

**Supplementary Figure 1:** Screening flowchart of patients included in the final analysis. IS: Immunosuppressive; PUMCH: Peking Union Medical College Hospital; SLE: Systemic lupus erythematosus; SLEDAI-2K: Systemic Lupus Erythematosus Disease Activity Index 2000.



**Supplementary** **Figure 2:** Efficacy of tacrolimus in active SLE patients. **(A)** SLEDAI-2K score change (5.7 ± 3.5, 3.2 ± 3.1, and 2.8 ± 2.4 at baseline and at months 3 and 6); **(B)** PGA score change (0.76 ± 0.49, 0.50 ± 0.41, and 0.43 ± 0.35 at baseline and at months 3 and 6); **(C)** daily dose change of prednisone required for controlling disease (21.8 ± 18.2 mg/day, 13.9 ± 8.4 mg/day, 10.2 ± 5.5 mg/day at baseline and at months 3 and 6); **(D)** patients achieved remission or LLDAS at baseline and 6 months (*N* = 0 [0%] and = 12 [22.2%] *vs*. *N* = 4 [7.4%] and = 18 [33.3%], respectively, *P <* 0.05); **(E)** change of serum C3 (0.757 ± 0.237 g/L, 0.849 ± 0.257 g/L, and 0.857 ± 0.255 g/L at baseline and at months 3 and 6); **(F)** change of serum C4 (0.130 ± 0.066 g/L, 0.151 ± 0.075 g/L, and 0.141 ± 0.059 g/L at baseline and at months 3 and 6); **(G)** change of anti-dsDNA antibody titer (359 ± 236 IU/mL, 270 ± 292 IU/mL, and 215 ± 219 IU/mL at baseline and at months 3 and 6); **(H)** change of 24-h urine protein (1.97 ± 1.55 g/24 h, 1.04 ± 0.98 g/24 h, and 0.64 ± 0.43 g/24 h at baseline and at months 3 and 6). SLE: Systemic lupus erythematosus; SLEDAI-2K: Systemic Lupus Erythematosus Disease Activity Index 2000; PGA: Physician Global Assessment; LLDAS: Lupus Low Disease Activity State; C3: Complement 3; C4: Complement 4; \**P* < 0.05; \*\**P* < 0.01; \*\*\**P* < 0.001.

**Supplementary Table 1: The studies of tacrolimus in SLE patients with various organ involvement.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Study** | **Study location** | **Study type** | **Number enrolled** | **Study duration (months)** | **Organ involvement, *n*/*N* (%)** | **SLEDAI** | **Steroid dosage (prednisone, mg/day)** | **Adverse events, *n*/*N* (%)** |
| **Skin** | **Arthritis** | **Haemalogical** | **thrombocytopenia** | **Serositis** | **Nephritis** | **Baseline** | **End of study** | **Baseline** | **End of study** |
| Our study | Single center in China | Prospective real-world study | 96 | 6 | 6/96 (6.3) | 4/96 (4.2) | 30/96 (31.3) | 14/96 (14.6) | NA | 65/96 (72.1) | 5.7 ± 3.5 | 2.8 ± 2.4 | 21.8 ± 18.2 | 10.2 ± 5.5 | 9/96 (9.4) |
| Kusunoki *et al*[1] | Single center in Japan | Retrospective pilot study | 10 | 12 | 4/10 (40) | 6/10 (60) | 3/10 (30) | 1/10 (10) | 0 | 0 | 6.8 ± 3.1 | 3.4 ± 0.9 | 16.8 ± 8.6 | 9.3 ± 4.6 | 4/10 (40) |
| Suzuki *et al*[2] | Single center in Japan | Open-label prospective study | 21 | 6 | 5/21 (23.8) | 8/21 (38.1) | 2/21 (9.5) | 0 | 0 | 5/21 (23.8) | 4.2 ± 2.0 | 1.2 ± 1.6 | 13.4 ± 8.3 | 10.3 ± 6.7 | 5/21 (23.8) |
| Watanabe *et al*[3]  | Single center in Japan | Retrospective study | 14 in TAC group; 20 in GC group | 12 | 4/14 (28.6) | 6/14 (42.9) | 3/14 (21.4) | Not mentioned | 0 | 5/14 (35.7) | 7.5 ± 0.43 | 4.5 | 7.18 ± 0.63 | Not mentioned | 1/14 (7.1) |
| Tani *et al*[4] | Three European centers in Italy, Spain and France  | Retrospective study | 29 | 12 | 2/29 (6.9) | 4/29 (13.8) | 6/29 (20.7) | 1/29 (3.4) | 2/29 (6.9) | 24/29 (82.8) | 8 (5.5–12) | 3 (2–8) | 7.5 (3.75–12.5) | Not mentioned | 3/29 (10.3) |

SLEDAI**:** Systemic Lupus Erythematosus Disease Activity Index.

**References**

1. Kusunoki Y, Tanaka N, Kaneko K, Yamamoto T, Endo H, Kawai S. Tacrolimus therapy for systemic lupus erythematosus without renal involvement: A preliminary retrospective study. Mod Rheumatol 2009;19:616–621. doi: 10.1007/s10165-009-0220-y.

2. Suzuki K, Kameda H, Amano K, Nagasawa H, Takei H, Nishi E, *et al*. Single center prospective study of tacrolimus efficacy and safety in the treatment of various manifestations in systemic lupus erythematosus. Rheumatol Int 2011;31:757–763. doi: 10.1007/s00296-010-1366-9.

3. Watanabe H, Yamanaka R, Sada KE, Zeggar S, Katsuyama E, Katsuyama T, *et al*. The efficacy of add-on tacrolimus for minor flare in patients with systemic lupus erythematosus: A retrospective study. Lupus 2016;25:54–60. doi: 10.1177/0961203315600538.

4. Tani C, Elefante E, Martin-Cascon M, Belhocine M, Lavilla Olleros C, Vagelli R, *et al*. Tacrolimus in non-Asian patients with SLE: A real-life experience from three European centres. Lupus Sci Med 2018;5:e000274. doi: 10.1136/lupus-2018-000274.

**Supplementary Table 2: Baseline characteristics of the 96 SLE patients treated by tacrolimus.**

|  |  |
| --- | --- |
| **Items** | **Mean ± SD or *N* (%)*****N* = 96** |
| Age (years) | 33.0 ± 9.3 |
| Female | 91 (94.8%) |
| Duration of SLE (years) | 6.8 ± 5.6 |
| SLEDAI-2K | 5.7 ± 3.5 |
|  2–4 | 47 (48.9%) |
|  5–9 | 35 (36.5%) |
| ≥10 | 14 (14.6%) |
| PGA | 0.76 ± 0.49 |
| Clinical manifestations |  |
|  Mucocutaneous | 6 (6.3%) |
|  Arthritis | 4 (4.2%) |
|  LN | 65 (72.1%) |
|  Hematologic disorder | 30 (31.3%) |
|  Thrombocytopenia | 14 (14.6%) |
|  Pulmonary hypertension | 28 (29.2%) |
| Immunologic indices |  |
|  ANA | 96 (100%) |
|  Anti-dsDNA | 56 (58.3%) |
|  Anti-Sm | 37 (38.5%) |
|  Anti-RNP | 48 (50.0%) |
|  Anti-SSA | 57 (59.4%) |
|  Anti-SSB | 14 (14.6%) |
|  Anti-rRNP | 24 (25.0%) |
|  Antiphospholipid antibody | 31 (32.3%) |
|  Hypocomplementemia | 61 (63.5%) |
| Concomitant medications |  |
|  Prednisone | 87 (90.6%) |
|  Daily dose (mg) | 21.8 ± 18.2 |
|  Hydroxychloroquine | 81 (84.4%) |
|  ACEI/ARB | 21 (21.9%) |
| Tacrolimus alone | 77 (80.2%) |
| No previous IS agents | 53 (55.2%) |
| Switch therapy | 24 (25.0%) |
|  Mycophenolate mofetil | 8 (8.1%) |
|  Cyclophosphamide | 6 (5.4%) |
|  Azathioprine | 4 (4.5%) |
|  Methotrexate | 2 (1.8%) |
|  Sirolimus | 2 (1.8%) |
|  Cyclosporin A | 2 (1.8%) |
| Add-on therapy | 19 (19.8%) |
|  Cyclophosphamide | 7 (7.3%) |
|  Mycophenolate mofetil | 5 (5.2%) |
|  Azathioprine | 4 (4.2%) |
|  Methotrexate | 1 (1.0%) |
|  Leflunomide | 1 (1.0%) |
|  Tofacitinib | 1 (1.0%) |

ACEI: Angiotensin-converting enzyme inhibitor; ARB: Angiotensin receptor blocker; IS: Immunosuppressive; LN: Lupus nephritis; PGA: Physician Global Assessment; SLE: Systemic lupus erythematosus; SLEDAI-2K: Systemic Lupus Erythematosus Disease Activity Index 2000.

**Supplementary Table 3: The RHC results of the patients with SLE-PAH.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **RHC** | **PASP (mmHg)** | **PADP (mmHg)** | **mPAP (mmHg)** | **PAWP (mmHg)** | **CO (L/min)** | **CI (L ⋅ min ⋅ m2)** | **PVR (WU)** |
| 001095 | Y | 53 | 23 | 33 | 9 | 4 | 2.51 | 6.5 |
| 004533 | Y | 34 | 13 | 20 | 8 | 5.7 | NA | 2.6 |
| 004636 | Y | 89 | 44 | 61 | NA | 3.9 | NA | 13.59 |
| 034856 | Y | 64 | 28 | 42 | 14 | 4.16 | 2.74 | 6.11 |
| 037753 | N |  |  |  |  |  |  |  |
| 062459 | Y | 61 | 27 | 41 | 10 | 4.1 | 2.53 | 7.56 |
| 072331 | Y | 49 | 22 | 31 | 5 | 4.23 | 3.18 | 5.91 |
| 127845 | N |  |  |  |  |  |  |  |
| 169552 | N |  |  |  |  |  |  |  |
| 004878 | N |  |  |  |  |  |  |  |
| 004989 | Y | 73 | 36 | 48 | 7 | 3.2 | NA | NA |
| 010423 | Y | 70 | 32 | 47 | 11 | NA | 2.9 | 7.2 |
| 027602 | Y | 53 | 26 | 38 | 15 | 5.4 | 3.38 | 4.25 |
| 034551 | Y | 93 | 34 | 50 | 9 | 7.71 | 5.28 | 6.22 |
| 050574 | Y | 73 | 31 | 46 | 7 | 4 | 2.5 | 9.75 |
| 056879 | Y | 61 | 24 | 36 | 5 | 3.8 | 2.38 | 8.5 |
| 058937 | Y | 76 | 44 | 55 | 10 | 2.83 | 1.66 | 16.25 |
| 059550 | Y | 50 | 24 | 33 | 8 | 5.64 | 3.3 | 6.2 |
| 081942 | N |  |  |  |  |  |  |  |
| 061001 | Y | 79 | 31 | 47 | 15 | 5.19 | 2.78 | 6.55 |
| 062672 | Y | 51 | 14 | 31 | 6 | 5 | 3.2 | 6.3 |
| 088623 | N |  |  |  |  |  |  |  |
| 123175 | N |  |  |  |  |  |  |  |
| 143139 | N |  |  |  |  |  |  |  |
| 146357 | N |  |  |  |  |  |  |  |
| 002018 | Y | 63 | 33 | 43 | 12 | 2.7 | 1.77 | 11.9 |
| 138052 | N |  |  |  |  |  |  |  |
| 004539 | Y | 38 | 16 | 26 | 4 | 6.1 | NA | 3.6 |

SLE-PAH: Systemic lupus erythematosus-pulmonary arterial hypertension.