Systemic lupus erythematosus — renal involvement and disease activity

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Summary

The relationship between renal morphology and clinical disease was analysed in 30 patients with lupus nephritis. The renal biopsies were classified according to modified WHO criteria. The active and chronic lesions present in these biopsies were semiquantitatively scored according to the method of Morel-Maroger. In our study 17% had class II lesions, 17% had Class III lesions, 46% had Class IV lesions, 13% had Class V lesions and 7% had Class VI lesions. Active and chronic lesions occurred amongst patients with Class III and IV than in any other category. Patients with Class III and IV lesions also had more severe renal impairment.

Introduction

The role of renal biopsy in systemic lupus erythematosus (SLE) remains controversial. Initial studies by Baldwin et al[1] and Pollack et al[2] described the changes seen on light microscopy and suggested that diffuse proliferative lupus nephritis was associated with a poorer prognosis than focal and membranous lesions. These results were supported by more recent studies which concluded that renal pathological changes contributed to prediction of prognosis[3].

Morel-Maroger et al[4] have further suggested that various morphological pictures may contribute to more appropriate choice of therapy. The usefulness of renal morphology particularly in terms of activity and chronicity of the lesions on light microscopy has been noted[4].

The additional value of immunoflourescence and Electron microscopy has also been appreciated.

As the presence or absence of renal involvement in SLE is an important factor which contributes to the morbidity and mortality, renal biopsy is of prognostic value.

This study was performed to ascertain the correlation of clinical features of lupus nephritis with the histological lesions according to WHO classification[5] (Table 1) and with the activity and chronicity of lesions.

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Patients and method

30 consecutive SLE patients who fulfilled the 1982 revised classification criteria for SLE (6) were studied. The patients were assesed by taking a detailed history, physical examination and extensive laboratoey evaluation. Ultrasound scan of abdomen was also performed on every patient to assess the renal size. Renal biopsies were performed and were fixed in Dubosq-Brazil Solution. Serial 1-2 mμ sections were cut and stained with haematoxylin and eosin, periodic-acid-Schiff, and Silver methanamine. Biopsies were classified according to the modified WHO classification[5]. The activity and chronicity indices of biopsies were then scored semi-quantitatively according to the method of Morel-Maroger (Table 2).

Results

The results of the light microscopic classification are shown in table 3.

WHO Class I lesions were not seen among our patients. 5 biopsies had pure mesangial alteration or WHO Class II lesions.

Focal lesions or WHO Class III, were seen in 5 patients. All 5 had focal segmental lesions with active necrotizing lesions (WHO Class III A). 14 patients had diffuse proliferative glomerulonephritis with 7 of them having active necrotizing lesions. 2 patients had advanced glomerulosclerosis.

The distribution of active and chronic lesions is shown in Table 4. Active lesions occured primarily among patients with Class III and IV lesions. Chronic lesions were more common in classes V and VI.

The clinical and biochemical findings of SLE patients are shown in Table 5.

All the patients with Class IV lesions had heavy proteinuria and one patient with pure membranous glomerulopathy, had hypertension, elevated blood urea and serum creatinine.

2 patients with Class II lesions had hypertension elevated blood urea and serum creatinine.

Among 14 patients with class IV lesions 9 had hypertension.

Table 1. WHO morphological classification of lupus nephritis (modified)

i. NORMAL GLOMERULI
   (a) Nil by all techniques
   (b) Normal by light, but deposits on electron microscopy or immunofluorescence.

ii. PURE MESANGIAL ALTERATIONS (mesangiopathy)
   (a) Mesangial widening and/or mild hypercellularity (+)
   (b) Moderate hypercellularity (++)

iii. A FOCAL SEGMENTAL GLOMERULONEPHRITIS
   (a) Active necrotizing lesions
   (b) Active and sclerosing lesions
   (c) Sclerosing lesions

iv. DIFFUSE GLOMERULONEPHRITIS
   (a) Without segmental lesions
   (b) With active necrotizing lesions
   (c) With active and sclerosing lesions
   (d) With sclerosing lesions

v. DIFFUSE MEMBRANOUS GLOMERULONEPHRITIS
   (a) Pure membranous glomerulonephritis
   (b) Associated with lesions of category II
   (c) Associated with lesions of category III
   (d) Associated with lesions of category IV

vi. ADVANCED SCLEROSING GLOMERULONEPHRITIS

Table 2. Lupus nephritis — semi-quantitative scoring

Activity score		*Chronicity score*	
Endocapilary proliferation	0-3	Glomerular sclerosis	0-3
Nuclear debris	0-3	30%	
Wire loops	0-3	30-80%	
Hyaline thrombi	0-3	80%	
Interstitial epithelial lesion	0-3	Interstitial sclerosis	0-3
Tubular epithelial lesions	0-3		
Fibrinoid necrosis	0-3x2		
Epithelial crescents	0-3x2		
Haematoxyphil bodies	0-3x2		
Necrotising angiitis	0-3x2		
Total	0-42		0-6

Table 3. Light microscopic classification of renal biopsies

WHO Class		*No. of Patients*	*%*
I		0	-
II	a	3	10%
	b	2	7%
III	a	5	17%
	b	-	-
	c	-	-
IV	a	2	7%
	b	7	22%
	c	5	17%
	d	-	-
V	a	1	3%
	b	2	7%
	c	-	-
	d	1	3%
VI		2	7%

Table 4. The distribution of active and chronic lesions

WHO Class	*No. of Patients*	*Active lesions Index 20*	*Chronic Index 3*
I	-	-	-
II	5	0	0
III	5	5	0
IV	14	14	3
V	4	2	2
VI	2	0	2

Table 5. Clinical and some of the biochemical features of SLE patients

WHO Class	I	II	III	IV	V	VI
No. of Patients	-	5	5	14	4	2
Hypertension	-	2	3	9	1	2
Albuminuria	-	4	-	7	4	-
Increased Blood Urea	-	2	1	10	1	2
Increased S. Creatinine	-	2	1	8	1	2

Discussion

The role of renal biopsy in the management of SLE had been controversial.

To ascertain the relationship between clinical renal disease and the pathological changes of lupus nephritis, we performed renal biopsies on 30 consecutive patients with lupus nephritis. In our study only classes II,III,IV,V and VI were represented.

Out of 5 WHO Class III patients, all showed very active necrotizing lesions. Out of 14 patients with class IV lesions 12 had very active necrotizing lesions.

Two of our patients with class III and IV, also had evidence of renal impairment and needed renal replacement therapy. According to the scoring system by Mora-l-Moroger (Table II) the total score of activity index is 42 and the chronicity index is 6.

In our study the biopsies with activity index more than 20 was seen mostly in WHO Class III and IV patients. Chronicity index of more than 3 were mainly seen in Class V and VI, which were non proliferative lesions.

High activity index and chronicity index of renal biopsies have been shown to be indicators of poor renal outcome[7].

A study by Leaker et al[7] showed a relationship between morphological classification and survival.

Thus survival was decreased among patients with Class III, IV and VI compared to I, II and V[7]. Class I and V are mainly non proliferative lesions and in our study Class V patient did not have any necrotizing lesions. Class II lesions have only mesangial proliferation but other features of activity are absent.

Chronic sclerotic lesions are seen mostly in Class VI biopsies. Likewise active and chronic lesions seen on biopsies are associated with poor survival.

In our study we have not looked at therapeutic aspect and survival of patients with lupus nephritis.

It has also been suggested that morphological features may be indicators for therapy[8]. In order to improve prognosis in SLE one should treat lupus nephritis while lesions are active and before chronic changes appear.

Since renal morphology may predict long term prognosis and since no clinical renal features uniformly predict renal morphology, it is important that proper evaluation of renal morpholgy in SLE patients will certainly help in their clinical management.

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