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Frequent Complications In Chronic Hematogenous Osteomyelitis In Children

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Abstract: Osteomyelitis is an inflammation of the bone marrow, which usually affects all elements of the bone (periosteum, spongy and compact substance). Depending on the etiology of osteomyelitis, it is divided into nonspecific and specific (tuberculosis, syphilitic, brucellosis, etc.); post-traumatic, hematogenous, postoperative, contact. The clinical presentation depends on the type of osteomyelitis and its form (acute or chronic). The basis of treatment of acute osteomyelitis is the opening and sanitation of all wounds, for chronic osteomyelitis - removal and sequestration of cavities, fistulas.
Key words: Acute osteomyelitis, Hematogenous osteomyelitis, Post-traumatic osteomyelitis, Gunshot osteomyelitis, Post-operative osteomyelitis

Osteomyelitis (from the Latin osteon bone + myelos bone marrow + itis inflammation) is an inflammation of the bone marrow, which usually affects all elements of the bone (periosteum, spongy and compact substance). According to statistics, osteomyelitis after injuries and operations accounts for 6.5% of all diseases of the musculoskeletal system. It often affects the femur and humerus, lower leg bones, vertebrae, mandibular joints, and upper jaw. After an open fracture of the diaphysis of long bones, post-traumatic osteomyelitis occurs in 16.3% of cases. Men suffer from osteomyelitis more often than women, children and the elderly - more often than the young and middle-aged.

Classification
There are nonspecific and specific osteomyelitis. Nonspecific osteomyelitis is caused by pyogenic bacteria: Staphylococcus aureus (90% of cases), streptococci, Escherichia coli and less common fungi. Specific osteomyelitis occurs with tuberculosis of bones and joints, brucellosis, syphilis, etc.

Endogenous (hematogenous) and exogenous osteomyelitis are distinguished depending on the way microbes penetrate the bone. In hematogenous osteomyelitis, purulent infectious agents are introduced through the blood from a distant center (furuncle, felon, abscess, phlegmon, infected wound or abrasion, tonsillitis, sinusitis, carious teeth, etc.). With exogenous osteomyelitis, the infection penetrates into the bone during trauma, surgery, or spreads from the surrounding organs and soft tissues.

In the initial stages, exogenous and endogenous osteomyelitis differ not only in origin, but also in manifestation. Then the differences are evened out, and both forms of the disease continue in the same way. The following forms of exogenous osteomyelitis are distinguished:

post-traumatic (after open fractures);

shooting (after a shooting fracture);
postoperative (after wire or bone operations);
contact (during the passage of inflammation from the surrounding tissues).
As a rule, osteomyelitis is initially acute. In favorable cases, it ends with recovery, in unfavorable cases, it becomes chronic. In atypical forms of osteomyelitis (Brodie's abscess, Ollier's albuminous osteomyelitis, Garre's sclerosing osteomyelitis) and some infectious diseases (syphilis, tuberculosis, etc.) there is no acute stage of inflammation, the process is primarily chronic.

Acute osteomyelitis
Manifestations of acute osteomyelitis depend on the direction of infection, the general condition of the body, and the degree of injury to the bone and surrounding soft tissues. X-ray changes are visible 2-3 weeks after the onset of the disease.

Hematogenous osteomyelitis
As a rule, it develops in childhood, a third of patients become ill before the age of 1 year. Very few cases of hematogenous osteomyelitis development in adults are, in fact, a recurrence of the disease in childhood. Most often it affects the tibia and femur. Multiple bones may be injured.

From remote sources of inflammation (abscess of soft tissues, phlegmon, infected wound), microbes pass through the blood to the whole body. In long tubular bones, especially in their middle part, a wide vascular network is well developed, in which the speed of blood flow slows down. Infectious agents settle in the bone. In unfavorable conditions (hypothermia, decreased immunity), microbes begin to multiply intensively and hematogenous osteomyelitis develops. There are three forms of the disease:

Septic-pyemic form. It is characterized by acute onset and severe intoxication. Body temperature rises to 39-40 °, accompanied by chills, headache and repeated vomiting. Possible loss of consciousness, delirium, convulsions, hemolytic jaundice. The patient's face is pale, lips and mucous membranes are bruised, and the skin is dry. The pulse increases, the pressure decreases. Spleen and liver enlarge, sometimes bronchopneumonia develops.

On the 1st-2nd day of the disease, clearly localized, sharp, drilling, bursting or tearing pain appears in the affected area, which increases with the slightest movement. The soft tissues of the limbs are swollen, the skin is hot, red, and tense. If it spreads to nearby joints, purulent arthritis develops.

After 1-2 weeks, a center of fluctuation (fluid in soft tissues) is formed in the center of the lesion. Pus enters the muscles, intermuscular phlegmon is formed. If the phlegmon is not opened, it can form a fistula or open on its own with progression, which leads to the development of periarticular phlegmon, secondary purulent arthritis or sepsis.

Local form. The general condition suffers less and sometimes remains satisfactory. Local inflammatory symptoms of bones and soft tissues predominate.

Adynamic (toxic) form. Rare. It is characterized by lightning fast onset. Symptoms of acute sepsis prevail: a sharp increase in temperature, severe toxicosis, convulsions, loss of consciousness, a

significant decrease in blood pressure, acute cardiovascular failure. Symptoms of bone inflammation are weak and appear late, which makes diagnosis and treatment difficult.

Post-traumatic osteomyelitis

Appears with an open bone fracture. The development of the disease is facilitated by contamination of the wound at the time of injury. The risk of developing osteomyelitis increases with comminuted fractures, extensive soft tissue injuries, severe concomitant injuries, vascular insufficiency, and decreased immunity.

Post-traumatic osteomyelitis affects all parts of the bone. In linear fractures, the inflammatory area is usually limited to the fracture site, the purulent process spreads; Accompanied by hectic fever, severe intoxication (weakness, weakness, headache, etc.), anemia, leukocytosis, increased ESR. Tissues in the fractured area are swollen, hyperemic and painful. A large amount of pus is released from the wound.

MRI of the foot. Osteomyelitis of the talus and tibia with the presence of a large area of destruction of bone tissue.

MRI of the foot. Osteomyelitis of the talus and tibia with the presence of a large area of destruction of bone tissue.

Shooting osteomyelitis

It often occurs with extensive lesions of bones and soft tissues. The development of osteomyelitis is facilitated by psychological stress, a decrease in body resistance, and insufficient healing of the wound.

General symptoms are similar to post-traumatic osteomyelitis. In acute armed osteomyelitis, local symptoms are often mild. Swelling of the limbs is moderate, there are no large amounts of purulent fistulae. The development of osteomyelitis is indicated by a change in the surface of the wound, which becomes dull and covered with a gray coating. Later, the inflammation spreads to all layers of the bone.

Despite the presence of an infectious focus, bone fusion usually occurs in gunshot osteomyelitis (with the exception of significant bone fragmentation, large displacement of fragments). In this case, purulent foci end in a callus.

Postoperative osteomyelitis

This is a type of post-traumatic osteomyelitis. Closed fractures occur after osteosynthesis operations, orthopedic operations, the use of compression-distraction devices or the insertion of wires when using skeletal traction (wire osteomyelitis). As a rule, the development of osteomyelitis occurs due to non-compliance with the rules of asepsis or an extremely traumatic operation.

Contact with osteomyelitis

It appears due to purulent processes in the soft tissues around the bone. Especially often, the infection spreads from soft tissues to the bone with panaritium, abscesses and phlegmon of the hand, extensive wounds of the scalp. Increased swelling is accompanied by increased pain in the area of the injury and the formation of a fistula.

Treatment

In the traumatology department only in the hospital. Limbs are immobilized. Massive antibiotic therapy is carried out taking into account the sensitivity of microorganisms. To reduce intoxication, replenish blood volume and improve local blood circulation, plasma, hemodeze and 10% albumin solution are injected. For sepsis, extracorporeal hemocorrection methods are used: hemosorption and lymphosorption.

A prerequisite for the successful treatment of acute osteomyelitis is drainage of the purulent focus. In the initial stages, burr holes are formed in the bone, then they are washed with solutions of antibiotics and proteolytic enzymes. For purulent arthritis, repeated punctures of the appendage are performed to remove pus and administer antibiotics, arthrotomy is indicated; When the procedure spreads to the soft tissues, the resulting wounds are opened, and then an open rinse is performed.

Chronic osteomyelitis

Complex and timely treatment of small foci of inflammation, mainly in young patients, the restoration of bone tissue prevails over its destruction. Foci of necrosis are completely replaced by newly formed bone and recovery occurs. If this does not happen (about 30% of cases), acute osteomyelitis becomes chronic.

By about 4 weeks, in all forms of acute osteomyelitis, sequestration occurs - a dead area of bone surrounded by altered bone tissue is formed. At 2-3 months of the disease, the sequestrations finally separate, a cavity is formed at the site of bone destruction, and the process becomes chronic.

Symptoms

As acute osteomyelitis progresses to a chronic state, the patient's condition improves. The pain will decrease and become painful. Fistula tracts are formed, which can look like a complex system of channels and can extend far from the site of skin damage. An average amount of purulent discharge is released from fistulas.

During remission, the patient's condition is satisfactory. The pain disappears, there is less discharge from the fistula. Sometimes the fistulas close. The duration of remission for osteomyelitis lasts from several weeks to several decades, depending on the general condition and age of the patient, localization of the lesion, etc.

The development of relapse is facilitated by accompanying diseases, a decrease in immunity and the closing of the fistula, which eventually leads to the accumulation of pus in the bone cavity. Recurrence of the disease resembles a faded picture of acute osteomyelitis, accompanied by hyperthermia, general intoxication, leukocytosis, and an increase in ESR. Limbs are painful, hot, red and swollen. After opening the fistula or opening the abscess, the patient's condition improves.

Computed tomography of the leg. Chronic post-traumatic osteomyelitis of the calcaneus with sequestration (red arrow) and fistulae (blue arrow).

Computed tomography of the leg. Chronic post-traumatic osteomyelitis of the calcaneus with sequestration (red arrow) and fistulae (blue arrow).

Diagnostics

Diagnosing chronic osteomyelitis in most cases does not cause difficulties. For confirmation, MRI, CT or X-ray is performed. Fistulography is performed to determine the fistulous tracts and their connection with the osteomyelitic lesion.

Treatment

Surgery is indicated for osteomyelitic cavities and wounds, purulent fistulas, sequestration, false joints, frequent relapses with intoxication, severe pain and dysfunction of the limbs, malignancy, other organs due to chronic purulent infection and displayed when there is a system failure.

Necrectomy (sequestrectomy) is performed - removal of sequestrations, granulations, osteomyelitis cavities along with the inner walls and cutting fistulas, followed by drainage with lavage. After sanitizing the cavities, bone grafting is performed.

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