Supplementary Table S1: A multiple regression analysis of the fulfillment of Boolean remission criteria

 Unstandardized SE *t* P value

 Coefficients (*B*)

Steinbrocker’s stage 0.644 0.277 2.320 0.022\*

mHAQ 1.257 1.342 0.937 0.351

TJC28 -0.513 0.980 -0.523 0.602

SJC28 3.203 1.433 2.235 0.027\*

PrGA -0.037 0.098 -0.375 0.708

PtGA 0.138 0.102 1.352 0.179

CRP 4.391 2.112 2.079 0.040\*

SE: standard error, mHAQ: modified Health assessment questionnaire, TJC28: Tender 28-Joint Count (shoulders, elbows, wrists, MCPs, PIPs, including thumb IP, and knees), SJC28: Swollen 28-Joint Count (shoulders, elbows, wrists, MCPs, PIPs including thumb IP, and knees), PrGA; Provider Global Assessment, PtGA: Patient Global Assessment, CRP: C-reactive protein, \* significantly different.

Supplementary Figure S1: Concordance between US findings and physical assessments

A. GS vs. tender joint

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2MCP | 3MCP | 4MCP | 5MCP | Wrist | 2MTP | 3MTP | 4MTP | 5MTP | Ankle |
| Stage | I | 0.73 | 0.92 | 0.97 | 0.98 | 0.73 | -0.02 | 0.40 | 0.80 | 0.94 | 0.50 |
| II | 0.77 | 0.87 | 0.95 | 0.91 | 0.67 | -0.03 | 0.24 | 0.79 | 0.88 | 0.48 |
| III | 0.63 | 0.79 | 0.90 | 0.83 | 0.51 | 0.14 | 0.41 | 0.66 | 0.88 | 0.54 |
| IV | 0.43 | 0.61 | 0.80 | 0.72 | 0.39 | 0.40 | 0.56 | 0.85 | 0.84 | 0.49 |

B. PD vs. swollen joint

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 2MCP | 3MCP | 4MCP | 5MCP | Wrist | 2MTP | 3MTP | 4MTP | 5MTP | Ankle |
| Stage | I | 0.81 | 0.90 | 0.95 | 0.95 | 0.52 | 0.95 | 0.93 | 0.96 | 0.88 | 0.96 |
| II | 0.79 | 0.83 | 0.94 | 0.91 | 0.48 | 0.88 | 0.90 | 0.95 | 0.82 | 0.84 |
| III | 0.56 | 0.71 | 0.81 | 0.78 | 0.36 | 0.91 | 0.88 | 0.95 | 0.73 | 0.69 |
| IV | 0.43 | 0.60 | 0.76 | 0.71 | 0.25 | 0.87 | 0.87 | 0.91 | 0.76 | 0.82 |

Concordance between GS positivity (GS score ≥2) and tender joints (A), and PD positivity (PD score ≥1) and swollen joints (B) was assessed by PABAK. The interpretation of PABAK is as follows: < 0.00 = none, 0.00-0.20 = slight, 0.21-0.40 = fair, 0.41-0.60 = moderate, 0.61-0.80 = substantial, and > 0.81 = excellent agreement.

Supplementary Table S2: Clinical information on each treatment group

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | TNFi | TCZ | ABT | Non Bio | P value |
|  | N=104 | N=35 | N=42 | N=219 |   |
| Age, median (IQR), years | 65.0 (55.5 – 72.0) | 63.0 (55.5 – 66.5) | 67.0 (56.0 – 74.0) | 66.0 (58.0 – 73.0) | 0.28 |
| Gender (male/female) | 14/90 | 8/27 | 2/40 | 48/171 | 0.03\* |
| Disease duration, median (IQR), years | 7.9 (3.7 – 17.9) | 7.0 (3.7 – 15.7) | 8.4 (4.4 – 15.5) | 9.2 (4.1 – 20.5) | 0.75 |
| Stage (I /II/III/IV） | 28/26/17/33 | 6/9/7/13 | 10/11/6/15 | 57/48/49/65 | 0.73 |
| DAS28 (ESR), median (IQR) | 2.6 (2.0 – 3.5) | 2.1 (1.4 – 2.7) | 2.8 (2.3 – 3.4) | 2.6 (2.0 – 3.5) | <0.01\* |
| SDAI, median (IQR) | 4.0 (1.1 – 8.7) | 3.8 (1.8 – 7.8) | 4.5 (1.6 – 9.5) | 3.8 (1.3 – 8.8) | 0.9 |
| CDAI, median (IQR) | 3.9 (0.8 – 8.1) | 3.8 (1.8 – 7.7) | 3.7 (1.2 – 8.7) | 3.6 (1.2 – 8.3) | 0.95 |
| PrGA, median (IQR), mm | 6.0 (0.0 – 16.0) | 6.0 (1.0 – 12.0) | 5.5 (0.0 – 15.8) | 6.0 (1.0 – 14.5) | 0.94 |
| PtGA, median (IQR), mm | 20.0 (7.0 – 44.5) | 20.0 (9.0 – 45.5) | 16.5 (7.0 – 44.5) | 15.0 (4.0 – 40.0) | 0.73 |
| CRP, median (IQR), mg/dL | 0.1 (0.0 – 0.3) | 0.0 (0.0 – 0.0) | 0.2 (0.1 – 0.5) | 0.1 (0.0 – 0.4) | <0.01\* |
| ESR, median (IQR), mm/hr | 18.0 (10.0 – 26.3) | 8.0 (5.0 – 12.5) | 20.0 (14.0 – 36.5) | 17.0 (10.0 – 29.0) | <0.01\* |
| Tender joint count, median (IQR) | 0.0 (0.0 – 1.0) | 0.0 (0.0 – 1.0) | 0.0 (0.0 – 1.0) | 0.0 (0.0 – 1.0) | 0.27 |
| Swollen joint count, median (IQR) | 0.0 (0.0 – 1.0) | 0.0 (0.0 – 1.0) | 0.0 (0.0 – 1.0) | 0.0 (0.0 – 1.0) | 0.94 |
| GS score, median (IQR) | 10.0 (6.8 – 14.3) | 14.0 (7.0 – 18.5) | 12.0 (9.0 – 16.0) | 12.0 (9.0 – 18.0) | <0.01\* |
| PD score, median (IQR) | 1.0 (0.0 – 5.0) | 3.0 (1.0 – 7.0) | 2.0 (0.0 – 5.0) | 2.0 (0.0 – 5.5) | 0.09 |
| MTX dose, median (IQR), mg/week | 6.0 (4.0 – 8.0) | 4.0 (0.0 – 8.0) | 0.0 (0.0 – 6.0) | 6.0 (1.0 – 8.0) | <0.01\* |
| CS dose, median (IQR), mg/dayƗ | 0.0 (0.0 – 0.0) | 0.0 (0.0 – 2.0) | 0.0 (0.0 – 2.8) | 0.0 (0.0 – 1.0) | 0.19 |
| Boolean remission, number, % | 30 (28.8) | 8 (22.9) | 12 (28.6) | 68 (31.1) | 0.79 |
| DAS28(ESR) remission, number, % | 52 (50.0) | 25 (71.4) | 16 (38.1) | 109 (49.8) | 0.03\* |
| SDAI remission, number, % | 44 (42.3) | 15 (42.9) | 19 (45.2) | 97 (44.3) | 0.98 |
| CDAI remission, number, % | 43 (41.3) | 14 (40.0) | 19 (45.2) | 93 (42.5) | 0.97 |

IQR: interquartile range, TNFi: Tumor necrosis factor inhibitors including infliximab, etanercept, adalimumab, golimumab, and certolizumab pegol, TCZ: Tocilizumab, ABT: Abatacept, DAS28 (ESR): Disease Activity Score 28 joints (erythrocyte sedimentation rate), SDAI: Simplified Disease Activity Index, CDAI: Clinical Disease Activity Index, PrGA: Provider Global Assessment, PtGA: Patient Global Assessment, TJC28: Tender 28-Joint Count (shoulders, elbows, wrists, MCPs, PIPs including thumb IP, and knees), SJC28: Swollen 28-Joint Count (shoulders, elbows, wrists, MCPs, PIPs including thumb IP, and knees), GS: gray scale, PD: power Doppler, MTX: Methotrexate, CS: Corticosteroid, Ɨ Equivalent to prednisone, \* significantly different.Supplementary Table S3: Comparison of clinical factors between patients with and without the progression of bone erosion receiving TCZ in DAS28 (ESR) remission

|  |  |  |  |
| --- | --- | --- | --- |
|  | ΔTSS=0 | ΔTSS>0 | P value |
|  | n=14 | n=6 |  |
| GS score, median (IQR) | 15.0 (12.3 – 20.0) | 7.0 (4.3 – 18.8) | 0.23 |
| PD score, median (IQR) | 3.0 (2.0 – 5.5) | 1.5 (0.3 – 8.8) | 0.48 |
| DAS28(ESR) , median (IQR) | 1.4 (1.3 – 1.8) | 2.2 (2.0 – 2.4) | 0.04\* |
| SDAI, median (IQR) | 2.3 (1.1 – 3.6) | 3.3 (2.2 – 7.2) | 0.16 |
| CDAI, median (IQR) | 2.3 (1.1 – 3.6) | 2.9 (1.9 – 7.2) | 0.22 |
| PrGA, median (IQR), mm | 5.0 (0.0 – 8.3) | 8.0 (2.0 – 11.8) | 0.2 |
| PtGA, median (IQR), mm | 10.0 (8.0 – 23.0) | 22.5 (19.3 – 42.3) | 0.45 |
| Tender joint count, median (IQR) | 0.0 (0.0 – 0.0) | 0.0 (0.0 – 0.0) | 0.58 |
| Swollen joint count, median (IQR) | 0.0 (0.0 – 0.0) | 0.0 (0.0 – 0.8) | 0.62 |

IQR: interquartile range, GS: gray scale, PD: power Doppler, SDAI: Simplified Disease Activity Index, CDAI: Clinical Disease Activity Index, PrGA: Provider Global Assessment, PtGA: Patient Global Assessment, TJC28: Tender 28-Joint Count (shoulders, elbows, wrists, MCPs, PIPs including thumb IP, and knees), SJC28: Swollen 28-Joint Count (shoulders, elbows, wrists, MCPs, PIPs including thumb IP, and knees), \* significantly different.

Supplementary Table S4: Relationship between total PD scores and sustainability of DAS28 (ESR) remission in each group

Treatment Remission n PD, median (IQR) P-value

TNFi Sustained 31 0 (0 – 1) 0.33

Relapsed 11 1 (0 – 2)

TCZ Sustained 15 2 (0 – 3) 0.1

Relapsed 4 6.5 (2 – 13.25)

ABT Sustained 7 1 (0.5 – 1.5) 0.1

Relapsed 3 3 (2.5 – 5.5)

Total Bio Sustained 53 1 (1 – 2) 0.05

 Relapsed 18 2 (0.25 – 3)

Non-Bio Sustained 69 1 (0 – 2) <0.01\*

Relapsed 20 4.5 (0 – 6)

PD: Power Doppler, IQR: interquartile range, TNFi: Tumor necrosis factor inhibitors including infliximab, etanercept, adalimumab, golimumab, and certolizumab pegol, TCZ: Tocilizumab, ABT: Abatacept, \* significantly different.