COMPUTER TOMOGRAPHY IN THE DIAGNOSTIC AND TREATMENT OF CHRONIC RECURRENT HEMATOGENIC OSTEOMYELITIS

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Abstract: *an assessment of the possibilities and effectiveness of the use of computer tomography in a complex of examination of 60 patients with chronic recurrent hematogenic osteomyelitis of tubular bones aged from 7 to 22 years who were on treatment in the department of purulent surgery of the 2-clinic of the Samarkand State Medical Institute for the period from 2004 to 2016 has been carried out. Thus, computer tomography is a research method that provides the highest reliability of detection of purulent-necrotic changes in the affected bones and increases the role of radiation diagnostic methods in the development of a set of therapeutic measures, including the volume and tactics of surgical intervention for chronic recurrent hematogenous osteomyelitis.*

Keywords: *chronic hematogenous osteomyelitis, diagnosis, treatment.*

КОМПЬЮТЕРНАЯ ТОМОГРАФИЯ В ДИАГНОСТИКЕ И ЛЕЧЕНИИ ХРОНИЧЕСКОГО РЕКУРЕНТНОГО ГЕМАТОГЕННОГО ОСТЕОМЕЛИТА

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Аннотация: *оценка возможностей и эффективности использования компьютерной томографии в комплексе обследования 60 пациентов с хроническим рецидивирующим гематогенным остеомиелитом трубчатых костей в возрасте от 7 до 22 лет, которые находились на лечении в отделении гнойной хирургии 2 клиники Самаркандского государственного медицинского института в период с 2004 по 2016 годы. Таким образом, компьютерная томография является методом исследования, обеспечивающим наивысшую надежность обнаружения гнойно-некротических изменений в пораженных костях и повышает роль методов лучевой диагностики при разработке набора терапевтических мер, включая объем и тактику хирургического вмешательства для хронического рецидивирующего гематогенного остеомиелита.*

Ключевые слова: *хронический гематогенный остеомиелит, диагностика, лечение.*

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Introduction. One of the urgent problems of purulent surgery is hematogenous osteomyelitis. The disease, which began in the childhood, is difficult to treat and rehabilitate, and often during the growth of the child leads to various anatomical and functional disorders of the musculoskeletal system and disability in the child, and then in the young able-bodied age, reducing their quality of life [1, 4, 9, 10]. Noting certain successes in the treatment of acute hematogenous osteomyelitis, it should be noted that the high frequency of development of chronic osteomyelitis, which, according to various authors, is from 10 to 60% [2, 5]. On the other hand, the failure rate in the treatment of chronic osteomyelitis has no tendency to decline, since recurrences after operative treatment reach 10 to 42% [3, 8]. The main reasons for the recurrence of chronic osteomyelitis, we consider the low infirmity of traditional methods of X-ray diagnostics in terms of visualization of the true size of the inflammatory focus in the bone, as well as the insufficient effectiveness of the used standard surgical methods, especially in long-suffering and repeatedly operated patients [1, 6, 7].

Aim of the investigation. To assess the possibilities and effectiveness of computer tomography in a complex of examination of patients with chronic recurrent hematogenic osteomyelitis of tubular bones.

Materials and methods. An assessment of the possibilities and effectiveness of the use of computer tomography in a complex of examination of 60 patients with chronic recurrent hematogenic osteomyelitis of tubular bones aged from 7 to 22 years who were on treatment in the department of purulent surgery of the 2-

clinic of the Samarkand State Medical Institute for the period from 2004 to 2016 has been carried out. In the age aspect, patients at the age from 12 to 16 (50%) and from 16 to 22 (30%) years old have been predominated. The boys were 36 (60%), girls 24 (40%). In 30 (50%) patients tibial lesion was noted, in 24 (40%) patient's femoral lesion was noted, in 4 (6,6%) patient's brachial lesion was noted, in 1 (1,7%) patient ulnar lesion was noted and in 1 (1,7%) patient's radial lesion was noted.

All patients in the complex of preoperative diagnostics along with general clinical, laboratory examinations and survey radiography in standard direct and lateral projections included computed tomography. The study was conducted on a multi-helix 32-slice computer tomography "HiSpeed Dual". The state of all parts of the affected bone and parasseous tissues have been assessed in the tomograms, the size of the focus, its relation to the bone walls, the presence and nature of sequesters in the bone cavity and soft tissues, and bone wall defects have been taken into account. The obtained data were compared with the results of clinical examination of the lesion area and X-ray examination, as well as the intraoperative pattern.

Results and discussion. Computer tomography, in contrast to the survey X-ray, made it possible to more accurately determine the true dimensions of the destructive process in the affected bone. In this figure (figure 1), the survey radiography shows a limited destructive process in the tibia, while on CT a widespread destruction of the proximal metadiaphysis with the presence of a parietal sequester is determined. In all cases, computer tomography was predominated traditional radiography in identifying small sequesters that support chronic inflammation and cause a persistently recurring course of the disease.

In this figure (figure 2), the patient has a picture of chronic osteomyelitis of the distal metadiaphysis of the femur in the survey radiography, but no sequestration is visualized, while on the computer tomography in the frontal and sagittal planes clearly determines the sequestration, in addition there are small sequesters in the soft tissues of the lower third of the thigh. One of the pathomorphological substrates for the recurrence of the inflammatory process in chronic osteomyelitis is osteosclerosis with varying degrees of obliteration of the bone-marrow canal, which develops as a result of a prolonged course of the inflammatory process, making it difficult to visualize, and in many cases masking small destructive cavities on X-rays (figure 3). With the help of computer tomography, the delineated focuses of destruction were clearly visualized; intraosseous abscesses, whereas on the review radiograph this substrate was not detected. Intraosseous abscesses are divided by us into 2 groups: single and multiple (2 or more).

Single abscesses were characterized by delimited focuses of destruction bordered by an osteosclerotic rim with fuzzy contours separating them from the normal parts of the bone marrow cavity (figure 4).

The computer tomographic picture of multiple abscesses was represented by two or more isolated cavities surrounded by osteosclerotic septum, which disordered the anatomical structure of the bone marrow canal (figure 5).

In this case (figure 6), in a patient with a recurrence of chronic hematogenous osteomyelitis of the femur, it is not possible to see osteosclerotic septum in an overview image, and multiple sclerotic septum clearly visualized in the sagittal and frontal planes on computer tomography.

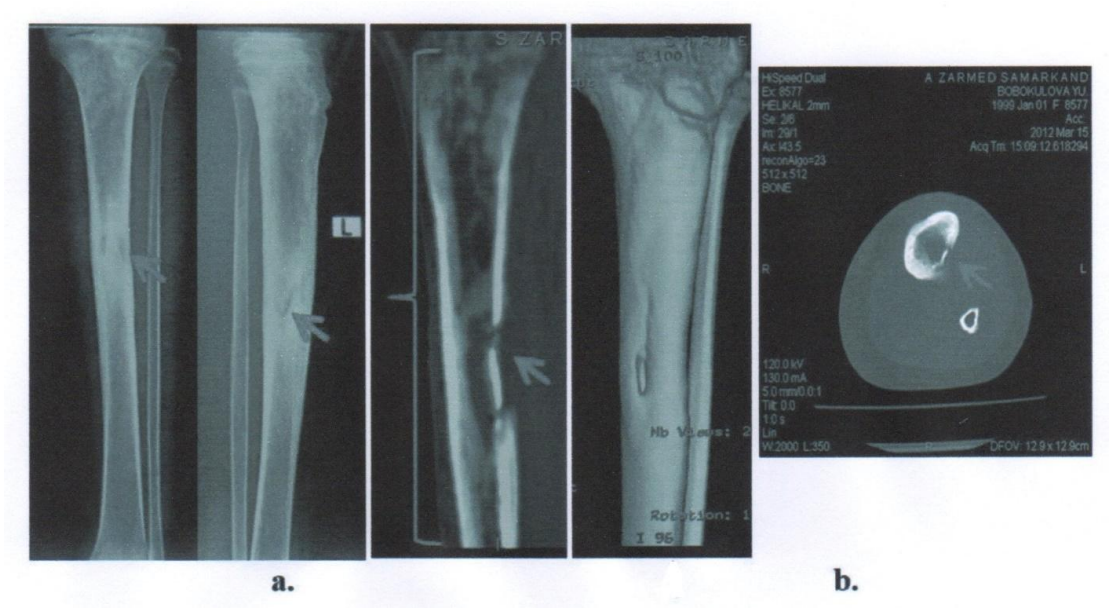

Fig. 1. Survey X-ray (a) and computer tomography (b) of the left chin bones. CRHO of the left tibial bone. Focuses of the destruction have been showed by arrows

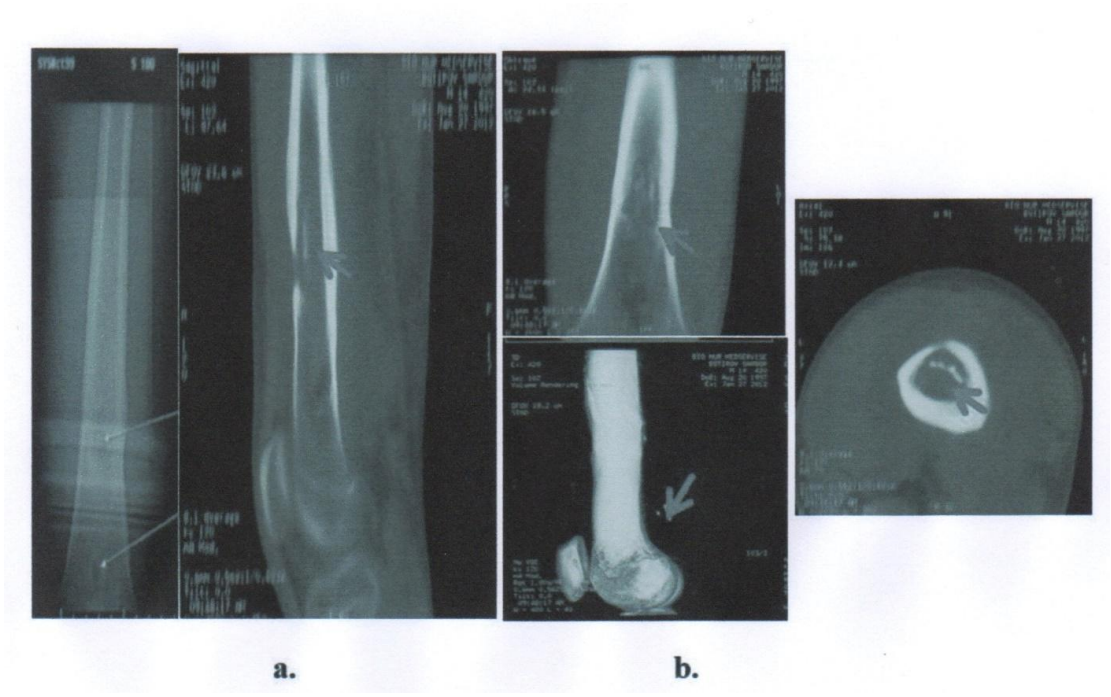

Fig. 2. Survey X-ray (a) and computer tomography (b) of the left hip. CRHO of the left femoral bone. Sequesters have been showed by arrows

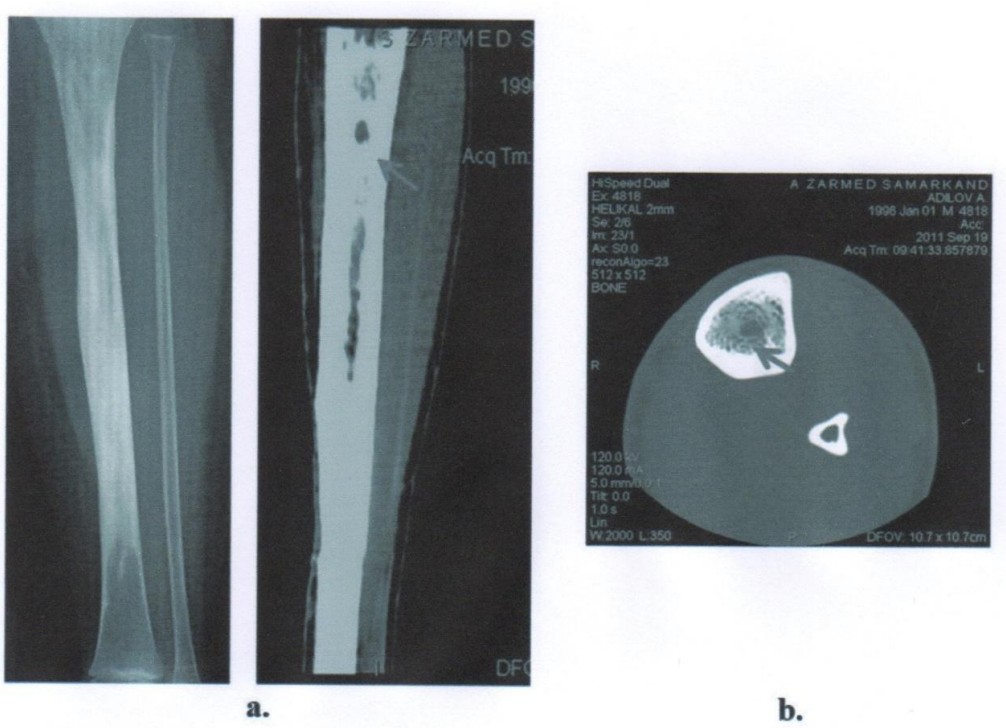

Fig. 3. Survey X-ray (a) and computer tomography (b) of the left chin. CRHO of the left tibial bone. Focuses of the osteosclerosis with obliteration of the bone-marrow canal have been showed by arrows

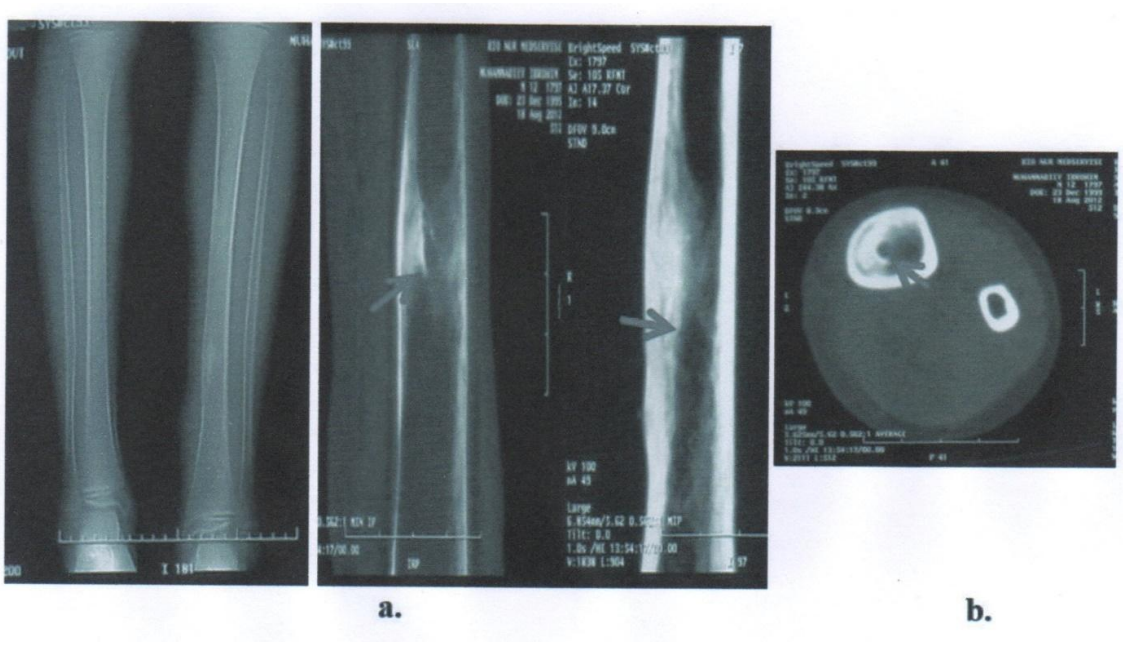

Fig. 4. Survey X-ray (a) and computer tomography (b) of the left chin. CRHO of the left tibial bone. Single intraosteal abscess have been showed by arrows

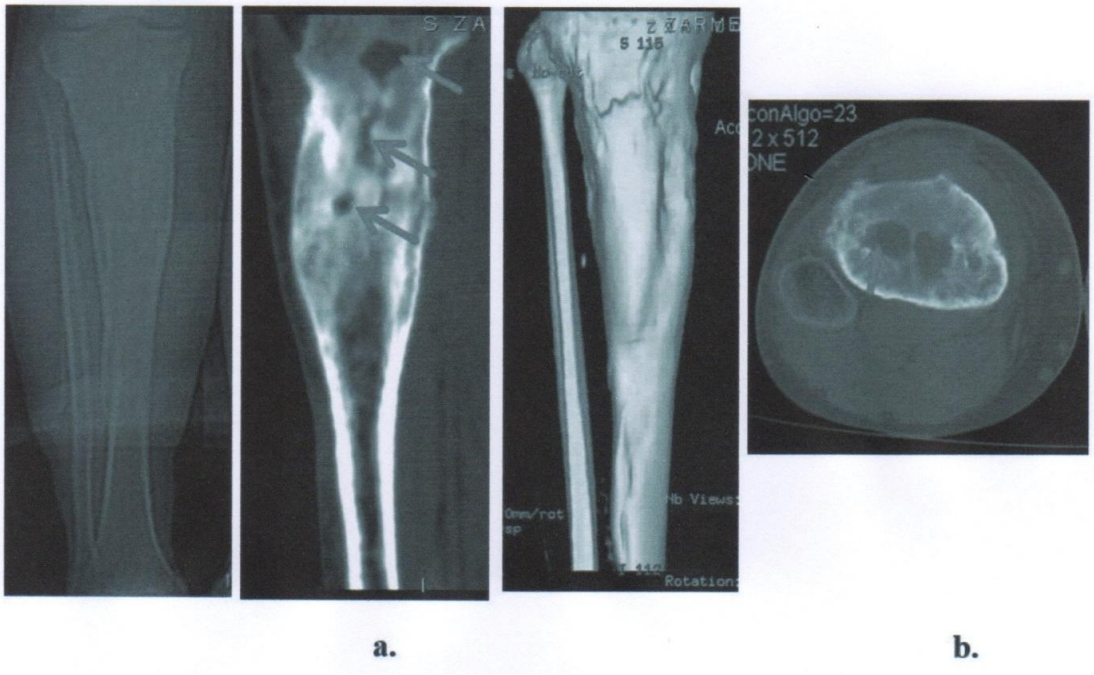

Fig. 5. Survey X-ray (a) and computer tomography (b) of the right chin. CRHO of the right tibial bone. Multiple intraosteal abscess have been showed by arrows

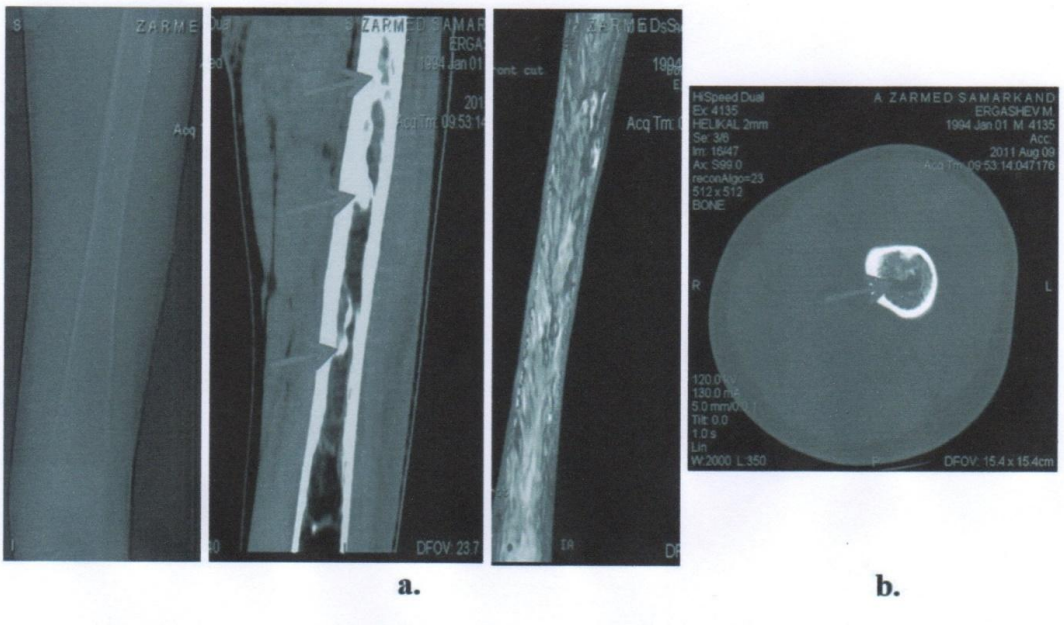

Fig. 6. Survey X-ray (a) and computer tomography (b) of the left hip. CRHO of the left femoral bone. Osteosclerotic septum has been showed by arrows

The obtained data are testified that due to high resolution, computer tomography provides complete information on pathomorphological changes in the bone, which is extremely important for the planning of treatment tactics and the choice of the volume of surgical intervention.

All patients were carried out surgical treatment consisting of osteotomy, sequesternecrectomy with radical sanation of pathological focuses; where intraoperative in all cases the diagnosis was confirmed.

Conclusions. Thus, computer tomography is a research method that provides the highest reliability of detection of purulent-necrotic changes in the affected bones and increases the role of radiation diagnostic methods in the development of a set of therapeutic measures, including the volume and tactics of surgical intervention for chronic recurrent hematogenous osteomyelitis.

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