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PECULIARITIES OF EPIDEMIOLOGY, PROBLEMS AND DIFFICULTIES OF DIAGNOSTICS OF HOSPITAL INFECTIONS AT THE PRESENT STAGE

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Abstract:

The etiological nature of nosocomial infections is determined by a wide range of microorganisms, which includes both pathogenic and opportunistic flora, the border between which is often rather blurred. Nosocomial infection is caused by the activity of those classes of microflora, which, firstly, is found everywhere and, secondly, is characterized by a pronounced tendency to spread. Identification of developmental features and assessment of the epidemic process of nosocomial infections in hospitals of various profiles made it possible to develop a scientifically grounded complex of organizational, methodological and practical measures to improve the system of epidemiological surveillance in these hospitals

Keywords: Nosocomial infection (HAI), opportunistic microbes (OPM), antibiotics, antibiotic resistance, infectious-inflammatory, surgical infection, antibiotic sensitivity, purulent-septic infection.

RELEVANCE: Nosocomial infections (HAIs) are the fourth most common cause of death in hospital patients - after diseases of the cardiovascular system, malignant tumors and strokes [9]. The incidence of nosocomial infections to a certain extent reflects the quality of medical care to the population and significantly affects the level of economic costs in its provision [1]. Nosocomial infections lead to an increase in hospitalization time, significantly reduce the quality of life and cause the development of stress reactions in the patient and, as a result, the loss of the reputation of the medical institution, which is difficult to assess in financial terms (11).

The role of opportunistic microorganisms in human pathology, whose participation in the implementation of the infectious process is manifested in the conditions of modern antibacterial therapy and the formation of multiresistant strains, has been determined. The causative agents of nosocomial infections include many pathogens that make up a person's own microflora: the normoflora of the biotope, microorganisms that persist in other systems or support a chronic process, and pathogens that enter the body from outside. There is a significant increase in purulent-septic infections caused by "nosocomial strains".

Identification of the developmental features and assessment of the epidemic process of nosocomial infections in hospitals of various profiles made it possible to develop a scientifically based set of organizational, methodological and practical measures to improve the system of epidemiological surveillance in these hospitals (2, 7,8,9,11).

The main causative agents of nosocomial infections (85% of the total) are opportunistic microorganisms: gram-positive cocci (epidermal and Staphylococcus aureus, beta-hemolytic streptococcus, pneumococcus, enterococcus) and gram-negative rod-shaped bacteria (Klebsiella, Escherichia, Enterobacter, Proteus, Pseudomonas, etc. (4,8,9).

The risk group most susceptible to the development of nosocomial infection includes newborns (especially premature babies) and young children; elderly and debilitated patients; people suffering from chronic diseases (diabetes mellitus, blood diseases, kidney failure), immunodeficiency, oncopathology (1,6,7,8).

Materials and methods of research: The isolated cultures were identified by morphological, tinctorial, cultural and biochemical characteristics.

[1,4,6,8]. Microbiological studies in opportunistic infections are aimed at isolating not one, but several main microbes in the test material, and not when specifying one specific pathogen, as is customary for diseases caused by pathogenic microbes [6,8,9,10]. The main method of microbiological diagnosis of opportunistic infections is bacteriological [6,7,9].

When using this method, consider the following:

- in the material from the patient, as a rule, there is an association of microbes, including both pathogens pathogens and species introduced from other organs and the environment, as well as microbes that can get into the material during its collection and delivery;
- the quantitative and species composition of the microflora varies in different patients and changes in the process the course of the disease, especially when using antibacterial drugs [4, 9,10].

RESULTS AND DISCUSSION: The reliability of bacteriological examination depends on: correct sampling of material from the patient; application of an effective set of differential diagnostic and selective nutrient media; the use of quantitative seeding material; stages of identification of isolated pure cultures (family, genus, species and, if necessary, variant); determination of properties indicating the pathogenicity of cultures and their belonging to hospital strains.

It should be mandatory to determine the antibiogram, as well as the properties of the cultures necessary for epidemiological analysis - fagovar, serovar, resistensvar, etc.

In order to determine the change of pathogens and changes in their properties, microbiological monitoring should be carried out every 5-7 days.

The microscopic method makes it possible to detect bacteria in smears of pathological material only in the case of their massive content (105 CFU / ml or more) and, due to the proximity of the morphology of bacteria, it only makes it possible to roughly judge the pathogen, referring it to large taxa (rods, cocci, spirochetes, gram-positive or Gram-negative, etc.). The results of microscopy can be used in the selection of nutrient media for further isolation of the pathogen (7,8). When identifying fungi and protozoa, the possibilities of the microscopic method are somewhat wider. The introduction of RIF into practice expands the possibilities of the microscopic method, but even in this case it cannot replace the bacteriological method, since it does not allow determining the sensitivity of the pathogen to chemotherapeutic agents and the predilection of the immune response to UPM antigens. Nevertheless, with prolonged and chronic forms of the disease, the serological method sometimes allows you to establish the etiology of the disease. Serological tests are made with paired sera of the patient and autoculture, the result is estimated by seroconversion of 4 times or more. To date, diagnostic preparations based on immune reactions (ELISA, immunofluorescent diagnosticums, monoclonal antibodies) to UPM have been poorly developed.

The results of microbiological diagnostics depend on the correct choice of material and compliance with the conditions for its collection, delivery, storage and processing.

- The type of material is determined by the clinical picture of the disease and must correspond to the location of the alleged pathogen, taking into account the pathogenesis of the disease.
- The amount of material should be sufficient to conduct the study and repeat it if necessary.
- The material is taken, if possible, in the initial period of the disease.
- Taking the material should be carried out before the start of antibiotic therapy or after a certain period of time after its appointment, necessary to remove the drug from the body.
- The material must be taken directly from the source of infection or the corresponding discharge should be examined (pus from the fistula, urine, bile, etc.).
- The sampling of material must be carried out at the time of the highest content of microbes in it.
- It is necessary to prevent contamination of the material with the normal microflora of the patient and the microbes of the environment.
- It is necessary to prevent the possibility of getting into the material of antimicrobial preparations (disinfectants, aseptics, antibiotics), to exclude contact with metals with oligodynamic properties, with cotton wool containing free fatty acids.
- Any clinical material should be considered as potentially dangerous to humans. Therefore, during its collection, storage, delivery, processing, in order to avoid infection, the same safety precautions must be observed as when working with pathogenic microbes.

Transportation of the clinical sample to the laboratory should be carried out as soon as possible.

- An accompanying document is attached to the clinical sample sent to the laboratory, containing the basic information necessary for conducting a microbiological study (nature of the material, last name, first name and patronymic of the patient, name of the institution or department, case history number, presumptive diagnosis of the disease, previous antimicrobial therapy, date and time of taking the material, signature of the doctor sending the material for examination).
- During transportation, the material should be protected from light, heat, cold, mechanical damage.
- After the study, the remains of the material are subject to destruction (autoclaving or incineration), and dishes, containers, tools - to disinfection.

Isolation of pathogens of opportunistic infections

1st day. Samples are collected and delivered to the laboratory. The material, if necessary, is processed for the purpose of homogenization and concentration. Gram smears are prepared and stained. In necessary cases, special methods of coloring are additionally used. Dilutions of the pathological material are prepared from 10-1 to 10-6 in a warm 0.5% sodium chloride solution with 0.01% gelatin (to prevent osmotic shock of bacteria) and 0.1 ml of the material is inoculated from the dilutions onto Petri dishes with a nutrient medium - lawn (for 3 cups from each dilution). In the standard set of nutrient media, it is desirable to include yolk-salt agar (for staphylococci), Endo medium or eosinmethyl agar (for enterobacteria), blood agar (for streptococci and a number of other nutrient-demanding species), Sabouraud medium (for fungi), medium for sterility control or other anaerobic media. In cases where there are indications of a likely pathogen (clinical symptoms, type of pathological material, microscopy results), more selective media should be used.

2nd day. Determine the nature of growth on nutrient media. The number of colonies of each type is counted on plates with sowing dilutions of pathological material to calculate the contamination of the material according to the

formula: X CFU = N * PD * SR, where N is the number of colonies, PD is the inoculum dose, SR is the degree of dilution.

Microscopic smears from grown colonies. Screened on the environment of the accumulation of colonies of various types. To increase the reliability of the study, it is desirable to weed out 2-3 colonies of the same type. This measure is caused by the heterogeneity of the population; it increases the cost of research, but sharply increases its reliability. If methods and capabilities are available, accelerated identification is carried out.

3rd day. Establishing the purity of culture. Identification of pure cultures. Determination of the antibiogram of isolated cultures.

4-5th day. Record the results of the tests used for identification.

Drawing up a conclusion (family, genus, type of isolated cultures; contamination of the material, CFU / ml or CFU / g; antibioticogram; etiological significance of the isolated cultures and the composition of their populations). According to clinical and epidemiological indicators, pathogenicity factors and epidemiological markers (phago-, sero-, bacteriocinovars, etc.) are determined in etiologically significant cultures.

Criteria for the etiological role of the isolated culture

To establish the etiological role of pathogenic microbes, it is sufficient to isolate the microbe from the material from the patient, the detection of specific antibodies in the blood serum in the diagnostic titer or seroconversion during the course of the disease by 4 times or more, the correlation between the isolated microbe and the clinical picture of the disease.

CONCLUSIONS: It should be borne in mind that the population of the pathogen changes during the course of the disease: during the transition to the chronic form, during the period of recovery and remission, during chemotherapy, in the presence of a competitor, it significantly decreases.

Treatment of opportunistic infections is difficult and must be comprehensive. Comprehensive treatment includes adequate surgery, rational antimicrobial chemotherapy, immunotherapy. Because opportunistic infections

purulent foci are often formed, their sanitation is necessary.

Given the widespread multidrug resistance to antibiotics among opportunistic pathogens, it is necessary

prescribe these drugs to patients, taking into account the results of determining the antibiogram isolated from patients with opportunistic microorganisms.

Since the spread of hospital strains is often associated with carriers, especially among hospital staff, it is necessary to identify and sanitize these carriers.

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