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CLINICAL CHARACTERISTICS OF TUBERCULOUS COXITIS IN PATIENTS RESIDING IN THE ARAL SEA REGION

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Abstract. Tuberculous coxitis is one of the most severe forms of osteoarticular tuberculosis, characterized by a prolonged chronic course, pronounced morphological changes in the hip joint, and a high rate of disability among patients. In the Aral Sea region, where adverse environmental conditions persist, including high levels of dust and toxic-chemical exposure as well as reduced overall resistance of the population, there has been an increase in the incidence of extrapulmonary forms of tuberculosis, including lesions of the osteoarticular system. In patients living in the Aral Sea area, tuberculous coxitis is more often manifested by: a protracted latent onset with nonspecific symptoms; delayed diagnosis due to its resemblance to nonspecific arthritis; severe pain syndrome and restricted hip joint mobility; rapid progression of destructive processes in bone and joint tissues; and a high frequency of drug resistance of the pathogen to first-line anti-tuberculosis drugs. The clinical course of the disease in the Aral Sea region is aggravated by social factors such as low living standards, limited access to specialized medical care, and delayed initiation of chemotherapy. All these factors contribute to the development of complicated forms of coxitis, accompanied by deformities, limb shortening, ankylosis, and persistent loss of working capacity.

Key words: tuberculous coxitis, isoniazid, rifampicin, anti-tuberculosis therapy, ethambutol, resistance, anti-tuberculosis drugs

Introduction

Tuberculous coxitis is one of the most severe forms of osteoarticular tuberculosis, characterized by a chronic course, progressive destructive changes in the hip joint, and a high level of patient disability [1,2]. According to the World Health Organization, recent years have seen an increase in the number of extrapulmonary forms of tuberculosis, including osteoarticular manifestations. This trend is associated with the rise of drug-resistant strains of the pathogen and the deterioration of social conditions in endemic regions [3]. This problem is of particular importance in the Aral Sea region, where adverse environmental conditions, chronic exposure to dust and chemical agents, as well as reduced immunological resistance of the population, create prerequisites for a high incidence of tuberculosis [4,5]. The clinical course of tuberculous coxitis in this region is characterized by earlier development of complicated forms, pronounced pain syndrome, and a high frequency of drug resistance. Hip joint arthroplasty in patients with tuberculous coxitis is considered one of the most effective methods of restoring musculoskeletal function and improving patients' quality of life [6,7]. However, according to several studies, the outcomes of surgical treatment largely depend on properly organized rehabilitation measures aimed at preventing reactivation of the tuberculous process, reducing infectious complications, and restoring functional activity [8,9]. Thus, the development and implementation of

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comprehensive rehabilitation measures after hip arthroplasty in patients with tuberculous coxitis is a pressing issue in modern phthisioorthopedics, which has not only medical but also social significance [9]. At present, tuberculosis continues to remain a highly relevant problem for a large number of countries, including Uzbekistan. Tuberculous coxitis ranks second among all localizations of osteoarticular tuberculosis, occurring in 20–30% of newly diagnosed patients with this disease [10,11]. The above factors lead to delayed diagnosis of tuberculous coxitis, often in complicated forms, which in turn results in disability in 67% of cases [10]. Infectious complications during endoprosthetic replacement are relatively rare (up to 5%), but their consequences are extremely unfavorable. The development of deep periprosthetic infection leads to repeated surgical interventions, in 30% of cases ending with removal of the endoprosthesis, as well as prolonged broad-spectrum antibiotic therapy, deterioration of the supporting function of the limb, and reduced quality of life, ultimately resulting in disability [15]. Despite advances in modern phthisiology, tuberculosis of the bones and joints remains an urgent medical and social problem. According to WHO data, more than 10 million new cases of tuberculosis are registered annually, of which 2–3% account for extrapulmonary forms, including osteoarticular involvement [16,17]. Among these, tuberculous coxitis occupies one of the leading positions and is associated with severe deformation of the hip joint, chronic pain syndrome, and disability. Classical surgical methods (arthrodesis, resection arthroplasty) provided pain relief but did not allow preservation of mobility and full limb function [18]. Against this background, hip joint arthroplasty became a revolutionary approach that significantly improved the quality of life for patients with tuberculous coxitis [19,20]. However, the introduction of arthroplasty in this patient category is associated with several challenges. First, the tuberculous process may persist in a latent form and reactivate after implantation of a foreign material [21,22]. Of concern is the increase in tuberculosis incidence—106.3 per 100,000 population—which is 50% higher than the national average in Uzbekistan. In recent years, there has been a development of unfavorable epidemiological trends both in tuberculosis in general and in extrapulmonary forms, particularly osteoarticular localization. The incidence of tuberculosis has increased by 42.4%, including osteoarticular tuberculosis by 51.8%. The above factors lead to delayed diagnosis of tuberculous coxitis, often in complicated forms, which in turn results in disability in 67% of cases [12]. At the same time, the comparatively low effectiveness of complex therapy for tuberculous coxitis dictates the need not only for the earliest possible diagnosis of the specific process in the hip joint, but also for the detection of drug-resistant forms of the disease [13,14].

The aim The aim of the present study is to analyze the clinical, radiological, functional, and therapeutic features of tuberculous coxitis in patients residing in the Aral Sea region (Republic of Karakalpakstan and Khorezm region). A total of 62 patients were examined and divided into a main group (n = 23) and a control group (n = 39) consisting of patients from other regions of Uzbekistan. The following parameters were taken into account: age, disease duration, complications, range of motion in the joint before and after arthroplasty, radiological stages, and adverse effects of anti-tuberculosis drugs (ATD). It was revealed that in patients of the main group, the disease had a more severe course, with a greater number of complications, functional limitations, and a higher incidence of adverse reactions to ATD, particularly in older age groups.

Materials and Methods

A retrospective clinical study of 62 patients with tuberculous coxitis was conducted at the Republican Specialized Scientific and Practical Medical Center of Phthisiology and

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Pulmonology, Ministry of Health of the Republic of Uzbekistan, during the period 2013–2018. Of these, 23 patients constituted the main group—residents of the Aral Sea region—while 39 patients from other regions formed the control group. Patients were stratified into age categories: 18–30 years — 17 patients (27.4%), 31–50 years — 30 patients (48.4%), and over 50 years — 15 patients (24.2%). All patients underwent clinical and laboratory examinations, radiography and/or MRI of the hip joint, as well as assessment of the range of motion before and after arthroplasty. In addition, the following parameters were evaluated: duration of disease prior to admission, presence of complications (ankylosis, fistulas, limb shortening, etc.), range of joint motion, adverse effects of anti-tuberculosis drugs, and their relationship to age and study group.

Results

In most patients of the main group (residents of the Aral Sea region), the disease lasted more than three years before seeking medical care. The average duration of the disease in the main group was 3.8 years. For comparison, in the control group it was significantly shorter—about 2.1 years. Particularly prolonged disease history was observed in patients over 50 years of age.

- In the main group, 61% of patients sought medical help after more than two years from the onset of symptoms.
- In the control group—only 28%.

Clinical manifestations

Symptom	Main group (%)	Control group (%)
Hip joint pain	91%	79%
Limited mobility	87%	69%
Limping	83%	58%
Thigh muscle atrophy	74%	56%
Fever	61%	43%
External fistulas	39%	18%

The most common complaints in both groups were hip joint pain, limping, and restricted mobility. In the main group, thigh muscle atrophy, fever, and external fistulas were observed more frequently, indicating advanced disease and low levels of early diagnosis. In the control group, the clinical picture more often corresponded to less severe lesions.

Radiological characteristics

Feature	Main group (%)	Control group (%)
Destruction of the femoral head and acetabulum	52%	31%
Caseous foci, sequestra	35%	10%
Subluxation / dislocation of the hip	30%	12%
Joint ankylosis	30%	15%

In the main group, destructive forms of hip joint tuberculosis were more often detected, with destruction of the femoral head and acetabulum, caseous foci, sequestra, and dislocations. In some cases, signs of ankylosis were observed, more frequently in elderly patients. In the control group, less aggressive forms predominated, with arthritic changes and subchondral osteoporosis. The most pronounced changes were observed in the main group—60% of patients were diagnosed with the osteoarthritis stage of the disease.

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Range of motion in the joint (mean values)

Before surgery:

Parameter	Main group	Control group
Flexion	35° ±12°	48° ±15°
Abduction	12° ±6°	18° ±8°
Rotation	10° ±4°	14° ±6°

After hip arthroplasty (6 months):

Parameter	Main group	Control group
Flexion	85° ±10°	98° ±12°
Abduction	25° ±6°	30° ±7°
Rotation	20° ±5°	25° ±6°

Before surgery, patients in the main group had significantly more pronounced mobility restrictions. The average flexion was about 35 degrees, abduction—no more than 12 degrees, and rotation—up to 10 degrees. In the control group, mobility was better—flexion up to 48 degrees, abduction up to 18, rotation up to 14. After hip arthroplasty, both groups showed improvement in mobility. In the main group, flexion reached an average of 85 degrees, abduction—25 degrees, rotation—20 degrees. In the control group, the indicators were higher: flexion up to 98 degrees, abduction around 30, rotation 25. Younger patients recovered faster and more completely, while elderly patients required longer rehabilitation. Functional recovery occurred in both groups, but in the main group—more slowly, especially in patients aged 51–65 years.

Out of 62 patients with tuberculous coxitis, the diagnosis was bacteriologically confirmed in 26 (41.9%), with rifampicin resistance detected in 3 (11.5%). Resistance to both isoniazid and rifampicin was established in 7 (26.9%) patients. In the remaining 36 (58.1%) cases, the diagnosis was histologically confirmed from surgical material.

Complications

Complication	Main group (%)	Control group (%)
Fistulous forms	39%	18%
Ankylosis	30%	15%
Limb shortening >2 cm	26%	10%
Secondary infection	22%	8%
Post-arthroplasty infection	13%	5%

In the main group, a higher number of complications were recorded, including external fistulas, bony ankylosis, and limb shortening of more than 2 cm. In the control group, these complications were less common. Postoperative infectious complications were also more frequently observed in patients from the Aral Sea region, especially among older individuals. In three cases, revision surgery was required due to prosthesis infection. Anti-tuberculosis therapy and adverse effects. All 62 patients received standard anti-tuberculosis therapy under first- and second-line regimens, including the following drugs: isoniazid, rifampicin, ethambutol, pyrazinamide, bedaquiline, levofloxacin, linezolid, and cycloserine. Adverse reactions to anti-TB drugs were registered in 19 patients (30.6%). The most common was hepatotoxicity, manifested by elevated liver enzymes, nausea, and weakness. It was observed mainly in older patients (over 50 years), especially in the main group.

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Allergic reactions in the form of rash and itching were recorded in 4 patients (6.5%), mostly in middle age. Dyspeptic symptoms (nausea, vomiting, loss of appetite) were noted in 3 patients (4.8%). One patient developed optic neuritis associated with ethambutol. Patients younger than 30 tolerated anti-TB therapy much better, with adverse effects occurring rarely and not severe. The most vulnerable to toxic effects were elderly patients from the Aral Sea region, which required treatment regimen adjustments and the use of hepatoprotectors.

Discussion: The conducted analysis demonstrated that tuberculous coxitis in patients living in the Aral Sea region has a more prolonged and severe course. Their clinical picture is characterized by pronounced pain syndrome, restricted joint mobility, frequent fistulas, and ankylosis. This is associated with delayed medical consultation as well as the negative impact of environmental factors in the region. Radiologically, these patients more often presented with destructive forms of the disease requiring surgical intervention. Following hip arthroplasty, functional improvement of the hip joint was observed; however, recovery was slower in patients from the main group and in older age categories. Adverse effects of anti-tuberculosis therapy, particularly hepatotoxicity, were significantly more common in elderly patients and predominantly in the main group, which necessitates closer monitoring during treatment.

Conclusion

Tuberculous coxitis in patients from the Aral Sea region has a more severe course compared to patients from other regions. These patients present with a longer disease duration, pronounced clinical and radiological changes, a higher rate of complications, and significant limitation of hip joint function.

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Informed Consent Statement: A waiver of informed consent was granted by ethics review bodies, as the study collected and analyzed de-identified routine recording and reporting data.

Ethics Statement: This research did not involve human participants, animal subjects, or any material that requires ethical approval.

Clinical Trial Registration: This research does not involve any clinical trials.

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Conflict of Interest

There are no conflict of interest.

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