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Clinical Significance of Nosocomial Infections in a Hospital Setting

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ABSTRACT

The issue of nosocomial infections (hospital-acquired infections (HAI), nosocomial infections) in the last twenty years has become of great relevance for many regions. The rapid pace of development of medical centers, the discovery of new methods in medical therapy, the creation of medical ultra and nanotechnologies, the use of new drugs that have immunosuppressive properties, artificially suppress immunity during transplantation of organs and tissues (cells), various endemics and epidemics will create a good circumstance for the distribution of infections.

KEYWORDS: *Hospital infections, epidemiology, etiology, preventions.*

Epidemiology and prevention of nosocomial infections is a newer discipline of knowledge that gained recognition from the world community in the 70s.

Nosocomial infections include infections not detected in the patient upon admission to the hospital. It is accepted that a patient who does not have symptoms of a particular disease can be considered infected when infections are found in such sterile areas of the body as:

1. Spinal fluid

2. Blood

Employees of medical institutions belong to this category of diseases in the event that the disease occurred as a result of their work.

Opportunistic pathogens such as streptococci, staphylococci, fungi and Pseudomonas aeruginosa in purely “sterile” conditions can undergo mutations that adapt to new conditions in the habitat and give an incentive to select new strains. New mutants acquire resistance to antibiotic disinfectants. By comparison, hospital-acquired infections account for more than 2 million cases each year in the United States. According to official data, 30,000 cases are detected in the Russian Federation every year.

Data on hospital infections are not published annually in Uzbekistan.

The most frequently detected nosocomial infections include E. coli and Staphilococcus aureus. They are being followed:

- ✓ Pseudomonas aeruginosa
- ✓ Clostridium difficile
- ✓ Candida albicans
- ✓ Klabsiella pneumoniae
- ✓ Gram-positive aerobes and anaerobes
- ✓ Bacillus fragilis
- ✓ Serrata marcescens

- ✓ Citrobacter
- ✓ Haemophilus influenzae

An important role in the disease of medical workers is played by blood-borne viral hepatitis types B, C, D.

The occurrence of nosocomial infections is caused by complex medical interventions, for example, the use of invasive devices. During the observation, it was revealed that sepsis is more often detected in "training" hospitals.

Development of nosocomial problems

The number of effective antibiotics in the treatment of nosocomial infections consists of 3-5 medicines. At the end of the previous century, scientists identified a new phenomenon - pan-resistance. In this case, nosocomial strains become resistant to antibiotics. A situation arises similar to the 19th century, when there was nothing to treat infectious diseases.

Factors of the disease of the patient with infections

Internal factors that increase the possibility of infection. For example: loss of integrity of the mucous membranes, skin, diabetes and diabetes insipidus.

External factors: therapeutic and diagnostic invasive medical devices.

Risk factors among pregnant women, in parturient women are diseases of the genitourinary system, postpartum hemorrhage, and infectious complications in previous pregnancies.

Even with the intensive work of surgeons and the operating team aimed at ensuring the sterility of the surgical field and the environment during the operation, almost 15% of patients experience complications after surgical interventions in the form of nosocomial infections. Complications of surgical interventions include purulent inflammation and nosocomial pneumonia. In the last 2 years, the SARS-CoV-2 virus has greatly affected the rate of infection of patients inside a healthcare facility.

The etiology of the occurrence of complex nosocomial infections are microorganisms such as:

Methicillin-resistant Stapylococus aureus

Vancomycin - resistant enterococci

Gram-negative bacteria that produce beta-lactamase

Clostridium difficile is the main cause of antibiotic-associated diarrhea and pseudomembranous colitis.

Aspergillius and Candida causing fungemia and severe respiratory disease

Infection of a treated patient occurs when using an intravascular catheter, transferring a patient from one department (institution) to transplantation, and surgical procedures.

Group incidence

With the violation of hygienic and sanitary regimes in hospitals, outbreaks of nosocomial infections occur. This is due to the unavailability of examinations for salmonellosis. A medical person with signs of an acute respiratory infection or other disease can serve as a focus of infection. The true morbidity and mortality from nosocomial infections exceed the detectable. The reason is the lack of registration of nosocomial infection in the departments.

For example, in 2005, only 16 outbreaks of infectious diseases were registered in medical institutions of the Russian Federation. With the number of victims 248 people. Of these, 5 outbreaks occurred in

maternity hospitals.

Problems of bioethics and nosocomial infections

In Western countries, it is considered a professional duty to inform about an infection that has arisen in hospitals. In developed countries, the discussion of the problems of patients who died from nosocomial infections is given the highest priority. Since in 2006, the world media announced that a newborn Briton, Luke Day, had died.

He died a day and a half after birth from methyllin-resistant Staphylococcus aureus (MRSA) at a hospital in Ipswich.

In 2001, the Washington Post reported the death of three children from nosocomial infections. This article was placed next to a message about a terrorist attack on the United States.

It is possible to develop the necessary measures in time, with timely notification of an infectious complication that has arisen. But, unfortunately, they do not always notify about the outbreak of nosocomial infections, since there is an opinion that nosocomial infections appear due to the poor work of the medical staff, and this automatically entails administrative responsibility.

In most cases, medicines are dispensed to district hospitals for the treatment of a primary disease, since the state standards for the provision of medical services are drawn up without taking into account antibiotic resistance. To eliminate nosocomial infection in the district hospital conditions, you will have to:

- use cheaper or outdated medicines
- Discharge an undertreated patient from the hospital (in the case history, the nosocomial infection is not indicated).

Clinical variants of nosocomial infections

An important form of hospital-acquired pneumonia is ventilator-associated pneumonia (VAP). There are early and late forms of the disease, and mortality during prolonged mechanical ventilation, the development of VAP reaches 40 - 80%.

According to Gelfand et al. (5) VAP found the following microorganisms:

Staphylococcus aureus - 17.8%

Staphylococcus spp - 21.9%

Streptococcus spp - 8.2%

Pseudomonas spp - 46.6%

Proteus spp - 15.1%

Enterobacter spp - 15.1%

Citrobacter spp - 12.3%

Klabsiella spp - 5.5%

Escherichia coli - 4.1%

Fungi - 5.5%

Mixed infection - up to 4%.

Prevention of nosocomial infections

To control the situation with nosocomial infections, microbiological monitoring is necessary in

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hospitals, maternity hospitals, and polyclinics.

Important directions for the prevention of nosocomial infections

1. The right choice of antibiotics.

In severe cases of nosocomial infections, use an inhibitor of the 5th generation of protected cephalosporins, cefapirazone / sulbactam, meropenem as monotherapy or combination therapy with aztrenam, amikacin or levofloxacin. Drugs such as ampiox or gentamicin are absolutely ineffective.

2. The use of antibiotics is strictly according to indications. The indiscriminate use of antibiotics worsens the situation by encouraging the selection of new resistant strains.
3. The use of modern disinfectants during the disinfection and sterilization direction.
4. Medical staff caring for the sick should always be reminded of the importance of hand washing.
5. Free visiting mode.

In a closed space there is an over-selection of virulent strains. With free access of visitors to medical institutions, the microorganisms that have arrived compete with the "owners" of hospitals. To stop this phenomenon in maternity hospitals, the child is applied to the breast with free feeding, discharged on the second or fourth day from the hospital.

6. Reduce the time the patient stays in the hospital

Basically, this period corresponds to a week.

In developed countries, the duration of hospitalization is 4-5 days, before surgery 2-3 hours.

In this way, maximum penetration of microorganisms can be achieved.

7. Pass periodic tests for Covid-19. Since in a strong human immunity, the disease can occur without symptoms.

To fix catheters, needles, endotracheal tubes, it is recommended to use special medical films to protect the skin. Applying adhesive plasters as a skin fixative presents a certain danger. Because the adhesive plaster promotes the penetration of hospital strains and gives excessive pressure on soft tissues.

First application to the breast. Immediately after birth, it is necessary to ensure the contact of the child with the mother "skin to skin" until the end of the first feeding. At the same time, the essence is not determined by the amount of colostrum that the child received, the contamination of the child by the microflora of the mother, which serves as a prevention of HAI infection.

Requirements for the choice of disinfectants in the system of prevention of nosocomial infections.

Among microbicidal measures, the most effective is sterilization. In different conditions, thermal disinfection is used instead of sterilization. In terms of efficiency, thermal disinfection is inferior to disinfection but overcomes the use of chemicals.

The spectrum of action against microorganisms of phenol, halogens, alcohols and peroxides is limited.

Therefore, for the treatment of the skin, they must be used in a displaced form. High-level disinfection is a disinfection in which virulent infections are destroyed. The number of spores is significantly reduced. Since the main criterion for DWI is sporicidality.

Difficulties exist in the processing of complex diagnostic instruments. The modern process of their disinfection is complex, multicomponent and requires special attention to the personnel, the solution used and the equipment. Under such conditions, decontamination chambers are used, they automate

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the cleaning process; increase the service life of expensive equipment.

The need is to provide the medical center with systems for drying and saving complex equipment.

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