MINISTRY OF HEALTH OF UKRAINE

ODESA NATIONAL MEDICAL UNIVERSITY

Faculty of Medicine №2

Department of Neurology and Neurosurgery

APPROVED BY
Vice-Rector for Scientific and Educational Work
_____ Eduard BURIACHKIVSKYI
«_ _» _____ 2024

TEACHING MATERIAL
FOR ISW CLASSES ON THE ACADEMIC SUBJECT

Faculty, Course: Stomatological, 4th year
Academic Discipline: **Neurosurgery**

Approved by:
Meeting of the Department of Neurology and Neurosurgery
Odesa National Medical University
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INDEPENDENT STUDENTS WORK

ISW No. 1

Topic: Stages of development of neurosurgery.

Relevance of the topic : using the example of the history of the development of neurosurgical science to show students the importance of neurosurgery in the structure of specialized medical care the population

Objectives of the lesson :

Educational objectives:

- to acquaint students with the organization of neurosurgical care.
- the student must know the main nosological forms of neurosurgical pathology
- the student must be able to examine a patient with neurosurgical pathology, provide emergency aid at the scene, during transportation and in the reception departments
- to bring student to fold algorithm examination the patient with neurosurgery pathology

Educational goals:

To take part in the formation in students of the principles of deontology, medical ethics, professional responsibility in general and in contact with patients with neurosurgery pathology

Specific objectives:

know:

1. The main nosological forms of neurosurgery pathologies.
2. The scheme is a plan for studying psycho -neurological status the patient
3. Main types of paraclinical methods examination.
4. Basic standards of examination of a patient with neurosurgery pathology

Content occupation.

The history of the development of neurosurgery in Ukraine, Odesa is taught. Basic clinical and paraclinical examination methods. Algorithm for providing specialized medical care to patients with brain and spinal cord pathology. Indications and contraindications for conducting basic neurosurgical examination methods. The technique of their implementation.

Literature:

1. Neurosurgery: textbook / [V.O. Pyatikop , I.O. Kutovyi, A.V. Kozachenko and others] ; under the editorship V.O. Pyatykop - Kyiv, VSV "Medicine", 2019 - 152 p.
2. Neurosurgery: textbook / [V. I. Tsimbalyuk, V. V. Medvedev, M. O. Marushchenko and others] ; under the editorship Acad. V. I. Tsimbalyuk. - 2nd edition. added , revised – Vinnytsia: Nova Kniga, 2020. – 360 p.
3. Grigorova I.A., Sokolova L.I., Gerasimchuk R.D., Son A.S., and others. Neurology // Instructional manual edited by I.A. Grigorova, L. I. Sokolova - 3rd edition - Kyiv, Medical University "Medicine", 2020 - 640 p.
4. Topical diagnosis of pathology of the nervous system. Diagnostic search algorithms. Shkrobot S.I., Saliy Z.V., Budarna O.Yu. Ukrmedknyga , 2018. – 156 p.
5. Methods of examination of a neurological patient: training . Guide / edited by L.I. Sokolova , T.I. Ilyash . K., 2020. - 144 p.

Emergency medicine. Emergency medical care: textbook / I.S. Zozulya, V.I. Bobrova, H.G. Roschyn and others / edited by I.S. Cuckoos - 3rd edition, trans. and additional - Kyiv. - VSV "Medicine", 2017. - 960 p.

6. Negrych T.I., Bozhenko N.L., Matvienko Yu.Sh. Ischemic stroke: secondary inpatient care: study . help Lviv: LNMU named after Danylo Halytskyi, 2019. - 160 p.
7. Handbook of Neurosurgery / Greenberg M. S. - Thieme , 2019. - 1784 p . ISBN 9781684201372

8. Neurology - Neurology: textbook / IA Hryhorova , LI Sokolova , RD Herasymchuk et al .; edited by IA Hryhorova , LI Sokolova . – Kyiv : AUS Medicine Publishing , 2017. - 624 p.

Additional literature:

1. Bozhenko M.I., Negrych T.I., Bozhenko N.L., Negrych N.O. Headache. Study guide.- K.: Medknyga publishing house , 2019.-48 p.

Information resource

1. Clinical guidelines and other publications on neurosurgery (State institution A.P. Romodanov Institute of Neurosurgery of the National Academy of Sciences of Ukraine) https://neuro.kiev.ua/uk/category/publishing-uk/

ISW No. 2

Topic : Aditional methods of examination in neurosurgery.

Relevance of the topic: The importance of auxiliary research methods in the diagnosis and development of pathogenetically justified treatment of diseases of the central nervous system."

The purpose of the lesson: to acquaint applicants with examination methods in neurosurgery.

Lesson content.

The value of auxiliary research methods in the diagnosis and development of pathogenetically justified treatment of diseases of the central nervous system.

Basic clinical and paraclinical examination methods. Algorithm for providing specialized medical care to patients with brain and spinal cord pathology. Indications and contraindications for conducting basic neurosurgical examination methods. The technique of their implementation. Analyze the data of clinical examination methods. Evaluate the data of X-ray examination. Evaluate the data of X-ray contrast examination methods.

Literature:

1. Neurosurgery: textbook / [V.O. Pyatikop , I.O. Kutovyi, A.V. Kozachenko and others] ; under the editorship V.O. Pyatykop - Kyiv, VSV "Medicine", 2019 - 152 p.

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Additional literature:

1. Bozhenko M.I., Negrych T.I., Bozhenko N.L., Negrych N.O. Headache. Study guide.- K.: Medknyga publishing house , 2019.-48p.

Information resource

1. Clinical guidelines and other publications on neurosurgery (State institution Institute of Neurosurgery named after Academician A.P. Romodanov of the National Academy of Sciences of Ukraine) h ttps://neuro.kiev.ua/uk/category/publishing-uk/

2. Clinical guidelines in neurology. (Order of the Ministry of Health of Ukraine No. 487 dated August 17, 2007)
https://zakon.rada.gov.ua/rada/show/v0487282-07#Text

ISW No. 3

Topic: Gunshot wounds to the skull and brain.

Relevance of the topic: Gunshot wounds of the skull and brain, their classification and clinic, first medical aid are very relevant during military operations.

The purpose of the lesson: to acquaint applicants with gunshot wounds, their classification and clinic, diagnostics, first aid.

Lesson content:

A modern gunshot wound can be inflicted by firearms (rifled, smooth-bore) and explosive (table and improvised). Injuring projectiles can be metal, plastic, etc. In this regard, gunshot wounds are characterized by a complex topography of wound canals, spaciousness and depth of tissue and organ damage, multiplicity and severity of the clinical course. In these conditions, medical triage (in the case of a mass defeat) and the sequence of medical, especially surgical, measures are of great importance. A doctor who provides assistance to a patient with a gunshot brain injury must determine who, where, when and by whom should operate. It is important to determine the nature and severity of the injury. Knowledge of this topic is necessary for doctors of all specialties. Until now, gunshot wounds were studied during military operations. In recent years, the number of gunshot wounds in peacetime has increased dramatically. Most surgeons have little experience in the treatment of gunshot wounds.

Classification of VCHMP

All injuries to the skull are divided according to the type of projectile that injures:

1 Bullets
2 shrapnel,
3 shrapnel,
4 as a fraction,
5 arrow-shaped elements,
6 homemade castings.

According to the nature of the injury:

1 - injury of soft tissues
2 - non-penetrating injuries without damage to the dura mater
3 - penetrating

According to the type of wound channel:

1 - tangents
2 - ricocheting (one hole that is both input and output)
3 - through wounds

4 - blind wounds
5 - rapid injuries

Medical-organizational and medical-technical features of peacetime ensure a better quality of diagnosis than in wartime.

In peacetime, there should be no definition of "wounds incompatible with life" for two reasons:

1 small but existing survival rate
2 refusals from treatment equivalent refusal progress in medicine

General principles of diagnosis:

1 Primary diagnosis should be quick and complete.
2 General clinical and neurological research with using the necessary instrumental and laboratory methods.
3 Application of complex studies - (AG) clearly according to indicators.
4 Instrumental diagnostics according to the principle of "instrument for the wounded", except for CT, MRI.
5 Diagnostic measures should be completed immediately after diagnosis, and then all attention is paid to treatment, including the surgical method.
6 All diagnostic studies are carried out in parallel with resuscitation measures, they do not compete, but complement each other.

Craniography is the first and mandatory research method. Determines the presence of a foreign body in the cranial cavity, multiple injuries, the type of weapon that injures, and the distance from which the shot was fired.

CT, MRI of the brain.
Cerebral angiography.
Ultrasound examination in the form of TCDH according to indicators.
Electrophysiological studies have general neurosurgical significance. Bacteriological studies (culture) for antibiotic treatment.

Surgical treatment.

The main principles are based on the mechanisms of pathogenesis. A gunshot wound can be distinguished:

3 zones

1 a) zone of the primary wound channel,
2 c) zone of contusion,
3 c) zone of molecular shock.

All of them firearms wound with moment their causing – bacterially contaminated.

In the course of a gunshot wound to the brain, 5 periods are distinguished:

1 1) initial period of length (up to 3 days);
2 2) the period of early reactions and complications of infection, dyscirculation (from the 3rd day to 3 weeks);
3 3) the period of elimination of early complications (from the 3rd-4th week to 3 months);
4 4) the period of late complications (up to 2-3 years).
5 5) the period of remote consequences, connected mainly with the presence of a meningeal scar.

The most important element of treatment is surgical treatment of the wound. Operations are contraindicated only in the state of atonic coma with bilateral paralytic mydriasis, violations of vital functions. This category of wounded needs symptomatic therapy.

Surgical treatment of soft tissue wounds is carried out under local anesthesia after a thorough toilet of the head and includes sparing excision of the edges of the wound.

Early radical surgical treatment of the wound with the removal of all foreign bodies, liquid blood and blood clots, brain detritus with washing of the wound with antibiotics, its active drainage, meningeal plastic, contributes to the prevention of purulent complications.

They distinguish:

1 primary surgical treatment of the wound;
2 secondary surgical treatment of the wound;
3 repeated surgical treatment of the wound.

Primary surgical treatment of the wound - is carried out in the wounded in the first place.

Secondary surgical wound treatment is an intervention for secondary changes in the wound caused by various complications.

Repeated surgical treatment of the wound is an operation, the second in the account, carried out even before purulent complications when the primary surgical treatment was inadequate.

Types of operations:

- surgical treatment of wounds of soft tissues of the head;
- surgical treatment of non-penetrating wounds of the skull;
- surgical treatment of penetrating wounds of the skull;
- surgical treatment of penetrating tangential and ricocheting wounds of the skull and brain;
- surgical treatment of blind penetrating craniocerebral injuries;
- surgical treatment of penetrating craniocerebral injuries.

Early treatment gives the best results.

The results of surgical treatment, functional results are satisfactory and good depending on the type of injuries and the quality of care.

Combined injuries of the facial skull and brain occur from 5 to 55% - this is not just a summation of injuries, because the brain and executive organs suffer, which significantly complicates the condition of patients. "Double blow" in a third of cases is complicated by traumatic shock. The erectile phase of shock is often prolonged, and often with normal blood pressure and the absence of tachycardia. In this connection, the assessment of others is important. shock parameters: BP instability, low pulse pressure, oliguria , reduction of BCC, CVT.

Features of damage to the facial skull with TBI include:

1 The frequency of gross respiratory disorders due to occlusion of the left ventricle.
2 Swelling and deformation faces make it difficult assessment state probable possibility of massive blood loss.
3 The threat of liquorice or its presence.
4 A kind of long-term hypochondriac condition caused by facial deformation.

Purulent complications develop more often after penetrating and connected wounds:

- meningitis - 27%;
- ventriculitis in 8%;

Literature

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2. Neurosurgery : Textbook / V.I. Tsymbalyuk, B. Luzan , I.P. Dmyterko and others ; under the editorship Acad. V. I. Tsymbalyuk . - Vinnytsia : Novaya kniga, 2011. - 304 p. ISBN 978-966382-371-3.

3. Lutsik A.A., Roerich V.V., Bondarenko G.Yu. Spinal cord injury. Educational allowance . Novokuznetsk , 2011.- 84 p.

4. Surgery for cerebral aneurysms . Ed . V.V. Krylova . In three volumes. Volume I. M., 2011.- 432 p. - ISBN 978-5-94982-050-6

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9. Greenberg J.O. (ed): Neuroimaging: A companion to Adams and Victor's Principles of Neurology, New York, McGraw-Hill, 2010.

ISW № 4

Topic: Peculiarities of management of incurable patients and the use of palliative treatment methods in neurosurgical practice

Relevance of the topic: palliative care covers the period from the moment of diagnosis of an incurable disease to the end of the period of bereavement; the duration of this period can vary from several years to weeks (or less often - days). It is not synonymous with terminal care, but includes the latter.

The purpose of the lesson : familiarization with the concept of palliative care and provision of adequate analgesia, optimization of symptomatic treatment and rehabilitation of patients with chronic pain syndrome regardless of the type of pain, improvement of the quality of life of the sick person and the people who care for him.

Lesson content:

- Definition of incurable to the patient
- Definition of palliative care
- Palliative care procedure for terminally ill patients.
- Medicinal and non-medicinal methods of treatment.
- Types of chronic pain.
- Assessment of the patient's quality of life.
- Karnovsky index

Literature

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ISW No. 5

Topic: Brain abscesses, epiduritis.

Relevance of the topic: A brain abscess is a limited accumulation of purulent exudate in the brain substance. The formation of an abscess is associated with the penetration of an infection into the brain.

The purpose of the lesson: To acquaint students with the etiology of brain and spinal cord abscesses. Clinic of brain abscesses of various localization. Diagnosis of brain abscesses.

Principles of surgical treatment of brain abscesses and epiduritis. Prevention of brain and spinal cord abscesses.

Lesson content.

- Definition of brain abscess - abscess as a nosological form of inflammatory brain lesion.
- Classification of brain abscesses (by number, location, cause).
- Pathomorphological features of brain abscess.
- Etiology of brain abscess.
- Pathogenesis of brain abscess.
- Clinical course of brain abscesses.
- Examination and diagnostic methods.
- The principle of conservative therapy.
- Indications and methods of surgical treatment.
- Be able to make a general examination of the patient and highlight the main symptoms for making a clinical diagnosis of a brain abscess.
- Assess the severity of the patient (determine the degree of compensation, subcompensation , decompensation).
- Be able to build an examination plan.
- Make a lumbar puncture (under the guidance of the teacher).
- Make an appointment for examination of the patient.
- Determine the main links of pathogenetic therapy and build an algorithm of treatment measures.

Literature

1. Handbook of Neurosurgery / Greenberg MS – Thieme , 2019. – 1784 p. ISBN 9781684201372
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ISW No. 6

Topic: Malformations of the brain and spinal cord.

Relevance of the topic: Defects in the development of the brain and spinal cord, the spine remain relevant in the section of neurosurgery, as the treatment of children with this pathology is surgical.

Educational goals:

Know:

1. Types of craniocerebral hernias
2. Meningocele
3. Meningoencephalocele
4. Meningoencephalocystocele
5. types of spinal hernias
6. Meningoradiculocele
7. Meningoradiculomyelocele

Be able:

1. Make a treatment plan
2. Set indicators for surgical treatment

Topic content:

Craniocerebral hernia

It occurs as a result of a malformation of the skull and brain, when the brain and its membranes protrude outward due to a congenital defect of the bones of the skull. There are several theories explaining the origin

Cerebral hernia. According to one of them, a brain hernia is formed as a result of inherited intrauterine diseases. Proponents of the second theory put disorders of embryonic development in the first place. The hernia occurs along the midline in the places of fusion of embryonic rudiments, from which the craniofacial skeleton is formed. Most often, the hernia is localized in the area of the fronto -nasal seam and near the inner corner of the eye (anterior cerebral hernia), less often - in the occipital region (posterior cerebral hernia).

Occasionally, a primary hernia occurs, when the brain and its membranes protrude into the nasal cavity or nasal part of the throat due to a bony defect in the area of the base of the skull. At the same time, there are no external signs of a hernia, and the protrusion is often diagnosed as a polyp. Depending on the contents of the hernial sac, several types of cranial hernia are distinguished .

Meningocele

Meningocele - protrusion of the soft shell of the brain due to a defect in the skull and dura mater. In the area of the hernia formation, the soft shell is thickened and has a gelatinous consistency . The dura mater does not participate in the formation of the hernia sac, it is attached to the edges of the bone defect from the side of the skull cavity.

Meningoencephalocele is the most common type of brain hernia (the hernial sac, in addition to the membranes, contains altered brain matter).

Meningoencephalocele, Meningoencephalocystocele Meningoencephalocystocele - protrusion of membranes and brain tissue together with

part of the ventricle of the brain (in the case of an anterior brain herniation - the anterior horn of the lateral ventricle, the posterior horn - the posterior horn).

The main symptom of a craniocerebral hernia is a protrusion of soft tissues in the area of the skull of different sizes, which sometimes , especially in the case of a posterior craniocerebral hernia, can exceed the size of the child's head.

The skin above the hernia formation is often scarred or thinned, sometimes it may not be in this place , the protruding area is covered with a thin translucent film. The skin may be affected by ulcers, with liquefied fistulae. When the child is crying and straining, the hernia can increase in size and change its consistency.

During palpation of the hernia, fluctuations and dense inclusions are sometimes detected . In the case of a large defect, the bones can be seen pulsation of the hernial sac. In children with an anterior cerebral hernia, the bones of the nose are deformed, the distance between the eye sockets increases, the hernia sac can protrude into one or both of them , displacing eyeballs outward.

Focal neurological symptoms of brain herniation are insignificant or may not be present. Sometimes there is a significant lag in mental development, there may be seizures, convulsions.

Medical treatment

Treatment of children with cranial hernia is surgical . The essence of the operation consists in the removal of the hernial sac and its contents , plasticity of the bony defect of the skull, and in the case of an anterior cerebral hernia , also in the maximum possible elimination of the cosmetic defect using plastic surgery methods.

Surgical treatment of anterior cerebral hernia. Access is often intracranial . At the same time, the best conditions are provided for removal of the neck of the hernial sac , its ligation and separation , as well as for plasticity of the defect of the dura mater and bone . There are two methods of intracranial operations. Therefore, the subdural method of operation is preferred .

The second stage of surgical treatment is aimed at removing the hernial sac and eliminating the cosmetic defect of the face as much as possible. This should be done by a cosmetologist who knows the methods of plastic surgery. For small hernias , if there is no deformation of the nasal bones and the diameter of the hernial opening in the bone does not exceed 1-1.5 cm, an extracranial method of operation can be used.

Spinal hernia

Spinal hernia is the result of a violation of embryonic development, apparently, at the stage of closing the neuroectodermal plate into a tube. This is a protrusion of the membranes, roots, and often the spinal cord due to a defect in the vertebral brackets. A hernia can be localized at any level of the vertebral column, but most often - in the lumbar -sacral department .

Spinal hernia is sometimes combined with malformations of the brain (hydrocephalus, agenesis of the corpus callosum, etc.). There are several main forms of spinal hernia/

Meningocele

A meningocele is a herniated protrusion formed only by the membranes of the spinal cord and covered by skin. The spinal cord is normally developed and located in the spinal canal. Spinal cord functions are normal or slightly impaired due to myelodysplasia .

Meningoradiculocele

Meningoradiculocele - protrusion of the roots of the spinal cord, which either pass through the wall of the herniated meniscus and again sink into the spinal canal, or end blindly at the bottom of the hernia . Weakness of certain groups of muscles of the lower limbs, sensitivity disorders of the root type, dysfunction of the pelvic organs are clinically observed.

Meningoradiculomyelocele

Meningoradiculomyelocele is the most severe disability in functional and prognostic terms. The spinal cord together with the roots protrudes from the spinal canal, passes through the hernial sac and ends at its bottom in the form of an embryonic plate that is not enclosed in a tube. The skin over the hernia sac or scar changed or thinned and resembles cigarette paper, sometimes with ulcers, granulations. Sometimes the hernial sac is formed only by the membranes of the spinal cord, through which the roots of the horse's tail and the spinal cord shine through. Violations of spinal cord functions are very often observed : lower flaccid paraparesis , sometimes paraplegia, sensitivity disorders, loss of tendon reflexes, urinary and fecal incontinence, often clubfoot. This

defect is most often combined with hydrocephalus.

Treatment is surgical , as soon as possible after the birth of a child. However, there are contraindications to surgical treatment, which can be divided into permanent and temporary. Permanent include severe forms of meningoradiculomyelocele with paraplegia, kyphosis and concomitant hydrocephalus. In this case, surgical treatment is unpromising. Temporary

contraindications arise in the presence of ulcers, inflammation of the hernial sac, sharp thinning of the skin above it with a very wide base, violation of the integrity of the hernial sac with leakage of cerebrospinal fluid for more than 2 days (infection and development of meningoencephalitis). In the case of an acute violation of the integrity of the hernia sac and leakage of cerebrospinal fluid, the operation is performed according to vital signs.

Literature

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