Clinical Characteristics and Traditional Chinese Medicine Syndrome Types of Inpatients with Gout

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Abstract [**Objectives**] To analyze the clinical characteristics, distribution of traditional Chinese medicine (TCM) syndrome types, spectrum of comorbidities, and complications among inpatients with gout. [**Methods**] Data from 592 gout patients admitted in the Department of Rheumatology at Wuxi Traditional Chinese Medicine Hospital between January 2018 and December 2024 were retrospectively collected. The data collected encompassed patient gender, age, TCM syndrome types, underlying comorbidities, infection status, and major complications, including renal insufficiency, interstitial lung disease, and osteoporosis. Descriptive statistical analyses were subsequently performed. [**Results**] Among the 592 inpatients, 80.75% were male and 19.25% were female. A total of 94.76% patients had at least one underlying condition, with hypertension (80.74%), cerebral infarction (29.59%), heart disease (24.24%), and diabetes (21.56%) being the most prevalent. The primary TCM syndrome types identified were damp-heat obstruction syndrome (63.51%) and phlegm-stasis obstruction syndrome (21.11%). During hospitalization, 20.94% of patients experienced concurrent infections, predominantly pulmonary infections (38.10%). The principal complications observed included renal insufficiency (32.09%), interstitial lung disease (18.75%), and osteoporosis (9.29%). [**Conclusions**] Inpatients diagnosed with gout often present with complex conditions and a high burden of comorbidities, predominantly cardiovascular and cerebrovascular diseases, as well as metabolic disorders. Additionally, there is a high incidence of infections and renal insufficiency within this population. TCM syndrome types in these patients are primarily characterized by damp-heat obstruction. In clinical practice, a comprehensive management approach that incorporates multidisciplinary collaboration is recommended. Alongside the control of uric acid levels and joint inflammation, proactive screening and management of comorbidities and related complications are essential.

Key words Gout, Inpatient, Complication, TCM syndrome type, Renal insufficiency, Comprehensive management

1 Introduction

Gout is a metabolic and inflammatory/immune disease characterized by serum uric acid levels, which result in the deposition of monosodium urate crystals in joints and tissues, subsequently causing multisystem damage. The disease exhibits considerable heterogeneity and frequently affects multiple parts, including synovial fluid, bones, and tendons. Besides, gout demonstrates a notable familial genetic predisposition.

Gout is a group of disorders characterized by the deposition of excessive serum uric acid in joints and tissues, resulting in various pathological damages. In severe cases, gout may be complicated by cardiovascular and cerebrovascular diseases, renal failure, and can ultimately pose a life-threatening risk. Furthermore, it is recognized as an independent risk factor for the development of conditions such as diabetes, metabolic syndrome, dyslipidemia, chronic kidney disease, and stroke[1]. Hypertension, coronary heart disease, a family history of gout, and elevated blood lipid levels are independent risk factors for primary gout[2]. By analyzing the comprehensive clinical profiles of inpatients with gout in the rheumatology department, medication regimens can be further optimized, and the management of chronic diseases can be enhanced.

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2 Materials and methods

2.1 Research objects A total of 592 inpatients diagnosed with gout and admitted to the Department of Rheumatology at Wuxi Traditional Chinese Medicine Hospital between January 2018 and December 2024 were included in this study. Of these patients, 114 were female (19.25%) and 478 were male (80.75%).

2.2 Diagnostic and case criteria

2.2.1 Diagnostic criteria. The classification criteria for gout established by the American College of Rheumatology (ACR) in 1987 and the European League Against Rheumatism (EULAR) in 2010 were utilized.

2.2.2 Equipment. The primary inspection equipment comprised a German Siemens multi-slice spiral CT scanner (model: Definition AS+), an American Siemens joint ultrasound device (model: ACUSON S3000), a Danish Tonica electromyography system, an American Hologic bone densitometer (model: Dantec KEYPOINT), an American GE cardiac color Doppler ultrasound machine (model: LOGIQ E9), and a Japanese PENTAX electronic upper gastrointestinal endoscope and colonoscope system (model: EPK-i5000).

2.2.3 TCM syndrome differentiation criteria. The identification of TCM syndrome types was conducted in accordance with the *Guidelines for the Combined Diagnosis and Treatment of Rheumatoid Arthritis* (Rheumatism Branch of the China Association of Chinese Medicine, 2018).

2.2.4 Inclusion criteria. All inpatients diagnosed with gout and admitted to the Rheumatology Department of Wuxi Traditional Chinese Medicine Hospital between 2018 and 2024 were included in this study. Comorbid conditions were documented, primarily

encompassing hypertension, cerebral infarction, various cardiovascular diseases (including coronary heart disease, heart failure, and arrhythmias), thyroid disorders (such as hyperthyroidism, hypothyroidism, and thyroid nodules), respiratory diseases, digestive system diseases, and a range of neurological disorders.

2.2.5 Exclusion criteria. Gout patients who had an unclear diagnosis, those in the active stage of tuberculosis, and individuals transferred to another department due to sudden cerebrovascular accidents were excluded from the study.

2.3 Statistical methods Descriptive statistical analyses of all data were performed using SPSS 22.0. Categorical data were presented as number of cases (n) and percentages (%).

3 Results and analysis

3.1 Patient gender and year distribution Among the 592 patients included in this study, over 80% were male, resulting in a male-to-female ratio of approximately 4.19∶1. This finding aligns with the epidemiological characteristic that gout is more prevalent in men. Regarding annual trends, the number of inpatients peaked in 2019 (Table 1), which may be attributable to increased disease awareness or seasonal variations.

Table 1 Gender distribution of inpatients with gout from 2018 to 2024

Gender	Year							Total	Percentage//%
	2018	2019	2020	2021	2022	2023	2024		
Female	23	21	21	23	8	8	10	114	19.25
Male	88	104	62	52	50	73	49	478	80.75
Total	111	125	83	75	58	91	59	592	100.00

3.2 Comorbidities of underlying diseases As presented in Table 2, 94.76% of inpatients with gout had at least one comorbid condition. This finding confirms that gout is not solely an isolated joint disorder but rather a systemic disease frequently associated with multiple metabolic and cardiovascular comorbidities. Therefore, clinical management should adopt a comprehensive and holistic approach.

Table 2 Overall comorbidities of underlying diseases in inpatients with gout

Comorbidity	Year							Total	Percentage//%
	2018	2019	2020	2021	2022	2023	2024		
Comorbid	105	112	79	73	54	80	58	561	94.76
No comorbid	6	13	4	2	4	1	1	31	5.24

3.3 Distribution of TCM syndrome types As presented in Table 3, the distribution of TCM syndrome types was predominantly characterized by damp-heat obstruction syndrome (63.51%), followed by phlegm-stasis obstruction syndrome (21.11%). This distribution suggested that the majority of inpatients were experiencing the acute attack phase, with pathogenesis primarily attributed to the accumulation of damp-heat. Conversely, phlegm-stasis obstruction was more frequently observed in patients during the chronic phase or those with recurrent episodes, reflecting the syndrome differentiation principle of this condition, wherein excess damp-heat predominates in the acute stage, while blood stasis is more prominent in the chronic stage.

Table 3 Primary TCM syndrome type distribution of inpatients with gout

TCM syndrome type	Year							Total	Percentage//%
	2018	2019	2020	2021	2022	2023	2024		
Rheumatic obstruction syndrome	0	2	2	9	6	7	4	30	5.06
Liver-kidney deficiency syndrome	15	14	6	8	5	3	0	51	8.61
Phlegm-stasis obstruction syndrome	34	25	28	16	5	15	2	125	21.11
Damp-heat obstruction syndrome	62	79	46	41	41	56	51	376	63.51

3.4 Spectrum of specific underlying diseases As presented in Table 4, among the various comorbidities examined, hypertension exhibited the highest prevalence at 80.74%, underscoring the strong association between gout and hypertension, which is likely attributable to shared pathological mechanisms such as insulin resistance and obesity. Furthermore, the combined prevalence rates of cerebral infarction, heart disease, and diabetes each exceeded 20%, further substantiating gout as a significant risk factor for cardiovascular and cerebrovascular diseases, as well as metabolic disorders. These findings highlight the necessity for systematic screening in clinical practice.

3.5 Concurrent infections As presented in Table 5, the incidence of concurrent infections among inpatients with gout was 20.94%, with pulmonary infections being the most prevalent, accounting for 38.10% of cases. This finding indicates that patients may face an elevated risk of infections, especially respiratory infections, attributable to chronic inflammatory conditions, immune system dysfunction, or the administration of immunosuppressive therapies. Therefore, it warrants particular attention in clinical management.

Table 4 Specific underlying disease spectrum of inpatients with gout

Underlying disease	Year							Total	Percentage//%
	2018	2019	2020	2021	2022	2023	2024		
Hypertension	84	96	65	54	42	65	47	453	80.74
Cerebral infarction	32	39	32	16	15	21	11	166	29.59
Heart disease	30	27	16	19	15	20	9	136	24.24
Diabetes	26	26	10	12	15	22	10	121	21.56
Thyroid disease	28	26	18	19	3	2	0	96	17.11
Respiratory disease	5	3	3	3	2	9	5	30	5.34
Digestive system disease	8	21	11	9	10	5	15	79	14.08
Neuropathy	16	15	12	7	3	8	8	69	12.29
Tumor	7	4	4	4	2	4	0	25	4.45

Table 5 Distribution of concurrent infection types in inpatients with gout

Infection type	Year							Total	Percentage//%
	2018	2019	2020	2021	2022	2023	2024		
Upper respiratory infection	5	0	3	1	0	1	3	13	10.32
Pulmonary infection	6	6	9	5	4	10	8	48	38.10
Intestinal infection	0	2	0	0	0	0	0	2	1.59
Urinary tract infection	2	6	4	5	1	2	1	21	16.67
Skin and soft tissue infection	0	2	4	6	6	0	0	18	14.29
Bone infection	0	2	0	0	0	0	1	3	2.38
Other infections	5	0	3	0	5	6	0	19	15.08
Total	18	18	23	17	16	19	13	124	–

3.6 Main complications As presented in Table 6, renal insufficiency exhibited the highest incidence (32.09%) among the complications. This condition is associated with multiple factors, including urate nephropathy, renal damage resulting from hypertension and diabetes, and represents a critical determinant of the long-term prognosis in patients with gout. Additionally, the incidence of interstitial lung disease (18.75%) warrants further investigation to elucidate its potential association with gout. The presence of osteoporosis highlights the importance of monitoring chronic inflammation and the long-term effects of pharmacological treatments on bone health.

Table 6 Occurrence of major complications in inpatients with gout

Complication	Year							Total	Percentage//%
	2018	2019	2020	2021	2022	2023	2024		
Renal insufficiency	34	35	25	26	21	30	19	190	32.09
Interstitial lung disease	16	32	17	15	7	17	7	111	18.75
Osteoporosis	5	5	3	12	11	6	12	55	9.12

4 Discussion

This study conducted a retrospective analysis of 592 inpatients diagnosed with gout to systematically characterize their clinical features, comorbidities, and TCM syndrome types. The findings indicate that inpatients with gout exhibit "three highs" characteristics: a high burden of comorbidities, an elevated risk of cardiovascular and renal diseases, and an increased susceptibility to infections.

In this patient cohort, the combined prevalence rate of underlying diseases was 94.76%, with hypertension (80.74%), cerebral infarction (29.59%), cardiac disease (24.24%), and diabetes (21.56%) being the most common. These findings are consistent with the characterization of gout as a systemic metabolic disorder. Hypertension, in particular, is among the most frequent comorbidities and serves as an independent risk factor for gout. This association has been corroborated by Zhang Shaofeng *et al.*[1], who identified hypertension as an independent risk factor for primary gout. Both conditions exhibit shared pathophysiological mechanisms, including insulin resistance, obesity, and additional factors[2-3]. The Chinese guidelines for gout diagnosis and treatment also highlight the close association between metabolic disorders, such as hypertension, and gout[4]. The data in this study further corroborate that inpatients with gout experience a substantial burden of cardiovascular and cerebrovascular diseases, underscoring the need for clinical management strategies that integrate urate-lowering therapy with cardiovascular risk prevention and control.

The distribution of TCM syndrome types exhibited a distinct profile, with damp-heat obstruction syndrome identified as the most prevalent (63.51%). This finding aligns with the analysis

conducted by Jiang Xun *et al.*[5], as well as the conclusions drawn by Li Daofang *et al.*[6] and Sun Hui[7] regarding gout syndrome types, all of which indicate that the accumulation of damp-heat represents the most common pathological state during the acute attack phase of gout. Phlegm-stasis obstruction syndrome, accounting for 21.11%, was identified as the second most prevalent type, suggesting that in patients experiencing chronic persistence or recurrent attacks, the formation and accumulation of pathological products such as phlegm and stasis are critical factors. These observations provide a foundation for a sequential TCM treatment strategy, emphasizing heat clearance and diuresis during acute episodes, followed by the resolution of phlegm and removal of blood stasis in chronic cases.

The incidence of concurrent infections and complications was notably high. The study identified that 20.94% of patients developed concurrent infections during hospitalization, with pulmonary infections constituting the most prevalent type (38.10%). These findings are consistent with those reported by Singh *et al.*[8], indicating that patients with gout, especially those with severe cases requiring hospitalization, constitute a high-risk population for infections. This increased susceptibility may be attributable to immune dysregulation inherent to the disease as well as the effects of therapeutic interventions. Regarding complications, approximately 1/3 (32.09%) of the patients exhibited renal insufficiency, underscoring the detrimental effects of prolonged hyperuricemia on renal function, as well as the contributory impact of comorbid conditions such as hypertension and diabetes[9]. In addition, this study identified a relatively high prevalence of interstitial lung disease (18.75%). Although the direct causal relationship between interstitial lung disease and gout remains to be conclusively established[10], these findings indicate the need for heightened clinical vigilance concerning pulmonary manifestations in patients with gout. Furthermore, the observed incidence of osteoporosis was 9.29%, aligning with the meta-analytical findings of Kim *et al.*[11] and Liu *et al.*[12], which suggest that gout may elevate the risk of osteoporosis and fractures. Consequently, it is imperative to monitor the effects of chronic inflammation and pharmacological treatments on bone health.

5 Conclusions

Inpatients with gout often present with complex conditions, frequently exhibiting multiple metabolic, cardiovascular, and cerebrovascular comorbidities. The predominant TCM syndrome type identified is damp-heat obstruction. These patients are also at an elevated risk for complications, including infections and renal insufficiency. Consequently, clinical practice should move beyond a singular focus on "arthritis" diagnosis and treatment, adhering instead to established guideline recommendations[4,9], and implementing a comprehensive, multidisciplinary management approach. Therapeutic strategies should encompass uric acid reduction, control of joint inflammation, management of comorbid conditions (particularly hypertension and diabetes), as well as the prevention and treatment of infections and renal impairment. Future research should aim to elucidate the relationship between gout and less common complications, such as interstitial lung disease. Additionally, by investigating the progression types of TCM syndromes, it is imperative to optimize integrated treatment protocols that combine traditional Chinese and Western medicine to enhance the long-term prognosis of patients.

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