

Clinical Characteristics, Disease Activity, Functional Status, and Quality of Life Results of Patients With Psoriatic Arthritis Using Biological and Conventional Synthetic Disease-Modifying Antirheumatic Drugs

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ABSTRACT

Objectives: This study aims to compare the clinical characteristics, disease activity, and quality of life (QoL) of patients with psoriatic arthritis (PsA) who use biological and conventional synthetic disease-modifying antirheumatic drugs (DMARDs) in a nationwide cohort throughout Turkey.

Patients and methods: A total of 961 patients (346 males, 615 females; mean age 46.9±12.2 years; range, 18 to 81 years) with PsA according to the classification criteria for PsA were included in the study. The patients' demographic and clinical characteristics, physical examination results, Disease Activity Score 28, Disease Activity Index for Psoriatic Arthritis and Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Psoriasis Area and Severity Index, Bath Ankylosing Spondylitis Functional Index, Bath Ankylosing Spondylitis Metrology Index, Hospital Anxiety and Depression Scale, Health Assessment Questionnaire, Psoriatic Arthritis Quality of Life (PsAQoL), and short form-36 scores were all recorded.

Results: Of the patients, 23% underwent biological DMARD (bDMARD) monotherapy, 42% underwent conventional synthetic DMARD (csDMARD) monotherapy, 10% underwent a csDMARD combination therapy, and 10% underwent a combination bDMARD and csDMARD treatment. The visual analog scale (VAS pain), patient global assessment, physician global assessment, and BASDAI scores were found to be lower among patients using combination treatment of csDMARD and bDMARD, while the swollen joint count was found to be lower among patients using bDMARD. The PsAQoL score was found to be the lowest among patients not using any medication and the highest among those using bDMARD.

Conclusion: In our study, patients with PsA were successfully treated with both csDMARD and bDMARD monotherapy. When the biological treatments used for PsA were compared with csDMARD, it was found that biological treatments had a positive effect on both disease activity and the QoL. Combinations of csDMARDs and bDMARDs were preferred in cases in which the disease activity was still high or increased. Because of the highest efficacy of the combined treatment, we highly suggest increasing the number of patients on combined treatment.

Keywords: Disease-modifying antirheumatic drug, functional status, psoriatic arthritis, quality of life.

Psoriatic arthritis (PsA) is an inflammatory disease that can affect the peripheral joints, axial skeleton, skin, and nails. The disease is part of the spondyloarthritis group and related to psoriasis.¹

Psoriatic arthritis is a heterogeneous disease that can vary from a mild disease state to an erosive and deformative state.² If left untreated, it can cause progressive joint damage, disability, disruption of functional status, decreased quality of life (QoL), and significantly increased mortality.³⁻⁵ Disability and increased mortality in PsA can be associated with both inflammatory skin lesions and joint damage.

Conditions such as disability, decreased physical activity, long-term comorbidities, and increased anxiety and depression during PsA further increase the burden of the disease.^{6,7} Early diagnosis and adequate treatment methods may help in avoiding such complications.⁸

According to the European League Against Rheumatism (EULAR) and Group for Research and Assessment of Psoriasis and Psoriatic Arthritis (GRAPPA) treatment guidelines, there are multiple treatment options available for PsA. The treatment is designed based on disease severity and disease activity. Treatment options include pharmacological and non-pharmacological strategies.⁹ Non-pharmacological strategies include patient training, exercise, and weight loss along with physical, occupational, and psychological therapies. In mild-to-medium disease activity, the disease is treated with conventional synthetic disease-modifying antirheumatic drugs

(csDMARDs) and non-steroidal anti-inflammatory drugs (NSAIDs). If this treatment is not effective or if intolerance and side effects emerge, biological DMARDs (bDMARDs) can be added to the treatment regime.¹⁰ The objective is to control the symptoms and inflammation, prevent progressive structural damage, and increase the QoL of the patients as much as possible by aiming for clinical remission through appropriate treatment options.¹¹ In this study, we aimed to compare the clinical characteristics, disease activity, and QoL of patients with PsA who use biological and conventional synthetic DMARDs in a nationwide cohort throughout Turkey.

PATIENTS AND METHODS

This cross-sectional study was conducted between February and December in 2018. The study included the demographic characteristics and clinical and laboratory data of 961 PsA patients (346 males, 615 females; mean age 46.9±12.2 years; range, 18 to 81 years) who were treated as part of their routine examinations. The clinical data obtained during the routine clinic visits of the patients were added to the electronic forms by using a national network that also serves as a scientific research cooperation platform (<https://www.trasd-network.org>). Patients with PsA from 25 different centers (University as well as Training and Research Hospitals) in Turkey who met the classification criteria for PsA, were undergoing csDMARD and bDMARD monotherapy or a combination treatment, aged

above 18 years, and had no other rheumatic disease(s) were included in the study. Patients who were diagnosed with psoriasis by dermatologists but who did not have arthritis, female patients who were pregnant or breastfeeding and patients with malignancies were excluded. The study protocol was approved by the Sakarya University Faculty of Medicine Ethics Committee (approval date/#: 25.01.2018/42). A written informed consent was obtained from each patient. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Patients were divided into four groups according to the given treatment as those who were not using any medication, those who received csDMARD monotherapy, those who received bDMARD monotherapy, and those under combination bDMARD and csDMARD therapy.

Patients' demographic characteristics (sex and age), body mass index (BMI), age at the onset of psoriasis (years), age at the onset of PsA (years), duration of psoriasis (years), duration of PsA (years), delay in PsA diagnosis (years), patient global assessment (PtGA), and physician global assessment (PhGA) were recorded.

Tender joint count and swollen joint count (SJC) of the patients were checked during the examination. The pain of the patients was evaluated using the visual analog scale (VAS-pain).

Disease activity of the patients was evaluated using the Disease Activity Score 28 (DAS28), Disease Activity Index for Psoriatic Arthritis (DAPSA), and the Bath Ankylosing Spondylitis Disease Activity Index (BASDAI).^{12,13} Psoriasis severity was evaluated using the Psoriasis Area and Severity Index,¹⁴ and the functional status was evaluated using the Bath Ankylosing Spondylitis Functional Index,¹⁵ and the Bath Ankylosing Spondylitis Metrology Index.¹⁶ The risk of anxiety and depression was evaluated using the Hospital Anxiety and Depression Scale, and the QoL was evaluated using the Health Assessment Questionnaire (HAQ),¹⁷ Psoriatic Arthritis Quality of Life (PsAQoL),¹⁸ and the short form (SF)-36.¹⁹

Statistical analysis

Statistical analyses were performed using the IBM SPSS for Windows version 22.0 software (IBM Corp., Armonk, NY, USA). Whether the

continuous numerical variables were normally distributed was evaluated using the Shapiro-Wilk test. Results of the numerical variables were presented as mean \pm standard deviation (SD). Because the comparisons between the groups did not show a normal distribution, non-parametric tests were used. To compare the data for determining the level of significance between the groups, Kruskal-Wallis test was used for continuous variables, while the Chi-square test or Fisher's exact test was used for the categorical variables. In all statistical analyses, the level of significance was considered as $p < 0.05$.

RESULTS

The study included patients with complete treatment data constituted using the TRASD-network. Of these patients, 36% were males and 547 (57%) were active smokers. Mean BMI was 28.4 (17.7-53.3) kg/m², and average duration of symptoms was seven years (range, 0 to 59 years). Hip pain, peripheral arthritis, spondylitis, and inflammatory back pain were identified in 211 (22%), 430 (45%), 351 (37%), and 430 (45%) of the patients, respectively.

There was no difference between the groups with regards to active smoking rates. The incidence of chronic back pain (50%) and morning stiffness in spine (49%) was high among the patients not using any medication, while that of spondylitis (47%), inflammatory back pain (57%), and enthesopathy (48%) was high among patients using bDMARD. The incidence of peripheral arthritis (73%) was the highest among patients using csDMARD. While the time span for delay in diagnosis of PsA was similar between the groups, the duration of symptoms (10 years; range, 1 to 49 years) and the duration since PsA diagnosis (7 years; range, 1 to 39 years) were determined to be the highest in the group using a combination of csDMARD and bDMARD and the lowest in the group not using any medication (5 years; range, 0 to 42 years and 2 years; range, 0 to 41 years, respectively) (Table 1).

Of the patients, 221 (23%) underwent bDMARD monotherapy (adalimumab: 73, etanercept: 49, infliximab: 35, golimumab: 22, certolizumab pegol: 26, ustekinumab: 10, and secukinumab: 6); 407 (42%) underwent csDMARD monotherapy

Table 1. Demographic and clinical disease activity characteristics in patients treated with disease-modifying antirheumatic drug

	Total (n=961)	No DMARD (n=139)	csDMARD (n=501)	bDMARD (n=221)	Combination DMARD (n=100)	p
Age (year)*	47 (18-81)	48 (20-72)	47 (18-81)	46 (18-72)	46 (21-77)	0.557
Body mass index (kg/m ²)*	28.4 (17.7-53.3)	28.5 (19.3-44.8)	28.4 (17.7-42.9)	28.7 (19.4-43)	27.7 (18.4-53.3)	0.609
Active smoker, n (%)	547 (57)	38 (28)	116 (23)	66 (30)	30 (30)	0.218
Sex						
Male, n (%)	346 (36)	45 (33)	148 (29)	108 (49)	45 (45)	<0.001
Visual analog scale-pain (0-10)*	5 (0-10)	5 (0-10)	5 (0-10)	4 (0-10)	4 (0-10)	0.034
Patient global assessment (0-10)*	4 (0-10)	5 (0-10)	5 (0-10)	4 (0-10)	4 (0-10)	0.017
Physician global assessment (0-10)*	4 (0-10)	4 (0-10)	4 (0-10)	4 (0-8)	3 (0-9)	0.029
Spondylitis, n (%)	351 (37)	42 (31)	163 (32)	103 (47)	43 (43)	0.001
Inflammatory back pain, n (%)	430 (45)	56 (41)	199 (40)	125 (57)	50 (50)	<0.001
Gluteal pain, n (%)	234 (24)	34 (25)	102 (20)	76 (34)	22 (22)	<0.001
Hip pain, n (%)	211 (22)	37 (27)	94 (19)	64 (29)	16 (16)	<0.001
Arthritis, n (%)	430 (45)	80 (58)	365 (73)	123 (56)	70 (70)	<0.001
Enthesitis, n (%)	638 (66)	44 (32)	191 (38)	105 (48)	51 (51)	0.002
Tender joint count*	2 (0-56)	2 (0-56)	2 (0-50)	2 (0-51)	2 (0-45)	0.062
Swollen joint count*	0 (0-28)	0 (0-24)	0 (0-23)	0 (0-24)	0 (0-28)	0.001
Disease Activity Score 28*	3.2 (0-7.5)	3.4 (0-6.4)	3.4 (0-7.5)	2.9 (0-7.4)	2.9 (0-6.7)	<0.001
Disease Activity Index for Psoriatic Arthritis*	17.2 (0-111.9)	17.8 (3.8-111.9)	18.8 (0-104)	14.6 (0-76.5)	13.3 (1.6-84.5)	0.002
BASDAI score*	3.4 (0-10)	4.3 (0-10)	3.5 (0-10)	3 (0-10)	2.9 (0-9.6)	0.007
BASMI score*	1 (0-9)	1 (0-8)	1 (0-9)	2 (0-8)	2 (0-7)	0.483
BASFI score*	1.5 (0-10)	1.2 (0-10)	1.5 (0-10)	1.4 (0-10)	1.9 (0-9)	0.506
Psoriasis Area Severity Index total score*	1.5 (0-51.3)	2 (0-26.7)	1.6 (0-51.3)	1.2 (0-24.6)	1.3 (0-46.8)	0.055
FACIT score*	18 (0-51)	18 (2-50)	18 (0-48)	19 (0-51)	17.5 (0-45)	0.811
Symptom durations (year)*	7 (0-59)	5 (0-42)	6 (0.1-59)	10 (0.3-48)	10 (1-49)	<0.001
Symptom durations (year)*	5 (0-44)	2 (0-41)	4 (0-37)	6 (0-44)	7 (1-39)	<0.001
Diagnostic delay (year)*	1 (0-32)	1 (0-32)	1 (0-27)	1 (0-29)	1 (0-16)	0.228
Psoriatic Arthritis Quality of Life score*	5 (0-20)	4 (0-20)	5 (0-20)	5 (0-20)	4 (0-20)	0.240
HAQ score*	0.3 (0-2.5)	0.3 (0-2)	0.3 (0-2.5)	0.3 (0-2.4)	0.2 (0-2.5)	0.800
HAQ-S score*	0.5 (0-2.8)	0.5 (0-2.8)	0.5 (0-2.7)	0.3 (0-2.8)	0.5 (0-2.7)	0.465
Physical functioning*	70 (0-100)	70 (0-100)	70 (0-100)	70 (5-100)	72.5 (0-100)	0.328
Role-physical*	50 (0-100)	50 (0-100)	50 (0-100)	50 (0-100)	75 (0-100)	0.371

Table 1. Continued

	Total (n=961)	No DMARD (n=139)	csDMARD (n=501)	bDMARD (n=221)	Combination DMARD (n=100)	p
Bodily pain*	67.5 (0-100)	57.5 (0-100)	62.5 (0-100)	67.5 (0-100)	67.5 (12.5-100)	0.006
General health*	45 (0-100)	50 (0-90)	45 (0-100)	45 (0-100)	45 (5-95)	0.212
Vitality*	40 (0-75)	40 (0-70)	40 (0-75)	40 (0-75)	40 (0-75)	0.947
Social functioning*	75 (0-100)	75 (12.5-100)	75 (0-100)	62.5 (0-100)	75 (25-100)	0.565
Role-emotional*	66.7 (0-100)	66.7 (0-100)	66.7 (0-100)	66.7 (0-100)	100 (0-100)	0.234
Mental health*	60 (0-100)	56 (8-100)	60 (0-100)	60 (0-100)	68 (8-92)	0.134
SF-36-Physical component summary score*	58.8 (3.8-100)	57.5 (10.5-97.5)	56.8 (3.8-100)	59.3 (6.3-100)	67.4 (13-98.8)	0.479
SF-36-Mental component summary score*	60 (5-93.8)	59.3 (8.3-90.5)	60.1 (5-93.8)	55.8 (7.3-91.5)	63.8 (17.3-91.8)	0.380

DMARD: Disease-modifying antirheumatic drug; csDMARD: Conventional synthetic disease-modifying antirheumatic drug; bDMARD: Biological disease-modifying antirheumatic drug; * Median (minimum-maximum) for continuous variables; BASDAI: Bath Ankylosing Spondylitis Disease Activity Index; BASMI: Bath Ankylosing Spondylitis Metrology Index; BASFI: Bath Ankylosing Spondylitis Functional Index; FACIT: Functional assessment of chronic illness therapy; HAQ-S: Health Assessment Questionnaire for spondyloarthropathies; SF-36: Short form 36.

Table 2. Psoriatic arthritis treatment regimen at clinic visit (n=961)

Treatment	n	%
Monotherapy with any csDMARD	407	42
Methotrexate	295	31
Sulfasalazine	62	6
Leflunomide	42	4
Hydroxychloroquine	4	0.4
Cyclosporine	4	0.4
Combination with one or more csDMARD	94	10
Monotherapy with any bDMARD	221	23
Adalimumab	73	8
Etanercept	49	5
Infliximab	35	4
Golimumab	22	2
Certolizumab pegol	26	3
Ustekinumab	10	1
Secukinumab	6	1
Combination bDMARD with one or more csDMARD	100	10

csDMARD: Conventional synthetic disease-modifying antirheumatic drug; bDMARD: Biological disease-modifying antirheumatic drug.

(methotrexate [MTX]: 295; Sulfasalazine [SSZ]: 62, and others: 50), and 94 (10%) underwent csDMARD combination treatment. In addition, 100 (10%) patients with PsA who underwent bDMARD treatment were administered a combination therapy with any csDMARD as well. It was found that 137 (14%) of the patients did not undergo any DMARD treatment (Table 2).

Notably, the VAS-pain, PtGA, PhGA, SJC, and BASDAI scores were the highest in the group not using any medication (5, range, 0 to 10; 5, range, 0 to 10; 4, range, 0 to 10; 0, range, 0 to 24; and 4.3, range, 0 to 10, respectively), while the VAS-pain, PtGA, PhGA, and BASDAI scores were the lowest in the combination csDMARD and bDMARD group (4, range, 0 to 10; 4, range, 0 to 10; 3, range, 0 to 9; and 2.9, range, 0 to 9.6, respectively). The SJC was the lowest in the bDMARD group (3, range, 0 to 10). DAS28 score was the highest in the group not using any medication (3.2, range, 0 to 7.5) and lowest in both groups using bDMARD (2.9, range, 0 to 7.4) and combination of csDMARD and bDMARD (2.9, range, 0 to 6.7). The DAPSA score was the highest in the group not using any medication (17.2, range, 0 to 111.9) and the lowest in

csDMARD and bDMARD combination group (13.3, range, 1.6 to 84.5) (Table 1).

Evaluation of the QoL in the groups revealed that the PsAQoL score was the lowest (5, range, 0 to 20) in the group not using any medication and the highest (5, range, 0 to 20) in the group using bDMARD. SF-36 physical component score (PCS) was the highest in the combination csDMARD and bDMARD group (67.4, range, 13 to 98.8) and the lowest in the group using csDMARD (56.8, range, 3.8 to 100) and bDMARD (59.3, range, 6.3 to 100). SF-36 mental component scores (MCSs) were the highest in the combination csDMARD and bDMARD group (63.8, range, 17.3 to 91.8) and the lowest in the group using bDMARD (55.8, range, 7.3 to 91.5). However, there was no difference between the SF-36 PCSs and SF-36 MCSs. Interestingly, among the subscales of SF-36, the bodily pain subscale was found to be significantly the lowest in the combination csDMARD and bDMARD group (67.5, range, 12.5 to 100) and the group not using any medication (57.5, range, 0 to 100) (Table 1).

DISCUSSION

This study evaluated the clinical characteristics, disease activity, and the QoL of patients in Turkey who used DMARD for PsA diseases. The rate of incidence of inflammatory backache (57%) and enthesopathy (48%) was higher among the patients using bDMARD, and the presence of peripheral arthritis (73%) was higher among the patients using csDMARD. The VAS-pain, PtGA, PhGA, SJC, DAS28-erythrocyte sedimentation rate, and BASDAI scores were significantly higher among the patients not using any medication.

Recently published guidelines of the GRAPPA and EULAR recommend using bDMARD on active arthritis patients with inadequate response to NSAID and csDMARD.¹¹ For patients with PsA, bDMARD has shown positive effects on the QoL by ensuring a significant improvement in physical functions.²⁰

An overview of the treatment options used in our study reveals that most of the patients with PsA underwent csDMARD therapy, with csDMARD monotherapy being used the most (42%). Among csDMARD users,

the most commonly used treatment was that of MTX (31%), and the least commonly used treatments were those of hydroxychloroquine (0.4%) and ciclosporin (0.4%). Reason for the low use of leflunomide, hydroxychloroquine, and ciclosporin in the treatment of PsA, according to the recommendations of GRAPPA and EULAR, it is may not be only a first-line treatment but also limited effectiveness in treatment. Among the patients, 23% underwent bDMARD monotherapy. The most used bDMARD was adalimumab (8%), while the least used ones were ustekinumab (1%) and secukinumab (1%). In our study, the reason why use of ustekinumab and secukinumab for the treatment of PsA was lower compared to other biological therapies may be due to the successful continuation of low disease activity because of the previously initiated biological therapies. In a multi-center study conducted in Australia that compared DMARD treatments (n=2,948), clinical symptoms of disease in the majority of patients with PsA were kept under control using csDMARD monotherapy (46%) and bDMARD monotherapy (19%).²¹

As seen in previous studies, difficulties in early diagnosis can cause a prolonged treatment process and delay in initiating early treatment. Thus, patients diagnosed at a later age tend to experience more damage and higher disease activity.²² In a country-wide study in Denmark, the delay in diagnosis for patients with PsA was found to be 56 months (4.6 years).²³ In this study, we determined that the delay in diagnosis for patients with PsA was 2.9±4.5 years. The average time between the onset of PsA and its diagnosis and the average duration of symptoms were 9.6±8.7 and 6.7±7.1 years, respectively, and these were significantly higher among patients using combination csDMARD and bDMARD (mean±SD: 11.5±8.2 and 8.7±6.8 years, respectively). This shows that as the beginning of treatment is delayed, there is greater need for biological treatment to regulate the disease activity. One of the reasons for the delay in diagnosis is the long-term follow-up of patients with psoriasis before establishing the diagnosis of PsA and focusing more on skin findings.

The DAPSA is a useful instrument that enables the assessment of the treatment response level and disease activity in PsA.^{13,24} In the literature, a study using DAPSA and clinical DAPSA for

evaluating disease activity determined that while the disease activity was moderate among patients undergoing csDMARD monotherapy and combination, the average disease activity was in the “remission” stage among those undergoing a combination csDMARD and bDMARD therapy or a bDMARD monotherapy.^{25,26} In agreement with these findings, our study determined that the average disease activity among patients not using any medication and those undergoing csDMARD monotherapy was higher compared with that of patients undergoing combination csDMARD and bDMARD therapy or a bDMARD monotherapy. Similarly, according to the DAS28 criteria, it was observed that most patients were kept under control superiorly with bDMARD monotherapy or any combination with csDMARD. This shows that bDMARDs are effective in suppressing the parameters associated with disease activity.²⁷

Presence of enthesitis is known to cause increased morbidity by causing erosion in the joints of patients with PsA.²⁸ In this study, we determined that most of the patients had enthesitis (66%). Our study had a higher prevalence of enthesitis compared with previously conducted studies.^{29,30} While it was significantly higher among the patients using combination DMARDs (51%), the prevalence of enthesitis was the lowest in those not using any medication. This shows that bDMARDs are required to suppress enthesitis and disease activity in patients with PsA, by the addition of bDMARD to csDMARD. Previous studies report that while NSAIDs and csDMARDs are the first option in the treatment of enthesitis, their effects are limited. In contrast, there is evidence that bDMARDs are effective in the treatment of enthesitis in PsA.³¹⁻³⁴

Because of the heterogeneity and complexity of PsA, it is difficult to clinically evaluate the patients. Patients with PsA experience functional impairment and lower QoL, which is why global evaluation of patients with PsA essentially involves a description of both the physical and psychological aspects.^{35,36} In agreement with the previously performed studies, we obtained lower scores among patients who used combination csDMARD and bDMARD in the physician and patient global evaluations.³⁷

Our analysis showed that patients with PsA have lower SF-36 physical and mental scores and

lower health-related QoL scores compared with the general population.³⁸ In a study conducted by Gottlieb et al.,³⁹ SF-36 PCSs in patients with PsA were similar to the ones reported in the literature, while the SF-36 MCSs were lower. In a study conducted in the general population in Norway, a comparison of patients with PsA using bDMARD with those using csDMARD revealed that the scores for the bodily pain, vitality, physical role, and general health perception subscales of SF-36 showed greater improvement.⁴⁰ In this study, we did not find any significant difference between the SF-36 PCSs and MCSs. However, the score for the general bodily pain subscale of SF-36 was the highest among the patients using combination cDMARDs and bDMARDs and the lowest among those not using any medication.

The HAQ is a questionnaire that evaluates the functionality of patients based on their pain and ability to perform daily life activities.⁴¹ HAQ for the spondyloarthropathies (HAQ-S) is a questionnaire developed specifically for individuals with spondyloarthropathies.⁴² Recent studies show that the treatments performed with different agents ensure the improvement of rheumatic symptoms in patients with PsA. When biological treatments were compared with csDMARDs in patients with PsA, the HAQ scores were found to be significantly lower.⁴³ However, in our study, no significant difference was observed in the DMARDs in terms of their associated HAQ and HAQ-S scores.⁴⁴

Limitations of our study included the fact that it was a cross-sectional, observational study, meaning that the present data included the evaluation of the disease for only a certain period in patients with a prolonged disease state. For this reason, the factors that affected the results of the study may have not been fully identified. Another limitation was that this study included patients using csDMARD and bDMARD and represented a majority of PsA cases. However, patients who needed to use NSAID and corticosteroids are monitored as part of general practice and may be included into the treatment program for only a brief period, which is why they were not included in the study. The strengths of this study included the fact that it is a multi-center study covering all regions of Turkey and that it included a large database of patients. It also provided the opportunity to examine the relevant clinical

characteristics and QoL between the patients who used DMARDs and those who did not use any medication.

In conclusion, in our study, patients with PsA were successfully treated with both csDMARD and bDMARD monotherapy. Both treatments have lowered the disease activity and positively influenced the QoL in patients with PsA. Combinations of csDMARDs and bDMARDs were preferred in cases in which the disease activity was still high or increased. Because of the highest efficacy of the combined treatment, we highly suggest increasing the number of patients on combined treatment.

Disclaimer

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