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Determination of Susceptibility of Bacterial Infections to Antibiotics and Prevention of Nosocomial Infections

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Abstract

In this article describe the definition of sensitivity of microorganisms to anti-bacteriology equipments has big values at treatment of infectious diseases and preventive maintenance in infection sick-lists. The results bacteriological rezistogramm at epidemiological research is the basic marker.

Keywords: disk-diffuse, F- plasmid, L-forma, S-forma, MIK, MBK

Introduction

Antibiotics play a key role among chemotherapeutic agents used in the treatment of various bacterial infections. Antibiotics are divided into a number of groups according to their origin, chemical structure, mechanism of antibacterial action. The widespread (sometimes incorrect) use of antimicrobials in practice leads to the formation of drug-resistant (resistant) variants of bacteria. Since the introduction of antibiotics into medical practice, antibiotic-resistant microorganisms have also begun to appear and contribute to the spread of infectious diseases.

Materials and Methods

The purpose of the topic: Early detection of the sensitivity of microorganisms to antibiotics and the prevention of nosocomial infections.

The resistance of microorganisms to antibiotics depends on the following mechanisms:

1. The conversion of active antibiotics to inactive forms.
2. Loss of permeability of the cell wall of the microorganism for a known antibiotic.
3. Violation of the special transport system in the bacterial cell.
4. The formation of vital metabolites for microorganisms.

Many pathogens are currently susceptible to antibiotic-resistant strains, which in turn cause nosocomial infections, which is becoming a serious problem worldwide. There are two main mechanisms by which bacteria develop antimicrobial resistance: natural and lifelong. The resistance of bacteria depends on whether they produce enzymes that inactivate the drug, or modify the metabolite that affects the drug. In some cases, bacteria show signs of resistance that are independent of their genetic characteristics. Many antibacterial drugs act on actively growing, dividing bacteria. Some bacteria enter the body in a latent form and can live for many years (the causative agent of tuberculosis). Some bacteria, on the other hand, can alter target structures in their cells that are affected by antibacterial drugs. For example, under the influence of an antibiotic, some bacteria tend to transform into L-forms. This makes the bacterium resistant to this antibiotic.

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Bacteria can also develop resistance to antibacterial drugs by altering their genomes. For example, as a result of a mutation, a bacterium can change its drug structure, drug purines, drug proteins or enzymes (for example, the 30C subunit in the ribosome, DNA-dependent RNA polymerases). Microorganisms may also show resistance to strains of antibacterial drugs as a result of selection. The emergence of strains resistant to antibacterial drugs in some bacterial populations can lead to the predominance of these strains in the population. MIRSA (S.aures methicillin resistant), a methicillin resistant type, was obtained by the same Staphylococcus aureus method. In addition, bacterial resistance to antibacterial drugs is also regulated by plasmids that carry genetic information that is not related to the bacterial chromosome. Transposons in plasmids may indicate resistance of bacteria to several drugs. Thus, the resistance of bacteria to antibacterial drugs depends on their chromosome or the plasmids contained in them, R-plasmids, eng.Resistance, depending on these characteristics, is transferred to subsequent populations.

The data show that, in practice, the predominance of bacteria exhibiting resistance to antibacterial drugs causes many problems in the treatment of infectious diseases. Therefore, in order to treat a patient, it is first necessary to be able to choose a medicine, knowing whether the selected pathogen is resistant to this antibiotic. Bacteria are currently divided into three categories depending on their susceptibility to antibiotics: susceptible, moderately resistant and resistant. Determining the susceptibility of microorganisms to antimicrobials is one of the main tasks of clinical bacteriology. Knowing the level of susceptibility of individual bacteria to antibacterial drugs is important for the rational choice of antibacterial drugs for the effective treatment of infectious diseases and to prevent the spread of the disease (prevention). On the other hand, obtaining the results of these tests for bacteria (resistance) to antibiotics can be an important market for epidemiological studies. In any case, the results of a study of the susceptibility of bacteria to antibiotics should be given in the index. The susceptibility of the pathogen to antibiotics should always be determined during treatment. When determining the susceptibility of bacteria to antibiotics, regardless of the method used, its value is MIC (minimum inhibitory concentration). The number and minimum concentration of MBC preparations (minimum bactericidal concentration), under standard conditions, i.e., bactericidal effect on the cultivated culture. The sensitivity criterion for MIC and MBC is the therapeutic index (TI). TI can be detected by serial dilution, electronic diffusion tests.

Therapeutic Index (TI) T MIC / K - minimum inhibitory concentration. K is the amount of antibiotic used in a therapeutic dose at the site of the disease or in the blood (μg / ml). The therapeutic index should not exceed 0.3 normal. The lower the indicator, the higher the effectiveness of the drugs.

Literature Review

The problems of the early detection of the sensitivity of microorganisms to antibiotics include the researches of the following scientists as Mukhamedov I.M [1, 2, 3, 4], Zakirov N.A. [9], Khaitov R.N. [5], Pokrovskiy V.P. [7], Korotyaev V.I. [8], Pozdneeva O.K. [7], Borisov L.B [6], and others

Experimental Work

Objective: to determine the susceptibility of bacterial infections to antibiotics and prevent nosocomial infections.

Control methods:

1. The bacteriological method
2. Disk diffuse method

Determination of bacterial sensitivity to antibiotics by disk diffusion.

Currently, only pathogens are susceptible to antibiotics. In the bacteriological laboratory, 75 test materials were obtained and checked for the presence of antibacterial drugs. Planted bowls are stored in a thermos for one day at 37 C. The disk determines the sensitivity to certain antibiotics depending on the diameter of the zone in which the growth of the surrounding microorganism culture has stopped.

In recent years, antibiotic-impregnated discs and devices used to insert them, developed by the Uzbek-American joint venture (Phoenix International LTD Hei Media), are widely used in the country.

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Currently, antibiotic-infused paper discs show the diameter of the zone of inhibition of bacterial growth (sensitive, moderately stable). Based on this, the sensitivity of bacteria to antibiotics is determined by special lines, and the sensitivity is determined by special tables.

The dispenser can be used to place antibacterial agents on the surface if the bacteria are inoculated, the advantage of which is that the antibiotics administered at each distance and their sterility are fully provided and absorbed over time.

In addition, if special ring discs are impregnated with different concentrations of the same antibiotic, then the dose of MIC or MBK of the drug used in the tested bacterial culture is determined.

Experimental Results

Table 1. Interpretation of the diameter of the zone where growth has stopped and Equivalent MIC value (µg / ml).

Antibiotics	ичество на диске (мкг) составляет ED	аметр зоны задержки роста, мм
Cefazolin		
Eshirichia coli	10	18
For staphylococcus	10	22
For candida	-	-
Klebsiella	-	20
For Pseudomonosis	-	-
Ceftroxin		
Eshirichia coli	10	15
For staphylococcus	10	10
For candida	10	-
Klebsiella	-	10
For Pseudomonosis	-	15
Tawanak		
Eshirichia coli	-	15
For staphylococcus	10	-
For candida	-	-
Klebsiella	-	10
For Pseudomonosis	-	15
Rixithromycin		
Eshirichia coli	30	10
For staphylococcus	30	10
For candida	30	-
Klebsiella	-	10
For Pseudomonosis	-	20
Cefotaxime		
Eshirichia coli	30	15
For staphylococcus	30	15
For candida	30	15
Klebsiella	-	10
For Pseudomonosis	-	8
Amoxiclav		
Eshirichia coli	5	-
For staphylococcus	5	15
For candida	5	-
Klebsiella	-	15
For Pseudomonosis	-	-
Dotasiv	30	
Eshirichia coli	10	20
For staphylococcus	10	10

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For candida	-	10
Klebsiella	-	-
For Pseudomonosis	-	-
Suprazone		
Eshirichia coli	15	10
For staphylococcus	-	15
For candida	-	-
Klebsiella	-	10
For Pseudomonosis	-	-
Chloramphenicol		
Eshirichia coli	30	-
For staphylococcus	-	10
For candida	-	-
Klebsiella	-	-
For Pseudomonosis	-	-
Dotasiv		
Eshirichia coli	10	20
For staphylococcus	-	20
For candida	-	10
Klebsiella	-	-
For Pseudomonosis	-	20
Mesoseph		
Eshirichia coli	30	-
For staphylococcus	-	15
For candida	-	-
Klebsiella	-	-
For Pseudomonosis	-	-
Fluconazole		
For candida	-	20

From the above studies it can be seen that from the pathogenic microorganisms St.aurtus, St. antibiotics such as epidermis, St. facialis-cefozolin, ceftroxin, dotofaf, mesosef, E. Solitavanak, dotosif, suprazone, candidiasis-fluconazole, cefotoxime, klebsiella amoxiclav, suprazone, roxithromycin, Psebdomanas aerogenosa-dotasif, tavanac..

Conclusion

In conclusion, we can say that the resistance of microorganisms to antibiotics depends on many factors, namely;

1. Use antibiotics in lower doses and for shorter periods of time to treat certain infectious diseases.
2. Uncontrolled use of antibiotics.
3. Inability to determine predisposition to antibiotics before use.

For the above reasons, due to the ineffective and improper use of antibiotics, treatment-and-prophylactic institutions produce strains that are sensitive to antibiotics, especially as a result of the inability to determine susceptibility before using antibiotics. In most of our patients, opportunistic microorganisms have an advantage over the course of the disease. Viral etiology plays a significant role in the causes of acute diarrhea in most patients admitted to the infectious diseases hospital.

Diseases are treated without sensitivity to antibiotics, while antibiotics not only have a negative effect on the body, but also affect the quality and quantity of normal microflora, leading to serious diseases. As a result, the body's immune system weakens and microbial strains sensitive to antibiotics appear.

Recommendation

1. Determine the susceptibility of microorganisms to antibiotics before using antibiotics against the pathogen.

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2. Elimination of factors affecting sustainability.
3. Strengthen measures aimed at the transmission mechanism to prevent secondary infections.

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