

Efficacy of Antibiotics in Chronic Hematogenous Osteomyelitis in Children

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Abstract: Osteomyelitis is an inflammatory purulent bone disease that is accompanied by the destruction (destruction) of bone tissue and is caused by infection (bacteria, fungi). Children often suffer from osteomyelitis. The highest rate of the disease occurs at the age of 6-14 years, but the pathology also occurs in children under 1 year of age. With osteomyelitis, all bone structures are affected, as well as the surrounding soft tissues and bone marrow. The disease develops rapidly, is characterized by a clear clinical picture and requires special treatment in the department of pediatric orthopedics or pediatric surgery.

Key points: Treatment, types, factors affecting the origin, preventive measures.

Osteomyelitis can affect any bone in the body, but the long tubular bones of the extremities (femur, tibia, humerus) are most often affected. Childhood osteomyelitis is a very dangerous disease, and the prognosis depends on the timely diagnosis of the pathology and the provision of a full set of necessary therapeutic measures. In the case of late diagnosis and the lack of specialists who can provide all the necessary modern medical care in a medical institution, the child may suffer long-term consequences in the form of permanent disability and even death.

The children's orthopedic department is an example of a modern clinic, where a child suspected of osteomyelitis quickly receives all the necessary diagnostic procedures and highly qualified care. Our orthopedic doctors have extensive experience in treating young patients with various forms of osteomyelitis. In most cases, doctors manage to control the situation without traumatic operations and without negative effects on the child's health in the future.

If necessary, specialists perform only minimally invasive modern surgical interventions, which can effectively treat osteomyelitis while completely preserving the damaged bone. Our orthopedists almost never resort to amputation, because the modern equipment of the operating rooms and the excellent training of doctors allow the child to be quickly and effectively disabled from the disease.

An important advantage of the treatment is the multidisciplinary approach, which means that the child can receive all the necessary help in one department, from the primary diagnosis to the complex special treatment and rehabilitation program. A whole team of professionals helps one patient at a time: pediatric orthopedists, pediatric surgeons, pediatricians, infectious disease specialists, plastic surgeons, and other doctors as needed.

At the same time, the approach to each clinical case is individual. Doctors do not use cookie-cutter treatment regimens for all children. A set of therapeutic measures is selected individually for each child by a team of specialists, taking into account the characteristics of his illness and general health.

Causes of osteomyelitis in children

Osteomyelitis is an infectious disease that occurs when bacteria or, less commonly, fungi enter the bone. This condition may occur:

Canthal spread of pathogenic microorganisms from adjacent infected tissues (for example, with purulent arthritis, abscess or phlegmon), as well as infected joint endoprosthesis, metal structures for osteosynthesis, etc.

Hematogenous spread of infection (with blood flow) from the primary focus (80% of all osteomyelitis is hematogenous). Caries, tonsillitis and chronic tonsillitis, pyoderma, sinusitis, acute otitis media, gingivitis, periodontitis, etc. can be an example of the main source of infection.

Post-traumatic spread of infection from open wounds, open cracks, foreign bodies that entered the wound during injuries.

According to the nature of the course, osteomyelitis can be acute or chronic. As a rule, osteomyelitis in a child is always acute in the first place. But if the necessary medical care complex is not provided, it can become a chronic condition.

The number one culprit among microorganisms is *Staphylococcus aureus* (85% of all cases of osteomyelitis). The disease can be caused by streptococci, pneumococci, *Escherichia coli*, *Klebsiella*, mycobacteria and *Pseudomonas aeruginosa*.

The risk of developing osteomyelitis increases in children with congenital anomalies of the musculoskeletal system, obesity, immune disorders, and diabetes.

Symptoms of osteomyelitis in children

Symptoms of osteomyelitis depend on its form (acute or chronic), the cause and the age of the child. As a rule, children experience acute hematogenous osteomyelitis, which is characterized by a clear clinical picture.

The main symptoms of acute osteomyelitis:

febrile fever (temperature 39-40 and above);

lack of appetite and weight loss;

nausea with vomiting;

decrease in blood pressure;

pale and dry skin;

severe general weakness, drowsiness, lethargy and sometimes impaired consciousness;

tachycardia;

headache;

convulsions;

hallucinations.

As a rule, such a clear intoxication syndrome lasts 2-3 days, then the symptoms subside a little, and local signs of bone damage come to the fore: severe pain in the infected bone area, aggravated by the slightest movements. , redness and swelling of the skin at the site of the lesion, sometimes a fistula with pus is formed (and the child's condition improves significantly).

A clear clinical picture helps to make an early diagnosis, because this condition of the child never escapes the attention of the parents. After hospitalizing the patient, it is important that the doctor suspects osteomyelitis, because the sooner the treatment is started, the better the prognosis. TAMS specialists must examine children for osteomyelitis with such a clinical presentation, so the pathology is detected from the first day of the child's stay in the hospital.

Patients with chronic osteomyelitis suffer from periodic pain in the bones for a long time (months and even years), which is accompanied by the formation of fistulas and discharge from them. In such a situation, it is not difficult to suspect a problem, any doctor can do it. Later, the child is sent

to a specialized pediatric orthopedic department for radical treatment (in such cases, mainly surgery).

Modern diagnostic methods

In the early stages of osteomyelitis, the pathology can be determined based on clinical signs. Laboratory and instrumental diagnostic methods are not very informative in the first days. Characteristic changes appear at the end of the first week of the disease.

A set of diagnostic measures:

Laboratory blood tests allow to assess the severity of the inflammatory process and predict its course.

Ultrasound examination of the affected area allows evaluation of the soft tissues around the damaged bone.

Digital radiography - you can see the changes in the bones from the 2nd week of the pathology.

CT and MRI can detect characteristic changes in bones with osteomyelitis much earlier than radiography.

Osteoscintigraphy of bones with ^{99m}Tc . This method helps to detect changes much earlier than ordinary radiography, but does not allow differential diagnosis between infection, fractures and tumors.

In cases of suspected chronic osteomyelitis, fistulography is used.

Bacteriological diagnosis - fluid culture obtained after open or closed puncture bone biopsy. This is necessary to choose the most effective antibacterial therapy.

Often, doctors have to trust their intuition and use all therapeutic measures even before confirming the diagnosis. Here it is important that the specialist has experience in diagnosing osteomyelitis. Only experienced doctors work in the children's orthopedic department of TAMS, which minimizes the possibility of diagnostic errors.

Prognosis of osteomyelitis in children

It is important that surgeons do not delay surgical intervention when necessary, which can remove infected areas of bone and soft tissue, prevent the spread of infection and the development of complications.

Modern treatment of osteomyelitis in children

The scheme of treatment of osteomyelitis, which is selected individually by children's orthopedists in each clinical case, is effective and safe.

Drug therapy is prescribed to all children with osteomyelitis and includes antibiotic therapy. Drugs are selected individually for each child, age, sensitivity of isolated microorganisms and general health of the child. Duration of treatment is at least 6-8 weeks. To minimize pain during drug infusions in TAMS, the child is equipped with a special port system that does not require piercing the skin with a needle each time antibiotics are administered.

Surgery often complements the treatment protocol for osteomyelitis. Access and surgical techniques depend on the location of the pathological center and its degree of spread. As a rule, orthopedic surgeons remove all dead bone and soft tissue and clean the lesion. After removing the source of infection from the bone, its cavity is washed with antibacterial agents, and bone grafting is performed to repair the resulting defect.

Hyperbaric oxygen therapy is an additional treatment method that can speed up the patient's treatment and rehabilitation process. To conduct a hyperbaric oxygenation session, the child is placed in a special pressure chamber, where the pressure is higher than atmospheric, which helps the body to be actively saturated with oxygen.

Bioactive glass is an innovative treatment for osteomyelitis. Bioglass is an amorphous substance that contains a lot of silicon, sodium, calcium and phosphorus. After bioglass is installed after bone surgery, it begins to actively grow with healthy tissue, which in most cases allows the patient to achieve a stable remission. The technique is used for chronic osteomyelitis.

Laser surgery is an ultra-modern method of treating osteomyelitis, in which the intervention is minimally invasive, blood loss is minimal, tissue healing and the rehabilitation process is significantly reduced.

Osteomyelitis is a serious disease, and after completing all treatment measures, the patient needs active rehabilitation, which can be obtained without any problems in the rehabilitation department of the Tel Aviv Medical Clinic. An important advantage of rehabilitation in Israel is the sanatorium-resort treatment at the Dead Sea, where the child undergoes mud therapy, recreational physical education, physiotherapeutic procedures, medicated baths, and manual therapy courses.

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