of shock in CCT is played by an extracranial pathology. The shock in isolated CCT develops in:
- multiple injures of the bones of the arch and the basis of the skull (of type)
- multiple injures of soft tissues of the head (of hemorrhagic type)
- in children (any haematomas can cause a hypovolemic shock)

Difference of shock from damages of the brain stem. If there is a decrease of hemodynamics, disturbances of breath and stem (floating eyeballs, anisocoria,
Chaine-Stocks respiration) it should be attributed to CCT. Isolated CCT has shock in 1-1.5 % of cases.
In mild CCT there is an amplification of function of the hypophysis (secretion of CTH grows), promoting the prompt formation of an osseous callous. And in severe CCT - function of the hypophysis is suppressed.

**Facial damages:**
- single fracture of the jaw
- traumatic extraction of a tooth
- injures of soft tissues, without a severe bleeding
- Лєфор 2, 3
- multiple damages of the facial skeleton

**Thoracic damages**
- fracture of the clavicle
- fracture up to 3 ribs without damage of the organs of the chest, nerves and vessels
- fracture of ribs with damage of the vessels
- damage of the organs of the chest
- hemo-pneumothorax
- damage of the organs of the mediastinum

**Transabdominal damages**
- subserous rupture of the gut
- any damages of hollow and parenchymatous organs

**Vertebral damages**
- fracture of bodies, arches, but without damage of the spinal cord and roots
- fracture of bodies, arches with damage of the spinal cord or roots

**Damages of the locomotor system:**
- the closed single fracture of the forearm, shin
- fracture of the pelvis, hip, open fractures, multiple fractures of bones, tearing off of the feet

**FATTY EMBOLISM**
Fatty embolism is characterized by sudden, quick onset (hemiparesis or a plegia, disturbances of consciousness, narrow pupils). In LP - liquor is pure or hemorrhagic. On the 2nd-3rd day there is fat in urine. Typically haematoma has a gradual onset. Fatty microthrombembolism occurs more often in the diencephalic areas.

**Differential diagnostics of fatty embolism and intracranial haematoma**

<table>
<thead>
<tr>
<th>Intracranial haematoma</th>
<th>Fatty embolism</th>
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<tbody>
<tr>
<td><strong>Severity of a craniocerebral trauma</strong></td>
<td></td>
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<tr>
<td>characteristic severe CCT</td>
<td>the combined damages and CCT are usually a little milder</td>
</tr>
<tr>
<td><strong>Severity of the combined damages</strong></td>
<td></td>
</tr>
<tr>
<td>various</td>
<td>usually severe</td>
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</tbody>
</table>
### Disturbance of consciousness

<table>
<thead>
<tr>
<th>Gradual aggravation of a degree of disturbance of consciousness</th>
<th>Sudden sharp disturbance of consciousness</th>
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### Pyramidal symptoms

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<tr>
<th>Gradual increase</th>
<th>Are sharply expressed at once. If there is no pyramidal manifestation, diencephalic and mesencephalic signs develop (paresis of the look, narrowing of pupils, floating eyeballs)</th>
</tr>
</thead>
</table>

### Eye fundus

<table>
<thead>
<tr>
<th>Vessels are dilated</th>
<th>Spasm of the arteries, haemorrhages, veins are fragmented</th>
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### Echoencephalography

<table>
<thead>
<tr>
<th>Displacement of the M-echo</th>
<th>There is no displacement of the median structures</th>
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### Lumbar puncture

<table>
<thead>
<tr>
<th>The increased pressure, blood in liquor</th>
<th>Transparent or xanthochromatic</th>
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</table>

### Diagnostic mill apertures

<table>
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<tr>
<th>Haematoma</th>
<th>Nothing is defined</th>
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### R-graphy of the lungs

<table>
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<tr>
<th>There is no thing</th>
<th>The lung with &quot;snow&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Petechial rash on a lateral surface of the stomach, fat in urine on the 2nd-3rd day</td>
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</tbody>
</table>

For the prevention of development of fatty embolism in patients with the combined trauma it is necessary to administer the preparations having immediate effect:

- Rheologic properties of blood
- Lipin, Lipostabil, Essentiale
- Antagonists of calcium (Verapamil, Nifedipine)
- To increase ОЦК (10% NaCl 100 ml + 100 ml Rheopolyglucin)
- ГОМК, Nootropics, Difenin
- Transfusion of liquids under the control of intracranial pressure (the control of blood osmolarity: if osmolarity is normal - intracranial pressure is normal too, if osmolarity of plasmas is reduced - intracranial pressure is always increased). It implies, that in the first 2-3 days it is better to administer osmodiuretics, and then saluretics.
- Carrying out of functionally stable osteosynthesis (plates, a spoke, but not a nail):
  - The first 4-6 hours – in mild or moderate CCT without disturbances (shock)
  - On removing from a shock - in mild or moderate CCT and a shock accompanying it
  - After stabilization of vital functions – in severe CCT with vital disorders

If fatty embolism has developed, it is necessary to influence development of collateral vessel. Transfusion of liquids under the control of intracranial pressure (the control of blood osmolarity: if osmolarity is normal - intracranial pressure is
normal too, if osmolarity of plasma is reduced - intracranial pressure is always increased).
- Antagonists of calcium
- increase of resistency of the brain tissue to hypoxia
- The Signay-cocktail - is introduced once a day intravenously

<table>
<thead>
<tr>
<th>500 ml of 20 % Mannitol</th>
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<tbody>
<tr>
<td>50 mg Dexasone (Metipred)</td>
</tr>
<tr>
<td>500 mg of vitamin E</td>
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<tr>
<td>500 mg Difenine</td>
</tr>
</tbody>
</table>
- solutions
- Lipostabil, Inhibitors of proteases, Essentiale

**Materials for self-monitoring:**

**A. Tests.**

1. The compression of the brain belongs:
   A. subdural hematoma
   B. linear fracture of the skull
   C. Starry cranial fracture
   D. contusion of the brain
   E. concussion of the brain

2. Concussion of the brain refers to biomechanism:
   A. shock-shockproof type
   B. type acceleration-deceleration
   C. The hydrodynamic type
   D. Cavitation type
   E. there is not a single correct answer

3. A bruised brain contusion of light degree requires treatment:
   A. Conservative
   B. Surgical
   C. Radial
   D. chemotherapeutic
   E. does not require treatment

4. Impaired consciousness with concussion of the brain observed:
   A. to 20 minutes.
   B. 30-60 minutes.
   C. 1-2 hours.
   D. Day 1-2
   E. 10-12 hours.

5. In the clinic of a mild severity bruised brain is main:
A. Focal symptomatology
B. impairment of vital functions
B. general cerebral symptoms
D. radicular symptoms
D. all answers are correct

6. In the clinic, a moderate level of brain contusion is prevalent:
A. Focal symptomatology
B. Disruption of vital functions
C. Cerebral symptomatology
D. Root radicular symptoms
E. All the answers are correct

7. In the clinical picture, a severe brain contusion is prevalent:
A. Focal symptomatology
B. impairment of vital functions
C. general cerebral symptoms
D. radicular symptoms
E. all answers are correct

8. For a severe brain contusion, a characteristic loss of consciousness:
A. to 20 minutes.
B. 30-60 minutes.
C. 1-2 hours.
D. a few hours and more
E. 10-12 hours.

9. Diffuse axonal injury by biomechanism:
A. shock-shockproof type
B. type acceleration-deceleration
C. The hydrodynamic type
D. Cavitation type
E. there is not a single correct answer

10. Depressed fracture by the type of ball for ping-pong characteristic for:
A. Children
B. people of advanced age
C. Older people
D. Teenagers
E. there is not a single correct answer

11. Causes of cerebral compression:
A. epidural hematoma
B. subdural hematoma
C. crushed fracture of the skull bones
D. pneumocephaly
E. all answers are correct

12. Methods of neuroimaging:
A. REG
B. EEG
C. ECG
D. MRI
E. Angiography

13. For a concussion of the brain is characteristic:
A. no change in CT
B. presence of a fracture of the bones of the cranial vault
C. the presence of blood in a general analysis of cerebrospinal fluid
D. The presence of vital disorders
E. all answers are correct

14. For a mild brain injury on CT, it is characteristic:
A. no change
B. hypodense focus
C. subdural hematoma
D. Hyperintensive focus
E. intracerebral hematoma

15. Cerebral edema can have
A. local character
B. hemispheric character
C. Generalized nature
D. answer a, b, c, faithful
E. there is not one correct answer

B. Situational tasks
1. Patient A, 67 years, a long time suffers an idiopathic hypertensia, to the doctor was not converted, has entered in hospital in a grave condition with acute disturbance of a cerebral circulation. In the neurologic status the quick aphasia, a right-hand penetrating hemiparesis, consciousness level - the penetrating deafenation is observed. To specify vascular basin in which there is a circulation disturbance, tactics of the subsequent conducting the patient.

2. Patient B, 34 years, is delivered by brigade in a reception from a road accident place. The skin and visible mucosas acyanotic, acrocyanosis, bubbling rales are spotted distantly, breath superficial, at a thorax palpation the crepitation is spotted, at a palpation of pelvic bones - pathological motility. BP 80/40мм hg, Pulse 130 in minute, the Abdomen slightly exerted. To painful stimuluses of the patient does not react, the tonus of muscles is reduced, reflexes without an accurate odds of the legs, meningeal symptoms do not cause, the photoreaction of pupils is reduced,
corneal jerk is maintained, speech contact misses. Locally - scalped wound of the right frontally-parietotemporal field, with presence of a moderate bleeding, plural grazes of a trunk, the extremities, the expressed paraorbital hematomas of both eyes, with presence chemosis, traces of a stomatorrhagia, a nose, the right ear. Define gravity of a state of the patient, level of disturbance of consciousness, set the previous diagnosis and algorithm of granting of the help.

3. Patient B, 74 years is found in the street. A skin and visible mucosas pale, acrocyanosis, breath superficial, BR 40. The AP 170/100 мм hg, Pulse 62 in minute. On painful stimuluses of the patient does not react, the tonus of muscles is reduced, reflexes D> S, meningeal symptoms do not cause, pupils D <S the photoreaction is reduced, corneal jerk is maintained, speech contact misses, response to a pain misses. Местно - a chin graze. A nucha muscle tension (2p/p), с-м of Kernig (+++) from 2 sides. Define consciousness level, gravity of a state of the patient, the list of necessary surveys to (prove), tactics of conducting the patient, the topical diagnosis.

4. The young man of 18 years is delivered in a reception after road accident. In the consciousness, completely oriented, but witnesses reporting about the short season of a syncope after a trauma. On a craniography fracture of the left temporal bone becomes perceptible. After roentgenography the patient subitaneously loses consciousness and the doctor notes dilatation of the left pupil. What most reliable diagnosis? What, in your opinion, has caused an aggravation of symptoms of the patient?

5. The 25-year-old patient complains of a headache, vomiting by "fountain". Was ill within a week. Has ceased to walk in connection with sharp unsteadiness, sight was broke. Objectively: an atony, ataxy, a nystagmus. In posture of Romberg drops to the left. The Finger-nose test carries out with intentional tremor, miss from both legs. The most probable diagnosis?

6. During a lumbar puncture the 4-year-old child with suspicion on a brain tumour had an intensive headache in a nucha, rotation nystagmus, vomiting, a dysarthria, pathological reflexes from two legs, breath and pulse disorder. What educes at the child?

7. The patient of 65 years, going in the winter in the morning on slippery road, has fallen, has strongly hit a nucha, there was a transient loss of consciousness. Home has returned independently with a moderate headache. Towards evening the headache has considerably strengthened, there was a vomiting, the patient became sleepy, there was a delicacy and a numbness in the right extremities, was observed the Jackson's epilepsy attack. It is hospitalised in neurosurgical unit where the acute subdural hematoma is diagnosed. What treatment in this case should be made quickly to salvage life to the patient?
8. The patient of 36 years as a result of road and transport incident has gained a serious craniocerebral trauma, is in a coma. At M-ehoentsefalografii to the right on 12 mm. On a computer tomography shift of median structures of a brain is found in a parietofrontal field at the left the subdural hematoma in the dimension 6x7x7 is found. What most correct tactics of treatment see?

9. Patient M, 60 years, in the evening, after operation has felt a headache, has fallen, has lost consciousness. From the anamnesis it is known: 15 years are ill with an idiopathic hypertensia. Objectively: the BP of 200/100 mm hg, pulse 80 in minute Consciousness misses. Right nasolabial fold is smoothed. Tendinous and periosteal disorders are not observed. A muscular tonus low. During survey in the left extremities the minimum locomotions are noted.

10. During carrying out of trepanation of a brain in a frontotemporal field on the right the patient age of 48 years, at an access stage has an intensive bleeding against rising of arterial pressure. You know what methods of a stopping of a bleeding, and at what stages of carrying out of bone-plastic trepanation they are used.

11. The patient of 36 years as a result of road and transport incident has gained a craniocerebral trauma. At survey consciousness level on Glasgo scale - 11, hemodynamically stable, breath independent, vesicular, is auscultated from both legs, in the neurologic status: a link sided hemiparesis, roentgenologic damages of bones of a calvaria it is not revealed, the ECHO-ES without shift. Define gravity of a state of the patient, subsequent tactics of conducting.

12. The 7-year-old child is delivered in clinic after accident with fracture of the upper jaw. Losing consciousness, the child tore. In 2 hours has regained consciousness, answered a question. In 4 hours the sopor has educed. Pulse 180 / minute Convulsive cuttings of the left extremities. An anisocoria. What diagnosis can be admitted in this case?

13. The patient of 60 years, is delivered from natural apartment by brigade, at survey the patient in consciousness, the treatment answers truly, is oriented in a place and space, complains of the expressed headache, is promptly exhausted, was ill acutely after a psychoemotional strain. Somatic - without an acute pathology. In the neurologic status - an easy paresis in the right arm, speech is maintained. Define gravity of a state of the patient, subsequent tactics of conducting.

14. The patient of 24 years has fallen to feet from a balcony 4 floors. Has felt a sharp dorsodynia through which self-contained could not rise. At survey the lordosis smoothness in lumbar department of a column becomes perceptible. Locomotions in lumbar department of a column are sharply circumscribed. Thrust force on a column the positive. A palpation of acanthas painful, especially 12-
thoracal. Sensitivity and locomotions of the inferior extremities are not broken.
What most reliable diagnosis?

15. The patient of 24 years during diving in the river has felt delicacy, a numbness in extremities which have occured after impact by a head in river bedrock. Has got out on coast by means of associates. At hospitalisation at the patient a skin light pink, breath is relaxed in n/departments, a BP of 100/70 mm hg, pulse of 84/minute, a gaste soft, takes over restricted participation in the breath certificate, the emicition does not check. In the neurologic status - the upper paraparesis, the inferior paraplegia, a hypesthesia from level 5 thoracal segments, the penetrating sensitivity miss. Specify the diagnosis, define gravity of a state of the patient, subsequent tactics of conducting.

**Literature.**

**Basic:**

**Additional:**

Informational resources:

www.umsa.edu.ua
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1532378/
http://www.neurooperations.com/

Methodical development is made by Pinchuk V.A.
Methodical development is revised and ratified on meeting of department nervous illnesses

with additions (by changes)

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