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NEUROSURGICAL INFECTIONS

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Annotation: This article provides an in-depth analysis of the problem of neurosurgical infections, their causes, clinical manifestations, methods of diagnosis and treatment. The work highlights the significance of modern neurosurgery, the types of postoperative infections and the role of causative microorganisms, in particular, the bacteria Staphylococcus aureus, S. epidermidis, E. coli, Pseudomanas aureginoza, klebsiella, and Cutibacterium acnes. It is also mentioned that fungal and viral infections occur, especially in patients with weakened immunity. The study emphasizes that clinical, radiological (CT, MRI) and microbiological (culture, PCR, lumbar puncture) methods play an important role in the diagnosis of infections. Strict adherence to the rules of asepsis and antisepsis in the prevention of infections, as well as such surgical measures as empirical and targeted antibiotic therapy, abscess drainage, and shunt removal, are shown as effective ways. The relevance of the work lies in the fact that neurosurgical infections are one of the most important problems in the healthcare system today, and their early diagnosis and treatment are important for improving the quality of life of patients. The research results provide a scientific and practical basis for improving the effectiveness of prevention, diagnosis, and treatment of infections in neurosurgery.

Keywords: Neurosurgery, infection, microorganisms, Staphlacoccus aureus, Pseudomonas auruginosa, MRSA, meningitis, abscess, asepsis, antibiotic therapy, microbiological analysis, diagnostics, prevention, immunity, purulent processes.

Input.

Neurosurgical operations, i.e., purulent and bacterial infections arising in the field of neurosurgery, have become an integral part of modern neurology and surgical practice. Neurosurgical infections, i.e., purulent and bacterial infections arising in the field of neurosurgery, have become an integral part of modern neurology and surgical practice. Neurosurgery is a comprehensive field of surgical interventions performed for the treatment of the brain and spinal cord, nerves, and other structures of the central nervous system. Along with the development of this field, problems related to infections arising in its practice, especially purulent and inflammatory microorganisms, are of great importance. Post-neurosurgical infections occur, especially in such forms as meningitis, brain and spinal cord abscesses,

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subdural and epidural infections, as well as postoperative wound infections of the surgical site. These infections not only negatively affect the quality of life of patients, but also increase their lifespan and complicate the treatment process.

Despite the development of microbiological science and the creation of modern diagnostic methods, there are a number of problems in identifying and treating microorganisms that cause neurosurgical infections. The main pathogens, such as Staphylococcus aureus and its MRSA form, S. epidermidis, gram-negative bacteria, as well as anaerobes and rare pathogens, including Cutibacterium acnes, contribute to the development of the infection. Additionally, fungal and viral infections occur in patients with weakened immune systems. On the other hand, clinical signs, radiological examinations (CT, MRI) and microbiological analyses (culture, PCR, lumbar puncture) play an important role in the diagnosis of these infections. Antibiotics, asepsis, and antisepsis are important in the prevention of infections, and empirical and targeted antibiotic therapy, as well as surgical interventions such as abscess drainage and shunt removal, are important steps.

This problem constitutes not only an important environment of the current period, but also the need to introduce new technologies and methods for the prevention and treatment of infections in the field of neurosurgery in the future, the development of microbiological analysis. This, in turn, contributes to improving the quality of life of patients, optimizing surgical outcomes, and increasing the overall effectiveness of the healthcare system. Therefore, the problem of neurosurgical infections is a relevant topic not only for clinical practice, but also for scientific research. This research will combine microbiological, clinical, and technological approaches to address emerging problems and develop advanced treatment methods.

Main part.

The modern significance of neurosurgery is becoming increasingly important for human health and quality of life. This area is especially important in solving problems related to neurosurgical interventions and resulting infections. Neurosurgical operations relate to important parts of the central nervous system, such as the brain, spinal cord, etc., and their successful implementation requires a high level of technological capabilities and qualified specialists.

Modern neurosurgical technologies and methods have made significant revolutions. Surgical interventions using endoscopic and microsurgical techniques are less invasive, the recovery period of patients is shorter, and the risk of the surgical process is reduced. With the help of these technologies, regional circulation, preservation of nerves, and good surgical results are ensured. Computed tomography (CT, MRI) technologies are also widely used in diagnostics, which makes surgical operations more accurate and safe.

However, an important problem associated with neurosurgical interventions is recurrent infections. This problem is especially important in the prevention of purulent infections that occur at the surgical sites. Purulent infections that occur during neurosurgical interventions are usually caused by microorganisms. These microorganisms may include Staphylococcus aureus, especially MRSA (methicillin-resistant staphylococci), S. epidermidis, as well as gram-negative bacteria, such as E. coli, Pseudomonas aeruginosa, Klebsiella, and anaerobes, such as Cutibacterium acnes. Patients with weakened immunity can also develop fungal and viral infections, which leads to a disruption of the surgical outcome.

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Several important methods are used in the diagnosis of neurosurgical infections. Clinical signs are assessed based on symptoms such as inflammation, swelling, pain, and fever. Radiological examinations, in particular CT and MRI, determine the exact location and depth of the infection site. Microorganisms are identified using laboratory and microbiological analyses, including culture and PCR, as well as a fluid sample is taken and examined by lumbar puncture. These methods are used to determine the infectious microorganisms and their ability to fight antibiotics.

Preventive measures play a key role in the prevention and treatment of infections. Antibiotics, asepsis, and antisepsis are important, contributing to ensuring the cleanliness of the surgical environment. In the process of empirical and targeted antibiotic therapy, the correct antibiotics are selected based on the results of microbiological analyses. At the same time, surgical interventions - drainage of the abscess, removal of the shunt - are important in controlling the infection, the success of which depends on the degree of infection and the correctness of the procedures.

Currently, the risks and consequences of neurosurgical infections are widely discussed. To minimize these problems as much as possible, early diagnosis and proper treatment are of great importance. Technological advances and scientific research continue in the field of medicine, which will help reduce the incidence of infections in neurosurgery in the future and mitigate their consequences. In conclusion, modern neurosurgery and its technologies, as well as achievements in the prevention and treatment of infections, are an important factor in improving human health and are one of the main directions for the development of the medical field.

Neurosurgical infections, especially postoperative purulent processes, are one of the most important and complex problems in the field of neurosurgery. These infections not only pose a serious threat to the health of patients, but also create significant difficulties for doctors in diagnosis and treatment. The types of post-neurosurgical infections and their relationship with microorganisms, the causes of this problem, and methods for its prevention should be studied comprehensively.

Among postoperative neurosurgical infections, the most common are meningitis, brain and spinal cord abscesses, subdural and epidural infections, and postoperative wound infections of the surgical site. Meningitis is typically a purulent inflammation of the meninges of the brain and spinal cord, caused by purulent microbes, especially bacteria and viruses. On the other hand, brain and spinal cord abscesses, as well as subdural and epidural infections, usually lead to the localization and development of bacteria and pose a life-threatening risk in severe cases.

The range of microorganisms causing these infections is wide, among the main ones of which Staphylococcus aureus and MRSA (Methicillin-Resistant Staphylococcus aureus) microbes, which have high antibiotic resistance, are of particular importance. Microorganisms that are part of many permanent microflora, such as S. epidermidis, are also important, since they mainly cause purulent processes around implants and prostheses. Gram-negative bacteria, in particular E. coli, Pseudomonas aeruginosa and Klebsiella, play an important role in neurosurgical infections, which are widespread mainly in healthy patients with weakened immunity. Anaerobes, such as Cutibacterium acnes, as well as rare pathogens, are important in these infections, especially in cases involving surgical procedures and implantation.

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Fungi and viruses play an important role, especially in patients with weakened immunity. For their diagnosis, along with clinical signs, radiological and microbiological methods are also used. In the diagnostic process, the clinical condition of patients, radiological examinations (CT, MRI) and laboratory tests, including culture, PCR, and lumbar puncture, are of great importance. These methods are used to detect the microorganisms of infection, and microbiological studies also serve as an important basis for determining antibiotics and other treatment methods.

Among the measures of primary importance in the prevention and treatment of infections are prophylactic antibiotics, strict adherence to the rules of asepsis and antisepsis. Empirical and targeted antibiotic therapy, as well as surgical interventions - drainage of abscesses, shunt removal processes, play an important role. These measures prevent the development of infection or allow for its effective treatment.

In conclusion, the risk of neurosurgical infections and their consequences are very serious, and their early detection and proper treatment are important. Research conducted in this area and the introduction of advanced technologies are of great importance in increasing the effectiveness of prevention and treatment of infections. In the future, the development of new microbiological, immunological, and technological approaches in this direction is expected to be an important step in the fight against infections in neurosurgery.

Conclusion.

In conclusion, the prevention and effective treatment of neurosurgical infections are of great scientific and practical importance. Research and technological developments in this area will create great opportunities in the future for ensuring human health and achieving new successes in the field of neurosurgery. At the same time, scientific developments in this area are of great importance for ensuring patient safety and increasing the overall effectiveness of the medical system, and they constantly need to be updated and developed.

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