

Ministry of Public Health of Ukraine
“Ukrainian Medical Stomatological Academy”

“APPROVED”

at the meeting of the Department
of Medical Informatics, Medical Biophysics

«27» august 2020

Minutes №. 1 «27» august 2020

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METHODICAL INSTRUCTIONS
FOR INDEPENDENT WORK OF STUDENTS DURING PREPARATION
TO PRACTICAL (SEMINAR) CLASSES AND IN CLASS

Academic subject	Safety of Vital Functions. Bioethics
Module No 1	Safety of Vital Functions. Bioethics
Topic	Bioethical and legal problems of HIV and other socially dangerous infections, medical psychology and psychiatry
Year of study	I
Faculty	Dental, Medical
Number of academic hours	2

Poltava – 2020

1. Relevance of the topic:

The safety of ability to live occurs on such direction as public health services. But work of medical workers can represent danger. It first of all concerns development of such dangerous infectious diseases as HIV- infection, AIDS, tuberculosis, virus hepatitis. These infections form threat not only to the population, but also medical personal that works with patients, HIV- infected person with them biological environments (blood, urine, faces, saliva, etc.). It is important for future doctor to know prophylaxis of dangerous and vitally dangerous illnesses.

2. The aims of the training course:

To know: potential dangers, definition of size and probability of their display, first of all dangerous infectious diseases and their threat for health of the medical worker;

To be able to: define (determine) dangerous and harmful factors which are sources of occurrence of such diseases as a HIV, AIDS, virus hepatitis, a tuberculosis among medical workers.

3. Materials for the before-class work and self-preparation work;

Names of previous disciplines	Practical skills
Medical biology	1. To define main principles of safety of person human being. 2. To analyze and estimate dangerous to human life, health and professional work of a situation and to make independently a decision on the use of urgent measures on their liquidation.
Physiology	
Microbiology	

4. Tasks for independent work during preparation for the lesson.

4.1. A list of the main terms, parameters, characteristics that a student should take when preparing for the class

Term	Definition
1. Human immunodeficiency virus infection and acquired immune deficiency syndrome (HIV/AIDS)	is a spectrum of conditions caused by <u>infection</u> with the <u>human immunodeficiency virus</u> (HIV)
2. The human immunodeficiency viruses (HIV)	are two species of <u>Lentivirus</u> (a subgroup of <u>retrovirus</u>) that causes HIV infection and over time <u>acquired immunodeficiency syndrome</u> (AIDS)

4.2. Theoretical questions to the class:

1. Danger for *medical personal* at work on HIV- infected (AIDS, a hepatitis, tuberculosis) patients.
2. The general attributes of the HIV/AIDS virus, hepatitis and tuberculosis.
3. Possible ways infection of medical workers by these diseases.
4. Measures of observance of "safety precautions" at work with patients infected HIV/ AIDS.
5. Measures of observance of "safety precautions" at work with patients infected with virus hepatitis.
6. Measures of observance of "safety precautions" at work with patients infected with a tuberculosis.
7. Donor blood is possible danger of infection with a virus of the HIV/ AIDS, virus hepatitis through it.

1. The contents of a theme:

Concept about dangerous diseases in practice of the medical worker.

The HIV is a human immunodeficiency virus. Coming across in an organism of the person it causes the fatal infectious disease named accepted in international practice for "HIV –infection". Illness proceeds long, has some stages, last one with different clinical displays is designate for "acquired immunodeficiency syndrome" (AIDS). The term "syndrome" designates set of illness symptoms.

It is necessary to ascertain, that at all persons who have caught a human immunodeficiency virus, AIDS, and fatal result already will develop sooner or later. Behind modern representations 5 years after infection AIDS develops at each third infected person.

Sharp displays are observed approximately in 30-70 % of infected people. The most often symptoms are rises in a body temperature of, increase in lymph nodes, quinsy, on the person, a trunk as pink or red spots, dissonance of digestion, a headache, vomiting and a photophobia.

HIV and AIDS in practice of the doctor

Danger of infection of a HIV of medical workers is possible at the carrying out medical - diagnostic manipulations at using needles, syringes and systems of single application. As all fabrics and fluids of the patient, especially blood and sperm, bear (carry) in itself danger of infection, their fence and is necessary for carrying out (for spending) researches in rubber gloves and special clothes. After performance of work wash personal hands. Tests of blood and other biological materials for research designate words «CAREFULLY - AIDS ". Materials keep are only in special capacities with the same mark.

Any damage of a skin and mucous membranes of the medical personnel, pollution by a biological material from patients during granting of medical service and work on HIV- infected material are qualified by it as medical accident. Right after contact to blood and other biological liquids it is necessary to wash out the polluted sites of skin water with the soap, the polluted mucous membranes pure (clean) water. Not later than 24-36 hours the prophylaxis must be by preparations during 4 weeks. The fact of medical failure is registered in special magazine, then the victim (behind its consent) during the nearest 5 days survey on presence of antibodies to a HIV. If result is negative, the following testing carry out in 1, 3 and 6 months. In case of revealing at medical worker HIV -infection, the special commission solves the problem on definition of infection by professional.

Physicians and all health care workers have the right to a safe work environment. Especially in developing countries, the problem of occupational exposure to HIV has contributed to high attrition rates of the health labour force. In some cases, employees become infected with HIV, and in other cases fear of infection causes health care workers to leave their jobs voluntarily. Fear of infection among health workers can also lead to refusal to treat HIV/AIDS patients. Likewise, patients have the right to be protected to the greatest degree possible from transmission of HIV from health professionals and in health care institutions.

- a. Proper infection control procedures and universal precautions consistent with the most current national or international standards, as appropriate, should be implemented in all health care facilities. This includes procedures for the use of preventive ART for health professionals who have been exposed to HIV.
- b. If the appropriate safeguards for protecting physicians or patients against infection are not in place, physicians and National Medical Associations should take action to correct the situation.
- c. Physicians who are infected with HIV should not engage in any activity that creates a risk of transmission of the disease to others. In the context of possible exposure to HIV, the activity in which the physician wishes to engage will be the determining factor. Whether or not an activity is acceptable should be determined by a panel or committee of health care workers with specific expertise in infectious diseases.
- d. In the provision of medical care, if a risk of transmission of an infectious disease from a physician to a patient exists, disclosure of that risk to patients is not enough; patients are entitled to expect that their physicians will not increase their exposure to the risk of contracting an infectious disease.
- e. If no risk exists, disclosure of the physician's medical condition to his or her patients will serve no rational purpose.

Virus hepatitis and possible one of its activators in an organism of the doctor

Virus hepatitis is serious problem of public health services considering their wide circulation. Now in the world more 500 million carriers of virus hepatitis with parenteral are totaled by

infection which in most cases get a chronic course with formation of difficult results - cirrhosis of a liver and a cancer of a liver. At present allocate seven types of virus hepatitis: B, C, D, E, F, G.

Viral hepatitis has emerged as a major public health problem throughout the world affecting several hundreds of millions of people. Viral hepatitis is a cause of considerable morbidity and mortality in the human population, both from acute infection and chronic sequelae which include, in the case of hepatitis B, C and D, chronic active hepatitis and cirrhosis. Hepatocellular carcinoma which is one of the ten most common cancers worldwide, is closely associated with hepatitis B, and at least in some regions of the world with hepatitis C virus.

The hepatitis viruses include a range of unrelated and often highly unusual human pathogens.

Hepatitis A virus

Hepatitis A virus (HAV), classified as hepatovirus, is a small, unenveloped symmetrical RNA virus which shares many of the characteristics of the picornavirus family, and is the cause of infectious or epidemic hepatitis transmitted by the fecal-oral route.

Hepatitis B virus

Hepatitis B virus (HBV), a member of the hepadnavirus group, double-stranded DNA viruses which replicate, unusually, by reverse transcription. Hepatitis B virus is endemic in the human population and hyperendemic in many parts of the world. A number of variants of this virus have been described. Natural hepadna virus infections also occur in other mammals including woodchucks, beechy ground squirrels and ducks.

Hepatitis C virus

Hepatitis C virus (HCV), is an enveloped single-stranded RNA virus which appears to be distantly related (possibly in its evolution) to flaviviruses, although hepatitis C is not transmitted by arthropod vectors. Several genotypes have been identified. Infection with this more recently identified virus is common in many countries. Hepatitis C virus is associated with chronic liver disease and also with primary liver cancer in some countries.

Hepatitis D virus

Hepatitis D virus (HDV) is an unusual, single-stranded, circular RNA virus with a number of similarities to certain plant viral satellites and viroids. This virus requires hepadna virus helper functions for propagation in hepatocytes, and is an important cause of acute and severe chronic liver damage in many regions of the world.

Hepatitis E virus

Hepatitis E virus (HEV), the cause of enterically-transmitted non-A, non-B hepatitis, is another non-enveloped, single-stranded RNA virus, which shares many biophysical and biochemical features with caliciviruses. The most similar genome to HEV is found in a plant virus, beet necrotic yellow vein virus, and there are similarities in the functional domains to rubella virus. Final taxonomic classification is yet to be agreed upon.

Hepatitis E virus is an important cause of large epidemics of acute hepatitis in the subcontinent of India, Central and Southeast Asia, the Middle East, parts of Africa and elsewhere. This virus is responsible for high mortality (15–20%), during pregnancy particularly during the third trimester.

The GB hepatitis viruses

The GB hepatitis viruses (GBV-A, GBV-B and GBV-C). The GB hepatitis viruses were cloned recently and preliminary genomic characterization shows that they are related to other positive-stranded RNA viruses with local regions of sequence identity with various flaviviruses. Phylogenetic analysis of genomic sequences showed that these viruses are not genotypes of the hepatitis C virus.

In the majority of regions of the world hepatitis B and C are prevail. Widely spreading of virus hepatitis be explained ease of infection. The virus hepatitis in 1000 times is more infectious than AIDS!!! Even traces of blood it appears enough for infection. The usual devices for shaving, manicure accessories, drawing tattoo, visiting of the dentist, the gynecologist, the transferred operation - all this can be a risk factor for infection. The hepatitis B is transferred the same as also a HIV, at direct contact to fluids of an organism of the infected person, through syringes or other tools which prick and cut, at blood transfusion, from mother to the child. It is similar up to a HIV,

this virus is not transferred at household contact, through a food, a water and air - droplet way. The main difference of a hepatitis B from a HIV is its higher infection.

Prophylaxis infection viruses of a hepatitis and immunoprophylaxis at contact to biological materials of the patient with a hepatitis

With the purpose of the prevention of infection with hepatitis in all healthcare facilities it is necessary using as much as possible medical and laboratory toolkit of disposable; severely to be observed rules of use, disinfection, and sterilization of medical and laboratory toolkit, the equipment.

Prophylaxis of professional infections of healthcare workers reduced to the maximal prevention of pollution of blood which contains virus hepatitis, in an organism of the doctor in a working time.

All manipulations at which can take place pollution of hands by blood or fluid, a trace to carry out in rubber gloves.

In case of pollution of hands by blood it is immediately to process them tampon moistened with a disinfectant solution (1 % a solution chloramines) and to wash up them twice warm flowing water with soap, dry to wipe an individual towel or a napkin of disposable using.

Surfaces of working tables at the end of each working day, and in case of pollution by blood it is immediately to process 3 % solution chloramines.

Medical personal who work contact to blood and its components are subject to inspection on presence of virus (HBsAg) in an effective date for work, and is farther not less often than a once in year.

Prophylaxis of posttransfusion hepatitis (PTH)

- a) Careful medical and biochemical inspection of all categories of donors;
- b) The maximal restriction of donors number concerning one recipient of blood or its preparations;
- c) Regular epidemiological investigation of cases PTH;
- d) Revealing of donors of sources PTH and their alienation from a donor service.

All categories of donors at everyone are subject to complex laboratory inspection with obligatory research of blood on presence HBsAg with use of high-sensitivity methods of its indication.

The person is not supposed to a donor service, in which as a result of inspection is established:

- transferred in past VH, irrespective of prescription of disease;
- presence HBsAg in whey of blood;
- presence of chronic diseases of a liver;
- Presence of clinical and laboratory attributes of a pathology of a liver;
- contact in family or in an apartment with patient VH for the period of 6 months from the moment of his hospitalization;

The person which had transfusion of blood and its components for last 6 months.

Tuberculosis and its distribution in Ukraine and the world.

The beginning of a new millennium is accompanied by menacing situation about that tuberculosis which always was the indicator of social well-being in public. Every year in the world from 7 up to 10 million patients with tuberculosis reveal are from which 2,5-3 million persons died. The total of patients on this illness makes 50-60 millions. ALL OVER THE WORLD death from tuberculosis wins first place among other infectious and parasitic illnesses.

The distribution of a tuberculosis leads to reductions to life expectancy, growth of a death rate, temporary and stable capacity for work.

Epidemic of a tuberculosis in our country is declared since 1995, since it continues to progress. Each hour per Ukraine register four new cases of tuberculosis and one case of death from this illness. Every year it appears 37 - 39 thousand persons and 11 thousand patients with tuberculosis died. Since 2001 disease a tuberculosis has increased in 2,2 times and has made a level 80,9 on 100 thousand population, and mortality has increased in 2,7 times and makes 22,6 on 100 thousand population.

Radiologists in the tropics or, indeed, anywhere else, should consider tuberculosis in almost every differential diagnosis: its manifestations, like its sufferers, are legion.

Definition

Tuberculosis is an infection with the *Mycobacterium tuberculosis* or *Mycobacterium bovis*. Both are gram-positive, acid and alcohol fast, aerobic, non-spore forming rods, classified with the actinomycetes. *M. tuberculosis* is a facultative intracellular parasite, which, many believe, is capable also of extracellular growth and can remain dormant for years or even decades.

Geographic Distribution

Tuberculosis is a worldwide infection from which some three million people die annually, more than from any other single infectious disease. It is probable that, because of AIDS, drug resistance, and population stresses, the epidemic will increase in the future unless brought under control. The countries with the largest number of patients with tuberculosis are Bangladesh, Brazil, China, India, Indonesia, Nigeria, Pakistan, the Philippines, and Vietnam. The rate of disease is highest in sub-Saharan Africa. In some parts of the world, 80% of the population react positively to a tuberculin skin test by the age of 25 years and many react much earlier (unless they are HIV-positive). In developing countries tuberculosis accounts for 26% of avoidable deaths.

The reported incidence, however, may not be accurate: it is often a reflection of the efficiency and methods used to detect the disease rather than a true indication of its actual prevalence. Public health facilities vary greatly, but, for example, it was estimated in East Africa (1971) that half a million persons were newly infected each year and that 75,000 would develop clinical tuberculosis, of whom only 25,000 would be diagnosed and 16,000 treated. Such figures have improved in some countries, but not in all. A person, once infected, is likely to harbor the tubercle bacillus for the rest of his or her life and it may remain dormant unless there is a change in general health or immunity, as occurs with AIDS, diabetes, leukemia, or malnutrition. Much less commonly, there may be reinfection.

Professional danger of the doctor of the phthisiatrician and the use of preventive measures

Doctors - phthisiatricians are persons who communicate with patients with tuberculosis because they are constant supervision of experts of a tubercular clinic. They have primary task the prevention of cases of disease by tuberculosis among the medical personnel.

With this purpose in a tubercular hospital persons employed are not younger than 18 years which have passed obligatory medical examination. The following prophylaxis examinations on tuberculosis are carried out every 6 months.

The rules of disinfection at work with tubercular patients are practically same as at work on HIV-AIDS patients and patients with hepatitis. It first of all works of medical personals in rubber gloves, using disposable toolkit, strict performance of rules of the current and final disinfection.

Observance even such simple safety rules at work with infected patients will help medical workers of the specialized establishments to keep the health.

Material for self - control:

- 1. What are the entrance gates for penetration the virus of AIDS into the organism of person?**
 - a) droplet way
 - b) alimentary way (through stomach intestinal tract)
 - c) injured skin and mucosa membranes
- 2. Possible ways of infection of medical personal by viruses of AIDS and hepatitis B are:**
 - a) during infected blood comes into the human organism
 - b) during the communication with patient
 - c) during the contact with patients staff
- 3. Taking and blood transfusing to AIDS-infected patients medical personal must make:**
 - a) in sterile coats
 - b) in special clothes and in rubber gloves

c) without following any special rules

4. What includes the term “medical accident“?

a) infect patient with AIDS-infection during the blood transfusing

b) soiling of injured skin and mucous membranes of medical personal with AIDS-infected biological material from patients during the giving first medical help

c) in the hospital infection of patient with infection that added to the main disease

5. People can work in tuberculosis establishments from age:

a) 18 years old

b) 20 years old

c) 16 years old

2. Literature

Basic:

1. Гігієна та екологія. - Підручник для студ. / За ред. В. Г. Бардова / Англ. мовою. - Вінниця: Нова книга, 2009. - 688 с. Іл.

2. Vladimir A. Korobchanskiy, Michael P. Vorontsov, Alisa A. Musulbas. - Hygiene and Ecology. - Kontrast Publishing Enterprise, Kharkov, 2006. - P. 162-165.

Additional:

3. Dr. John Everett Park. Preventive and social medicine. Text-book m/s Banarsidas Bhanot. Publishers 1167 PREM Nagar. Jabalpur, 482001 (India) 1997.

4. Brett I. Cassens, M.D., M.B.A., EA.C.P. Preventive medicine and Publik health. Harwal Publishing. (Philadelphia. Baltimore, Hong Kong, London, Munish, Sydney, Tokyo). A. Waverly Company-1992.

5. English-Russian Glossary of selected terms in preventive toxicology. United Nations environment programme. Centre of international Project, GKNT. M.: 1982 (Interim Document).

6. O.John M.Zast. Public health and human ecology. - 2nd ed. -Me Graw- Hill, 1987.

The methodical guidance has been compiled by Lienkova O.O.