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# CLINICAL FEATURES OF JUVENILE RHEUMATOID ARTHRITIS

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✓ ***Resume***

***This article discusses the clinical, laboratory and instrumental features of juvenile rheumatoid arthritis. Juvenile rheumatoid arthritis is a chronic autoimmune disease that mainly affects the joints and develops in children under 16 years of age. Until now, the mechanism of development of this disease has not been fully elucidated, which is of interest for today. This pathological process poses a serious danger in the health care system and among the population, as it develops rapidly and leads to disability in the child population. The study of the factors and mechanisms of development of juvenile rheumatoid arthritis will allow optimizing early diagnosis and carrying out preventive measures.***

***Key words: JRA, clinic, laboratory and instrumental parameters***

# КЛИНИЧЕСКИЕ ОСОБЕННОСТИ ЮВЕНИЛЬНОГО РЕВМАТОИДНОГО АРТРИТА

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✓ ***Резюме***

***В данной статье рассматриваются клинико-лабораторные и инструментальные особенности ювенильного ревматоидного артрита. Ювенильный ревматоидный артрит представляет собой хронический аутоиммунный процесс, поражающий в основном суставы и развивающиеся у детей младше 16 лет. До сих пор до конца не выяснен механизм развития данного заболевания, чем и представляет интерес и сегодняшнее время. Данный патологический процесс представляет серьезную опасность в системе здравоохранения и среди населения так как быстро развивается и приводит к инвалидизации детского населения. Изучения факторов и механизмов развития ювенильного ревматоидного артрита позволить оптимизировать раннюю диагностику и проводить профилактические мероприятия.***

***Ключевые слова: ЮРА, клиника, лабораторные и инструментальные показатели***

# YUVENIL REVMATOID ARTRITINING KLINIK XUSUSIYATLARI

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✓ ***Rezyume***

***Ushbu maqolada balog'atga yetmagan revmatoid artritning klinik, laboratoriya va instrumental xususiyatlari ko'rib chiqiladi. Voyaga yetmaganlarning revmatoid artriti surunkali autoimmun kasallik bo'lib, asosan bo'g'imlarga ta'sir qiladi va 16 yoshgacha bo'lgan bolalarda rivojlanadi. Hozirgacha ushbu kasallikning rivojlanish mexanizmi to'liq ochib berilmagan va bugungi kunda qiziqish uyg'otmoqda. Ushbu patologik jarayon sog'liqni saqlash tizimida va aholi o'rtasida jiddiy xavf tug'diradi, chunki u tez rivojlanadi va bolalar populyatsiyasining nogironligiga olib keladi. Voyaga etmaganlar romatoid artritining rivojlanish omillari va mexanizmlarini o'rganish erta tashxis qo'yish va profilaktika choralarini optimallashtirish imkonini beradi.***

***Kalit so'zlar: YuRA, klinika, laborator va instrumental ko'rsatkichlar***

## Relevance

According to modern concepts, juvenile rheumatoid arthritis (JRA) is a chronic autoimmune disease characterized by destructive and inflammatory joint damage that develops in children under the age of 16 years [1,3,8,15]. With this disease, such formidable manifestations of the disease as carditis, interstitial lung damage and serositis often develop. In 1/2 of patients, chronic polyarthritis recurs (with or without systemic manifestations), osteochondral destruction of the joints progresses, and functional insufficiency develops [2, 4,12,13,15].

Currently, some researchers consider JRA not as a classical autoimmune disease, but as an autoinflammatory disease [11,14,]. However, the mechanisms of disease development are not fully understood.

Of the group of rheumatic diseases, JRA ranks first in the pediatric population in terms of prevalence. It has been proven that the main role in the development of JRA is played by an imbalance between the activity of various subpopulations of CD4+ lymphocytes and excessive synthesis of pro-inflammatory cytokines: IL-2, IL-17, IFN-γ, TNF-α, IL-1, IL-6, IL8 [ 9, 10]. Hyperproduction of pro-inflammatory cytokines further underlies neoangiogenesis, damage to the synovial membrane of the joint, cartilage (and subsequently bone), as well as the development of systemic manifestations of the disease and the transformation of acute immune inflammation (characteristic of the early stage of juvenile arthritis) into chronic inflammation with the development of pannus and irreversible destruction articular structures.

Most likely, disorders of both innate and acquired immunity play a role in the development of the disease.

Many clinical and laboratory manifestations of the disease in JRA are due to a high level of IL6 both in the blood serum and in the synovial fluid due to the activation of the mechanism of innate immunity [3,4,8]. Hyperproduction of IL6 is associated with the development of such extra-articular manifestations as fever and thrombocytosis [11]. IL6 stimulates the production of acute-phase inflammatory proteins (C-reactive protein and amyloid A, haptoglobin, fibrinogen) by hepatocytes, and also competitively inhibits the synthesis of albumin and transferrin. IL6 stimulates the secretion of hepcidin by hepatocytes, which reduces iron absorption in the intestine and inhibits its release from macrophages, which is the cause of iron deficiency for erythropoiesis and the cause of anemia [3,5,17]. At elevated concentrations, IL-6 blocks the production of adrenocorticotropic hormone, cortisol and growth hormone, which leads to the development of fatigue, drowsiness, depression, cognitive impairment and stunting in children with JRA. The activity of this cytokine is also associated with the development of amyloidosis, a formidable complication of this disease [7,10].

**Purpose of the study:** To study clinical, laboratory and instrumental parameters of children with JRA.

## Materials and methods

The study involved 45 children from 2021 to 2022. All patients underwent clinical, instrumental and immunological examinations at the clinic of the Tashkent Pediatric Medical Institute in the Department of Cardiorheumatology. The data collected includes socio-demographic characteristics such as age groups, health characteristics of children.

The diagnosis was established according to clinical and functional data in accordance with the international consensus on the diagnosis and treatment of rheumatic diseases. The diagnoses were verified on the basis of a thorough history taking, clinical, laboratory (general blood count, urine), biochemical blood test, instrumental (radiography, electrocardiography, ultrasound). Particular attention was paid to the prescription of the pathological process, past and concomitant diseases.

Differences were considered statistically significant at $p < 0.05$.

## Result and discussion

When analyzing the obtained data on the age of children with JRA, we obtained the following results: children from 3 to 7 years old accounted for 11.1% (n=5), from 7 to 14 years old - 57.8% (n=26), from 14 years and more was 33.3% (n=15). (Fig. 1.)

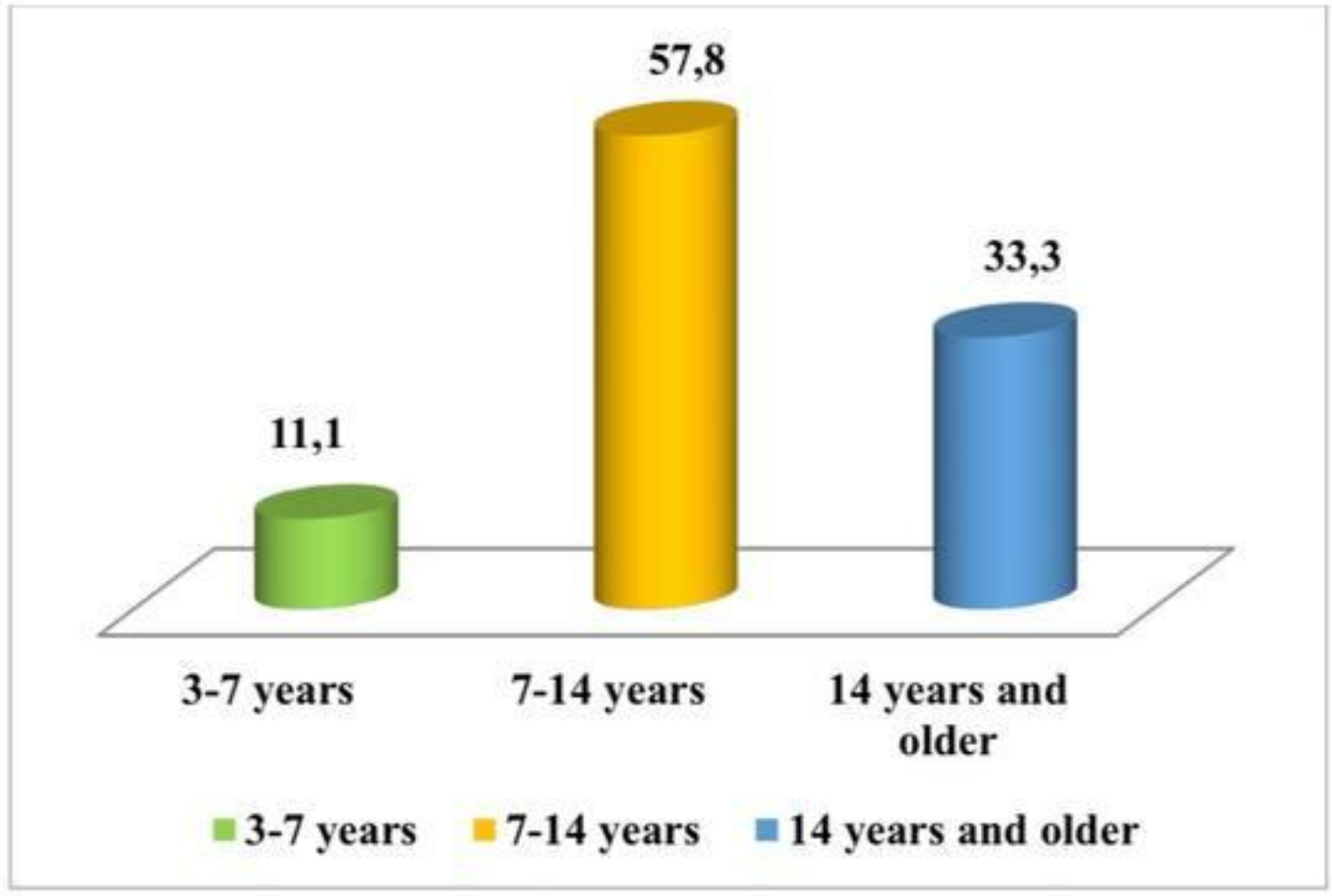


**Fig.1. Age distribution of children with juvenile rheumatoid arthritis (%), (P<0.05)**

When analyzing gender, a slight prevalence of males (53.0%) than females (47.3%) was revealed. (Fig. 2.)

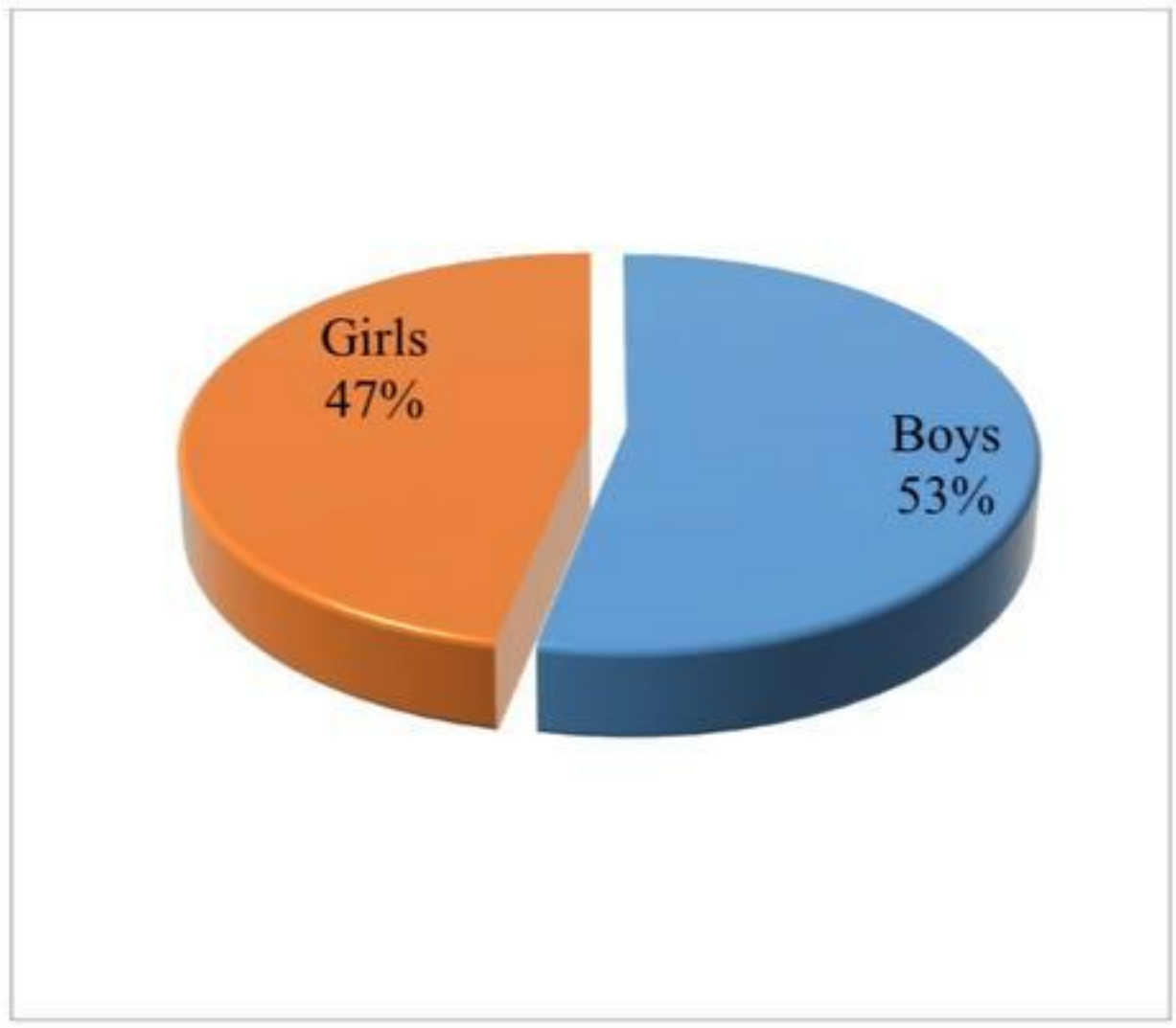


**Fig. 2. Distribution of groups by gender in children with juvenile rheumatoid arthritis (%), (P<0.05)**

Pain in the joints of the legs and arms was detected on average in 88.6% (n=40) and 64.4% (n=29) of children with, respectively. Local articular signs of JRA (limitation of movement, edema) occurred in 77.6% of children. Signs of intoxication (temperature, general weakness, loss of appetite, tachycardia, shortness of breath) were observed on average - 39.1%. Neurological disorders (convulsive syndrome, capriciousness) were on average in 37.7% of children with JRA. (Fig.3.)

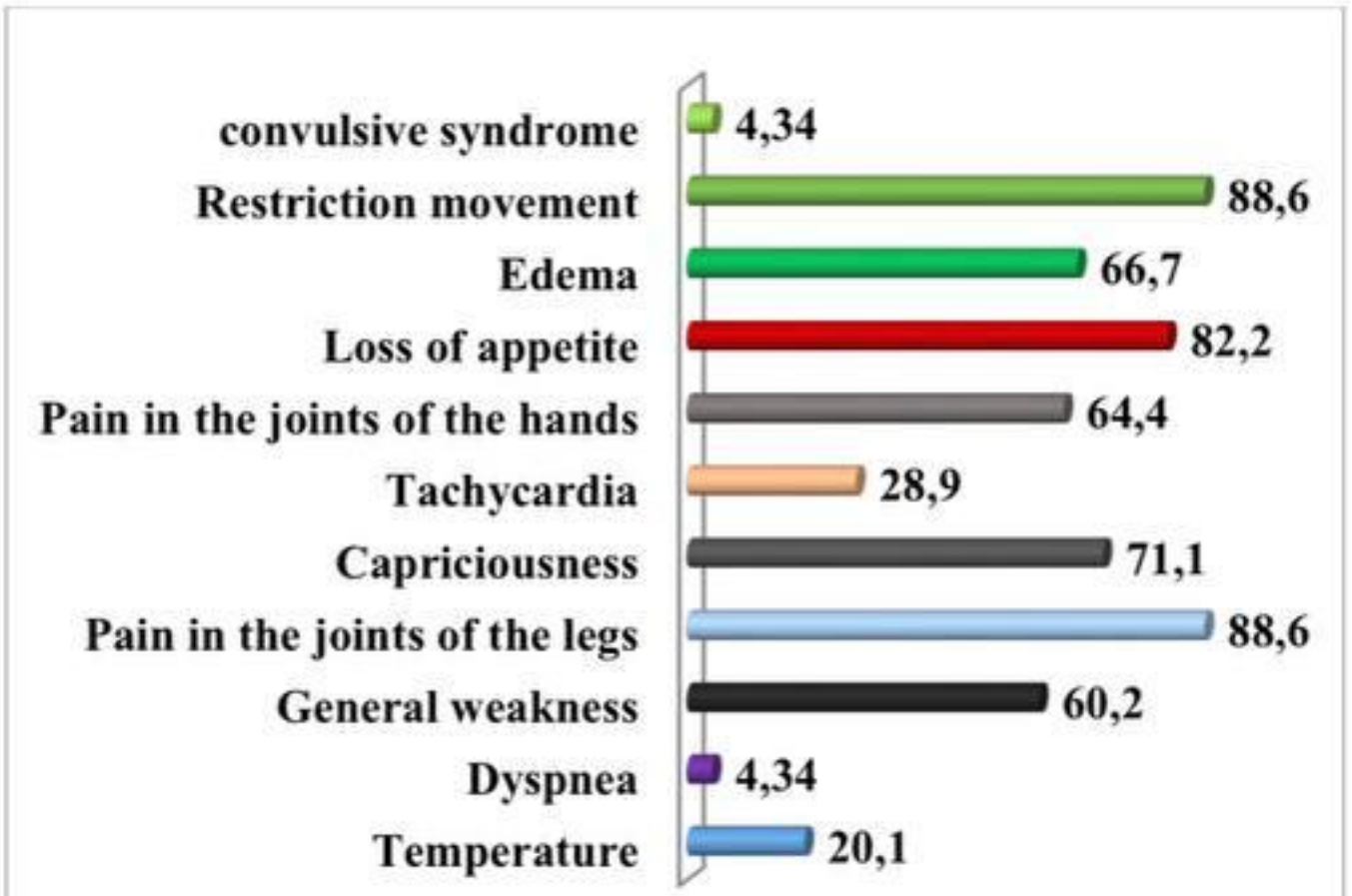


**Fig. 3. Main complaints of children with juvenile rheumatoid arthritis (%), (P<0.05)**

An analysis of somatic diseases revealed that in children with JRA, ENT diseases were more common (91.1%). Diseases of the cardiovascular system were in 64.4%. Anemia was found in 53.3% of children with JRA. The frequency of occurrence of diseases of the nervous system was 31.1%. Also, diseases of the urinary system were detected in 20.1%, rickets in 13.2%, dysbacteriosis in 15.6% of children with JRA. Dysmetabolic nephropathy, ophthalmic disorders, allergic diseases were detected in an average of 7.74%. TORCH infection was found in 6.67% of children with the studied pathology. (Fig. 4.)

**(Table 1).**

**Analysis of TORCH infection in children with juvenile rheumatoid arthritis, %.**

| TORCH | Children with JRA (n=45) |
|---|---|
| **CMV** | 6.67 |
| **Herpes** | 4.44 |
| **Mycoplasma** | 2.21 |
| **Chlamydia** | 6.67 |

The analysis of TORCH infection revealed the presence of cytomegalovirus and chlamydia in 6.67% (n=3), 4.44% (n=2) herpes simplex and 2.22% (n=1) mycopalism. (Table 1.)

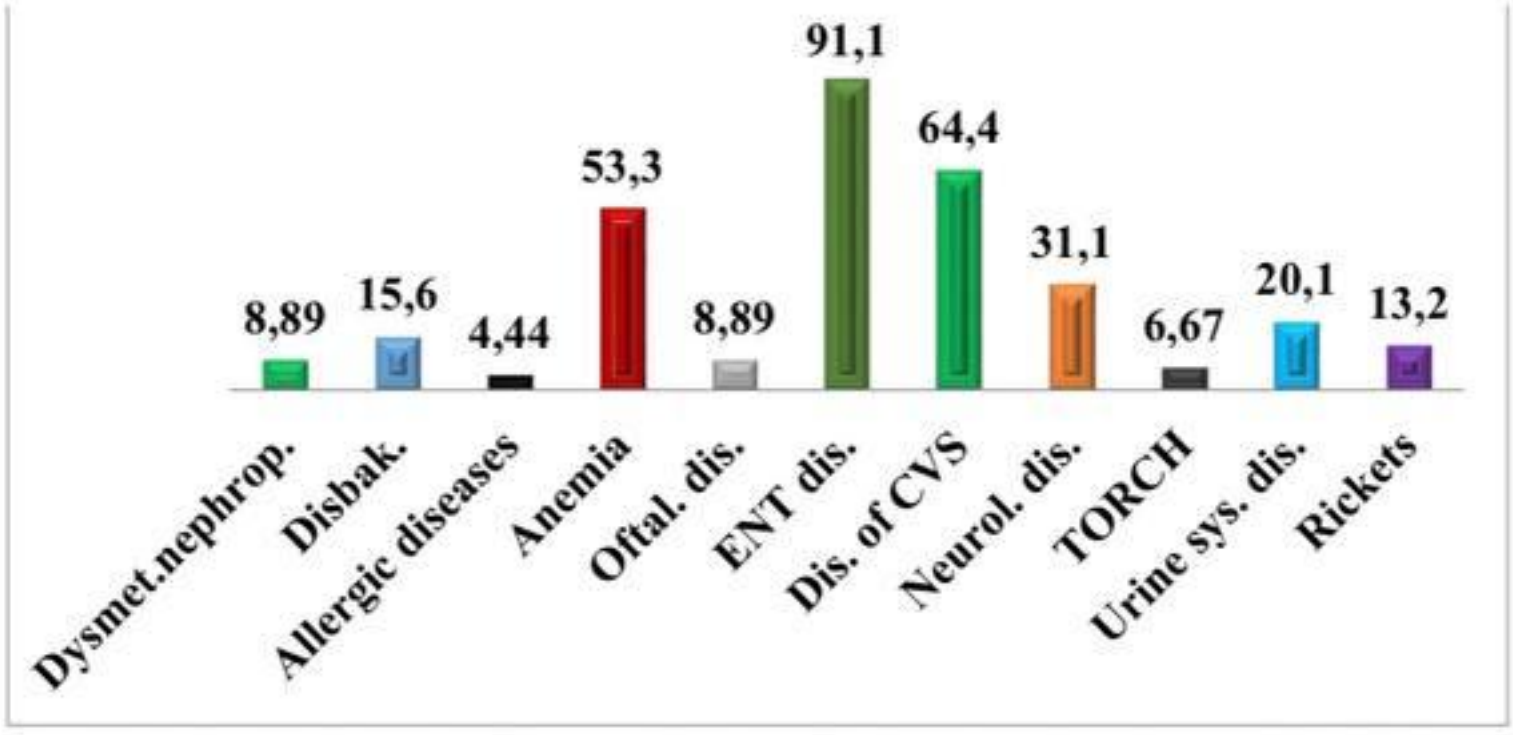


**Fig.4. Associated pathology inchildren with juvenile rheumatoid arthritis (%), (P<0.05)**

Analysis of laboratory data revealed changes in the level of leukocytes in peripheral blood, possibly due to the antimicrobial activity of the immune system. The erythrocyte sedimentation rate was increased (25.6), which indicates an inflammatory reaction of the body. There were no statistically significant changes in the level of other parameters. (Fig.5.)

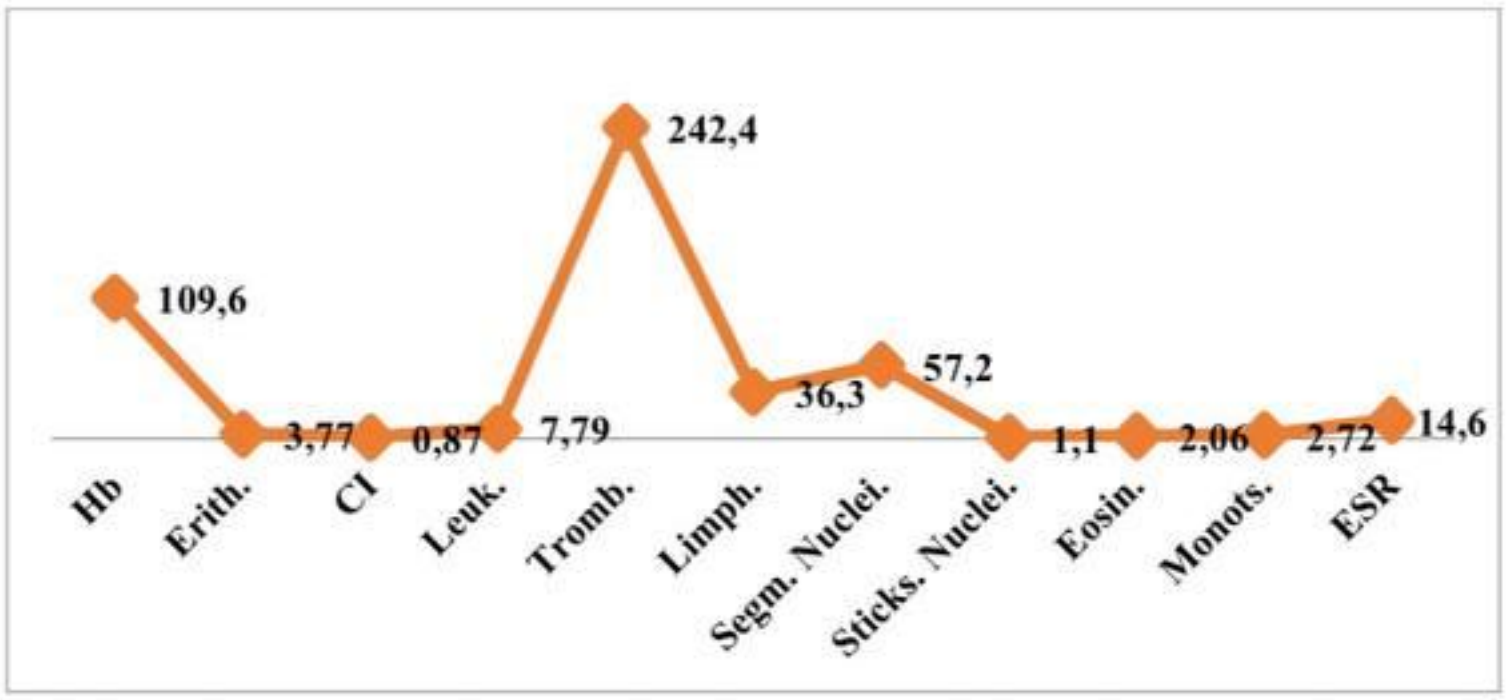


**Fig.5. Complete blood count parametersatchildren with juvenile rheumatoid arthritis, (P<0.05)**

No significant changes were found in the biochemical analysis of the blood of children with juvenile arthritis. (Fig. 6.)

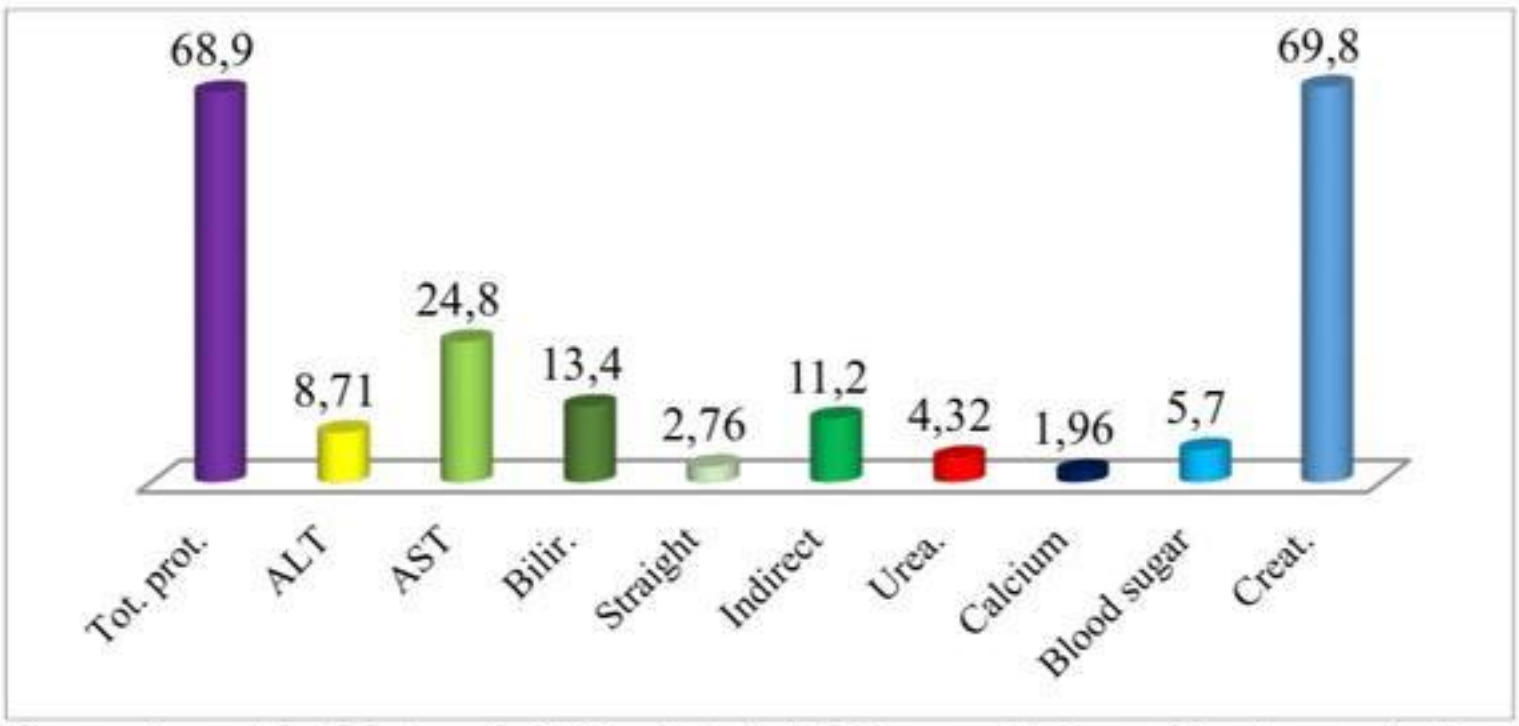


**Fig.6. Parameters of a biochemical blood testatchildren with juvenile rheumatoid arthritis, (P<0.05)**

To study the role of innate immunity parameters in the development of JRA, we studied acute phase proteins.

The main function of the acute phase protein system is the excretion (elimination) of foreign cells and the regulation of the immune response.

One of them is C-reactive protein (CRP) - an acute phase protein related to non-specific protective factors produced by liver cells.

When analyzing the results of C reactive protein in children with JRA, an increase in its level was found in 24.4%.

Antistreptolysin O (ASLO) -these are antibodies produced by the body directed against streptolysin O, a toxic enzyme that is secreted by certain groups of hemolytic streptococci. An increase in this indicator indicates the sensitization of the body to streptococcal antigens. During the period of convalescence, the indicator decreases compared to the acute period, so it can be used to monitor the dynamics of the course, assess the degree of activity of the rheumatic process [14].

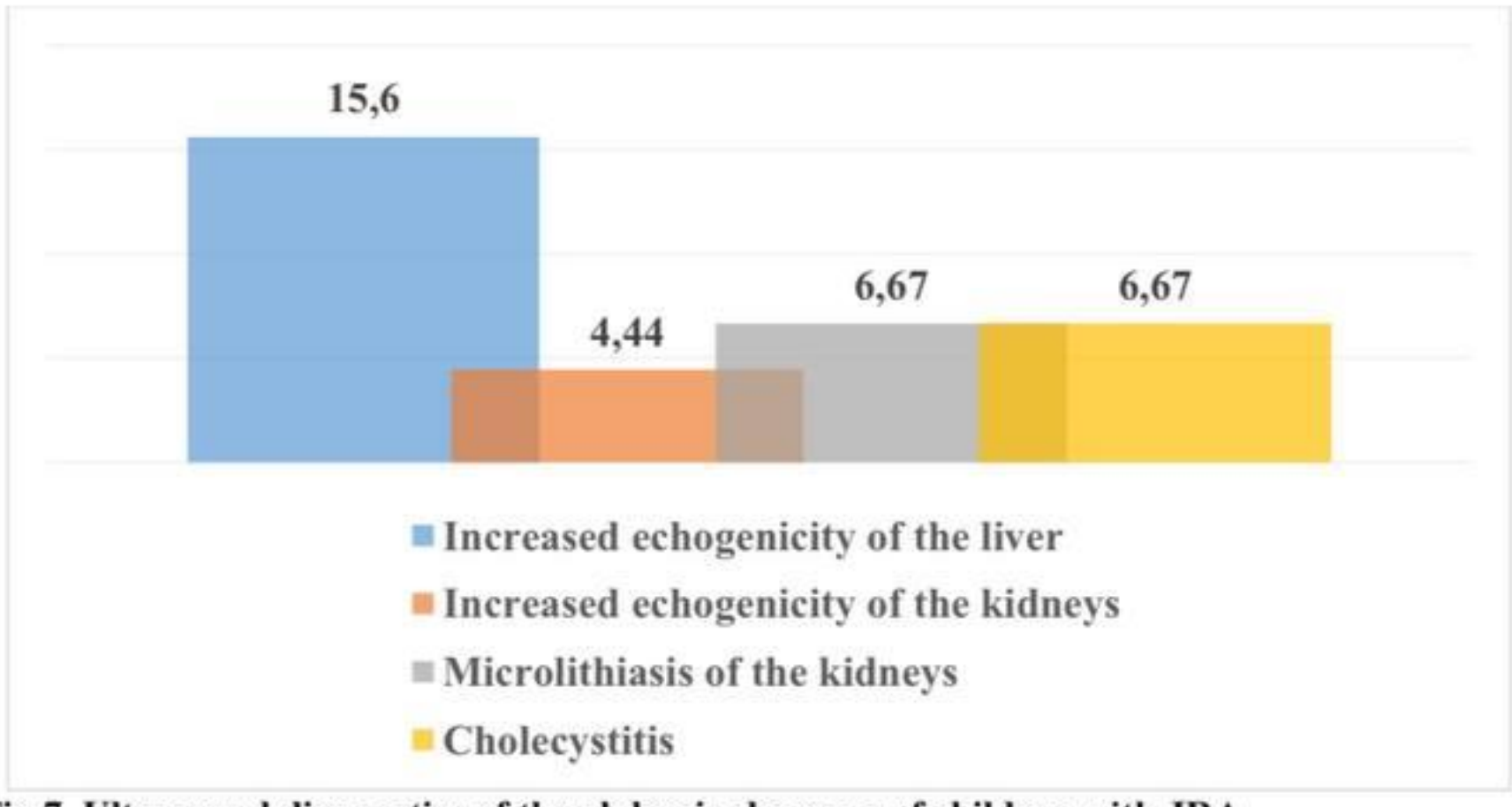


**Fig.7. Ultrasound diagnostics of the abdominal organs of children with JRA**

In our study, this indicator was elevated in 46.7% of children with JRA.

Analysis of data on ultrasound examination of the abdominal organs in children with JRA revealed inflammatory changes in the liver in 15.6%, in the gallbladder 6.67%, as well as inflammatory changes in the kidneys in 4.44% and impaired water-salt metabolism in the kidneys at 6.67%. Inflammatory changes in the liver may be associated with autoimmune processes affecting parenchymal organs or with the iatrogenic effects of previously received therapy [12]. (fig.7.)Next, we analyzed the data of electrocardiographic diagnostics. The phenomenon of impaired repolarization of the heart was detected in 13.3%, blockade of the Hiss bundles in 22.2%, hypertraphy and sinus tachycardia in 6.67% of children with JRA. The above changes are probably the result of the initial manifestations of autoimmune heart damage as a result of the underlying disease [9]. (fig.8.)

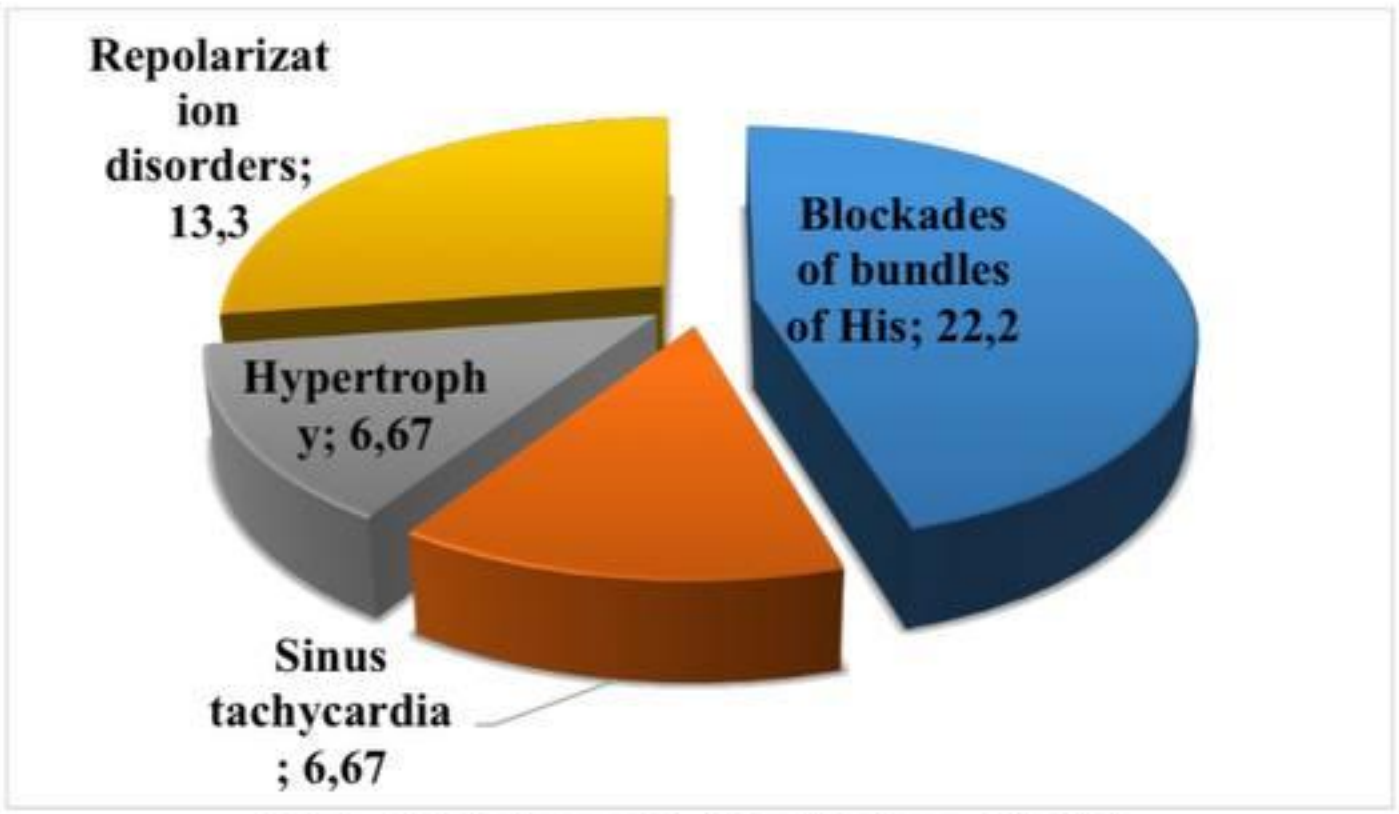


**Fig.8. ECG changes in sick children with JRA**

In the study of x-ray data, we revealed the following; reduction of interarticular spaces in 6.67%, signs of bone erosion in 2.22%, osteoporosis in 24.4% of the examined children with JRA. The latter is possibly associated with a sedentary lifestyle, vitamin D deficiency, improperly selected and violation of the dosage of basic drugs. [13] (Fig. 9).

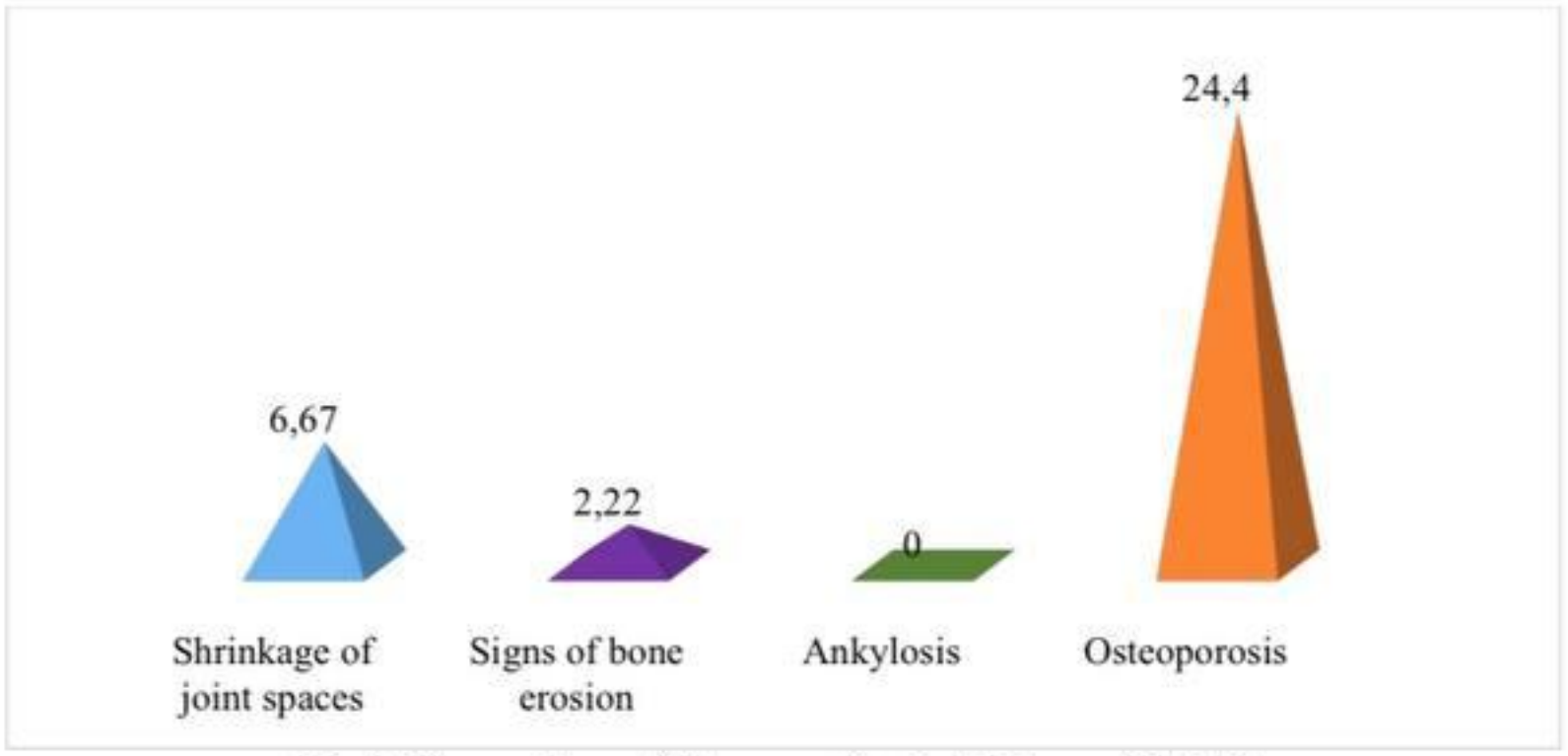


**Fig.9. X-ray signs of the examined children with JRA**

## Conclusion

Thus, our studies allowed us to draw the following conclusions: children with JRA were characterized by the prevalence of such complaints as pain in the joints of the arms and legs and restrictions on their movement; Frequent diseases of the ENT organ and the cardiovascular system and minor damage to the organs of vision and the genitourinary system; In the analysis of laboratory data, moderate leukocytosis and an increase in ESR, as well as CRP and ASLO, were characteristic; Instrumental studies revealed a slight rheumatoid lesion of parenchymal organs, rhythm and conduction disturbances of the heart, and moderate osteoporosis with narrowing of the interarticular spaces.

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