Research Article
Clinical Efficacy of Gandakang Tablets plus Methylprednisolone in Patients with Systemic Lupus Erythematosus

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Objective. To evaluate the clinical efficacy of Gandakang tablets plus methylprednisolone in patients with systemic lupus erythematosus (SLE). Methods. From February 2015 to February 2019, 60 eligible patients with SLE were recruited and assigned via the random number table method at a ratio of 1:1 to receive either methylprednisolone (control group) or Gandakang tablets plus methylprednisolone (observation group). The primary endpoint was clinical efficacy, and the secondary endpoints included Systemic Lupus Erythematosus Disease Activity Index (SLEDAI) score, immunoglobulin (Ig), inflammatory factor levels, and adverse events. Results. Gandakang tablets plus methylprednisolone were associated with a significantly higher treatment efficacy versus methylprednisolone alone (P < 0.05). Gandakang tablets plus methylprednisolone resulted in significantly lower SLEDAI scores and lower levels of IgG, IgM, IgA, tumor necrosis factor-α (TNF-α), interleukin-4 (IL-4), and interleukin-6 (IL-6) versus single medication of methylprednisolone (P < 0.05). The two groups showed a similar incidence of adverse events (P > 0.05). Patients given Gandakang tablets plus methylprednisolone had higher mental health, emotional role, physical role, social functioning, and bodily pain scores versus those receiving the monotherapy of methylprednisolone (P < 0.05). Conclusion. Gandakang tablets plus methylprednisolone is effective in the treatment of SLE by enhancing the patients’ immunity, mitigating the inflammatory response, eliminating negative emotions, and improving their quality of life.

1.Introduction
Systemic lupus erythematosus (SLE) is a connective tissue disease secondary to autoimmune system disorders [1] and is associated with the presence of pathogenic antibodies in the serum that binds to self-antigens to form immune complexes, leading to the involvement and damage of multiple organ systems [2]. Its pathogenesis is still poorly understood. In recent years, with the development of medical technology, considerable progress has been realized in the treatment of SLE in China, with significant enrichment in the 10-year survival [3]. It has been noted that cumulative organ damage caused by the disease will seriously compromise the prognosis [4]. Therefore, the mitigation of the toxic side effects of low-dose drugs while ensuring the therapeutic benefits is the current priority of clinical research [5]. Methylprednisolone tablets are commonly used for SLE to hinder the growth of connective tissue and alleviate the inflammatory response. However, the long-term use of methylprednisolone is predisposed to consequences such as gastrointestinal bleeding, which results in poor long-term efficacy [6]. Gandakang tablet is a herbal preparation made from Radix Bupleuri, Radix Rubiae, Rhizoma Imperatae, Fructus Amomi, Radix Angelicae Sinensis, Xiang Qu, Poria, Pheretima, Rhizoma Atractylodes Macrocephalae, Pericarpium Citri Reticulate Viride, Carapax Trionycis, Fructus Aurantii Immaturus, Radix Paeoniae Alba, Radix Codonopsis, and Radix Glycyrrhizae, which dredges the liver and strengthens the spleen, resolves blood stasis, and unblocks the collaterals. Accordingly, this study
aims to investigate the clinical efficacy of Gandakang tablets plus methylprednisolone in the treatment of SLE.

2. Materials and Methods

2.1. General Information. From February 2015 to February 2019, 60 eligible patients with SLE were recruited and assigned via the random number table method at a ratio of 1:1 to a control group or an observation group. The two groups showed similar baseline features \((P > 0.05)\), as shown in Table 1. This study was approved by the hospital ethics committee (No. 7929HMU201).

Inclusion criteria [7]: (1) patients who met the H1 classification criteria for SLE; (2) patients without a history of hormone or immunosuppressive therapy in the last 3 months before treatment; (3) patients who were informed of the purpose and process of the study and signed the informed consent form. Exclusion criteria: (1) patients with severe mental illness; (2) patients with allergies to the drugs used in this study; (3) patients during lactation or pregnancy; (4) patients with other types of rheumatic diseases; (5) patients with dysfunction of vital organs such as the kidney and liver.

2.2. Methods. Patients in the control group were given methylprednisolone powder injection (Pfizer Manufacturing Belgium NV) intravenously at 15–30 mg/kg and repeated every 4–6 h. The treatment spanned 48 hours. Patients in the observation group were given methylprednisolone powder (the medication was identical to that for the control group) plus Gandakang tablets orally, 3 g/d, 3 times/d. The efficacy (the medication was identical to that for the control group) of Gandakang tablets plus methylprednisolone in the treatment of SLE.

2.3. Observational Indicators

(1) Clinical Efficacy. Markedly effective: facial pigmentation completely disappears. Effective: facial pigmentation is significantly alleviated. Ineffective: no improvement or even aggravation of facial pigmentation is found. The total clinical efficacy = (the number of markedly effective cases + the number of effective cases)/total number of cases \times 100\%.

(2) Immunoglobulins (Ig). Five ml of morning fasting venous blood was collected from the patients of both groups and centrifuged to determine the levels of IgG, IgM, and IgA in both groups using the immunoturbidimetric method.

(3) Inflammatory Factor Level. Three milliliters of morning venous blood was collected from the patients of both groups and serum was obtained by centrifugation. The levels of tumor necrosis factor-\(\alpha\) (TNF-\(\alpha\)), interleukin-4 (IL-4), and interleukin-6 (IL-6) were determined using an enzyme-linked immunosorbent assay.

(4) Adverse Events. Adverse events such as headaches were recorded in both groups.

2.4. Statistical Methods. SPSS25.0 statistical software was adopted for processing data in this study. The measurement data were expressed as \((\text{mean} \pm \text{standard error})\) using the independent paired \(t\)-test, and the count data were expressed as \([n(\%)]\) using the chi-square test. Differences are considered statistically significant at \(P < 0.05\).

3. Results

3.1. Clinical Efficacy. Gandakang tablets plus methylprednisolone were associated with a significantly higher treatment efficacy versus methylprednisolone alone \((P < 0.05)\) (Table 2).

3.2. Disease Condition. Gandakang tablets plus methylprednisolone resulted in significantly lower SLEDAI scores versus methylprednisolone alone \((P < 0.05)\) (Table 3).

3.3. Immunoglobulins. Before treatment, there was no statistically significant difference in the levels of IgG, IgM, and IgA between the two groups \((P > 0.05)\). Gandakang tablets plus methylprednisolone resulted in significantly lower SLEDAI scores and lower levels of IgG, IgM, and IgA versus the single medication of methylprednisolone \((P < 0.05)\) (Table 4).

3.4. Inflammatory Factor Levels. Before treatment, there was no statistically significant difference between the levels of TNF-\(\alpha\), IL-4, and IL-6 in the two groups \((P > 0.05)\). The patients receiving combined treatment had lower levels of TNF-\(\alpha\), IL-4, and IL-6 versus monotherapy of methylprednisolone \((P < 0.05)\) (Table 5).

3.5. Adverse Events. In the control group, there were 3 cases of headache and 4 cases of vomiting, and the incidence of
adverse reactions was 23.33% (7/30). In the observation group, there were 2 cases of headache and 2 cases of vomiting, and the incidence of adverse reactions was 13.33% (4/30). No significant differences were observed in the incidence of adverse events between the two groups (P > 0.05) (Table 6).

### 3.6. Symptom Remission.
Gandakang tablets plus methylprednisolone were associated with a better remission rate versus methylprednisolone (P < 0.05) (Table 7).

### 3.7. Quality of Life.
Before treatment, there was no statistically significant difference between the mental health, emotional role, physical role, and social functioning scores of the two groups (P > 0.05). Patients given Gandakang tablets plus methylprednisolone had higher mental health, emotional role, physical role, social functioning, and bodily pain scores versus those receiving the monotherapy of methylprednisolone (P < 0.05) (Table 8).

### 4. Discussion
Systemic lupus erythematosus is a common disease in rheumatology [4] and an inflammatory connective tissue disease triggered by autoimmune abnormalities, with pathological changes such as connective tissue fibrosis, mucus edema, inflammatory response, and vascular abnormalities [8]. Its clinical manifestations include fever, skin and mucous membrane damage, joint pain, and organ damage, and delayed treatment may trigger irreversible damage to various systems such as nerves and blood [9]. Currently, pharmacological treatment is the mainstay in clinical practice, in which glucocorticoids can effectively offset the disorders of the autoimmune system...
The results of this study showed better quality of life for patients given Gandakang tablets plus methylprednisolone versus those receiving methylprednisolone alone. Furthermore, patients’ negative emotions can be mitigated after treatment, which contributes to the recovery of mental health, and the improvement of quality of life.

In conclusion, Gandakang tablets plus methylprednisolone are effective in the treatment of SLE, which improves the immunity of patients, mitigates inflammatory responses, eliminates their negative emotions, and enhances their quality of life. The proposed use of Gandakang tablets is simultaneous and additional to methylprednisolone therapy.

**Data Availability**

The datasets used during the present study are available from the corresponding author upon reasonable request.

**Disclosure**

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Conflicts of Interest**

The authors declare that they have no conflicts of interest.

**Authors’ Contributions**

Min Wang and Guoquan Li contributed equally to this study.

**References**

[1] G. Ruiz-Irastorza and G. Bertsias, "Treating systemic lupus erythematosus in the 21st century: new drugs and new perspectives on old drugs," *Rheumatology*, vol. 59, no. Suppl5, pp. v69–v81, 2020.

[2] A. Ugarte, A. Danza, and G. Ruiz-Irastorza, "Glucocorticoids and antimalarials in systemic lupus erythematosus: an update and future directions," *Current Opinion in Rheumatology*, vol. 30, no. 5, pp. 482–489, 2018.

[3] S. Porta, A. Danza, M. Arias Saavedra et al., "Glucocorticoids in systemic lupus erythematosus. Ten questions and some issues," *Journal of Clinical Medicine*, vol. 9, no. 9, p. 2709, 2020.

[4] L. F. da Rosa Franchi Santos, N. T. Costa, M. Maes, A. N. C. Simão, and I. Dichi, "Influence of treatments on cell adhesion molecules in patients with systemic lupus erythematosus," *Evidence-Based Complementary and Alternative Medicine*, vol. 2020, 2020.

### Table 8: Comparison of the quality of life of patients in the two groups before and after treatment.

| Groups       | n   | Before Treatment | After Treatment | t   | P value |
|--------------|-----|------------------|----------------|-----|---------|
| Observation  | 30  | 77.23 ± 5.61     | 92.15 ± 6.63   | 13.324 | 0.056  |
| Control      | 30  | 77.29 ± 5.33     | 82.24 ± 5.97   | 6.63  | 0.012   |
|              |     | 71.69 ± 6.94     | 82.83 ± 6.78   | 17.014 | 0.001   |
|              |     | 81.97 ± 6.23     | 86.18 ± 7.22   | 15.023 | 0.001   |
|              |     | 73.46 ± 6.16     | 90.58 ± 6.15   | 18.543 | 0.001   |

The results of this study showed that Gandakang tablets plus methylprednisolone were associated with higher efficacy and lower levels of IgG, IgM, IgA, TNF-α, IL-4, and IL-6 versus methylprednisolone, indicating that the combined treatment can effectively reduce the level of inflammatory factors in SLE patients, regulate their immune function, and facilitate rapid recovery. Methylprednisolone is a mild glucocorticoid with strong anti-inflammatory effects and is widely used in the treatment of rheumatic diseases and endocrine disorders [16]. As mentioned before, long-term high doses of methylprednisolone may lead to adverse effects such as Cushing’s syndrome and femoral head necrosis. Moreover, methylprednisolone tablets also reduce capillary permeability and effectively prevent the entry of toxic substances and vascular endothelial dysfunction [17]. Nonetheless, monotherapy of methylprednisolone fails to achieve satisfactory efficacy, which underlines the significance of the combined use of other drugs. Many SLE patients have autoimmune disorders with significantly higher immunoglobulin levels than those of healthy individuals [18, 19]. The decreased levels of IgG, IgM, and IgA after treatment are ascribed to the fact that Gandakang tablets effectively inhibit the abnormal proliferation of B lymphocytes in patients and nonspecifically remove antigen-sensitive small lymphocytes, thereby downregulating IgG, IgM, and IgA levels and facilitating the restoration of patients’ immune function. In addition, the drug is degraded by the liver and only a small amount of active metabolites passes the blood-brain barrier, which efficiently reduces adverse reactions and synergizes with methylprednisolone tablets to promote patients’ recovery to the maximum extent.

**Authors’ Contributions**

Min Wang and Guoquan Li contributed equally to this study.

**References**

[1] G. Ruiz-Irastorza and G. Bertsias, “Treating systemic lupus erythematosus in the 21st century: new drugs and new perspectives on old drugs,” *Rheumatology*, vol. 59, no. Suppl5, pp. v69–v81, 2020.

[2] A. Ugarte, A. Danza, and G. Ruiz-Irastorza, “Glucocorticoids and antimalarials in systemic lupus erythematosus: an update and future directions,” *Current Opinion in Rheumatology*, vol. 30, no. 5, pp. 482–489, 2018.

[3] S. Porta, A. Danza, M. Arias Saavedra et al., “Glucocorticoids in systemic lupus erythematosus. Ten questions and some issues,” *Journal of Clinical Medicine*, vol. 9, no. 9, p. 2709, 2020.

[4] L. F. da Rosa Franchi Santos, N. T. Costa, M. Maes, A. N. C. Simão, and I. Dichi, “Influence of treatments on cell adhesion molecules in patients with systemic lupus
erythematosus and rheumatoid arthritis: a review," *Inflammopharmacology*, vol. 28, no. 2, pp. 363–384, 2020.

[5] Q. Lin, M. Zhang, H. Tang et al., "Acute pancreatitis and macrophage activation syndrome in pediatric systemic lupus erythematosus: case-based review," *Rheumatology International*, vol. 40, no. 5, pp. 811–819, 2020.

[6] N. Bitencourt and B. L. Bermas, "Pharmacological approach to managing childhood-onset systemic lupus erythematosus during conception, pregnancy and breastfeeding," *Pediatric Drugs*, vol. 20, no. 6, pp. 511–521, 2018.

[7] N. K. Al-Adhoubi and J. Bystrom, "Systemic lupus erythematosus and diffuse alveolar hemorrhage, etiology and novel treatment strategies," *Lupus*, vol. 29, no. 4, pp. 355–363, 2020.

[8] P. Shen, J. Li, S. Tu, G. Chen, and C. Chen, "Acquired hemophilia A in a woman with systemic lupus erythematosus: a case report and review of literature," *Medicine*, vol. 99, no. 43, Article ID e22926, 2020.

[9] J. F. Zhou, S. Y. Liu, and Y. Zheng, "Intussusception merged with systemic lupus erythematosus: one case report and retrospective analysis," *Clinical Rheumatology*, vol. 37, no. 1, pp. 285–288, 2018.

[10] G. Ruiz-Irastorza, A. Ugarte, I. Ruiz-Arruza, and M. Khamashta, "Seventy years after Hench’s Nobel prize: revisiting the use of glucocorticoids in systemic lupus erythematosus," *Lupus*, vol. 29, no. 10, pp. 1155–1167, 2020.

[11] R. K. Piliana, D. Suri, A. K. Jindal et al., "Lupus anticoagulant hypoprothrombinemia syndrome associated with systemic lupus erythematosus in children: report of two cases and systematic review of the literature," *Rheumatology International*, vol. 38, no. 10, pp. 1933–1940, 2018.

[12] A. Pieta, E. Pelechas, N. Gerolymatou, P. V. Voulgari, and A. A. Drosos, "Calcified constrictive pericarditis resulting in tamponade in a patient with systemic lupus erythematosus," *Rheumatology International*, vol. 41, no. 3, pp. 651–670, 2021.

[13] O. Ilizaliturri-Guerra, R. Uriarte-Botello, R. A. Pineda-Sic et al., "Low-dose rituximab therapy in steroid-refractory thrombocytopenia due to systemic lupus erythematosus," *Rheumatology International*, vol. 40, no. 10, pp. 1717–1724, 2020.

[14] J. Li, H. Meng, W. Jiang, J. Liu, Z. Cui, and J. Miao, "Cerebral venous sinus thrombosis and subdural hematoma in a female patient with systemic lupus erythematosus: a case report and literature review," *Annals of Palliative Medicine*, vol. 10, no. 7, pp. 8454–8459, 2021.

[15] A. Fanouriakis, N. Tziolos, G. Bertias, and D. T. Boumpas, "Update on the diagnosis and management of systemic lupus erythematosus," *Annals of the Rheumatic Diseases*, vol. 80, no. 1, pp. 14–25, 2021.

[16] G. C. Tsokos, M. S. Lo, P. C. Reis, and K. E. Sullivan, "New insights into the immunopathogenesis of systemic lupus erythematosus," *Nature Reviews Rheumatology*, vol. 12, no. 12, pp. 716–730, 2016.

[17] Y. Nagafuchi, H. Shoda, and K. Fujio, "Immune profiling and precision medicine in systemic lupus erythematosus," *Cells*, vol. 8, no. 2, p. 140, 2019.

[18] A. Shaban and E. C. Leira, "Neurological complications in patients with systemic lupus erythematosus," *Current Neurology and Neuroscience Reports*, vol. 19, no. 12, p. 97, 2019.

[19] M. Larosa, M. Zen, M. Gatto et al., "IL-12 and IL-23/Th17 axis in systemic lupus erythematosus," *Experimental Biology and Medicine*, vol. 244, no. 1, pp. 42–51, 2019.