Int J Clin Exp Pathol 2017;10(5):6082-6091
www.ijcep.com /ISSN:1936-2625/IJCEP0049620

Original Article

Clinical and pathological characteristics of male patients with systemic lupus erythematosus from northeast China: a ten-year retrospective study

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Received January 24, 2017; Accepted April 17, 2017; Epub May 1, 2017; Published May 15, 2017

Abstract: This study was designed to specifically compare the clinical and pathological characteristics of male patients from northeast China, who were diagnosed with systemic lupus erythematosus (SLE). The data from 777 SLE patients were retrospectively analyzed. Among these, 85 patients were male, while 692 were female. Our retrospective analysis of the clinical and pathological data indicated that the male-to-female ratio for SLE was 1 to 8.14, and male SLE patients typically displayed lower frequency of photosensitivity and arthritis, but a higher Systemic Lupus Erythematosus Disease Activity Index (SLEDAI) score. Male patients also had a high frequency of proteinuria and a low frequency of anti-Ro/Anti-Sjögren's-syndrome-related antigen A (SSA). The 73 male lupus nephritis (LN) patients displayed a high incidence of renal dysfunction in all clinical types, and 42 among these with type IV pathological type, underwent renal biopsies. In addition, type V was observed to be the most common pathological type in male patients with occult nephritis (60.0%), whereas type IV and III appeared to be the common pathological types in male patients with nephritis syndrome. In addition, male patients with nephrotic syndrome displayed type V pathological type, while those with renal dysfunction had type IV and type IV+V pathological types. Moreover, male patients with LN also displayed a lower frequency of complete response (CR). Thus, it is recommended to consider gender differences early, in order to aid accurate diagnosis and necessary treatment. Overall, renal biopsy should be ideally considered for better outcomes, especially in male patients with LN.

Keywords: Lupus nephritis, sex, systemic lupus erythematosus, renal biopsy, pathology

Introduction

Systemic lupus erythematosus (SLE) is an autoimmune disease that affects multiple organs and result in significant morbidity and mortality [1]. Large number of autoantibodies produced by the patient's immune system, due to many pathogenic factors, result in damage to multiple organs. The incidence of SLE had increased over the years, and clinical manifestations vary substantially. Epidemiological studies have indicated that SLE is prevalent in many regions of the world [2], and incidence in China is approximately 70-100/100,000, while in Japan is approximately 18.2/100,000. However, in North America, SLE incidence and mortality rates are lower in Caucasian populations as compared to African-American populations [3, 4]. Recently, it has been proposed that the goal of SLE treatment should be to control disease activity, reduce side effects of drugs, reduce complications, prevent organ damage, improve quality of life and prolong survival time [5]. However, due to high prevalence and clinical diversity, it has been speculated that assessment of specific subtypes will be helpful to understand the etiology and pathogenesis of SLE to achieve optimal treatment and prognosis [6]. Based on the current literature, genetic factors, environmental factors, co-existing im-

mune disorders, sex hormones, and drugs have been implicated in the pathogenesis of SLE [7-11].

Many studies have emphasized that gender plays an important role in SLE [12, 13]. There appears to be a clear gender bias: indeed, SLE usually occurs in females of childbearing age. In males, there is very low morbidity associated with SLE, and it has been shown that only 4-22% of SLE patients are males [14]. A follow-up study over five years by Stefanidou *et al.* [15] indicated that male sex might be linked as a poor outcome risk factor in SLE prognosis. In addition, there are also other reports which highlight the typical characteristics and the differences in SLE pathogenesis between male and female patients. However, overall, there has been no consensus regarding the specific reasons for the observed gender bias, and hence, in our study, we examined this difference in Chinese SLE patients.

Among the many organs affected by SLE, the renal system is most frequently affected in these patients, especially in males. Lupus nephritis (LN) is the most prevalent SLE manifestation, and was first reported in an 18 years old male patient in 1923. This patient displayed symptoms such as skin lesions, oral ulcers, leukopenia, proteinuria, and cardiac insufficiency, and after three years of diagnosis, died due to complications. Since this report, it has been observed through many retrospective studies, that clinical manifestations of SLE/LN are not typical in early phase, thereby enhancing the chances of early misdiagnosis, and subsequently leading to faster rates of disease progression. Thus, this finding emphasizes the importance of early SLE diagnosis in male patients. In this study, we have retrospectively analyzed the clinical data of 777 SLE patients in the last ten years, to determine whether any association of specific clinical characteristics is apparent between male and female SLE patients. In addition, we have also examined the clinicopathological characteristics of 42 cases of male with LN and their relationship with pathological subtypes and clinical manifestations, with an aim to identify clues for diagnosis and treatment of male SLE patients.

Patients and methods

Patients

We retrospectively analyzed 777 cases of SLE, admitted to the Second Hospital of Jilin University, China, between October 2005 and May 2016. The hospital is located on the east coast of Eurasia in northeast China and acts as referral center for a mixed rural and urban population of approximately 27 million. The 85 male patients and 692 female patients registered during this period signed a consent form regarding the use of their samples for research purposes. This study is approved by the Ethics Review Committee of the Second Hospital of Jilin University. The patients were selected based on the following criteria:

- Patients were admitted to hospital during initial symptoms.

- Patientsmet the SLE diagnosis criteria as outlined by the revised criteria of the American College of Rheumatology (ACR) for SLE in 1997 [16].

- A complete patient record was available from the time of onset to diagnosis including clinical symptoms and signs after admission to the conventional biochemical and immunological examination. In addition, the information regarding systemic lupus erythematosus disease activity index (SLEDAI), developed in 1985 at the symposium on the prognosis of lupus erythematosus in Japan, was also available. This index typically evaluates the lupus activity in 9 organ systems based on 24 clinical parameters.

- Patients had multiple organ damage due to exclusion of drugs, viruses and other connective tissue diseases.

Clinical data collection

The following data were collected from all the 777 patients: name, gender, age, clinical and laboratory data, pathologic diagnosis, and treatment. Follow-up parameters of each patient were also recorded for further analysis. However, 89 patients were excluded due to unavailability of detailed follow-up information.

The following parameters depicting the effect of renal damage were used as evidence with the exception of other diseases: 1) persistent proteinuria (>0.5 g/24 hours); 2) persistent hematuria (urinary RBC >3/HP); 3) nephrotic syndrome; 4) decreased estimated glomerular filtration rate (eGFR<60 mL/min/1.73 m^2) calculated according to the simplified MDRD formula: eGFR (mL/min/1.73 m^2)=186 × (Scr)

Table 1. Clinical classification and definition criteria of LN

Clinical Classification	Definition criteria
Occult nephritis	Mild clinical symptoms with no edema, hypertension and other clinical manifestations. The main manifestation included hematuria and (or) mild proteinuria (0.5 g/d< quantitative urinary protein <1 g/d), or proteinuria (1 g/d≤ quantitative urinary protein ≤3.5 g/d without hematuria and eGFR≥60 mL/min/1.73 m^2
Nephritis syndrome	Mild to moderate proteinuria (1 g/d≤ urinary protein excretion ≤3.5 g/d) with hematuria, urinary tube may be accompanied by edema and hypertension and eGFR value of ≥60 mL/min/1.73 m^2
Nephrotic syndrome	High proteinuria (urinary protein quantitation >3.5 g/d), low serum albumin (<30 g/L), hyperlipidemia, high degree of edema and eGFR≥60 mL/min/1.73 m^2
Renal failure	Decrease in glomerular filtration rate (eGFR<60 mL/min/1.73 m^2), may be accompanied by anemia, hypertension and edema.

Abbreviations: LN: lupus nephritis; eGFR: estimated glomerular filtration rate.

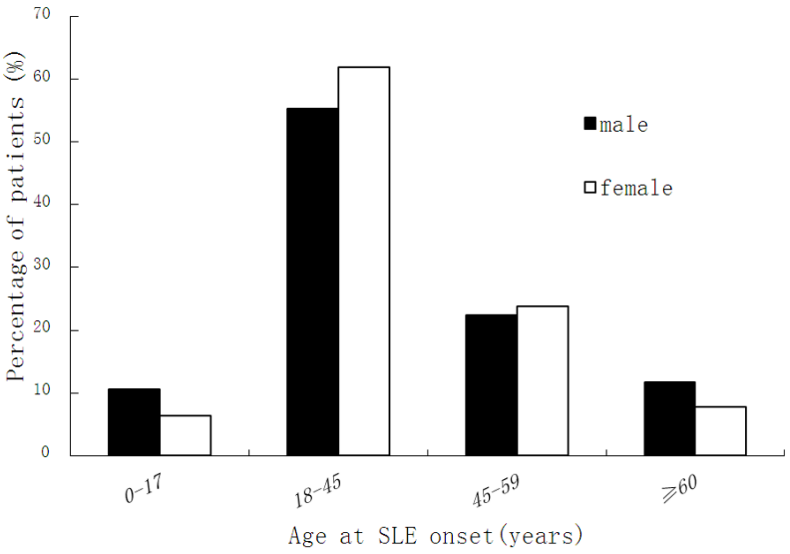

Figure 1. Onset age frequency analysis between male and female SLE patients: 85 male and 692 female patients from different age groups were categorized based on SLE diagnosis, and their percentages were plotted.

1.154 × (age) 0.203 × (female: × 0.742). Scr represents serum creatinine levels.

Based on proteinuria, hematuria, hypertension, edema, eGFR and the clinical classification standard of MaZ, we defined the following clinical types: 1, occult nephritis; 2, nephritis syndrome; 3, nephrotic syndrome; and 4, renal failure, as described in **Table 1**. All the renal pathologic types were determined according to International Society of Nephrology and Society of Renal Pathology (ISN/PRS) guidelines, revised in 2003.

Treatment and prognosis evaluation

Based on the Kidney Disease Improving Global Outcomes (KDIGO) and SLEDAI guidelines, treatment effects of LN were classified into three categories of complete remission (CR), partial remission (PR), and no response (NR). CR was defined as a urinary protein excretion of ≤500 mg/24 h, accompanied by normal serum concentrations of albumin and SCr, and SLEDAI score of ≤9. However, PR was defined as the urinary protein excretion between ≥0.5 g and ≤3.5 g/24 h, and improvement or normalization of serum albumin concentration, a stable level of SCr, and SLEDAI score of ≥10 and ≤14. Moreover, NR was defined as no improvement in the urinary protein excretion and serum albumin levels, and SLEDAI of ≥15. The end point for the renal survival was end-stage renal disease requiring dialysis, transplantation, or resulting in death.

Statistical analysis

All the data points were tabulated in a standard EXCEL database, and the analyses were performed by SPSS statistical package, version 21.0 (SPSS, Inc., Chicago, IL) software. Data were presented as proportions for categorical variables, while mean ± SD for continuous variables. Differences in the categorical variables, such as proportions between groups, were analyzed by the chi-square test. The comparison of the numerical data between groups was performed using Student's t-test or the Mann-

Table 2. Assessment of clinical manifestations and laboratory tests in male and female SLE patients

Clinical manifestations (n (%))	Male (n=85)	Female (n=692)	*P* values
Photosensitivity (n (%))	11 (12.9)	155 (22.4)	0.045*
Oral ulcers (n (%))	15 (17.6)	141 (20.4)	0.553
Arthritis (n (%))	31 (36.5)	334 (48.3)	0.04*
Rash (n (%))	42 (49.4)	322 (46.5)	0.616
Serositis (n (%))	43 (50.6)	301 (43.5)	0.214
Alopecia (n (%))	18 (21.2)	195 (28.2)	0.172
Pulmonary interstitial lesion (n (%))	6 (7.1)	32 (4.6)	0.326
Raynaud's (n (%))	9 (10.6)	64 (9.2)	0.69
Fever (n (%))	42 (49.4)	312 (45.1)	0.45
Hematological (n (%))	64 (75.3)	523 (75.6)	0.954
Leukopenia (n (%))	26 (30.6)	278 (40.2)	0.087
Anemia (n (%))	55 (64.7)	431 (62.3)	0.663
Thrombocytopenia (n (%))	27 (31.8)	178 (25.7)	0.233
Renal disease (n (%))	73 (85.9)	548 (79.2)	0.146
Neuropsychiatric (n (%))	2 (2.4)	15 (2.2)	0.912
SLEDAI score	14.48 sco	12.89 sco	0.018*
Proteinuria (n (%))	67 (78.8)	468 (67.6)	0.035*
Hematuria (n (%))	57 (67.1)	460 (66.5)	0.914
Leucocyturia (n (%))	43 (50.6)	395 (57.1)	0.255
Hypoproteinemia (n (%))	45 (52.9)	321 (46.4)	0.253
eGFR<60 mL/min/1.73 m^2 (n (%))	32 (37.6)	211 (30.5)	0.179
High anti-IgG (n (%))	25 (29.4)	273 (39.5)	0.072
Low C3 (n (%))	68 (80.0)	583 (84.2)	0.316
ANA (n (%))	77 (90.6)	635 (91.8)	0.712
High anti-dsDNA (n (%))	40 (47.1)	372 (53.8)	0.243
Anti-Smith (n (%))	21 (24.7)	181 (26.2)	0.774
Anti-U1RNP (n (%))	27 (31.8)	265 (38.3)	0.241
Anti-Ro (SSA) (n (%))	37 (43.5)	380 (54.9)	0.047*
Anti-La (SSB) (n (%))	8 (9.41)	106 (15.3)	0.146

*$P<0.05$.

Whitney U test, due to lack of normality. The *P* value (2-tailed) of <0.05 represented significant differences.

Results

Among the total 777 SLE patients, 85 were males, while 692 were females, with a male-to-female ratio of 1 to 8.14. The average age of male patients was 37.94±16.96 (range 10-87 years), and the female patients was 37.37± 14.52 (range 5-92 years). There was no significant difference in the percentage of patients among different age groups based on gender as seen in **Figure 1**. However, the incidence in both male and female patients was higher in the age group of 18-45 years old.

Clinical manifestations

The categorization of various clinical features among male and female SLE patients has been summarized in **Table 2**. Male patients showed clinical manifestations such as renal disease (85.9%), hematological issues (75.3%), and serositis (50.6%), and were also common in female patients. However, the frequency of photosensitivity and arthritis in male patients was lower than female patients [(12.9% vs. 22.4%, *P*=0.045) and (36.5% vs. 48.3%, *P*=0.04), respectively]. This might be consistent with the ratio of leucopenia percentages in male and female patients (30.6% vs. 40.2%, *P*=0.087). However, the SLEDAI score was significantly higher in male patients than female patients (means, 14.48 vs. 12.89, *P*=0.018). Apart from this, we did not observe any statistically significant difference in other recorded clinical manifestations.

Laboratory assessments

The laboratory based assessment of different clinical parameters among male and female patients, as shown in **Table 2**, indicated that the frequency of proteinuria was significantly higher in male patients as compared to female patients (78.8% vs. 67.6%, *P*=0.035). However, the incidence rate of low complement C3 was high in both male and female patients (80.0% vs. 84.2%, *P*=0.316), while anti nuclear antibody (ANA) spectrum appeared to show a higher frequency in male patients but with no significant difference in comparison to female patients (90.6% vs. 91.8%, *P*=0.712). Furthermore, we observed an increased frequency of Sjögren's syndrome associated with SLE in females, and female-related increased frequency of anti-SSA and anti-SSB positivity. The frequency of other parameters like, anti-double

Table 3. Clinical classification of LN

	Male (n=73)	Female (n=548)	*P* values
Occult nephritis (n (%))	12 (16.4)	121 (22.1)	0.27
Nephritis syndrome (n (%))	11 (15.1)	91 (16.6)	0.739
Nephrotic syndrome (n (%))	18 (24.7)	125 (22.8)	0.725
Renal dysfunction (n (%))	32 (43.8)	211 (38.5)	0.381

Table 4. Pathological distribution of LN

	Male patients (n=42)	Female patients (n=306)	*P* values
I (n (%))	0 (0)	2 (0.7)	0.599
II (n (%))	1 (2.4)	19 (6.2)	0.318
III (n (%))	5 (11.9)	44 (14.4)	0.666
IV (n (%))	15 (35.7)	112 (36.6)	0.911
V (n (%))	10 (23.8)	51 (16.7)	0.254
III+V (n (%))	1 (2.4)	25 (8.2)	0.181
IV+V (n (%))	10 (23.8)	53 (17.3)	0.27

stranded DNA (dsDNA), anti-U1 ribonucletoprotein (U1RNP), anti-Smith and anti-La (SSB) showed similar changes in both groups. However, we did observe a significantly lower frequency of anti-SSA in male patients than female patients (43.5% vs. 54.9%, *P*=0.047) (**Table 2**).

Clinical classification of renal damage

Renal damage between male and female SLE patients was evaluated based on the clinical classification. Out of 777 SLE patients, 621 had LN, including 73 male and 548 female patients (**Table 3**). Among the 73 male patients with LN, the incidence of renal dysfunction was highest in all clinical types (43.8%), followed by nephrotic syndrome (24.7%), as seen in **Table 3**. However, the frequency of all other clinical manifestations was similar between male and female patients with LN.

Pathological classification in male and female patients with LN

Among the 621 patients with LN, 348 underwent renal biopsies, including 42 male and 306 female patients (**Table 3**). We were not able to collect the pathological data from type VI category (sclerosing lupus nephritis), because renal biopsy in this group was of little significance. No patients showed serious complications, such as death or blood transfusion, surgery, arteriography, or nephrectomy. In 42 male SLE patients that underwent renal biopsies, type IV was the most common pathological type (35.7%), followed by type IV+V and type V (23.8% each). There were no significant differences between male and female patients in all other pathological types (**Table 4**).

Comparative analysis of clinical classification in male patients with LN from different pathological types

The male LN patients categorized based on pathological type in **Table 5** were further classified based on the clinical manifestations. Among the 42 male patients undergoing renal biopsies, type V was the most common pathological type, with those with clinical manifestation of occult nephritis (60.0%). In contrast, type IV was the most common pathological type in male patients with clinical manifestation of nephritis syndrome (50.0%), followed by type III (33.3%). In addition, male patients with the clinical manifestation of nephrotic syndrome displayed Type V as the most common pathological type (46.2%), followed by type IV (23.1%). However, male patients with the clinical manifestation of renal dysfunction had type IV as the most common pathological type (50.0%), followed by type IV+V (38.9%).

Assessment of treatment and prognosis in male and female patients with LN

To study the treatment effects and prognosis of LN, data from 73 male and 548 female patients was analyzed. Renal biopsies in male LN patients have increased over the last 10 years. The follow-up time ranged from six months to three years (average 12.7 months). However, our data showed that among 73 male LN patients, 36 achieved complete response (CR) (49.3%) while 18 achieved partial remission (PR) (24.7%), and 10 patients (13.7%) showed no response (NR) to treatment. However 9 patients (12.3%) died (**Table 6**). Interestingly, the rate of CR in male LN patients was significantly lower than female LN patients (49.3% vs. 66.2%, *P*=0.005). However, no significant differences were observed in other categories

Table 5. Clinical classification of male LN patients into different pathological types

	Occult nephritis (n=5)	Nephritis syndrome (n=6)	Nephrotic syndrome (n=13)	Renal dysfunction (n=18)	Total (n=42)
II (n (%))	1 (20.0%)	0 (0%)	0 (0%)	0 (0%)	1 (2.4%)
III (n (%))	1 (20.0%)	2 (33.3%)	1 (7.7%)	1 (5.55%)	5 (11.9%)
IV (n (%))	0 (0%)	3 (50.0%)	3 (23.1%)	9 (50.0%)	15 (35.7%)
V (n (%))	3 (60.0%)	0 (0%)	6 (46.2%)	1 (5.55%)	10 (23.8%)
III+V (n (%))	0 (0%)	0 (0%)	1 (7.7%)	0 (0%)	1 (2.4%)
IV+V (n (%))	0 (0%)	1 (16.7%)	2 (15.3%)	7 (38.9%)	10 (23.8%)

Table 6. Treatment and prognosis evaluation of LN

	Males (n=73)	Female (n=548)	*P* values
CR (n (%))	36 (49.3)	363 (66.2)	0.005*
PR (n (%))	18 (24.7)	89 (16.2)	0.074
NR (n (%))	10 (13.7)	57 (10.4)	0.394
Mortality (n (%))	9 (12.3)	39 (6.6)	0.117

*$P<0.05$, CR: complete remission; PR: partial remission; NR: no remission.

(PR, NR and mortality) between male and female LN patients.

Discussion

It has been extensively reported that a higher number of SLE patients are female [17], and male SLE patients are less common and do not display typical clinical manifestations. Thus, little is known about male SLE and, therefore, often results in misdiagnosis and mistreatment. The incidence of SLE has also been shown to be linked with race and geographical region, as many studies have pointed toward substantial ethnic disparities in SLE diagnosis, which often influence severity and outcomes of the disease [18]. In parallel, many other studies have also pointed toward the involvement of gender and age as the main influencing factors in addition to ethnic and regional differences [19]. However, in our study, we analyzed a relatively large number of SLE patients over a long period of time, to specifically review the clinical characteristics of male SLE patients from Northeast China. It has been previously reported that the ratio of SLE incidence rate in male and female was 1:7~1:9 in the Chinese population [19, 20]. Consistent with previously published reports, in our study, we also observed a ratio between male to female SLE patients as 1:8.14. However, we did not find any significant gender difference in the age of onset of SLE, with 18-45 years old patients in both genders showing the highest incidence. The mean age of male patients was 37.94±16.96 years, while female patients had 37.37± 14.52 years. This data suggested an association of higher SLE incidence rate with prime reproductive age. Similarly, another study from Thailand also demonstrated that the mean onset age of SLE in male patients was 34.6±14 years, while in females patients was 34.4±11.7 years [21], and the ratio of male and female incidence rate was 1:17.7. However, contrary to our results, another control study from Brazil [22] including 18 male and 254 female SLE patients, showed that despite the ratio of male to female as 1:14.1, the mean age of male patients was 26.27±11.84 years, while that of the female patients was 31.98±10.98 years. They indicated a significant difference based on the age between males and females for SLE incidence rate.

In addition, we observed that clinical manifestations of LN in male patients were not as prominent as female patients, and the incidence of photosensitivity and arthritis were lower in male patients compared to female patients in our study. This was consistent with the study by Faezi *et al.* [23]. Moreover, lack of any differences in our study between male and female patients for characteristics such as rash, fever, and oral ulcers, was consistent with the observation by Jitima *et al.* [21].

The involvement of the hematological system is one of the most common clinical manifestations of SLE. SLE progression is often accompanied by anemia, leucopenia and thrombocytopenia, which may exist alone or in combination. Consistent with previously reported results [24], we also observed that hematological damage and SLE activity positively correlated, and anemia was the most common manifestation. The difference in the incidence of anemia based on gender was not clear in our study; however male patients displayed significantly higher SLEDAI scores than female patients.

SLE diagnosis largely depends on clinical features and laboratory results, and, in particular, on the detection of various immunological autoantibodies. Based on the revised Systemic Lupus International Collaborating Clinics (SLICC) diagnostic criteria of SLE formulated by the American College of Rheumatology (ACR) in 2009 and published in 2012 [25], the status of immunological indicators are paramount in diagnosis. In this context, the results from our study suggested that positive rates of ANA in all the immune outcomes of male and female SLE patients were highest, however, there was no difference based on gender. Anti-SSA antibodies, mainly found in Sjögren's syndrome, were also detected in SLE, and have been shown to be directly involved in the pathological damage of tissue. The frequency of anti-SSA was significantly lower in male patients in our study. It has also been reported that anti-Ro is related to skin lesions and photosensitivity, and is thus consistent with the low incidence of photosensitivity and arthritis observed in male patients.

Renal damage, a common SLE complication, has been reported in 30%-50% of the SLE patients, indicating renal involvement [26]. Renal damage has been shown to affect prognosis of SLE patients, and LN appears to be the leading causes of death in these patients [27, 28]. Our clinical classification revealed that in male LN patients, the incidence of renal dysfunction was highest. This observation may account for the reason that male SLE patients have a higher mortality and a poorer prognosis. The identification of renal damage as one of the key factors was consistent with other previously published studies [29, 31]. In addition, we also noticed more severe renal damage in male patients with LN than females, which may also account for the poor prognosis of male LN patients as compared to female patients.

Percutaneous renal biopsy was first introduced for clinical use in the early 1950s [32]. For many years, renal biopsy has been the gold standard and first approach of diagnosis in LN patients. However, recently, some experts have started to doubt the necessity of renal biopsy in LN due to the concerns regarding the risks associated with renal biopsy. However, our study emphasized that renal biopsy may still be helpful in diagnosis. It is important to have a clinical significance of the pathological classification of glomerular diseases [33]. In recent years, improvements in imaging techniques and biopsy needles had optimized the efficacy of this procedure and minimized risk and complications.

As indicated in our study, the cases of renal biopsies in male LN patients had increased over the last 10 years. We observed type IV as the main pathological type in these patients, and similar observation has been made in other studies involving Chinese patients [34]. In 42 male LN patients who underwent renal biopsies, type IV, V and IV+V were the main pathological types and accounting for 83.3%, which indicated a serious prognosis. However, data from the study of Western countries demonstrated that the proportion of type II, III and V pathological types was higher in male patients [35]. This indicated that differences in the distribution of pathological types in patients with LN may be related to racial differences.

Moreover, our study also revealed that male patients with clinical manifestations of occult nephritis displayed type V as the most common pathological type, while male patients with clinical manifestations of nephritis syndrome had type IV as the most common pathological type. Similarly, male patients with nephrotic syndrome had type V as the most common pathological type. Type IV pathological classification was also associated with male patients having clinical manifestations of renal dysfunction. Male patients displayed a variety of renal pathologies, which were not homogeneous with the clinical manifestations.

Interestingly, some studies have identified that biopsy results may change the originally prescribed treatment plan in >40% of SLE patients [36]. Further, prolonged disease activity due to inadequate treatment has been shown to contribute to cumulative organ damage [37-39]. We believe that no matter how serious the renal manifestations and abnormal urine values are, renal biopsy should be performed to determine the renal pathology and thus guide therapy. However, in this regard, we consider that our study has some limitations due to the small sample size for pathological study of male LN, as only data from 42 patients was analyzed. Thus, we propose that the relationship between clinical manifestations and renal pathological classification in male patients with LN requires further analysis using a larger sample size.

In term of treatment modalities, we analyzed the data from 73 male SLE patients who were either treated with glucocorticoid therapy, or a combination with cyclophosphamide or other immunosuppressive agents. Our results indicated that rate of complete response in male LN patients was significantly lower than female patients. Furthermore, we demonstrated that male patients were less responsive to treatment than female LN patients.

In brief, male SLE patients from northeast China displayed a lower incidence rate, but higher frequency of severe renal damage, along with several differences in additional clinical manifestations, compared to female SLE patients. However, SLE disease activity appeared to be more significant in male patients, and the incidence of photosensitivity and arthritis among all clinical manifestations in these patients was lower than female patients. In addition, the frequency of proteinuria in male patients was higher, and levels of anti-Ro (SSA) were significantly lower. The pathological distribution between male and female patients was similar, and type IV pathological type was the most prevalent among them. Based on our results, we recommend the need for renal biopsy. Furthermore, our study revealed that rate of complete remission in male LN patients was also significantly lower than female patients.

Acknowledgements

The authors wish to acknowledge Dr Yuchun Tao, Public Health School of Jilin University, for his help in data analysis. This study was supported by the Health and Family Planning Commission of Jilin Province (2015ZC043) and the Science and Technology Foundation of Jilin Province (20160101106JC).

Disclosure of conflict of interest

None.

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