



Treatment of Chronic Recurrent Hematogenous Osteomyelitis

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Abstract

The results of surgical treatment of 180 patients with chronic recurrent osteomyelitis of the tube bones have been analyzed. The results of clinical – laboratory investigations including immunologic and morphological examinations have been presented and also the role of computer tomography in the diagnostic of intraosteal pathology has been proved. Patients were divided into 2 groups, the first one has got traditional surgical treatment and the second one has got surgical treatment due to elaborated method. The proposed tactic of surgical treatment consists in careful exfoliation of the periosteum from the bone, longitudinal osteotomy, sequesternecroectomy with full restoration of the structure of the bone-marrow canal along the whole length, lavage and ultrasound cavitation with antiseptic solution. The performed surgical tactic secured the most radical sanation of the osteomyelitic foci and improved the treatment results of this severe pathology.

Keywords: Osteomyelitis, Bone, Surgical treatment

Introduction

According to the data of World Health Organization, among acute surgical pathology of childhood acute hematogenous osteomyelitis (AHO) is 2,2-10%, and among purulent-septic infections – from 12, 5% to 47%. In approximately 20-60% of patients, the acute stage of the disease becomes chronic, causing a prolonged multiple recurrent course and reducing the patients' quality of life [1]. In connection with severe purulent-necrotic lesions of bone tissue in the distant periods after treatment, in about 15-54% of cases, various types of orthopedic disorders (ankylosis, false joints, shortening and deformities of the osteo-articular system) are observed, leading to disability [2,3]. It is generally recognized that one of the conditions for the successful treatment of this category of patients is a radically performed sequesterectomy. The frequency of unsatisfactory treatment outcomes for chronic hematogenous osteomyelitis (CHO) does not tend to decrease, since the recurrence of the disease after repeated operations

in the chronic stage reaches from 22 to 78, 4% [4]. Patients with chronic recurrent hematogenous osteomyelitis (CRHO) are often subjected to surgical interventions 3, 5, 10 or more times, remaining untreated for tens or more years [5,6]. The duration of the disease, the difficulties of treatment, the high percentage of complications and the disability of children, the significant economic costs of their rehabilitation determine the relevance and social significance of this problem [7].

The aim of the investigation was to improve the results of surgical treatment of chronic recurrent hematogenous osteomyelitis by optimizing diagnosis and expanding the radicalness of surgical intervention.

Material and Methods of Investigation

The basis of this scientific work is the analysis of the results of the examination and treatment of 180 patients with CRHO who received treatment at the 2-clinic SamMI from

1995 to 2016. The ratio of boys and girls was 2,3 / 1. The average age of patients with CRHO at the time of admission was 15, 5±5, 9 years. The duration of the case history in 63,3% of patients exceeded 4 or more years, including 12,8% of patients – 10 years, during which they underwent several surgical interventions. 7,8% of patients had previously undergone 1 sequesternectomy, 92,2% had repeated unsuccessful repeated surgical interventions. Total 485 unsuccessful sequesternectomy were performed in 180 patients – an average of 2, 7 operations per patient.

Damaging by chronic hematogenous osteomyelitis is more susceptible to the largest tubular bones - femoral (50, 0%) and tibial (37, 8%).

All patients underwent a comprehensive examination, including clinical, radiological, computed tomography, laboratory, and morphological methods of investigation and assessment of the quality of life of patients.

Depending on the method of surgical treatment, all patients with CRHO of tubular bones were divided into two clinical groups: the control group consisted of 74 (41,1%) patients who received traditional surgical treatment from 1995 to 2003; The basic group of patients consisted of 106 (58,9%) patients who underwent surgical treatment in the period from 2004 to 2018 according to the developed methodology.

In the *control group* of patients, surgical tactics for both primary and repeated surgical interventions consisted in conducting local sequesternectomy in the zone of greatest lesion, determined according to the local status and, accordingly, the projection and length of the lesion on the review radiograph.

In the *basic group* of patients, approaches to the diagnosis and surgical treatment of CRHO were radically revised. In particular, computed tomography of the affected bone was included in the protocol of comprehensive examination of patients with this pathology. In addition, the developed surgical treatment method was used for all patients with repeated operations for CRHO – a technique of extended sequesternectomy with recanalization of the affected bone (patent for invention of the Republic of Uzbekistan № IAP 03377 “Method for surgical treatment of chronic recurrent hematogenous osteomyelitis”).

The feasibility of a significant expansion of the scope of the operation by performing a wide longitudinal osteotomy throughout the bone marrow canal (BMC) at CRHO is justified by several points:

- a. It allows you to fully sanitize not only the main osteomyelitis focus, but also to detect and eliminate all X-negative

intraosseous abscesses that were not diagnosed before the operation;

- b. Eliminates inflammatory intraosseous hypertension;
- c. By mechanical destruction of osteosclerotic septa, it helps to restore a single lumen of the bone marrow canal;
- d. It is a convenient access for the treatment of all purulent-necrotic foci with antiseptics and low density ultrasound (LDU);
- e. Provides adequate long-term drainage of the lodge of all foci of purulent inflammation.

Results and Discussion

The proposed tactics of surgical treatment of CRHO allowed to statistically significantly reduce the frequency of wound purulent complications from 20,3 to 3,8%, reduce the overall duration of inpatient treatment (from 31,2±2,1 to 21,9±0,6 days) and the duration of stay in the clinic in the postoperative period (from 18,3±0,9 to 14,9±0,35).

Performing a surgical approach did not lead to a noticeable increase in the severity and duration of edema in the tissues of the operated limb ($p=0,94$); it was not accompanied by a more frequent increase in the body temperature of the operated patients.

The distant results of surgical treatment of CRHO in terms from 2 to 20 years were studied in 86 (81,1%) patients of the basic group and in 49 (66,2%) patients of the control group. The result was classified as *good* in the absence of exacerbations of purulent-inflammatory process in soft tissues and recurrences. A *satisfactory* result was noted in the event of exacerbations in the form of infiltration and suppuration of the wound, as well as in the development of external fistulas that did not spread to the bone and succumbed to conservative therapy, closing for 1-6 months. The *unsatisfactory* results included cases of repeated development of purulent fistulas and radiological signs of osteomyelitis recurrence.

With the use of traditional method of surgical treatment of CRHO, there is a high likelihood of recurrence of the disease, reaching 32, 7%, and such accompanying complications of recurrent necrotic process in the affected bone, such as the development of fistulas, shortening, pathological fractures, ankylosis, limb deformities and so on.

At the same time, the repeated decrease in the main patient group (from 32,7% to 1,2%) in the distant period after the operation results in the risk of recurrence of the disease and, thus, the elimination of the likelihood of complications associated with the recurrences of CRHO indicates the radicality and effectiveness of the proposed approaches. to repeated surgical interventions for chronic hematogenous

osteomyelitis (Table 1).

Complication	Investigated groups				P
	Control, n=49		Basic, n=86		
	abs.	%	abs.	%	
Recurrence of CRHO	16	32,7	1	1,2	0,0048
Bone-skin fistulas	9	18,4	1	1,2	0,0082
Shortening of the limb	2	4,1	-	-	0,0316
Pathological fracture	2	4,1	-	-	0,1692
Axial deformation with impaired function	3	6,1	-	-	0,13

Table 1: Complications in the distant period after surgical operation in CRHO.

In addition, we used a special questionnaire developed in the clinic to assess the distant results of surgical treatment of CRHO, allowing the patient to assess the quality of life after the intervention. Good results in patients of the main group were obtained in 97,7% of cases, and in patients of the

control group – only in 34,7% of cases. A satisfactory result in the basic group was in 1 (1,2%) patient, while in the control group there were 32,7%. The number of unsatisfactory results in the basic group was significantly lower (1,2%) than in the control group (32,7%) (Table 2).

Group of patients	Good		Satisfactory		Unsatisfactory	
	abs.	%	abs.	%	abs.	%
Basic, n=86	84	97,7	1	1,2	1	1,2
Control, n=49	17	34,7	16	32,7	16	32,7
χ^2 -тест	df=2; $t_{stat} = 11.244$; $t_{crit} = 9.21$; $p=0,004$; $p<0,01$					
In general, n=135	101	74,8	17	12,6	17	12,6

Table 2: The quality of life of respondents in a distant period after surgery for CRHO.

Conclusion

Thus, a comparative analysis of the immediate, nearest and distant results of treatment of CRHO in patients showed that the use of the developed tactics of surgical treatment allowed reducing the recurrence rate of the disease from 32,7% to 1,2% and in 98,9% of patients getting good and satisfactory results.

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