

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ**  
**Харківський національний медичний університет**

## **INFECTIOUS DISEASES**

***Manual for practical classes in pathomorphology  
for English-speaking medical students***

## **ІНФЕКЦІЙНІ ХВОРОБИ**

***Методичні вказівки до занять з патоморфології  
для студентів медичних вузів  
з англійською мовою навчання***

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## Foreword

Pathomorphology, one of the most important medical subjects is aimed at teaching students understanding material basis and mechanisms of the development of main pathological processes and diseases.

This manual published as separate booklets is devoted to general pathological processes as well as separate nosological forms. It is intended to the English-medium students of the medical and dentistry faculties. It can be used as additional material used both for home and individual work in class. It can also be used to master the relevant terminology and its unified teaching.

The manual is based on the syllabuses in Pathomorphology for Medical Students (2015).

For a practical class of 2 hour duration the following time calculation is recommended:

1. Determining the primary level of the knowledge – 5 min.
2. Independent work of the students – 50 min.
3. Determining the final level of the knowledge – 20 min.
4. Checking the protocols of the practical class and attestation of the students – 15 min.

The suggested Manual allows to organize the teaching process in the proper way.

## References:

1. Патоморфологія : нац. підручник / В.Д. Марковський, В.О. Туманський, І.В. Сорокіна та ін. ; за ред. В.Д. Марковського, В.О. Туманського. – Київ : ВСВ «Медицина», 2015. – 936 с.
2. Струков А.И. Патологическая анатомия / А.И. Струков, В.В. Серов. – Москва : Медицина, 1993. – 687 с.
3. Anderson's Pathology // Edited by John M. Kissane. The C.V. Mosby Company. – Toronto – Philadelphia, 1990. – 2196 p.
4. Thomas C. Macropathology / C. Thomas. – Toronto – Philadelphia : B.C. Decker Inc., 1990. – 355 p.
5. Thomas C. Histopathology / C. Thomas. – В Toronto – Philadelphia : C. Decker Inc., 1989. – 386 p.

## Lesson

### Intestinal infections

**Motivational characteristic of the subject:** knowledge of the Infectious Diseases chapter is necessary for mastering corresponding subjects at clinical departments and for clinical anatomical interpretation of autopsy material.

**The educational purpose and tasks of the lesson** are as follows: study of etiology, pathogenesis and anatomical pathology of the stages and forms of typhoid (enteric fever), dysentery, salmonellosis and cholera, as well as their possible complications and outcomes.

### Material provision for the lesson:

- tables: "Typhoid", "Dysentery", "Salmonellosis", "Cholera";
- colour pictures: "Cerebriform Swelling of Peyer's Patches in Typhoid" (macro-micropreparation), "Catarrhal Desquamative Enteritis in Cholera" (microstructure), "Colitis in Dysentery" (microstructure), "Lymph Node in Typhoid" (micropreparation);
- slides: "Cerebriform Swelling of Peyer's Patches in Typhoid", "Choleraic Enteritis", "Dysenteric Colitis", "Lymph Node in Typhoid";
- macropreparations: cerebriform swelling of Peyer's patches, stage of necrosis and ulceration of Peyer's patches, splenic hyperplasia in typhoid, diphtheritic colitis in dysentery, chronic polypoid-ulcerative colitis;
- microspecimens: No. 230 – cerebriform swelling of Peyer's patches in typhoid, No. 231 – hyperplasia of lymph node in typhoid, No. 232 – diphtheritic-ulcerative colitis in dysentery.

### Control over Initial Level of Knowledge (example):

1. Is the causative agent of typhoid discharged with milk of lactating women?
  2. Name possible methods of laboratory diagnosis of typhoid within the first two weeks:  
*A. Haemoculture.                      B. Wassermann's test.                      C. Widal's test.*
  3. List forms of salmonellosis:  
*A. Intestinal (toxic).    B. Dysenteric.    C. Typhoidal.    D. Septic.*
  4. Extraintestinal complications in dysentery:  
*A. Perforation of ulcer.                      D. Pyelitis.                      G. Amyloidosis.  
B. Paraproctitis.                      E. Arthrites.                      H. Intoxication.  
C. Bronchopneumonia.                      F. Abscesses in liver.                      I. Exhaustion.*
  5. Complications of cholera: specific (1) and non-specific (2):  
*A. Pneumonia.                      D. Erysipelas.                      G. Post-choleraic uremia.  
B. Abscesses.                      E. Sepsis.  
C. Phlegmon.                      F. Post-choleraic typhoid.*
- Keys: 1 – yes; 2 (a, c); 3 (a, c, d); 4 (c, d, e, f, g, h, i); 5 (1) f, g, (2) a, b, c, d, e.*

### Sequence of Educational Steps during Independent Work of Students in Class

#### Study and describe the following macropreparations:

1. Cerebriform swelling of Peyer's patches in typhoid.

Describe Peyer's patches and solitary follicles, point out the size and shape of these formations, their localization in the small intestine, their proportion in the lumen; appearance of the surface and form on section. What is the causative agent of the disease? List possible intestinal complications and specify when (at what stage) they may appear.

2. Stage of necrosis and ulcerations of Peyer's patches.

Describe the size and integrity of the patches, state of the surface, appearance of the edges of ulceration and characteristics of the bottom in some ulcers. Name the portion of the small intestine where changes of Peyer's patches are the most pronounced. What extraintestinal complications can take place?

3. Splenic hyperplasia in typhoid.

Describe the size of the organ, its mass and consistency; the cause and pathogenesis of splenic hyperplasia.

4. Diphtheritic colitis in dysentery.

Describe thickness of the large intestinal wall and state of its mucous coat (surface, colour). Point out the primary localization of this process in the large intestine. Disclose the mechanism of formation of ulcers in dysentery and give their macroscopic characteristics (shape, size, depth). Name possible intestinal complications and causes of death.

5. Chronic polypoid-ulcerative colitis.

Describe appearance of the mucous coat: size, shape and depth of ulcers, appearance of the preserved mucous coat. What kind of inflammation is typical for this pathology? What complications may develop against this background?

**Study, draw and describe the following microspecimens:**

No. 230 – cerebriiform swelling of Peyer's patch in typhoid (stained with hematoxylin and eosin).

Describe the degree of blood filling and cell composition in the patch, give a quantitative assessment of the lymphocytes and reticular cells. Describe the reticular cells (size, colour of their nuclei, state of cytoplasm). Name the structures which are formed by the reticular cells.

No. 231 – hyperplasia of lymph node in typhoid (stained with hematoxylin and eosin).

Point out whether the lymph node structure is intact and describe the cell composition of the typhoid granulomas. What may be revealed in the cytoplasm of the reticular cells? In what organs are similar changes possible?

No. 232 – diphtheritic-ulcerative colitis in dysentery (stained with hematoxylin and eosin).

Describe composition of films on the mucous coat of the large intestine; point out how deep they penetrate into the wall (layers) of the intestine. Describe the mucous coat, the degree of its intactness, the depth of ulcerative defects, the state of the vascular system. Name possible outcomes of this pathology and possible intestinal complications.

**Control over Final Level of Knowledge (example)**

1. List stages of changes of Peyer's patches in typhoid: a) ..., b) ..., c) ..., d) ..., e) ... .

2. What forms of salmonellosis are distinguished: a) ..., b) ..., c) ... ?

3. Name the main intestinal complications in dysentery: a) ..., b) ..., c) ..., d) ..., e) ..., f) ... .

4. List the main morphological changes in the small intestine that are revealed in persons who died within the active period of cholera: a) blood filling, b) state of the epithelium, c) state of the serous coats, d) contents of the intestine.

5. Name the main causes of death in cholera: a) ..., b) ..., c) ..., d) ... .

6. Autopsy has revealed fibrinopurulent peritonitis. In the ileum, in the centre of necrotized Peyer's patches there are ulcers with uneven edges. In the bottom of one of them there is perforation. Microscopically, edges of partially necrotized patches reveal proliferation of the reticular cells. What diagnosis should be made on the basis of the above findings? (The disease, the stage of its development, the name of microscopical structures in Peyer's patches).

*Keys:* 1. a) cerebriform swelling, b) necrosis of Peyer's patches, c) formation of ulcers, d) stage of clear ulcers, e) healing of ulcers; 2. a) intestinal (toxic), b) septic, c) typhoid; 3. a) perforation, b) paraproctitis, c) peritonitis, d) intestinal phlegmon, e) intestinal haemorrhage, f) cicatricial stenoses of intestine; 4. a) acute plethora, b) necrosis and desquamation of epithelium, c) colourless fluid without any smell ("rice water"), d) dry with haemorrhages, dim, covered with mucus; 5. a) dehydration, b) coma, c) uremia, d) intoxication; 6. Typhoid, stage of formation of ulcers, typhoid granulomas.

### **Krok questions:**

1. An autopsy of a 46-year-old male, who died from intoxication, revealed mucus and some blood in the lumens of the rectum and sigmoid colon, the mucous membrane had numerous brown-green membranous superpositions and haemorrhages. Microscopically, fibrinous colitis was found. On bacteriological examination of the intestinal contents, *Shigella sonnei* was isolated. Make a diagnosis of the disease.

A. *Cholera*.

C. *Dysentery*.\*

E. *Crohn's disease*.

B. *Salmonellosis*.

D. *Yersiniosis*.

2. On autopsy of a 40-year-old male, who died from intoxication, his small intestine contained groups of follicles which rose above the mucous coat. Their surface had grooves and convolutions, their pattern resembling the cerebral surface. Against a background of loss of lymphocytes, a microscopic examination of the follicles revealed a proliferation of monocytes, histiocytes and reticular cells, as well as clusters of macrophages which formed granulomata. What disease are the described changes typical for?

A. *Dysentery*.

D. *Typhoid fever*.\*

B. *Salmonellosis*.

E. *Cholera*.

C. *Amoebiasis*.

3. The disease in a 35-year-old male began acutely with diarrhoea and numerous vomitings, his faeces were watery. Against a background of a sharply expressed

dehydration, he developed spasms followed by a comatose state, and the patient died. On autopsy, an expressed cadaveric rigidity, a dry wrinkled skin of the hands and blood thickening were found. The lumen of the small intestine was sharply dilated and overfilled with some colourless fluid which resembled rice water. The mucous coats of the stomach and intestine were oedematous, with a lot of microfocal haemorrhages. Microscopically, serous-haemorrhagic gastroenteritis was revealed. What is your diagnosis?

A. *Salmonellosis*.

C. *Colibacillosis*.

E. *Typhoid fever*.

B. *Yersiniosis*.

D. *Cholera*.\*

**Terms:** typhoid, bacteraemia, bacteriocholia, ileotyphus, colotyphoid, cerebriform swelling, necrosis, formation of ulcers, clear ulcers, healing of typhoid granuloma; wax-like necrosis of abdominal muscles, typhoid sepsis, salmonellosis, the most acute gastroenteritis, "home cholera", paratyphoids A and B; dysentery, catarrhal colitis, fibrinous colitis, ulcerative colitis, chronic dysentery; cholera, profuse diarrhea, choleraic enteritis, choleraic gastroenteritis, algid period, exsiccosis, choleraic typhoid, postcholeraic uremia.

**Practical skills and abilities:** on the basis of the knowledge acquired it is necessary to be able to explain the etiology, pathogenesis, morphology of stages, complications and outcomes of typhoid, dysentery, salmonellosis and cholera, as well as to give their clinical-anatomical analysis.

### Revise the word-building elements:

para – near, beside

dys – bad, disturbed

hyper – increased

entero – small intestine

colo – colon, large intestine

necro – death

procto – anus and rectum

pyelo – renal pelvis

peritoneo – peritoneum

bacter – bacterium

bacterio – bacterium

gastro – stomach

-plasia – development

-osis – disease

-oid – resembling

-itis – inflammation

-emia – blood condition

## Lesson

### Viral infections, rickettsioses, malaria

**Motivational characteristic of the subject:** knowledge of morphological changes in the organism during viral infections is necessary for understanding viral diseases and rickettsioses at clinical departments; in the practical work of a doctor, it is necessary for understanding viral diseases and rickettsioses during clinical anatomical analysis of autopsy observations.

**The educational purpose and tasks of the lesson** are as follows: study of etiology, pathogenesis, classification, morphological peculiarities and pathomorphosis of influenza, parainfluenza, adenoviral respiratory-syncytial infection, smallpox, rabies, classical typhus, malaria.

#### Material provision for the lesson:

- **text tables:** "Dynamics of Local Changes in Influenza", "Classical Typhus";
- **colour pictures:** "Haemorrhagic Necrotic Laryngotracheo-bronchitis", "Lung in Influenza", "Patient's Appearance and Types of Temperature Curves in Influenza" "Types of Vasculites in Classical Typhus", "Patient's Appearance in Classical Typhus", "Smallpox Virus", "Clinical Forms of Smallpox", "Development of Eruption Elements in Smallpox", "Types of Temperature Curves in Malaria";
- **slides:** "Vasculites in Classical Typhus", "Typhous Granuloma in Myocardium", "Haemorrhagic Meningitis", "Haemorrhagic Tracheobronchitis in Influenza";
- **macropreparations:** haemorrhagic laryngotracheobronchitis in influenza, haemorrhagic pneumonia in influenza, spleen in malaria, changes on skin in smallpox;
- **microspecimens:** No. 205 – serous-desquamative viral pneumonia; No. 88 – viral-bacterial pneumonia; No. 223 – typhogenic encephalitis.

#### Control over Initial Level of Knowledge (example):

1. Are there any abscesses in the lungs during an acute course of toxic influenza?
2. Which of the listed processes are characteristic of the "large motley influenzal lung":  
A. *Foci of pneumonia.* D. *Pneumosclerosis.*  
B. *Inter-alveolar Haemorrhages.* E. *Foci of abscess formation and necrosis.*  
C. *Anthraxis.*
3. List morphological changes in the organism characteristic of classical typhus:  
A. *Presence of exanthema.* D. *Interstitial encephalitis.*  
B. *Meningo-encephalitis.* E. *Diffuse waxy (porphyry) spleen.*  
C. *Parenchymatous encephalitis.*
4. What morphological manifestations are observed in organs during smallpox:  
A. *Pulmonary gangrene.* C. *Intestinal gangrene.* E. *Necrotic pneumonia.*  
B. *Osteomyelitis.* D. *Orchitis.*



5. Name postvaccinal complications in smallpox and rabies:

A. *Meningoencephalitis*.

B. *Allergic eruptions*.

C. *Acute ascending paralysis (Landry's paralysis)*.

D. *Necroses of soft tissues in the area of vaccination*.

E. *Paralysis of single nerves and mental disorders*.

Keys: 1 – no; 2 (a, b, e); 3 (a, b); 4 (b, c, d, e); 5 – smallpox (a, b, d), rabies (a, c, e).

### **Sequence of Educational Steps during Independent Work of Students in Class**

**Study and describe the following macropreparations:**

1. Haemorrhagic laryngotracheobronchitis in influenza.

Pay attention to the state of the tracheal mucosa: its appearance, colour, presence of a film on its surface. Determine, what form of influenza this preparation demonstrates.

2. Haemorrhagic pneumonia in influenza.

Pay attention to dimensions of the lung, its appearance on section; give the name of the preparation, explain the morphological picture of changes in the lung in influenza; indicate the form of influenza in this case.

3. Spleen in malaria.

Describe its dimensions, state of the capsule, colour on section. Explain, what causes a change in the colour. List complications and causes of death in malaria patients.

4. Skin in smallpox.

Describe appearance of ulcerous formations on the skin, explain mechanisms of their development. Name clinical-morphological forms, complications and causes of death in patients with smallpox.

**Study, draw and describe the following microspecimens:**

No. 205 – serous-desquamative viral pneumonia (stained with hematoxylin and eosin).

Describe the state of the exudate in the alveoli and lumens of the bronchi; pay attention to changes in the alveolar septa and peribronchial tissue.

No. 88 – viral-bacterial pneumonia (stained with hematoxylin and eosin).

At a small magnification of the microscope, find foci of pneumonia. At a large magnification, study the state of the walls of the bronchi and alveoli. Determine the cellular contents of the exudate in the alveoli and lumens of the bronchi. Name the form of influenza characterized by these changes.

No. 223 – typhogenic encephalitis (stained with hematoxylin and eosin).

At a small magnification of the microscope, find foci of the inflammation; at a large magnification, study the cellular contents of Popov-Davydovsky granuloma. Pay attention to the character of blood filling in the brain substance; find changes characteristic of vasculites in the capillaries and arterioles.

### Control over Final Level of Knowledge (example):

1. List clinical-anatomical forms of influenza: a) ..., b) ..., c) ... .
2. What macroscopic changes are revealed in lungs in a severe form of influenza? What is the name of such a lung? a) ..., b) ..., c) ..., d) ..., e) ..., f) ..., g) ... .
3. List complications of vaccination: a) ..., b) ..., c) ... .
4. What are the causes of death in influenza?: a) ..., b) ..., c) ..., d) ... .
5. In what organs do the morphological changes caused by classical typhus develop?: a) ..., b) ... .
6. List kinds of malaria: a) ..., b) ..., c) ... .
7. Autopsy has revealed enlargement of the spleen and liver, and hyperplasia of the marrow. The organs are dark grey. On microscopic examination, there is a marked hyperplasia of cells in these organs. The cerebral vessels have stases. The grey matter of the brain is dark slate. The white matter contains numerous microfocal haemorrhages and foci of necrosis. What disease is it? What caused the patient's death? Why are the organs grey?

*Keys:* 1. a) mild (out-patient), b) moderate, c) severe; 2. a) haemorrhage, b) foci of necrosis, c) foci of atelectasis, d) foci of emphysema, e) foci of sup-puration, f) panbronchitis, g) "large motley influenzal lung "; 3. a) postvaccinal meningo-encephalitis, b) necrosis of soft tissues in the area of vaccination, c) allergic eruption; 4. a) intoxication, b) haemorrhages into vital centres, c) pul-monary complications, d) cardiac insufficiency; 5. a) nervous system, b) ves-sels; 6. a) tropical, b) three-days', c) four-days'; 7. Malaria, coma, deposits of hemomelanine.

### Krok questions:

1. The disease in a male patient began with chills, an elevation of the body temperature up to 40° C, a headache, a cough, dyspnoea. On the 5th day, under the phenomena of respiratory insufficiency, the patient died. On autopsy it was found that the lungs were enlarged and motley by appearance. Against a back-ground of an impairment of circulation and massive haemorrhages, a micro-scopic examination revealed numerous foci of serous-haemorrhagic pneumonia, foci of an emphysema and atelectasis. What disease is characterized by such a picture in the lungs?

A. *Croupous pneumonia.*

B. *Adenovirus infection.*

C. *Influenza.\**

D. *Respiratory-syncytial infection.*

E. *Parainfluenza.*

2. A visual examination of the corpse of a 40-year-old male, who died from heart failure, revealed traces of a rash in the form of brown spots and points on his skin, as well as a conjunctival eruption. There were bedsores in the regions of the sacrum and spinous processes of the vertebrae, and paraffinomata in the places of subcutaneous injections of drugs. A microscopic examination of the CNS, skin, adrenal glands revealed destructive-proliferative endothrombovas-culitis in the vessels of the microcirculation and small arteries of the above or-

gans with presence of Popov's granulomata, and there was isolated myocarditis in the heart. Which of the diagnoses listed below was the most probable?

- A. *Kussmaul's disease*.      C. *Enteric fever*.      E. *HIV infection*.  
B. *Q fever*.      D. *Epidemic typhus*.\*

3. A geologist, who several months before had been on an expedition in the Central Asia, had paroxysms of a fever, an icteric colouring of the skin, hypochromic anaemia and loss of body mass during his life-time. On autopsy, a sharp enlargement of the spleen and liver, as well as hyperplasia of the marrow were found. Microscopically, there was haemomelanosis of the liver, spleen and marrow. What disease are such changes typical for?

- A. *Amoebiasis*.      C. *Epidemic typhus*.      E. *Relapsing fever*.  
B. *Chronic septicaemia*.      D. *Malaria*.\*

**Terms:** toxic influenza, influenza with impairment of respiratory tract, "large motley influenzal lung"; pustular smallpox, haemorrhagic smallpox, varioloid, "balloon degeneration" of epidermis, purpuric smallpox; rabies (nodules of rabies, Babes-Negri bodies); classical typhus (vasculites: warty, proliferative, necrotic; destructive-proliferative endo-thrombovasculitis, Popov's granulomas); malaria splenomegaly, malaria coma, Dyurk's granuloma.

**Practical skills and abilities:** on the basis of the knowledge acquired it is necessary to diagnose viral diseases and rickettsioses, as well as to carry out clinical-anatomical analysis of observations of sections.

**Revise the word-building elements:**

- encephalo – brain
- orcho – testis
- myelo – bone marrow
- osteo – bone
- anthroco – coal dust
- homo – blood
- laryngo – larynx
- tracheo – trachea
- broncho – bronchus
- vasculo – vessel
- myo – muscle
- cardio – heart
- meningo – meninges (membranes around brain and spinal cord)
- pneumo – lung
- pneumato – lung
- spleno – spleen
- osis – disease
- itis – inflammation
- oma – tumor
- orrhagia – bursting forth blood
- sclerosis – hardening
- megaly – enlargement

## Lesson

### Childhood infectious diseases (diphtheria, scarlet fever, measles, whooping cough, meningococcal infection)

**Motivational characteristic of the subject:** knowledge of morphological changes in the organism in childhood infectious diseases is necessary for formation of clinical-anatomical thinking in senior students when they study this pathology at the Department of Infectious Diseases.

**The educational purpose and tasks of the lesson** are as follows: study of etiology, epidemiology, pathogenesis and clinical-anatomical forms of childhood infectious diseases as well as their possible complications and peculiarities in their course owing to preventive inoculations given.

#### Material provision for the lesson:

- **text tables:** "Diphtheria (etiology)", "Diphtheria (clinical-morphological manifestations)", "Meningococcal meningitis", "Measles (clinical-morphological manifestations)", "Scarlet Fever (clinical-morphological manifestations)", "Scarlet Fever (Stages of Course)", "Whooping Cough (clinical-morphological manifestations)";
- **colour pictures:** "Meningococcal Infection", "Measles";
- **slides:** "Diphtheritic Amygdalitis in Diphtheria", "Necrotic Laryngitis", "Epidemic Cerebrospinal Meningitis";
- **macropreparations:** diphtheritic laryngotracheitis, heart in diphtheria, morbillous laryngotracheobronchitis, purulent meningitis, hydrocephaly, Henoch's angina, multiple bronchiectasia of lungs;
- **microspecimens:** No. 94 – laryngeal diphtheria, No. 191 – peribronchial pneumonia in measles, No. 86 – purulent leptomeningitis, No. 190 – parenchymatous myocarditis (in diphtheria);

#### Control over Initial Level of Knowledge (example):

1. Is diphtheria regarded as a childhood infectious disease?
2. Name local changes in diphtheria:
  - A. *Enlargement of the tonsils.*
  - B. *Plethora and oedema of the mucous coats of the fauces and tonsils.*
  - C. *Presence of whitish-yellowish films on the mucous coats.*
  - D. *Oedema of the soft tissues of the neck.*
  - E. *Toxic myocarditis.*
  - F. *Necrotic nephrosis.*
  - G. *Enlargement of regional lymph nodes.*
3. In what childhood infections does Waterhouse-Friderichsen syndrome develop:
  - A. *Diphtheria.*
  - B. *Scarlet fever.*
  - C. *Whooping cough.*
  - D. *Measles.*
  - E. *Meningococcal infection.*

4. Clinical-morphological forms of meningococcal infection:
 

A. <i>Allergic</i> .	D. ) <i>Haemorrhagic</i> .
B. <i>Nasopharyngitis</i> .	E. <i>Meningococemia</i> .
C. <i>Meningococcal meningitis</i> .	F. <i>Toxic</i> .
  5. Morphological changes in measles: (1) local and (2) general:
    - A. *Catarrhal inflammation of the fauces*.
    - B. *That of the bronchi*.
    - C. *That of the eye conjunctivae*.
    - D. *Exanthema*.
    - E. *Enanthema*.
    - F. *Metaplasia of the epithelium of the bronchi into a stratified squamous one*.
- Keys: 1 – yes; 2 (a, b, c, d, g); 3 (a, e); 4 (b, c, e); 5 (1) a, b, c, d, f, g, (2) e.

**Sequence of Educational Steps during  
Independent Work of Students in Class**

**Study and describe the following macropreparations:**

**1. Diphtheritic laryngotracheobronchitis.**

Describe the colour of the mucous coat and character of fibrinous films, name the kind of the inflammation, list complications and give definitions to such notions as “laryngeal diphtheria” and “descending croup”.

**2. Heart in diphtheria.**

Describe the size of the heart, state of its cavities, thickness of the myocardium, its colour; name the morphological changes which the myocardium develops in diphtheria; list possible complications, name their cause and outcome.

**3. Morbillous laryngotracheobronchitis.**

Describe the appearance of the preparation, the colour of the laryngeal, tracheal and bronchial walls; explain what process causes this colour; name the causative agent of measles and describe the pathogenesis of necrotic bronchitis: a) ..., b) ...; list other morphological signs of bronchitis in measles: a) ..., b) ..., c) ...; give examples of complications after necrotic bronchitis: a) ..., b) ..., c) ..., d) ... .

**4. Purulent meningitis.**

Give characteristics of blood filling in the pia mater, state of the gyri and sulci, the appearance of the exudate; name the form of meningococcal infection, say when meningitis develops, list its outcomes: a) ..., b) ...; list types of complications, name the cause of death.

**5. Hydrocephaly.**

Describe the appearance of the brain, expressiveness of its gyri, volume of the lateral ventricular sinuses, thickness of the brain substance; name the pathological process in the cerebral hemispheres in hydrocephaly; list changes in the pia mater, say which of them are observed at the initial stages of the disease, list their etiology: a) ..., b) ...; explain the term “hydrocephaly”.

6. Henoch's angina.

What changes have developed in the fauces? Describe the colour and blood filling of the tonsillar mucosa; determine the mechanism of these changes; list possible complications, describe changes in regional lymph nodes.

7. Multiple bronchiectasia of lungs.

Describe the appearance of the lung, state of the lumens in the bronchi, thickness of their walls, character of the exudate, pathogenesis of bronchiectasia, name the disease which results in such a complication, list its outcomes.

Get acquainted with slides on the electrified stand: "Diphtheritic Amygdalitis in Diphtheria", "Necrotic Laryngitis", "Epidemic Cerebrospinal Leptomeningitis".

**Study, draw and describe the following microspecimens:**

No. 94 – laryngeal diphtheria (stained with hematoxylin and eosin).

At a small magnification, describe thickening of the mucous coat with presence of the fibrin-containing exudate which reaches the submucous layer, describe the state of the vessels; make differential diagnosis between the laryngeal diphtheria and descending croup; list possible complications of intubation and tracheostomy.

No. 190 – parynchematous myocarditis (stained with hematoxylin and eosin).

At a small magnification, describe foci of myolysis in the myocardium, plethora of vessels, as well as focal interstitial infiltration with lymphoid cells; name the pathological process, list possible outcomes.

No. 191 – peribronchial pneumonia in measles (stained with hematoxylin and eosin).

Describe the state of lumens in the bronchi, presence of some purulent exudate in them; pay attention to metaplasia of the cylindrical bronchial epithelium into a stratified squamous one, as well as infiltration of the bronchial wall with leukocytes. What are the main causes of the disease? List possible outcomes.

No. 86 – purulent leptomeningitis (stained with hematoxylin and eosin).

At small and large magnifications, describe thickening of the pia mater, its infiltration with some purulent exudate, vasodilatation of the pia mater. Name the type of the inflammation, the causative agent, complications and outcomes.

**Control over Final Level of Knowledge (example):**

1. Name the organs on whose membranes development of local changes is observed in measles: a) ..., b) ..., c) ..., d) ... .

2. Name kinds of morbillous bronchites depending upon the character of spreading of the inflammatory process: a) ..., b) ..., c) ..., d) ... .

3. What morphological changes does the heart develop in diphtheria? a) ..., b) ... .

4. List the main complications of diphtheria.

5. What causes the second (allergic) period of scarlet fever? a) ..., b) ... .

6. List complications of the septic form of scarlet fever: a) ..., b) ..., c) ..., d) ..., e) ..., f) ... .

7. Say what changes the lungs develop in whooping cough: a) ..., b) ..., c) ... .

8. Autopsy of a girl, aged 5 years, has revealed the following changes: microfocal haemorrhages in the region of the buttocks, lower extremities, eyelids and on the sclerae, as well as serous pericarditis, and massive haemorrhages in the adrenal glands. It is known that the child died 25 hours after the onset of this disease. What is your diagnosis? What is the name of the syndrome which has developed?

*Keys:* 1. a) mucosa of the fauces, b) that of the trachea, c) that of the bronchi, d) the eye conjunctiva; 2. a) endobronchitis, b) mesobronchitis, c) pan-bronchitis, d) peribronchitis; 3. a) alterative myocarditis, b) interstitial myocarditis; 4. a) laryngeal diphtheria, b) descending croup, c) haemorrhages, ulcerations, d) pneumonia; 5. a) sensibilization of the body with a streptococcus, b) hyperergic response; 6. a) retro-pharyngeal abscess, b) otitis-antritis, c) purulent osteomyelitis of the temporal bone, d) cervical (Dupuytren's) phlegmon, e) brain abscesses, f) purulent meningitis; 7. a) interstitial emphysema, b) spontaneous pneumothorax, c) atelectases; 8. Meningococcal infection, meningococemia, Waterhouse-Friderichsen syndrome.

### **Krok questions:**

1. A 4-year-old boy was hospitalized to a resuscitation department due to a progressing drop of his blood pressure. Twenty-four hours after the moment of admission to the hospital the boy died from an uncontrolled collapse. A pathological anatomical examination revealed the following changes: macroscopically, there were diffuse subcutaneous haemorrhages with foci of necrosis, bilateral massive haemorrhages in the cortical layer of the both adrenal glands, ischaemia of the cortical layer of the kidneys and hyperaemia of the malpighian pyramids in the medullary layer. Histologically, a disseminated intravascular blood coagulation, a necrosis of the epithelium in the renal tubules, alterative changes in the liver, myocardium and brain were found. Diagnose the disease.

A. *Generalized viral infection.*

D. *Meningococcaemia.\**

B. *Septicaemia.*

E. *Fulminant sepsis.*

C. *Septicopyaemia.*

2. The disease in a child began with a high body temperature, a pain in the throat, some swelling of the submandibular lymph nodes. On visual examination of the fauces, its surface was oedematous and moderately hyperaemic, the tonsils were enlarged and covered with white-greyish films which were tightly united with the underlying tissues, any attempt to remove them caused formation of bleeding defects. What disease are the revealed changes typical for?

A. *Catarrhal angina.*

C. *Diphtheria.\**

B. *Scarlet fever.*

D. *Meningococcal infection.*

3. A.C. is a four-year-old girl who is referred to hospital by her family doctor. She has presented with catarrhal inflammation in the mucous membrane of the mouth, trachea, bronchi, and conjunctiva. The mucous membrane is swollen, plethoric; the mucous secretion is increased, which is accompanied by rhinitis, cough, lacrimation. Enanthema is noted on the mucous membrane of the cheeks against the lesser lower molars. It looks like whitish spots called Belsky-Filatov-Koplik's spots, which develop before the eruption on the skin. What diagnosis is most probable?

- A. Measles.\*      C. Infectious mononucleosis.      E. Scarlet fever.  
B. Mumps.      D. Diphtheria.

**Terms:** diphtheria of fauces, tonsils, eye conjunctiva, genitals, wound; exotoxin, tissue respiration; fibrinogen, thromboplastin, fibrinous film; diphtheritic and croupous inflammation; laryngeal diphtheria; toxic myocarditis; early and late paralysis of heart; parenchymatous neuritis; Waterhouse-Friderichsen syndrome; intubation; tracheostomy; scarlet fever; "flaming fauces"; "strawberry tongue", necrotic angina, eustachitis; rash (exanthema), laminar desquamation; retropharyngeal abscess, otitis-antritis, primary complex in scarlet fever, extra-buccal scarlet fever; meningococcal infection, Wekselbaum's meningo-coccus, nasopharyngitis, meningitis, meningococcemia, ependymitis, pyocephalus, meningoencephalitis, hydrocephaly, cerebral cachexia, arthritis, iridocyclitis, uveitis, pericarditis, necrotic nephrosis, cutaneous eruption; measles (RNA virus, anergy, descending croup, branny desquamation, giant multinuclear macrophages, giant cell morbillous pneumonia, morbillous encephalitis, endo-, meso- and pan-bronchitis, peribronchitis, peribronchial pneumonia, seroimmunity, vaccination); whooping cough ("respiratory tract neurosis", apnea, asphyxia, extravasates, reticular formation, nuclei of vagus, death of neurons, frenulum of tongue).

**Practical skills and abilities:** it is necessary to learn how to use the knowledge of etiology, pathogenesis and clinical-anatomical forms in diagnosing childhood infections; it is necessary to know complications, causes of death and outcomes of childhood infections for their correct treating; on the basis of the knowledge acquired it is necessary to be able to differentiate various childhood infections.

### Revise the word-building elements:

- peri – around
- meningo – meninges
- necro – death
- cocco – coccus
- laryngo – larynx
- tracheo – trachea
- broncho – bronchus
- cephalo – skull
- myo – muscle
- cardio – heart
- naso – nose



- itis – inflammation
- emia – blood condition
- stomy – make a new opening

## Lesson

### Tuberculosis

**Motivational characteristic of the subject:** knowledge of morphological manifestations of tuberculosis – a chronic infectious disease affecting all organs in the human body – is necessary for its further study at clinical departments and in the practical work of a physician.

**The educational purpose and tasks of the lesson** are as follows: to study etiology and pathogenesis, classification, clinical-anatomical forms of tuberculosis; while studying macropreparations in class, it is necessary to reveal and substantiate principles of the clinical-anatomical classification, the morphological characteristic of kinds of tuberculosis (primary, haematogenic and post-primary {reinfection}); to learn complications and outcomes of tuberculosis.

#### Material provision for the lesson:

- tables: "Primary Tuberculosis", "Haematogenic Tuberculosis", "Post-primary Tuberculosis", "Anatomical Forms of Progressive Pulmonary Tuberculosis", "Scheme of Tuberculosis Development", "Clinical Classification of Tuberculosis", "Tuberculous Granuloma (drawing)", "Differential Diagnosis of Tuberculosis and Syphilis";

- slides: "Miliary Pulmonary Tuberculosis", "Caseous Pneumonia", "Macrofocal Pulmonary Tuberculosis", "Caseous Tuberculous Lymphadenitis";

- macropreparations: primary pulmonary tuberculous complex; miliary tuberculosis of kidney and spleen; acute pulmonary cavern; tuberculous caseous bronchadenitis; primary intestinal tuberculous complex; tuberculosis of spine, uterus and uterine appendages; acute focal pulmonary tuberculosis; tuberculous caseous pneumonia; cirrhotic tuberculosis;

- microspecimens: No. 201 – healed primary affection in lung (Ghon's focus); No. 109 – miliary pulmonary tuberculosis; No. 111 – caseous pneumonia.

#### Control over Initial Level of Knowledge (example):

1. Is tuberculosis an acute disease?
2. List morphological signs in haematogenic generalization of primary tuberculosis:
  - A. *Miliary tubercles in different organs.*
  - B. *Development of caseous pneumonia.*
  - C. *Development of Simon's foci.*
  - D. *Appearance of foci of pneumosclerosis.*
  - E. *Development of tuberculous leptomeningitis.*
3. Name ways of generalization of primary tuberculosis:
 

A. <i>Perineural.</i>	C. <i>Haematogenic.</i>	E. <i>Intracanalicular.</i>
B. <i>Lymphogenic.</i>	D. <i>Growth of primary affection.</i>	

4. What are the peculiarities of primary tuberculosis?
    - A. *As a rule, it has the aerogenic way of infection.*
    - B. *It begins mostly in adults.*
    - C. *It occurs mostly in childhood.*
    - D. *Development of thrombophlebitis.*
    - E. *Development of obliteration of pleural cavities.*
  5. Make differential diagnosis between clinical-morphological manifestations of primary and postprimary tuberculosis:
    - A. *Primary tuberculous complex.*
    - C. *Aschov's foci.*
    - B. *Foci of Abrikosov's reinfection.*
    - D. *Miliary tuberculosis.*
- Keys: 1 – no; 2 (a, b, c, e); 3 (b, c, d); 4 (a, c); 5: primary (a, d), postprimary (b, c).

### **Sequence of Educational Steps during Independent Work of Students in Class**

#### **Study and describe the following macropreparations:**

1. Primary pulmonary tuberculous complex.  
Find components of the primary tuberculous complex. At what age does it appear most frequently? What kind of tuberculosis does it morphologically manifest? List processes taking place in healing of the primary tuberculous complex. Give the name of the primary tuberculous complex healed.
2. Tuberculous leptomeningitis.  
Point out the localization of the process. Describe the pia mater. In what kind of the process progression does it appear? What complications may develop?
3. Renal tuberculosis.  
Point out the localization of the process. Describe morphological changes in the kidney. What form of tuberculosis is it? List possible complications.
4. Spinal tuberculosis.  
Study and describe the macropreparation. What is the appearance of vertebral bodies and intervertebral disks? What form of tuberculosis is it?
5. Fibrocavernous pulmonary tuberculosis.  
Point out the localization of the process. Describe the appearance of the lung on section. Pay attention to the state of the cavity, the character of its walls. What does the surrounding pulmonary tissue look like? What are the ways for spreading of the process in the lung? What are the complications and causes of death?  
Get acquainted with slides on the electrified stand: "Miliary Pulmonary Tuberculosis", "Caseous Pneumonia", "Macrofocal Pulmonary Tuberculosis", "Caseous Tuberculous Lymphadenitis".

#### **Study, draw and describe the following microspecimens:**

- No. 201 – healed primary tuberculous focus (stained with hematoxylin and eosin).  
Describe morphology of Ghon's focus. Name stages in the primary affection healing.

No. 111 – caseous pneumonia (stained with hematoxylin and eosin).

Study the micropreparation. Specify, when tuberculosis develops exudative inflammation. Name outcomes of caseous pneumonia.

No. 109 – miliary pulmonary tuberculosis (stained with hematoxylin and eosin).

This preparation is intended for demonstration purposes.

No. 75 – tuberculous caseous lymphadenitis (stained with hematoxylin and eosin).

This preparation is intended for demonstration purposes.

### **Control over Final Level of Knowledge (example):**

1. Ways of invasion of the causative agent of tuberculosis into the human organism: a) ..., b) ..., c) ..., d) ..., e) ... .

2. Complications of postprimary tuberculosis: a) ..., b) ..., c) ..., d) ..., e) ... .

3. What are Abrikosov's reinfection focus and Assmann-Redecker focus?

4. Name variants in the course of primary tuberculosis.

5. Clinical-morphological forms of postprimary tuberculosis.

*Keys:* 1. a) aerogenic, b) alimentary, c) through skin lesions, d) tonsils, e) placenta; 2. a) pulmonary haemorrhage, b) pneumothorax, c) pleural empyema, d) secondary amyloidosis, e) "pulmonary" heart; 3. a) fresh foci of postprimary tuberculosis, more frequently in segments I - II of the right lung, b) postprimary infiltrative tuberculosis, where perifocal inflammation prevails over caseous changes; 4. a) morphological healing and clinical recovery, b) progression via different ways, c) chronic course; 5. a) acute focal, b) fibrofocal, c) infiltrative-pneumonic, d) tuberculoma, e) acute caseous pneumonia, f) acute cavernous, g) fibrocavernous, h) cirrhotic, i) pulmonary tuberculosis in combination with occupational diseases.

### **Krok questions:**

1. An autopsy of a 17-year-old girl, who died from pulmonary insufficiency, revealed in the lower lobe of her right lung some confluent areas of caseous necrosis which were surrounded by fresh foci of an exudative inflammation; the bronchopulmonary, bronchial and bifurcation lymph nodes were characterized by phenomena of caseous necrosis. Which of the diagnoses listed below was the most probable?

A. *Growth of primary affect in primary tuberculosis.\**

B. *Haematogenic form in progression of primary tuberculosis.*

C. *Haematogenous tuberculosis with predominant affection of lungs.*

D. *Tuberculoma.*

E. *Caseous pneumonia in secondary tuberculosis.*

2. A 48-year-old male died from progressing cardiopulmonary insufficiency. From his case history it is known that before he had been ill with primary tuberculosis. An autopsy revealed a pulmonary emphysema, reticular pneumosclerosis, white-grey foci with corticopleural localization and a hypertrophy of the right ventricle of the heart. The mesenteric lymph nodes had a picture of

tuberculous lymphadenitis. On microscopic examination, the pulmonary tissue was characterized by prevalence of a productive tissue reaction with formation of tuberculous granulomata. What form of pulmonary tuberculosis is such a picture typical for?

A. *Acute focal.* C. *Infiltrative.* E. *Miliary.*

B. *Fibrofocal.* D. *Haematogenous-disseminated.\**

3. A room for dissections received the body of a male with reduced nourishment, who was ill with pulmonary tuberculosis and died from cardiopulmonary insufficiency. On autopsy, the lungs were enlarged, dense, with a thickened pleura and fibrinous-purulent superpositions on it. On section, the lungs contained grey-yellow polysegmental foci which were confluent in the upper lobes and actually occupied the whole lobe. A microscopic examination revealed prevalence of necrotic changes over the perifocal ones. The first segment of the right lung had a Ghon's focus. Which of the diagnoses was the most probable?

A. *Infiltrative tuberculosis.* D. *Tuberculomata.*

B. *Caseous pneumonia.\** E. *Fibrofocal tuberculosis.*

C. *Acute focal tuberculosis.*

**Terms:** tuberculosis, primary tuberculous focus, lymphadenitis, phthisis, haematogenic tuberculosis, generalization, dissemination, haematogenic disseminated tuberculosis, postprimary tuberculosis, reinfection, fibro-focal tuberculosis, caseous pneumonia, fibrocavernous tuberculosis, pathomorphosis.

**Practical skills and abilities:** on the basis of the study of morphology it is necessary to be able to diagnose different kinds of tuberculosis.

**Revise the word-building elements:**

extra – outside

exo – external

in – inside

peri – surrounding

pan – whole

meso – middle

tox – poison

meningo – meninges

cocco – coccus

thrombo – thrombus, blood clot

myo – muscle

cardio – heart

neuro – nervous system

necro – death

oto – ear

orcho – testis

bucco – cheek

pyo – pus

arthro – joint

nephro – kidney

broncho – bronchus

- in – substance
- itis – inflammation
- stomy – make a new opening
- emia – blood condition
- osis – disease

## Lesson

### Brucellosis. Plague. Tularemia. Anthrax. Sepsis

**Motivational characteristic of the subject:** knowledge of morphological changes in the organism in the above infections is necessary for studying brucellosis, plague, tularemia, anthrax and sepsis at clinical departments, and in the practical work of a doctor for clinical-anatomical analysis of autopsy material.

**The educational purpose and tasks of the lesson** are as follows: study of etiology, pathogenesis and classification, as well as morphological changes in the organs and tissues, clinical-morphological forms, complications, causes of death, pathomorphosis of brucellosis, plague, tularemia, anthrax and sepsis; ability to make a diagnosis on the basis of the knowledge about morphology of the above diseases; mastering of peculiarities of sepsis in children and those of stomatogenic sepsis.

#### Material provision for the lesson:

- tables: "Brucellosis", "Tularemia", "Plague", "Anthrax", "Sepsis", "Sepsis according to Infection Atrium", "Classification of Sepsis", "Peculiarities of Modern Sepsis", "Peculiarities of Sepsis in Children";
- colour picture: "Haemorrhagic Leptomeningitis in Anthrax";
- slides: "Embolic Apostematous Nephritis", "Polypous-Ulcerous Endocarditis";
- macropreparations: brain abscess, apostematous nephritis, septic spleen, polypous-ulcerous endocarditis, ulcerous skin lesions in chroniosepsis, septic endometritis;
- microspecimens: No. 93 – embolic apostematous nephritis; No. 182 – polypous-ulcerous endocarditis.

#### Control over Initial Level of Knowledge (example):

1. Is sepsis an infectious disease?
2. List peculiarities of sepsis that differentiate it from other diseases:
  - A. *Polyetiological character.*
  - B. *Contagiousness.*
  - C. *Absence of cycles in the course of the disease.*
  - D. *Specific anatomic pathology.*
  - E. *Strict specificity of the causative agent.*
  - F. *Monopathogenicity.*
  - G. *It develops durable immunity.*
  - H. *Complications of the disease are more frequent.*

3. Name clinical-anatomical forms of anthrax:  
 A. *Cutaneous*. C. *Conjunctival*. E. *Intestinal*.  
 B. *Cutaneobubonic*. D. *Pulmonary*.
4. List theories of pathogenesis of sepsis:  
 A. *Infectious*. C. *Polyetiological*. E. *Viral*.  
 B. *Compromise*. D. *Reactological*.
5. Which of the mentioned signs belong to (1) local signs of sepsis, (2) general ones:  
 A. *Dystrophic*. C. *Inflammatory*. E. *Hyperplastic*.  
 B. *Infection atrium*. D. *Septic focus*.
- Keys: 1 – yes; 2 (a, c, f, h); 3 (a, c, d, e); 4 (a, b, d); 5 (1) b, d; (2) a, c, e.

### **Sequence of Educational Steps during Independent Work of Students in Class**

#### **Study and describe the following macropreparations:**

1. Septic endometritis.

Determine dimensions of the uterus and thickness of its wall, describe the state of the mucous membrane. What manifestations of sepsis (local or general) do these changes belong to and what are they called?

2. Pulmonary abscess.

Describe the cavity in the lungs, the state of its walls. What clinical-anatomical form of sepsis does this preparation manifest?

3. Brain abscess.

Describe the appearance of the cavity in the brain. What is the cavity filled with? What is the state of its walls? What is the source of infection? What is the name of this form of sepsis according to its infection atrium?

4. Apostematous nephritis.

Describe the size of the kidney, presence of greyish-yellowish pus-containing microfoci on its surface and on section. What is the name of this form of sepsis according to its infection atrium?

5. Septic spleen.

Describe the size of the organ, the state of its capsule, colour on section, presence of scraping. What is the name of such a spleen? What kinds of septic manifestations are they: general or local?

6. Ulcerous skin lesions in chroniosepsis.

Describe ulcerous changes in the skin. List manifestations of chroniosepsis.

7. Polypous-ulcerous endocarditis.

Describe the size of the heart, volume of its chambers, thickness of ventricular walls, state of the valvular cusps and presence of fibrinous warty formations on them.

### **Study, draw and describe the following microspecimens:**

No. 93 – embolic apostematous nephritis (stained with hematoxylin and eosin).

At a small magnification of the microscope, find foci of suppurative inflammation and bacterial emboli; at a large magnification, determine cellular contents of the exudate. What clinical-anatomical form of sepsis does this preparation manifest?

No. 182 – polypous-ulcerous endocarditis (stained with hematoxylin and eosin).

Describe the state of the valvular cusps, pay attention to the character of old and fresh destructive changes. Find colonies of bacteria in sedimentations on the cusps and determine cellular contents of the infiltrate near the base of the cusps.

### **Control over Final Level of Knowledge (example):**

1. List peculiarities of sepsis: a) etiological, b) epidemiological, c) clinical, d) immunological.
2. Pathoanatomical changes in sepsis: a) local changes: 1) ..., 2) ..., 3) ..., 4) ..., 5) ..., 6) ..., 7) ..., 8) ... ; b) general changes: 1) ..., 2) ..., 3) ... .
3. Name clinical-morphological forms of sepsis: a) ..., b) ..., c) ..., d) ... .
4. Clinical-morphological forms of anthrax: a) ..., b) ..., c) ... .
5. Two days after a criminal abortion the female patient's temperature elevated up to 40°C, she was semiconscious, and there were numerous haemorrhages in her skin. She died three days later. What clinical-morphological form of sepsis and type of sepsis according to its infection atrium were there? What changes were observed near the infection atrium?

*Keys:* 1. a) polyetiological, b) noncontagious, c) absence of cycles in its course, d) it does not develop any immunity; 2a: 1) septic focus, 2) phlebitis, 3) thrombophlebitis, 4) lymphangitis, 5) lympho-thrombosis, 6) lymphadenitis, 7) arteritis, 8) thrombarteritis; 2b: 1) dystrophic, 2) inflammatory, 3) hyperplastic; 3. a) septicemia, b) septicopyemia, c) chroniosepsis, d) septic endometritis; 4. a) external, b) internal, c) primary septic; 5. Septi-cemia, uterine sepsis, septic endometritis.

### **Krok questions:**

1. Three days after a criminal abortion a female developed an elevation of her body temperature up to 40°C, cloudiness of consciousness, petechial haemorrhages on her skin. Two days later she died under increasing phenomena of intoxication. An autopsy revealed jaundice, petechial haemorrhages in the serous and mucous membranes, a sharp enlargement of the spleen and lymph nodes. Microscopically, the spleen and lymph nodes were characterized by a proliferation of the lymphoid and reticular cells, as well as a large number of immature forms of haemopoiesis. Besides, there were dystrophic changes and an interstitial inflammation in the liver, kidneys, heart, as well as disseminated necrotic vasculitides. What was the most probable form of sepsis?

- A. *Septicopyaemia.*                      C. *Septicaemia.\**                      E. *Fulminant sepsis.*  
B. *Chernogubov's disease.*              D. *Chronic sepsis.*

2. An autopsy of a 40-year-old male, who worked as a sheep-breeder and died from a severe intoxication, revealed on the skin some papulopustular haemorrhagic rash with necroses and ulcerations, as well as enlarged immovable dark red lymph nodes in the inguinal region which were united with one another and had a doughy consistency. The spleen was enlarged, flaccid and had an abundant scrape. Microscopically, the lungs revealed a focal serous-haemorrhagic inflammation with necroses; the heart, liver and kidneys were characterized by dystrophic and necrotic changes; the lymph nodes had haemorrhagic-necrotic lymphadenitis with some purulent melting. Make a diagnosis.

A. *Bubocutaneous form of plague.*      D. *Septicaemic plague.*

B. *Bubonic plague.\**      E. *Septicaemia.*

C. *Primary pneumonic plague.*

3. A male cattle-farm worker acutely fell ill and died under the phenomena of intoxication. An autopsy revealed an enlarged flaccid spleen, which was dark cherry on section and gave an abundant scrape. The pia mater of the vault and base of the skull were dark red and oedematous (a "cardinal's cap"). Microscopically, there was a serous-haemorrhagic inflammation of the meninges and cerebral tissues with destruction of the walls of small vessels. What was the most probable diagnosis?

A. *Tularaemia.*      C. *Brucellosis.*      E. *Meningococcal meningoencephalitis.*

B. *Anthrax.\**      D. *Plague.*

**Terms:** sepsis, septicemia, septicopyemia, chroniosepsis, septic (bacterial) endocarditis, septic focus, infection atrium, septic spleen, purulent resorptive fever, traumatic cachexia, primary and secondary anthracic sepsis, anthrax, "red cap" – "cardinal hat".

**Practical skills and abilities:** on the basis of the study of morphology it is necessary to diagnose brucellosis, plague, tularemia, anthrax, sepsis.

### Revise the word-building elements:

post – after

re – once more

lympho – lymph, lymphatic system

adeno – gland

phthiso – cough

hemato – blood

geno – develop, produce

pneumo – lung

patho – disease

morpho – shape

-osis – disease

-itis – inflammation

-ia – condition



*Навчальне видання*

## **ІНФЕКЦІЙНІ ХВОРОБИ**

### **Методичні вказівки до занять з патоморфології для студентів медичних вузів з англійською мовою навчання**

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# **INFECTIOUS DISEASES**

***Manual for practical classes in pathomorphology  
for English-speaking medical students***