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Research Article

Remission and Active Disease in Young Adult Patients with Juvenile Idiopathic Arthritis During the Transition Period from Paediatric to Adult Healthcare

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Abstract

The objective of the research was to study the frequency of remission in young adults with juvenile idiopathic arthritis during the transition period from paediatric to adult healthcare and factors contributing to its development.

Materials and methods. In our study, there were included 165 adult patients from different regions of Ukraine diagnosed with juvenile idiopathic arthritis according to the classification criteria of the International League of Associations for Rheumatology. All the patients were examined in the Oleksandrivska City Clinical Hospital, Kyiv during 2015-2018. There were assessed the presence of rheumatoid factor, anti-cyclic citrullinated peptide, antinuclear antibodies, human leukocyte antigen B27, disease duration, disease activity (the Juvenile Arthritis Disease Activity Score-10 and the Disease Activity Score-28), C-reactive protein, past medical history, quality of life (the 36-Item Short Form Health Survey), the degree of depression (the Patient Health Questionnaire-9) and alexithymia (the 20-item Toronto Alexithymia Scale). In all the patients, bone mineral density was studied using dual-energy x-ray absorptiometry with the evaluation of T- and Z-scores in different regions of the skeleton. The disease was considered inactive at the Disease Activity Score-28 <2.6 and the Juvenile Arthritis Disease Activity Score-10 <1 and <2 for oligoarticular and polyarticular variants of juvenile idiopathic arthritis, respectively.

Results. All the patients were divided into 2 groups: Group I included 136 (82.4%) patients with active disease at the time of examination; Group II comprised 29 (17.6%) patients who achieved remission according to the Disease Activity Score-28 or the Juvenile Arthritis Disease Activity Score-10. In Group I, females prevailed accounting for 58.1% of patients as compared to Group II (31.0%). Disease duration was longer in patients of Group I ($p<0.01$); however, they did not differ from patients of Group II in age at disease onset and the International League of Associations for Rheumatology variants of juvenile idiopathic arthritis. In Group II, lesions involving more than 3 joints ($p<0.01$), hand arthritis ($p<0.01$), symmetric arthritis ($p<0.01$), enthesitis ($p<0.01$), spinal pain ($p<0.01$) were observed less frequently. Fewer patients required joint replacement ($p<0.01$); the number of deformed and painful joints ($p<0.05$, $p<0.001$, respectively) was smaller. However, there was no difference in the level of rheumatoid factor, anti-cyclic citrullinated peptide, antinuclear antibodies, and the presence of human leukocyte antigen B27. The achievement of remission improved physical well-being of patients (the physical component score, $p<0.001$), although overall mental well-being (the mental component score) did not change according to the 36-Item Short Form Health Survey. In patients with remission, the indicators of physical functioning ($p<0.001$), role functioning ($p<0.001$), social functioning ($p<0.001$), bodily pain ($p<0.001$), general health ($p<0.001$), mental health ($p<0.001$) improved. There was observed a reduction in the level of depression to the normal one according to the Patient Health Questionnaire-9 ($p<0.05$); however, in both groups, there were observed elevated levels of alexithymia. Both groups did not differ in the frequency of immunobiological therapy prescription; however, the results should be intepreted with caution, since only 5 (17.1%) patients in Group II received immunobiological therapy earlier or at the time of examination. In Group II, patients did not receive glucocorticoids at the time of examination ($p<0.001$) and earlier more often ($p<0.001$). Both groups did not differ in both the duration of treatment with disease-modifying antirheumatic drugs and the doses of methotrexate and sulfasalazine.

Conclusions. Remission of juvenile idiopathic arthritis was detected in 17.6% of the surveyed young adult patients from different regions of Ukraine during the transition period from paediatric to adult healthcare, that indicated that in most cases the goal of treat-to-target strategy was not achieved. Patients with active disease often developed joint deformities and required their replacement; they had worse physical well-being according to the 36-Item Short Form Health Survey, although mental well-being was affected in both patients with active disease and those with remission, which may be due to high levels of alexithymia in both groups. Patients with active disease had higher levels of depression according to the Patient Health Questionnaire-9, whereas patients in remission showed no depression.

Keywords

juvenile idiopathic arthritis; remission; activity; quality of life; therapy

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Problem statement and analysis of the recent research

The clinical course of juvenile idiopathic (rheumatoid) arthritis (JIA)[1] in adulthood and at the stage of transition from paediatric to adult healthcare, as well as the frequency of remission have not been sufficiently studied yet [2, 4]. The clinical course of JIA in childhood is known to be both monocyclic and polycyclic and may be characterized by long-term remissions [3, 7]. However, the clinical course of JIA in adulthood and the features of the development and diagnosis of remission in adult patients have been insufficiently studied. According to the International League of Associations for Rheumatology (ILAR) prognosis, patients with oligoarticular JIA go into remission most frequently. Adult rheumatologists are not always aware of this JIA subtype, as the clinical course of rheumatoid disease has no equals in adulthood. Oligoarticular JIA is characterized by the presence of positive antinuclear antibodies (ANA). It occurs most often in girls at the age of 2-6 years with the development of arthritis involving less than 4 joints. This variant is characterized by the favourable prognosis and long-term remissions. In other JIA variants, remission occurs more rarely. Although, a significant proportion of young adults with JIA present persistent disease activity, no unified approaches to its measurement have been developed yet [5, 6, 7, 11]. The Juvenile Arthritis Disease Activity Score (JADAS) [12] is known to be used for assessing disease activity in childhood. It has different variations depending on the number and location of the joints considered while calculating the score: JADAS-71, JADAS-27, JADAS-10 or cJADAS (JADAS-3). This scale allows determining disease activity in JIA by estimation of the sum of the following parameters: the physician's global assessment of disease activity (measured on a 0-10 visual analog scale (VAS)); the patient's/parent's global assessment of well-being (measured on a 0-10 VAS); the assessment of 71, 27 or 10 involved joints, joint count (71, 27, 10), active joint count (JADAS-71, JADAS-27 and JADAS-10, respectively); normalized C-reactive protein (C-RP) or erythrocyte sedimentation rate (ESR) measured by the Westergren method. Recently, in paediatric practice, the JADAS-3 which excludes the determination of the ESR or C-RP has been used. It is calculated using the three aforementioned clinical indicators. According to the JADAS-10, disease activity in childhood is assessed as follows: for oligoarthritis and polyarthritis, the disease is considered inactive at the JADAS-10$<$1; oligoarthritis activity is low at the JADAS-10$<$2, polyarthritis activity is low at the JADAS-10$<$3.8; oligoarthritis activity is moderate at the JADAS-10 of 2.1-4.2, polyarthritis activity is moderate at the JADAS-10 of 3.9-10.5; oligoarthritis activity is considered to be high at the JADAS-10$>$4.2, polyarthritis activity is considered to be high at the JADAS-10$>$10.5 [12].

In 2006, A. Ravelli, and A. Martini proposed to differentiate between "inactive disease" and "clinical remission" [10]. JIA is considered inactive when there are no joints with active arthritis, no fever, rash, serositis, splenomegaly, or generalized lymphadenopathy attributable to JIA, no active uveitis; normal ESR or C-RP; physician's global assessment of disease activity indicates no disease activity.

For the concept of "achieving clinical remission" two options were proposed:

1. Clinical remission with medication. The criteria for inactive disease must be met for a minimum of 6 consecutive months while the patient is taking medication

2. Clinical remission without medication. The criteria for inactive disease must be met for a minimum of 12 consecutive months while the patient is not taking any anti-arthritis and anti-uveitis medications. There are certain criteria for determining the absence of disease activity, namely the absence of the joints with active arthritis, fever, rash, serositis, splenomegaly, or generalized lymphadenopathy attributable to JIA, uveitis; normal ESR or CRP or the absence of association of their increase with JIA, duration of morning stiffness $<$15 min.

However, remission in JIA is a controversial issue being insufficiently studied [9, 11]. There is no consensus method of assessing JIA activity and remission in adulthood, and the factors associated with remission development have not been sufficiently study as well.

The objective of the research was to study the frequency of remission in young adult patients during the transition period from paediatric to adult healthcare and in adulthood as well as factors contributing to its development.

1. Materials and methods

The study included 165 adult patients with JIA who were transferred to adult rheumatology services. This group included patients residing in different regions of Ukraine who were diagnosed with JIA during 1984-2013. Inclusion criteria were as follows: patients with JIA according to the ILAR criteria [8]; patients over 18 years of age without severe comorbidity whose diagnosis of JIA was reviewed retrospectively. Patients with disease duration of less than 3 years were excluded from the study. There was conducted a retrospective analysis of the patients' medical records including the patient's age at disease onset, the time elapsed between the first clinical manifestations and the time of diagnosis, disease activity at disease onset and treatment received in childhood. All the patients over 18 years of age were examined as outpatients or inpatients in the Oleksandrivska City Clinical Hospital, Kyiv from April 2015 to Mai 2018. There were assessed disease duration, the ILAR variant at disease onset, the presence of rheumatoid factor (RF), anti-cyclic citrullinated peptide (A-CCP), ANA, human leukocyte antigen B27 (HLA-B27), disease activity according to the JADAS-10 and the Disease Activity Score-28 (DAS-28), C-RP, treatment received by the patient at the time of examination and past medical history including immunobiological therapy (IBT). Quality of life

(QoL) in patients with JIA was evaluated using the 36-Item Short Form Health Survey (SF-36). The degree of depression was assessed using the Patient Health Questionnaire-9 (the PHQ-9) and the degree of alexithymia was assessed using the 20-item Toronto Alexithymia Scale (TAS-20). In all the patients, bone mineral density (BMD) was studied using dual-energy x-ray absorptiometry with the evaluation of T- and Z-scores in different regions of the skeleton.

The presence of active disease and remission in adulthood was assessed. The disease was considered inactive at the DAS-28 <2.6 and the JADAS-10 <1 and <2 for oligoarticular and polyarticular variants of JIA, respectively, that were assessed in patients simultaneously.

2. Results and discussion

All the patients were divided into 2 groups: Group I included 136 (82.4%) patients with active disease at the time of examination by an adult rheumatologist; Group II comprised 29 (17.6%) patients who achieved remission according to the DAS-28 or the JADAS-10. Table 1 presents general characteristics of young adult patients with JIA. Thus, patients who achieved remission did not differ in age while carrying out the research; however, in the group of active disease, women prevailed accounting for 58.1% of patients as compared to the group of patients who achieved remission (31.0%). Patients of both groups did not differ in height, although they had larger body weight ($p<0.01$) and, accordingly, higher body mass index (BMI); however, it was within the normal BMI range. Disease duration was longer in patients of Group I ($p<0.01$); however, they did not differ from patients of Group II in age at disease onset and the ILAR variants of JIA.

The analysis of clinical manifestations (Table 2) revealed that in patients of Group II, lesions involving more than 3 joints ($p<0.01$), hand arthritis ($p<0.01$), symmetric arthritis ($p<0.01$), enthesitis ($p<0.01$), spinal pain ($p<0.01$) were observed less frequently. Fewer patients required joint replacement ($p<0.01$); the number of deformed and painful joints ($p<0.05$, $p<0.001$, respectively) was accordingly smaller. When examining patients of Group II, there were observed no X-ray changes, or they were more often diagnosed with X-ray stage I according to the criteria proposed by Sharp ($p<0.001$).

Patients of both groups differed in the DAS-28, the JADAS, the physician's/patient's global health assessment (measured on a 0-10 VAS), C-RP and ESR (all p-values <0.01), that are responsible for the activity of the process (Table 3). However, there was no difference in the levels of RF, A-CCP, ANA and the presence of HLA-B27. There were no differences in the levels of total cholesterol, low-density lipoproteins (LDL), and glucose serving as risk factors for atherosclerosis.

BMD is known to reduce more often in patients with chronic inflammatory diseases. Therefore, we studied serum levels of 25-hydroxyvitamin D (25 (OH) D), total and ionized calcium in patients of both groups; however, there were observed no statistically significant differences between the two groups.

Table 4 presents the results of studying BMD in young adult patients with JIA who achieved remission and those with active disease. There were some differences in the lumbar spine (LS) by Z-score, the femoral neck (FN) by BMD and Z-score and the ultra-distal region of the forearm by BMD (all p-values<0.05).

The analysis of QoL, alexithymia and depression in young adult patients with JIA who achieved remission and those with active disease (Table 5) revealed significant impact of active disease. Thus, the achievement of remission improved physical well-being of patients (the physical component score (PCS), $p<0.001$), although overall mental well-being (the mental component score (MCS)) did not change. According to the SF-36, in patients with remission, the indicators of physical functioning (PF) ($p<0.001$), role functioning (RF) ($p<0.001$), social functioning (SF) ($p<0.001$), bodily pain (BP) ($p<0.001$), general health (GH) ($p<0.001$), mental health (MH) ($p<0.001$) improved. There was observed a reduction in the level of depression to the normal one according to the PHQ-9 ($p<0.05$); however, in both groups, there were observed elevated levels of alexithymia and they did not differ in this indicator.

The analysis of drug therapy in young adult patients with JIA who achieved remission and those with active disease (Table 6) revealed that they did not differ in the frequency of IBT prescription; however, the results should be intepreted with caution, since among patients who achieved remission, only 5 (17.1%) individuals received IBT earlier or at the time of examination. However, patients with JIA who achieved remission turned out more often not to receive glucocorticoids (GCs) at the time of examination ($p<0.001$) and earlier ($p<0.001$). Both groups did not differ in both the duration of basic therapy with disease-modifying antirheumatic drugs (DMARDS) and the doses of methotrexate and sulfasalazine.

3. Conclusions

Thus, according to the results of our study, remission was detected in 17.6% of the surveyed young adult patients from different regions of Ukraine during the transition period from paediatric to adult healthcare and in adulthood, that indicated that in most cases the goal of treat-to-target strategy was not achieved. Patients with active disease often developed joint deformities and required their replacement; they had worse physical well-being according to the SF-36, although mental well-being was affected in both patients with active disease and those with remission, which may be due to high levels of alexithymia in both groups. Patients with active disease had higher levels of depression according to the PHQ-9, whereas patients in remission showed no depression.

Prospects for further research

Further studies of factors contributing to the development of JIA remission in adulthood considering past IBT are essential.

Table 1. Characteristics of young adult patients with JIA who achieved remission and those with active disease (the median (minimum-maximum) [the lower and upper quartiles])

Clinical manifestations	Active disease (n=136)	Remission (n=29)	p
Age at the moment of examination, years	23.3±7.5	20.7±3.2	0.252
Age at JIA onset, years	9.0±4.9	10.2±4.9	0.209
Gender (males/females)	79 (58.1%) / 57 (41.9%)	9 (31.0%) / 20 (69.0%)	0.008*
Height, m	1.7±0.1	1.7±0.1	0.095
Body weight, kg	61.5±13.8	68.9±12.0	0.008*
BMI, kg/m^2	21.1±3.7	22.9±2.7	0.008*
Disease duration	13.5 (7; 18.2)	7.5 (4.2; 12.7)	0.006*
ILAR variant of JIA			
RF (+) polyarthritis	12 (8.8%)	0 (0%)	
Persistent oligoarthritis	31 (22.8%)	11 (39.3%)	
Extended oligoarthritis	17 (12.5%)	4 (14.3%)	
RF (-) polyarthritis	35 (25.7%)	4 (14.3%)	0.305
Systemic arthritis	19 (14%)	3 (10.7%)	
Enthesitis-related arthritis	21 (15.4%)	6 (21.4%)	
Psoriatic arthritis	1 (0.7%)	0 (0%)	

Table 2. Clinical manifestations in young adult patients with JIA who achieved remission (the median (minimum-maximum) [the lower and upper quartiles])

Clinical manifestations	Active disease (n=136)	Remission(n=29)	p
Morning stiffness, min	10 (5; 30) [0; 240]	5 (0; 7.5) [0; 30]	0.001*
Systemic manifestations	24 (17.6%)	2 (6.9%)	0.116
Arthritis >3 joints	68 (50%)	1 (3.4%)	0.001*
Hand arthritis	49 (36%)	1 (3.4%)	0.001*
Symmetric arthritis	47 (34.6%)	1 (3.4%)	0.001*
Lymphadenopathy	11 (8.1%)	1 (3.4%)	0.336
Uveitis	19 (14%)	3 (10.3%)	0.451
Enterocolitis	2 (1.5%)	0 (0%)	0.678
The presence of arthritis			
Oligoarthritis	75 (55.1%)	10 (34.5%)	
Monoarthritis	3 (2.2%)	4 (13.8%)	0.001*
Polyarthritis	43 (31.6%)	0 (0%)	
Absence of arthritis	15 (11%)	15 (51.7%)	
Enthesitis	31 (22.8%)	0 (0%)	0.004*
Dactylitis	6 (4.4%)	0 (0%)	0.247
Sacroilitis	32 (23.5%)	4 (13.8%)	0.179
Back pain	74 (54.4%)	5 (17.2%)	0.001*
Need for joint replacement	41 (30.1%)	1 (3.4%)	0.001*
Painful joints (the number)	2 (1; 5) [0; 22]	0 (0; 0) [0; 3]	0.001*
Deformed joints, ankyloses/orthopedic prostheses (the number)	0 (0; 1) [0; 11]	0 (0; 0) [0; 4]	0.030*
Swollen joints (the number)	1 (0; 2) [0; 16]	0 (0; 0) [0; 1]	0.001*
X-ray stage	1 (1; 3) [0; 4]	1 (0; 1) [0; 2]	0.001*
Functional failure of joints			
0	10 (7.4%)	14 (48.3%)	
1	51 (37.5%)	15 (51.7%)	0.001*
2	65 (47.8%)	0 (0%)	
3	10 (7.4%)	0 (0%)	

Table 3. Disease activity and laboratory findings of young adult patients with JIA who achieved remission and those with active disease (the median (minimum-maximum) [the lower and upper quartiles])

Parameter	Active disease (n=136)	Remission (n=29)	p
DAS-28	3.4±1.4	1.6±0.7	0.001*
JADAS	8 (5; 15) [1; 34]	1 (0; 3.5) [0; 13]	0.001*
VAS (patient), mm	40 (30; 60) [0; 90]	10 (2.5; 20) [0; 40]	0.001*
VAS (physician), mm	40 (20; 50) [0; 90]	0 (0; 10) [0; 30]	0.001*
C-RP	6 (4; 24) [0; 284]	4 (4; 4) [0; 4]	0.001*
ESR, mm/hour	14 (6; 30) [2; 70]	5 (3; 7) [1; 17]	0.001*
RF	0 (0; 0) [0; 64]	0 (0; 0) [0; 1]	0.358
A-CCP	2 (2; 2) [1; 7.1]	2 (2; 2) [1; 2]	0.460
ANA	16 (11.7%)	3 (10.3%)	0.161
HLA-B27	41 (30.1%)	6 (20.7%)	0.156
LDL, mmol/l	2.6±1.1	2.2±0.8	0.848
Cholesterol, mmol/l	4.6±1.1	4.1±1.1	0.111
Glucose, mmol/l	4.8±0.6	4.7±0.7	0.856
25(OH)D, ng/ml	18 (14.2; 23.1) [6.1; 48.5]	22.8 (20; 23) [20; 28.3]	0.189
Albumin, g/l	39.1 (36; 46) [2.5; 49.3]	46 (39.3; 58) [39.3; 50.3]	0.179
Total calcium, mmol/l	2.4 (2.3; 2.4) [1.3; 2.5]	2.3 (1.4; 2.7) [1.2; 2.9]	0.511
Ionized calcium, mmol/l	2.5 (2.3; 2.5) [2.3; 2.5]	-	-

Table 4. BMD in young adult patients with JIA who achieved remission and those with active disease (the median (minimum-maximum) [the lower and upper quartiles])

Parameter	Active disease (n=136)	Remission (n=29)	p
LS BMD, g/cm^2	1.04 (0.9; 1.21) [0.36; 1.39]	1.13 (1; 1.28) [0.98; 1.7]	0.090
T-score in the LS	-1.02 (-1.5; 0.72) [-3; 1.8]	-	-
Z-score in the LS	-0.9 (-1.9; 0.32) [-6.3; 2.3]	-0.09 (-0.65; 0.84) [-0.8; 3.5]	0.031*
FN BMD, g/cm^2	0.91 (0.8; 1.03) [0.24; 1.32]	0.99 (0.95; 1.31) [0.86; 1.35]	0.042*
T-score in the FN	-0.8 (-1.6; -0.3) [-3.1; 1.14]	-	-
Z-score in the FN	-0.8 (-1.38; -0.1) [-5.3; 1.97]	0.35 (0.15; 0.63) [0.1; 0.7]	0.017*
Whole skeleton BMD g/cm^2	0.81 (0.66; 0.89) [0.43; 1.06]	0.9 (0.77; 1.04) [0.75; 1.06]	0.098
T-score in the whole skeleton	-0.35 (-1.83; 0.18) [-2.4; 1.83]	-	-
Z-score in the whole skeleton	-0.35 (-1.5; 0.19) [-2.9; 2.38]	-0.2 (-0.2; -0.2) [-0.2; -0,2]	0.848
Ultra-distal forearm BMD g/cm^2	1.02 (0.88; 1.11) [0.66; 1.29]	1.14 (0.97; 1.28) [0.93; 1.29]	0.048*
T-score in the ultra-distal region of the forearm	-0.45 (-1.58; 0.32) [-2.3; 2.26]	-0.4 (-0.4; -0.4) [-0.4; -0.4]	0.942
Z-score in the ultra-distal region of the forearm	-0.5 (-1.25; 0.39) [-4.8; 2.76]	-0.3 (-0.6;) [-0.6; 0.3]	0.699

References

[1] Kovalenko VM, Shuba NM, Yaremenko OB et al. Substantiation report concerning retention of diagnosis "juvenile rheumatoid arthritis" status in adult patients with a disease onset in childhood and adolescence. Ukr. revmatol. zhurnal. 2016;63:5-7. [published in Ukrainian].

[2] Ammerlaan JW, Scholtus LW, Bijlsma HJ et al. An urge for change: transitional care for young adults with juvenile idiopathic arthritis. Patient Educ Couns. 2013;92:127-129. DOI: https://doi.org/10.1016/j.pec.2013.02.006 [PMid:23490174]

[3] Barth S, Haas J-P, Schlichtiger J et al. Long-Term Health-Related Quality of Life in German Patients with Juvenile Idiopathic Arthritis in Comparison to German General Population. PLoS ONE. 2016;11(4): e0153267. DOI: https://doi.org/10.1371/journal.pone.0153267

[4] Bertilsson L, Andersson-Gare B, Fasth A et al. Disease course, outcome, and predictors of outcome in a population-based juvenile chronic arthritis cohort followed for 17 years. J Rheumatol. 2013;40(5):715-724. DOI: https://doi.org/10.3899/jrheum.120602

[5] Consolaro A, Giancane G, Schiappapietra B et al. Clinical outcome measures in juvenile idiopathic arthritis. Pediatr

Table 5. Indicators of life quality, alexithymia and depression in young adult patients with JIA who achieved remission and those with active disease (the median (minimum-maximum))

Indicators	Active disease (n=136)	Remission (n=29)	p
QoL according to the SF-36 PCS	43.1±9.6	53±7.3	0.001*
QoL according to the SF-36 MCS	44.7±11.2	49.3±9.7	0.082
PF	67.2±25.4	87.6±14.7	0.001*
RF	56.4±33	77.4±27.9	0.001*
BP	50.5±24.4	79.9±22.4	0.001*
GH	48.1±21.6	68.7±19.1	0.001*
VT	52.4±21.1	65.8±16.7	0.001*
SF	68.8±23.7	85.3±17.1	0.001*
RE	64±33.7	77.5±30.2	0.054
MH	64.1±20.2	74.2±17.1	0.027*
TAS-20	67.1±11.2	64±8.5	0.606
PHQ-9	8.6 (6.8; 9.9)	4.9 (3.6; 6.8)	0.040*

Notes: RE - role limitations due to emotional problems; VT - vitality.

Table 6. Drug therapy in young adult patients with JIA who achieved remission and those with active disease

Indicators	Active disease (n=136)	Remission (n=29)	p
IBT at the time of examination	21 (15.4%)	3 (10.3%)	
IBT in past medical history	10 (7.3%)	2 (6.9%)	0.807
No IBT	105 (77.2%)	24 (82.8%)	
GCs in past medical history	94 (69.1%)	16 (55.2%)	0.000*
GCs at the time of examination	41 (30.1%)	1 (3.4%)	0.001*
GCs: the average dose, mg	4 (2.5; 8) [0; 28]	5 (3; 8) [0; 10]	0.001*
DMARDS: therapy duration	4 (1; 9.7) [0; 30]	3 (2; 6) [0; 12]	0.127
DMARDS: methotrexate, mg/week	10 (0; 15) [0; 25]	0 (0; 15) [0; 25]	0.047
DMARDS: sulfasalazine, g/day	2 (0.6; 2) [0; 3]	2 (2; 2.5) [0; 3]	0.196

Rheumatol Online J. 2016;14:23. DOI: https://doi.org/10.1186/s12969-016-0085-5

[6] Dzhus MB, Mostbauer HV, Karasevska TA, Ivashkivskyi OI. Long-term effects of articular and extra-articular damage in adult patients with juvenile rheumatoid arthritis with different immunogenic markers. Galic'kij likars'kij visnik. 2017;24(3):7-11. DOI: https://doi.org/10.21802/gmj.2017.3.15

[7] Guillaume S, Prieur AM, Coste J et al. Long-term outcome and prognosis in oligoarticular-onset juvenile idiopathic arthritis. Arthritis Rheum. 2000;43(8):1858-1865. DOI: https://doi.org/10.1002/1529-0131(200008)43:8<1858::AID-ANR23>3.0.CO;2-A

[8] Petty RE, Southwood TR, Manners P et al. International League of Associations for Rheumatology classification of juvenile idiopathic arthritis: second revision, Edmonton 2001. J Rheumatol. 2004;31(2):390-392. [PMid:14760812]

[9] Prevoo ML, van Gestel AM, van T Hof MA et al. Remission in a prospective study of patients with rheumatoid arthritis. American Rheumatism Association preliminary remission criteria in relation to the Disease Activity Score. Br J Rheumatol. 1996;35:1101-1105. DOI: https://doi.org/10.1093/rheumatology/35.11.1101

[10] Ravelli A, Martini A. Remission in juvenile idiopathic arthritis. Clin Exp Rheumatol. 2006;24(43):105-110.

[11] Scal P, Horvath K, Garwick A. Preparing for adulthood: health care transition counseling for youth with arthritis. Arthritis Rheum. 2009;61(1):52-57. DOI: https://doi.org/10.1002/art.24088

[12] Wu Q, Chaplin H, Ambrose N et al. Juvenile arthritis disease activity score is a better reflector of active disease than the disease activity score 28 in adults with polyarticular juvenile idiopathic arthritis. Ann Rheum Dis. 2016;75(3):635-636. DOI: https://doi.org/10.1136/annrheumdis-2015-208462

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