ORIGINAL ARTICLE

Outcomes of Treating Rheumatoid Arthritis with Combination Conventional Synthetic Disease-Modifying Anti-Rheumatic Drugs Therapy: A Hospital Database in Real-World Data

Thida Phungtaharn, MD[1], Weerapong Singharn, MD[1], Kittikorn Duangkum, MD[1], Pimchanok Tantiwong, MD[1], Yada Siriphannon, MD[1]

[1] Department of Internal Medicine, Khon Kaen Hospital, Khon Kaen, Thailand

Objective: Rheumatoid arthritis (RA) is a chronic inflammatory disease with limited treatment options in real-world settings. The present study objective was to evaluate treatment response rates and associated complications, considering some limitations in available treatments.

Materials and Methods: A retrospective analytical study was conducted on RA patients at the Internal Medicine Department, Khon Kaen Hospital, between January 2015 and May 2022.

Results: Seven hundred twenty-one RA patients were included, of which 118 patients, or 16.37%, were treated with four types of conventional synthetic disease-modifying anti-rheumatic drugs (csDMARDs). At 24 weeks, the patients with the four types of csDMARDs treatment had remission and low disease activity by DAS28-ESR more than in whom received one to three types of csDMARDs, which is 67.80% versus 35.82%. The findings were also similar to the categorization of disease activity using DAS28-CRP, which was 83.90% versus 80.10%. When compared to baseline, mean DAS28-ESR and mean DAS28-CRP were significantly different in both 12 weeks and 24 weeks in both groups. The adverse events in the patients with one to three types of csDMARDs treatment and four types of csDMARDs treatment was 5.80% versus 11.24%, respectively.

Conclusion: RA patients treated with a combination of csDMARDs showed positive results, with 35.82% achieving treatment targets using one to three types and 67.80% achieving targets with four types, all with minimal increase in complications.

Keywords: Rheumatoid arthritis; Disease-modifying anti-rheumatic drug; Outcomes; Disease activity

Received 24 March 2025 | Revised 16 July 2025 | Accepted 22 July 2025

J Med Assoc Thai 2025;108(8):630-6

Website: http://www.jmatonline.com

Rheumatoid arthritis (RA) is a chronic inflammatory disease caused by an abnormal immune system response, leading to inflammation and destruction of synovial tissue and joint linings. The exact cause is unknown, but it is believed to be influenced by various factors such as genetics, hormones, infections, chemicals, or environmental triggers. These factors cause an overactive immune response, producing inflammation and cytokines that damage the synovium, cartilage, bone, and surrounding tissues. Patients often exhibit clinical signs such as fever, fatigue, anemia, pericarditis, pleuritis, and vasculitis. Delayed or inappropriate treatment can lead to joint deformities, disability, and even death. Proper treatment can help reduce severe complications of the disease.

The incidence of RA in Western countries is approximately 1% of the population[1]. In Thailand, a study by Chaiamnuay et al. found an incidence of 0.12% of the population[2].

Current standard treatment for RA includes early diagnosis and initiation of disease-modifying anti-rheumatic drugs (DMARDs), alongside non-steroidal anti-inflammatory drugs (NSAIDs) or low-dose steroids. The treatment goal is to achieve remission or low disease activity within six to twelve months[3-5]. Studies have shown that early combination therapy, which may include steroids or biologics disease-modifying anti-rheumatic drugs (bDMARDs), can significantly improve outcomes and reduce radiographic joint damage

Correspondence to:

Phungtaharn T.

Department of Internal Medicine, Khon Kaen Hospital, Khon Kaen 40000, Thailand.

Phone: +66-81-3441139

Email: Thida.p@kkumail.com

How to cite this article:

Phungtaharn T, Singharn W, Duangkum K, Tantiwong P, Siriphannon Y. Outcomes of Treating Rheumatoid Arthritis with Combination Conventional Synthetic Disease-Modifying Anti-Rheumatic Drugs Therapy: A Hospital Database in Real-World Data. J Med Assoc Thai 2025;108:630-6.

DOI: 10.35755/jmedassocthai.2025.8.630-636-02842

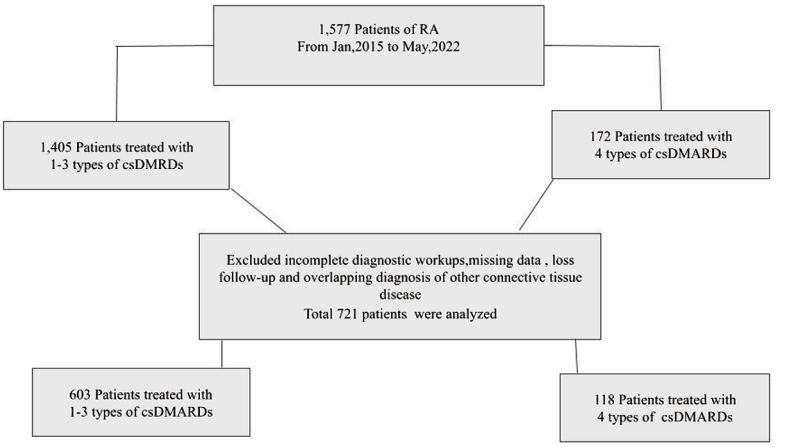

Figure 1. Patients enrollment

compared to monotherapy or step-up combination therapy[6-10].

Despite recommendations to use one to three conventional synthetic disease-modifying anti-rheumatic drugs (csDMARDs) before switching to bDMARDs or targeted synthetic disease-modifying anti-rheumatic drugs (tsDMARDs) if treatment goals were not met within three to six months, cost constraints limit access to these advanced therapies in Thailand. This necessitates the use of more than three csDMARDs in some patients. However, no study has evaluated the response rate or effectiveness of using more than three csDMARDs in this context. Therefore, the present study objective was to evaluate the response rates and complications of treatment, according to data extracted from a hospital database.

Materials and Methods

Study design and population

The present study was a retrospective analytical study conducted on patients diagnosed with RA at the Internal Medicine Department, Khon Kaen Hospital, between January 2015 and May 2022. Patients were included if they were 18 years of age or older and met the American College of Rheumatology (ACR) 1987 revised criteria for the classification of RA[11] or the 2010 American College of Rheumatology/ European League Against Rheumatism (ACR/ EULAR) classification criteria for RA[12]. Over a period of 89 months, 1,577 patients diagnosed with RA were followed up at the Outpatient Department of Khon Kaen Hospital. Among these, 1,405 patients received treatment with one to three types of csDMARDs, while 172 patients received four types. After excluding cases due to incomplete diagnostic workups, missing data, or loss to follow-up, 721 patients met the eligibility criteria for inclusion in the study. Of these, 603 patients had been treated with one to three types of csDMARDs, and 118 patients had received four types. Patients with overlapping diagnoses of other connective tissue diseases were excluded (Figure 1).

Data collection

Data was extracted from the hospital's electronic medical records in patients with ICD10 code M058 M059 and M06, including patient demographics, clinical characteristics, laboratory results, treatment regimens, and treatment outcomes. The Disease Activity Score for 28 joints based on the erythrocyte sedimentation rate (DAS28-ESR) and Disease Activity Score for 28 joints based on the C-reactive protein level (DAS28-CRP) were used to assess disease activity at baseline, 12 weeks, and 24 weeks.

Treatment regimen

Patients were divided into two groups based on their treatment at stable dosage for at least six months as those treated with four types of csDMARDS and those treated with one to three types of csDMARDs. Disease activity was assessed using DAS28-ESR, DAS28-CRP, and monitored for complications at weeks 0, 12, and 24. The csDMARDs included methotrexate (MTX), sulfasalazine (SSZ), chloroquine (CQ), hydroxychloroquine (HCQ), leflunomide (Lef), azathioprine (AZA), and cyclosporine A (CyA).

Outcome measures

The primary outcome was the rate of achieving treatment targets of DAS28-ESR or DAS28-CRP

of less than 3.2 at 24 weeks. Secondary outcomes included the change in DAS28-ESR and DAS28-CRP from baseline to 24 weeks and the cumulative incidence of adverse events.

Operational definitions

Complete remission is defined when DAS28-ESR or CPR was less than 2.6. Low disease activity is fulfilled when DAS28-ESR or CRP was between 2.6 and 3.2. Achieving treatment targets was defined by DAS28-ESR or CRP of less than 3.2. Baseline characteristics were recorded by the date of first visit.

Statistical analysis

Descriptive statistics were used to summarize the baseline characteristics of the study population. Continuous variables were expressed as mean ± standard deviation (SD) or median and interquartile range (IQR), as appropriate. Categorical variables were expressed as frequencies and percentages. The independent samples t-test and the Mann-Whitney U test were used to compare continuous variables between groups, while the chi-square test or Fisher's exact test was used to compare categorical variables. Student paired t-test was used for analyzing comparison of continuous data within group. A p-value of less than 0.05 was considered statistically significant. Statistical analysis was performed using IBM SPSS Statistics, version 26.0 (IBM Corp., Armonk, NY, USA).

Ethics approval

The study was conducted in accordance with the Declaration of Helsinki and received approval from the Institutional Review Board of Khon Kaen Hospital under protocol code KEXP65032 on June 29, 2022. The committee waived the requirement for informed consent.

Results

Patient characteristics

One thousand five hundred seventy-seven patients with RA were found in the medical records. Of these, 172 were treated with four types of csDMARDs, and 1,405 were treated with one to three types. After applying the study criteria, 721 patients were included. Among them, 118 received four types of csDMARDs, and 603 received one to three types. The average age was 56.3±13.4 years, and the average disease duration was 9.6±6.2 years. Most patients were female at 93.48%.

Baseline characteristics

The baseline characteristics between patients with four types csDMARDs treatment and one to three types csDMARDs treatment were comparable in term of underlying disease and serology results for rheumatoid factor (RF) and anti-cyclic citrullinated peptide antibody (ACPA). However, patients treated with four types of csDMARDs had a significantly higher mean baseline DAS28-ESR than those treated with one to three types of csDMARDs at 5.11±0.69 versus 4.51±0.62 ($p<0.001$). The group receiving four types of csDMARDs demonstrated a higher prevalence of positive RF and ACPA compared to those treated with one to three types. Moreover, ACPA levels were significantly elevated in patients treated with four csDMARDs, as confirmed by statistical analysis.

The demographic data and baseline characteristics of the patients treated with four types and one to three types of csDMARDs are summarized in Table 1.

For treatment regimen, the most common regimen in patients who received one to three types of csDMARDs was the combination of MTX, SSZ, and Lef in 23.71%, followed by MTX monotherapy in 20.90%, and MTX plus SSZ in 17.25%. While combination of MTX, HCQ, SSZ, and Lef was the most common regimens among patients with four types of csDMARDs treatment in 84.75%, followed by combination of MTX, CQ, SSZ, and Lef in 8.47%. The details of csDMARDs regimens are presented in Table 2.

Treatment outcomes

Primary outcome:

At 24 weeks, the patients with one to three types of csDMARDs treatment had a higher proportion of high disease activity and moderate disease activity by using DAS28-ESR but lower proportion of remission and low disease activity than in whom received four types csDMARDs. The findings were also similar to the categorization of disease activity using DAS28-CRP. The details of primary outcome are presented in Table 3.

Secondary outcomes:

At 12 weeks, there was significant higher of mean DAS28-ESR in the four types csDMARDs combination therapy group than in one to three types of treatment at 4.65±0.99 versus 3.57±0.79 ($p=0.004$) as well as at 24 weeks at 4.48±0.93 versus 3.68 versus 1.91 ($p=0.001$). However, there was no difference of mean DAS28-CRP between group at 12 weeks with

Table 1. Demographic data and baseline characteristics of the patients treated with 4 types and 1 to 3 types csDMARDs

Characteristic	1 to 3 types csDMARDs (n=603)	4 types csDMARDs (n=118)	p-value
Age (years); mean±SD	59.76±11.43	55.72±11.67	0.001*
Female sex; n (%)	571 (94.69)	103 (87.29)	0.003*
Underlying disease; n (%)	267 (44.28)	60 (50.85)	0.190
Positive for rheumatoid factor[a]; n (%)	305 (50.58)	75 (63.56)	0.520
Negative for rheumatoid factor; n (%)	118 (19.57)	15 (12.71)	-
Positive for anticyclic citrullinated peptides antibody[b]; n (%)	278 (46.10)	56 (47.46)	0.960
Anticyclic citrullinated peptides antibody level (IU/L); median (IQR)	200 (42 to 300)	300 (38 to 481.75)	<0.001
Bone erosion; n (%)	474 (78.61)	40 (33.90)	0.001*
Laboratory			
ESR before start csDMARD (mm/hour); mean±SD	73.21±36.09	89.79±31.46	0.001*
ESR at 12 weeks after treatment (mm/hour); mean±SD	71.49±35.85	75.18±30.23	0.004*
ESR at 24 weeks after treatment (mm/hour); mean±SD	76.57±35.85	68.79±31.97	0.005*
CRP before start csDMARD (mg/dL); median (IQR)	5.00 (1.5 to 17)	15.3 (7.45 to 28.45)	0.020
CRP at 12 weeks after treatment (mg/dL); median (IQR)	4.30 (1.40 to 11.70)	8.00 (3 to 19.65)	0.202
CRP at 24 weeks after treatment (mg/dL); median (IQR)	3.90 (1.30 to 11.40)	5.85 (2.65 to 15.60)	0.794
Disease activity			
DAS28-ESR; mean±SD	4.51±0.62	5.11±0.69	0.009*
• Remission; n (%)	126 (20.90)	10 (8.47)	
• Low disease activity; n (%)	178 (29.52)	57 (48.31)	
• Moderate disease activity; n (%)	292 (48.42)	43 (36.44)	
• High disease activity; n (%)	7 (1.16)	8 (6.78)	
DAS28-CRP; mean±SD	3.12±1.42	3.79±0.89	0.001*
• Remission; n (%)	512 (84.91)	97 (82.20)	
• Low disease activity; n (%)	54 (8.96)	2 (1.69)	
• Moderate disease activity; n (%)	24 (3.98)	0 (0.00)	
• High disease activity; n (%)	13 (2.16)	19 (16.10)	

csDMARDs=conventional synthetic disease-modifying anti-rheumatic drugs; SD=standard deviation; IQR=interquartile range; ESR=erythrocyte sedimentation rate; CRP=C-reactive protein; DAS=disease activity score

(a) RF results from other hospitals cannot be searched, (b) ACPA are not performed on all patients

* Statistical significance

Table 2. csDMARDs regimens

1 to 3 types csDMARDs (n=603)	n (%)	4 types csDMARDs (n=118)	n (%)
Drugs		Drugs	
MTX	126 (20.90)	MTX+HCQ+SSZ+Lef	100 (84.75)
Other monotherapy	18 (2.99)	MTX+CQ+SSZ+Lef	10 (8.47)
MTX+SSZ	104 (17.25)	MTX+HCQ+SSZ+CyA	2 (1.69)
MTX+HCQ	74 (12.27)	MTX+HCQ+SSZ+AZA	1 (0.85)
Other double therapy	41 (6.80)	Other quadruple therapy	5 (4.24)
MTX+SSZ+Lef	143 (23.71)		
MTX+HCQ+Lef	36 (5.97)		
MTX+HCQ+SSZ	34 (5.64)		
Other triple therapy	27 (4.48)		

csDMARDs=conventional synthetic disease-modifying anti-rheumatic drugs; MT=methotrexate; SSZ=sulfasalazine; HCQ=hydroxychloroquine; Lef=leflunomide; CyA=cyclosporin A; AZA=azathioprine

3.39±1.05 versus 2.27±0.73 (p=0.900) and at 24 weeks with 3.27±0.96 versus 2.37±1.79 (p=0.860) at 24 weeks.

When compared to baseline, mean DAS28-ESR and mean DAS28-CRP were significantly different in both 12 weeks and 24 weeks in both groups. For the

Table 3. Primary outcomes

Disease activity at 24 weeks	1 to 3 types csDMARDs (n=603); n (%)	4 types csDMARDs (n=118); n (%)	p-value
DAS28-ESR at 24 weeks			
Remission	68 (11.28)	25 (21.19)	<0.001*
Low disease activity	148 (24.54)	55 (46.61)	<0.001*
Moderate disease activity	295 (49.92)	30 (25.42)	0.001*
High disease activity	92 (15.26)	8 (6.78)	<0.001*
DAS28-CRP at 24 weeks			
Remission	436 (72.31)	98 (83.05)	<0.001*
Low disease activity	47 (7.79)	1 (0.85)	<0.001*
Moderate disease activity	21 (3.48)	0 (0.00)	0.001*
High disease activity	99 (16.42)	19 (16.01)	0.779

csDMARDs=conventional synthetic disease-modifying anti-rheumatic drugs; DAS=disease activity score; ESR=erythrocyte sedimentation rate; CRP=C-reactive protein

* Statistical significance

Table 4. Secondary outcomes

Disease activity	1 to 3 types csDMARDs (n=603)			4 types csDMARDs (n=118)		
	Mean±SD	Mean change from baseline (95% CI)	p-value[a]	Mean±SD	Mean change from baseline (95% CI)	p-value[a]
DAS28-ESR at baseline	4.51±0.62	0		5.11±0.69	0	
DAS28-ESR at 12 weeks	3.57±0.79	0.89 (0.82 to 0.97)	<0.001*	4.65±0.99	0.41 (0.27 to 0.55)	<0.001*
DAS28-ESR at 24 weeks	3.68±1.91	0.78 (0.61 to 0.95)	<0.001*	4.48±0.93	0.59 (0.44 to 0.75)	<0.001*
DAS28-CRP at baseline	3.12±1.42	0		3.78±0.89	0	
DAS28-CRP at 12 weeks	2.27±0.73	0.78 (0.64 to 0.92)	<0.001*	3.38±1.05	0.32 (0.19 to 0.46)	<0.001*
DAS28-CRP at 24 weeks	2.37±1.79	0.67 (0.47 to 0.87)	<0.001*	3.27±0.96	0.45 (0.26 to 0.63)	<0.001*

csDMARDs=conventional synthetic disease-modifying anti-rheumatic drugs; DAS=disease activity score; ESR=erythrocyte sedimentation rate; CRP=C-reactive protein; SD=standard deviation; CI=confidence interval

* Statistical significance, (a) p-value for change from baseline were calculated with the use of paired t-test

Table 5. Cumulative incidence proportion of adverse events

Variable	1 to 3 types csDMARDs n (%)	4 types csDMARDs n (%)
Leukopenia	1 (0.17)	4 (3.39)
Pancytopenia	2 (0.33)	2 (1.69)
Maculopathy	14 (2.32)	3 (2.54)
Acute hepatitis	10 (1.67)	4 (3.39)
Acute renal failure	5 (0.83)	0 (0.00)
Drugs allergy	3 (0.50)	0 (0.00)

csDMARDs=conventional synthetic disease-modifying anti-rheumatic drugs

patients who received one to three types csDMARDs, the mean difference was highest change in DAS28-ESR at 12 weeks with the mean change of 0.89 (95% CI 0.82 to 0.97). While in patients with four types csDMARDs treatment, the mean difference was highest change in DAS28-ESR at 24 weeks with the mean change of 0.59 (95% CI 0.44 to 0.75). The changing of mean DAS28-ESR and DAS28-CRP at baseline, 12 weeks, and 24 weeks in both groups are shown in Table 4.

The most common adverse events in those who received one to three types csDMARDs were maculopathy in 2.32%, followed by acute hepatitis in 1.67%, while leukopenia and acute hepatitis were the most common adverse events in the four types csDMARDs treatment group. The rates of adverse events are presented in Table 5.

Discussion

The present study included RA patients who met the inclusion criteria, which was 721 participants, and the majority was female with 674 patients. This characteristic aligns with other studies where female patients are more prevalent than male patients.

Regarding factors related to disease prognosis, such as the detection of RF or ACPA, it was found that the four types of csDMARDs group tended to have higher levels. Previous studies have shown that higher blood values of these markers are associated with more severe disease[13,14].

An assessment of the disease activity at the start of data collection found that 49.58% of one to three

types and 43.22% of the four types of csDMARDs group did not achieve treatment outcomes.

The group treated with four types of csDMARDs showed a significantly higher rate of achieving treatment targets at 24 weeks. These results suggest that a combination of various csDMARDs can be effective in achieving treatment targets[6].

Compared to the study by O'Dell et al.[8], the group receiving a triple therapy regimen of MTX, SSZ, and HCQ, achieved treatment goals, with a DAS28-ESR of less than 3.2 at 24 weeks in 43% of patients. In the present study, the group receiving one to three csDMARDs achieved the treatment goal of DAS28-ESR less than 3.2 at 35.82%.

Previous studies have demonstrated the benefits of early and aggressive combination therapy in achieving better long-term outcomes for RA patients. The present study aligns with these findings by showing that intensive csDMARD therapy is associated with significant improvements in disease activity[3-5]. However, unlike studies advocating for the early use of bDMARDs or tsDMARDs, the present study suggests that a step-up approach with additional csDMARDs can also be effective, particularly in resource-limited settings where bDMARDs may not be readily accessible.

There was no significant difference in the rate of adverse events between the two groups. This indicates that the addition of a fourth csDMARD does not increase the risk of adverse events, making it a viable option for patients with severe disease who do not respond to three types of csDMARDs.

The present study findings support the use of combination csDMARD therapy as an effective treatment strategy for RA, particularly in settings with limited access to advanced therapies. Clinicians should consider the severity of disease and prognostic factors when deciding on the intensity of csDMARD therapy. For patients not achieving treatment targets with one to three types of csDMARDs, adding a fourth csDMARD could be a reasonable next step.

The present study has limitations including its retrospective design and reliance on electronic medical records. It is important to acknowledge that the findings were derived from a single hospital, which may restrict their generalizability. To address these limitations, future prospective studies involving larger and more diverse populations are warranted.

Conclusion

In conclusion, the present study demonstrates that while patients treated with four types of csDMARDs present with more severe disease at baseline, the addition of a fourth csDMARD does significantly improve treatment outcomes compared to those treated with one to three types of csDMARDs. Nevertheless, for patients with severe disease not responding to fewer csDMARDs, adding a fourth csDMARD remains a viable option without increasing the risk of adverse events. These findings support the strategic use of combination csDMARD therapy tailored to disease severity and resource availability in clinical practice.

What is already known about this topic?

Current standard treatment for RA includes early diagnosis and initiation of DMARDs. Recommendations to use one to three csDMARDs before switching to bDMARDs or tsDMARDs if treatment goals are not met within three to six months.

What does this study add?

For patients not achieving treatment targets with one to three types of csDMARDs, adding a fourth csDMARD could be a reasonable next step without increasing the risk of adverse events. These findings support the strategic use of combination csDMARD therapy tailored to disease severity and resource availability in clinical practice.

Acknowledgement

The authors would like to thank to all the colleagues, arthritis patients, and Professor Dr. Chingching Foocharoen for her valuable advice.

Conflicts of interest

All authors declare no conflict of interest.

References

1. Chopra A, Abdel-Nasser A. Epidemiology of rheumatic musculoskeletal disorders in the developing world. Best Pract Res Clin Rheumatol 2008;22:583-604.
2. Chaiamnuay P, Darmawan J, Muirden KD, Assawatanabodee P. Epidemiology of rheumatic disease in rural Thailand: a WHO-ILAR COPCORD study. Community Oriented Programme for the Control of Rheumatic Disease. J Rheumatol 1998;25:1382-7.
3. Smolen JS, Landewé RBM, Bergstra SA, Kerschbaumer A, Sepriano A, Aletaha D, et al. EULAR recommendations for the management of rheumatoid arthritis with synthetic and biological disease-modifying antirheumatic drugs: 2022 update. Ann Rheum Dis 2023;82:3-18.
4. Smolen JS, Landewé RBM, Bijlsma JWJ, Burmester

GR, Dougados M, Kerschbaumer A, et al. EULAR recommendations for the management of rheumatoid arthritis with synthetic and biological disease-modifying antirheumatic drugs: 2019 update. Ann Rheum Dis 2020;79:685-99.
5. The Rheumatism Association of Thailand. Guideline for diagnosis and treatment of rheumatoid arthritis. Bangkok: Thai Rheumatism Association; 2014.
6. Goekoop-Ruiterman YP, de Vries-Bouwstra JK, Allaart CF, van Zeben D, Kerstens PJ, Hazes JM, et al. Clinical and radiographic outcomes of four different treatment strategies in patients with early rheumatoid arthritis (the BeSt study): a randomized, controlled trial. Arthritis Rheum 2005;52:3381-90.
7. Nam JL, Villeneuve E, Hensor EM, Conaghan PG, Keen HI, Buch MH, et al. Remission induction comparing infliximab and high-dose intravenous steroid, followed by treat-to-target: a double-blind, randomised, controlled trial in new-onset, treatment-naive, rheumatoid arthritis (the IDEA study). Ann Rheum Dis 2014;73:75-85.
8. O'Dell JR, Mikuls TR, Taylor TH, Ahluwalia V, Brophy M, Warren SR, et al. Therapies for active rheumatoid arthritis after methotrexate failure. N Engl J Med 2013;369:307-18.
9. Hetland ML, Haavardsholm EA, Rudin A, Nordström D, Nurmohamed M, Gudbjornsson B, et al. A multicenter randomized study in early rheumatoid arthritis to compare active conventional therapy versus three biological treatments: 24 week efficacy results of the NORD-STAR trial. Ann Rheum Dis 2020;79:13-4.
10. Pokharel G, Deardon R, Barnabe C, Bykerk V, Bartlett SJ, Bessette L, et al. Joint estimation of remission and response for methotrexate-based DMARD options in rheumatoid arthritis: A bivariate network meta-analysis. ACR Open Rheumatol 2019;1:471-9.
11. Arnett FC, Edworthy SM, Bloch DA, McShane DJ, Fries JF, Cooper NS, et al. The American Rheumatism Association 1987 revised criteria for the classification of rheumatoid arthritis. Arthritis Rheum 1988;31:315-24.
12. Aletaha D, Neogi T, Silman AJ, Funovits J, Felson DT, Bingham CO, 3rd, et al. 2010 Rheumatoid arthritis classification criteria: an American College of Rheumatology/European League Against Rheumatism collaborative initiative. Arthritis Rheum 2010;62:2569-81.
13. Morel J, Combe B. How to predict prognosis in early rheumatoid arthritis. Best Pract Res Clin Rheumatol 2005;19:137-46.
14. Bresnihan B. Are synovial biopsies of diagnostic value? Arthritis Res Ther 2003;5:271-8.