ORIGINAL ARTICLE

Lupus Band Test in Systemic Lupus Erythematosus

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Summary

The usefulness of the direct immunofluorescent antibody technique - lupus band test (LBT) - for the diagnosis of systemic lupus erythematosus (SLE) has been well established. The aims of the study were to determine the prevalence of the LBT at various sites of the skin in a cross section of patients with SLE and its correlation with disease activity. The LBT was demonstrated in 64% of skin lesions, 63% in non-lesional sun-exposed (NLSE) skin and 25% in non-lesional sun-protected (NLSP) skin. The prevalence of the LBT in lesional and NLSE groups was significantly different from the NLSP group ($p = 0.03$ and 0.005 respectively). There was a significant correlation between the presence of a positive LBT in NLSE skin with the presence of the LE cell phenomenon ($p = 0.04$) and anti – ds DNA antibody (0.02). In addition, there was a significant correlation between IgG LBT in the NLSE skin with serum hypocomplementaemia ($p = 0.03$) and anti – ds DNA antibody ($p = 0.04$). Other than these, no significant correlation was detected between the LBT from the 3 sites with overall clinical activity, renal disease, active skin lesions, or other laboratory indices of activity. These findings suggest that the LBT is mainly indicated as a diagnostic tool and has little role in assessing disease activity.

Key Words: Systemic lupus erythematosus, Lupus band test, Prevalence, Disease activity

Introduction

Systemic lupus erythematosus (SLE) is an immune complex disease with multisystem involvement. The immunopathological hallmark of this condition is the presence of immune complex deposits, consisting of antigen, antibody (immunoglobulin) and complement in the basement membrane of the tissues or in the vessel walls of affected organs.

It is well established that the lupus band test (LBT) is useful in the diagnosis of SLE. The prevalence of these deposits varies with the type of skin lesions, duration of the lesion, site of biopsy, the presence or absence of systemic disease and treatment of the disease. In patients with discoid LE skin lesions without evidence of systemic involvement, 75-80% will have immune deposits at the dermoepidermal junction of these lesions[1]. The lesions of subacute cutaneous LE are positive for the LBT in about 60% of the cases[2]. In SLE skin lesions, immunoglobulin and complement deposits may be found in as low as 50% of the patients[3] to as high as 94%[4].

Immune deposits do not occur in normal skin of patients with chronic discoid LE and are much less frequent in patients with subacute cutaneous LE. Thus, the presence of the LBT in normal skin is helpful for establishing a diagnosis of SLE and for differentiating systemic from discoid LE[5].

The prognostic significance of these immune deposits, however, remains controversial. Pohle[6] and Burnham[7] were the first to present evidence that SLE patients with a positive LBT on normal appearing skin had an increased prevalence of renal disease. Subsequently, other studies[8,9] have also demonstrated this relationship

This article was accepted: 22 June 2004
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including a local study by Adam et al[10]. However, many other studies[11-15] refute this.

This paper aims to determine the prevalence of the LBT at the different sites of the skin - lesional, non-lesional sun-exposed (NLSE) and non-lesional sun-protected (NLSP) - in the local SLE population and its relationship with disease activity, both clinically and by laboratory parameters.

Materials and Methods

Consecutive patients with SLE who consented to the study were recruited from the wards and clinics of the General Hospital, Kuala Lumpur. All patients satisfied the American Rheumatism Association (ARA) criteria for SLE[16] and active or overt skin lesions were not a pre-requisite for inclusion. However, patients who were severely ill or with advanced chronic renal failure were not included.

At the time of the skin biopsy, a history was taken and examination performed on every patient. All patients had their blood taken for the following tests: haemoglobin, leucocyte count, platelet count, ESR, complement (C3, C4) concentration, ANF titer, LE cell phenomenon, anti-dsDNA antibody test, renal profile, a 24-hour urine protein and renal biopsy (if indicated).

Wherever possible, elliptical biopsies from lesional, non-lesional sun-exposed (NLSE) and non-lesional sun-protected (NLSP) skin were done in each patient at the same time. Lesional skin biopsies were taken from exposed sites and the majority were acute LE lesions. The NLSE skin was obtained from the extensor aspect of the upper third of the forearm, while the NSLP skin was taken from the upper thigh. The skin biopsy specimens were processed on the same day and subsequently analysed by direct immunofluorescent studies.

The results of the skin biopsy were assessed by the same pathologist who was blinded as to the status of the patient. Clinical activity was assessed by means of a scoring system as used by Lim et al[17]. A current clinical activity score was constructed by noting the presence of the following features: arthritis, pericarditis, pleuritis, Raynaud's phenomenon, myalgia, neurological abnormalities, renal abnormalities, skin lesions, and alopecia. Patients scored zero if they were free from these manifestations at the time of the study, 1 if they had one or two features and 2 if three or more. A current laboratory activity score was constructed taking into account the presence of abnormalities in the following tests: ESR, platelet count, WBC, lymphocyte count, DNA binding, serum complement concentrations and the presence of proteinuria. Scores of 0 to 2 were assigned using the same principle as for the clinical activity score. The disease was considered to be 'inactive' if both clinical and laboratory activity scores were zero, and 'active' if both scores were equal or greater than 1. If only one of the scores was positive, the disease was considered to be 'probably active'.

LBT was defined as the presence of a bright thick linear band of immunofluorescence at the dermoepidermal junction (DEJ) of the skin comprising of immunoglobulins with or without the presence of complements. Renal involvement was defined clinically by haematuria (> 5 red blood cells per high power field) or cellular casts in the urine or proteinuria of > 500 mg per 24-hours with or without azotaemia and confirmed by renal biopsy, wherever possible.

Data Analysis

All data pertaining to the patients and the results of their laboratory tests were analysed using the Chi square test with Yates correction where appropriate. A p value of = 0.05 was taken as significant.

Results

Thirty-three consecutive patients (30 females, 3 males) with confirmed SLE were recruited between January 1991 and January 1992. Eight were newly diagnosed cases who were not on treatment before the skin biopsy. However, 19 cases who were on follow-up for more than a year had a clinical relapse at the time of the study and had a skin biopsy done before the dose of steroids was increased. The rest were known to have the condition for less than a year and were on maintenance dose of steroids. Overall, there were 28 clinically active cases whilst only 5 were inactive. The majority (40%) of the patients were in the 21-30 year age group. The mean age was 34 years (range 15-61).

Clinical and laboratory characteristics

The main clinical manifestations are skin (76%) and renal (55%) followed by arthritis/arthralgia (30%). This probably reflect the fact that most of our patients are from the Dermatology and Nephrology units (Table I). The most common skin manifestations included photosensitivity (48%), followed by malar rash (39%),

vasculitic lesions in the palms and soles (30%) and alopecia (27%) (Table II).

All, except 2 patients, had a positive ANA test. Of these, about half had a titre of more than 1:40. Hypocomplementaemia occurred in 71% of patients followed by a positive anti-dsDNA in 64%. Significant proteinuria (> 500 mg/24-hours) occurred in 55% of patients. Of note is the LE cell phenomenon which was seen in 57% of all patients (Table III).

Prevalence of the Lupus Band Test (Table IV)
64% of patients had a positive LBT in lesional skin, 63% in NLSE skin and 25% in NLSP skin. The prevalence of the LBT in the lesional and NLSE groups was significantly different from the NLSP group. ($p = 0.03$ and $p = 0.005$ respectively)

Composition and prevalence of immunoreactants in positive LBTs from the various sites
In lesional skin, the combination of IgM and IgG was most frequently seen (5 out of 9 biopsies) followed by IgM alone (2 out of 9 biopsies). In the NLSE group, the combination of IgM and IgG was most frequently seen (7 out of 20 biopsies), followed by IgM alone (5 out of 20 biopsies) and IgG alone (5 out of 20 biopsies). In the NLSP group, IgM alone and a combination of IgG and IgM were found equally (3 out of 7 biopsies).

In the lesional skin, IgM and IgG were equally found (7 out of 8 specimens each with positive reactions or 87.5%), followed by IgA, C_3 and fibrin (25% each). Similarly in NLSE skin, there were more reactions with IgM (70%) and IgG (65%) than IgA (5%), C3 (5%) and fibrin (5%). In the NLSP skin, IgM was universal (100%) as compared with IgG (42.8%) and IgA (14.2%).

Relationship of the LBT to severity of clinical disease
There was no relationship between the presence or absence of the LBT and overall disease activity , renal disease or active skin lesions at the 3 different sites.

Relationship of the LBT with laboratory characteristics (Table V)
There was a significant correlation between the presence of a positive LBT in NLSE skin with the presence of a positive LE cell phenomenon ($p = 0.04$) and anti-dsDNA antibody ($p = 0.02$). No significant correlation was detected between the LBT and the laboratory indices of activity in the lesional and NLSP skin.

Relationship of the class of immunoglobulin deposition in a positive LBT with clinical and laboratory characteristics (Table VI).

The presence of IgG alone or combined with other immunoglobulins in a positive LBT in NLSE skin was associated with a high incidence of anti-dsDNA antibody (12 out of 20 patients) ($p = 0.04$) and the presence of hypocomplementaemia (13 out of 21 patients) ($p = 0.03$). There was no significant correlation between the immunoglobulin class deposited in a LBT to clinical or laboratory indices of activity in both the lesional and NLSP skin.

Relationship between immunofluorescence of skin (NLSE) and kidney biopsies
Nine patients with a renal biopsy also had a skin biopsy done. Three had focal proliferative glomerulonephritis - 2 of these had a positive LBT (67%). Four patients had diffuse proliferative glomerulonephritis - 3 of these had a positive LBT (75%). Two patients had crescentic lupus nephritis and both had a positive LBT. There was insufficient renal tissue for immunofluorescence in 2 patients. Of the remaining 7 patients, all had IgG, IgA and C_3 in the renal glomeruli and all, except 1, had IgM. Except for one patient with a negative IgG in the skin immunofluorescence, IgG was present in both the skin and renal biopsies of the remaining 6 patients.

Relationship between serum complement and renal pathology
All the 4 patients with diffuse proliferative glomerulonephritis had low serum complement levels - both C3 and C4 (100%), whilst in the focal proliferative group, 2 had both low C3 and C4 concentration and 1 had low C3 only. Of note is the presence of a normal C3/C4 concentration in both patients with crescentic lupus nephritis.

(A summary of the clinical, serological and LBT findings of all the patients is presented in Table VII).

Table I: Clinical Features of SLE Patients (n = 33)

Clinical Features	Frequency	Percentage
Skin lesions	25	76
Renal abnormalities	18	55
Arthritis/arthralgia	10	30
Alopecia	9	27
Raynauds phenomenon	3	9
CNS	1	3

Table II: Type of Skin Lesions in the SLE Patients (n = 33)

Skin Lesions	Frequency	Percentage
Photosensitivity	16	48
Malar rash	13	39
Vasculitic lesions	10	30
Alopecia	9	27
Photosensitive rash (arms, "V" - neck)	5	15
Mouth ulcers	3	9
Discoid lesions	2	6
Livedo reticularis	1	3

Table III: Laboratory Characteristics of the SLE Patients (n = 33)

Laboratory Characteristics	Frequency	Percentage
ANA > 1:10	16	48
> 1:40	15	45
Hypocomplementaemia (31 pts only)	22	71
Anti-dsDNA	21	64
Proteinuria	18	55
LE cells (22 pts only)	16	57
Serum creatinine > 124 umol/l	6	18
Leucopenia	5	15
Thrombocytopenia	5	15

Table IV: Prevalence of LBT in Skin Biopsies from Various Sites

Site	Total Number	Number Positive	Percent Positive
Lesional skin	11 *	7	64
Non-lesional sun-exposed (NLSE)	32 +	20	63
Non-lesional sun-protected (NLSP)	32 +	8	25

* a total of 11 biopsies were done for lesional skin
+ a total of 32 biopsies were done. 1 patient in each group was not done as they refused permission.

Table V: Relationship of LBT Positivity from Various Sites to Laboratory Characteristics in the Same Patients

Laboratory Characteristics	LESIONAL			NLSE			NLSP		
	Total no. biopsied	No. positive	p-value	Total no. biopsied	No. positive	p-value	Total no. biopsied	No. positive	p-value
WBC count (no/cm3)									
< 4000 (5)	2	1	NS	5	4	NS	5	1	NS
> 4000 (28)	8	6	NS	27	16		27	7	
Sedimentation rate									
< 20mm/hr (5)	1	1	NS	5	1	NS	5	0	NS
> 20mm/hr (25)	9	6		24	16	NS	24	8	
LE Cell preparation									
positive (16)	6	4	NS	15	12	0.04	16	4	NS
negative (12)	4	3		12	4		11	3	
Complement (C3)									
low (18)	5	5	NS	17	13	NS	17	5	NS
normal (13)	5	4		13	7		13	3	
Complement (C4)									
low (18)	5	4	NS	17	12	NS	17	6	NS
normal (13)	5	4		13	8		13	2	
Complement (C4/C3)									
low (22)	6	5	NS	21	16	NS	21	7	NS
normal (9)	4	3		9	4		9	1	
ANA									
present (31)	9	7	NS	30	20	NS	31	8	NS
absent (2)	2	1		2	0		1	0	
Anti-dsDNA									
present (21)	5	4	NS	20	16	0.02	21	7	NS
absent (12)	6	4	NS	12	4		11	1	

NS = Not Significant

Table VI: Relationship of Class of Antibody Deposition in LBT Positive Non-Lesional Exposed Skin to Clinical and Laboratory Characteristics

Immunoglobulin Class	NEGATIVE			IgM			IgG			IgA			C3		
Clinical and Laboratory Characteristics	Total no. Biopsied	No. Pos (%)	P - Value	Total no. Biopsied	No. Pos (%)	P - Value	Total no. Biopsied	No. Pos (%)	P - Value	Total no. Biopsied	No. Pos (%)	P - Value	Total no. Biopsied	No. Pos (%)	P - Value
Overall Disease Activity															
Active (28)	27	9 (33)	NS	27	13 (48)	NS	27	14 (52)	NS	27	1 (4)	NS	27	1 (4)	NS
Inactive (5)	5	3 (60)		5	0 (0)		5	0 (0)		5	0 (0)		5	0 (0)	
Renal Disease															
Present (18)	17	5 (29)	NS	17	8 (47)	NS	17	10 (59)	NS	17	1 (6)	NS	17	1 (6)	NS
Absent (15)	15	7 (47)		15	7 (47)		15	4 (27)		15	0 (0)		15	0 (0)	
Skin lesions															
Present (22)	21	8 (38)	NS	21	11 (52)	NS	21	9 (43)	NS	21	1 (5)	NS	21	1 (5)	NS
Absent (13)	11	4 (36)		11	4 (36)		11	5 (45)		11	0 (6)		11	0 (6)	
Complements															
Low (22)	21	5 (24)	NS	21	12 (57)	NS	21	13 (62)	0.03	21	1 (5)	NS	21	1 (5)	NS
Normal (9)	9	5 (56)		9	3 (33)		9	1 (11)		9	0 (0)		9	0 (0)	
Anti-dsDNA															
Present (21)	20	4 (20)	0.02	20	12 (60)	NS	20	12 (60)	0.04	20	1 (5)	NS	20	1 (5)	NS
Absent (12)	12	8 (67)		12	3 (25)		12	1 (17)		12	0 (0)		12	0 (0)	

NS = Not Significant

Table VII: Summary of Patients Characteristics

Case No.	Skin	Joints	CNS	Serositis	Blood	Renal	ANA	Anti-DNA	Low Complement	LE Cell	ESR >20mm/hr	Kidney Pathology	Immunofluorescence of skin		
													Lesion	NLSE	NLSP
1	+	-	-	-	+	+	+	+	+	+	+	ND	IgG IgM	ND	-
2	-	-	-	-	-	-	+	+	ND	-	-	ND	ND	-	-
3	+	-	-	-	-	-	+	+	+	+	+	ND	ND	IgM	IgM
4	+	-	-	-	+	+	-	-	+	ND	+	FPGN	IgG IgM	-	-
5	+	+	-	-	-	-	+	+	+	+	+	ND	ND	IgG IgM	-
6	+	+	-	-	-	+	+	-	-	-	+	ND	IgG	-	IgA IgM
7	+	-	-	-	-	-	+	-	ND	+	+	ND	-	-	-
8	+	-	-	-	+	+	-	-	+	-	+	ND	-	-	ND
9	+	-	-	-	-	-	+	-	+	+	+	ND	IgG IgM	-	-
10	-	-	-	-	-	+	+	+	+	+	-	FPGN	ND	IgG	-
11	+	-	-	-	+	-	+	-	-	-	+	ND	ND	-	-
12	+	+	-	-	-	-	+	-	-	-	ND	ND	IgM	IgM Fibrin	-
13	-	-	-	-	+	-	+	-	-	-	ND	ND	ND	IgM	-
14	-	-	+	-	+	+	+	+	+	-	+	ND	ND	IgG IgM IgA	IgG IgM
15	-	-	-	-	+	+	+	+	-	ND	ND	CLN	ND	IgG	-
16	-	+	-	-	-	+	+	-	+	ND	+	DPGN	ND	IgG	-
17	+	-	-	-	+	+	+	+	+	+	-	FPGN	ND	IgG IgM	IgG IgM
18	+	+	-	-	+	+	+	-	+	ND	+	DPGN	ND	IgG IgM	-
19	+	-	-	-	+	+	+	+	+	+	-	ND	ND	IgG	-
20	+	+	-	-	+	-	+	+	+	-	-	ND	ND	IgM	IgM
21	+	-	-	-	+	-	+	+	-	+	+	ND	ND	-	-
22	+	-	-	-	-	+	+	-	+	-	-	DPGN	ND	-	-
23	+	-	-	-	-	-	+	+	-	-	-	ND	IgG IgM	-	-
24	+	+	-	-	+	+	+	+	-	+	-	ND	-	IgM	-
25	+	-	-	-	-	+	+	-	-	-	+	CLN	ND	-	-
26	-	-	-	-	-	-	+	+	+	-	-	ND	ND	-	-
27	+	-	-	-	-	+	+	+	+	+	+	ND	ND	IgG IgM	IgG IgM
28	+	-	-	-	-	-	+	+	+	+	+	ND	IgG IgM	IgG IgM	-
29	-	+	-	-	-	-	+	+	+	+	+	ND	ND	IgG IgM	IgM
30	+	-	-	-	+	+	+	+	ND	+	DPGN	ND	IgM	IgM	-
31	+	-	-	-	+	+	+	+	+	+	+	ND	ND	IgG IgM	-
32	+	+	-	-	-	+	+	+	+	+	+	ND	IgG IgM C3	IgG IgM C3	-
33	+	+	-	-	+	-	+	+	+	+	+	ND	ND	IgG	-

CLN = Crescentic lupus nephritis; FPGN = Focal proliferative glomerulonephritis; DPGN = Diffuse proliferative glomerulonephritis; ND = Not done

Table VIII: Comparision of positive Lupus Band Test in Non-Lesional Sun-Exposed and Sun-Protected Skin in Other Studies

Study	No of cases	Percentage of positive reactions		
		Lesional	Sun-exposed	Sun-protected
Tay and Lim (1975) [19]	33	41	-	32
Deng et al (1976) [22]	30	80	-	61
Ahmed and Provost (1979) [20]	19	-	77	37
Jacobs et al (1983) [21]	18	-	70	55
Ratnam et al (1987) [18]	35	77	28.5	-
Present study (1991)	33	64	63	25

Discussion

This study confirms the variability of the LBT at the various sites - lesional, non-lesional sun-exposed (NLSE) and non-lesional sun-protected (NLSP) skin. Positive reactions were found in 64% of the lesional skin, 63% in the NLSE skin and 25% in the NLSP skin. These figures are compared with those of other studies in Table VIII. It is important to highlight here that this is the only study that has compared the prevalence of the LBT at all the 3 sites.

The overall prevalence of a positive LBT in lesional skin is slightly lower than that reported by Ratnam[18] from neighbouring Singapore, but much higher than that reported by Tay and Lim, also from Singapore[19]. Our results for NLSE concurs with those reported by Ahmed and Provost[20] and Jacob et al[21], but is very much higher than that reported by Ratnam et al[18]. It is surprising that Ratnam and Tay and Lim, both from the island state of Singapore, report such vastly different results on such a homogenous population. For NLSP skin, our results are similar to that reported by Ahmed and Provost[20], Tay and Lim[19] but lower than that reported by Deng et al[22] and Jacobs et al[21].

Various reasons have been postulated for the differences in the prevalence of the LBT. These include age of the lesion[5] the type of lesion, the site of the lesion[3,5,20], disease activity and whether treatment has been given[3,5]. The incidence of a positive LBT increases with age of the lesion. The site of the biopsy varies with whether it is sun-exposed or sun-protected. Following successful treatment, the LBT frequently becomes negative although this may take 3-6 months[5]. However, other workers[14,21] found no difference in the LBT positivity with respect to treatment unlike that reported by Provost et al[8].

There was a significant difference in the prevalence of the LBT in the lesional and NLSE groups from the NLSP group ($p = 0.03$ and 0.005 respectively). Similar results were obtained by Ahmed and Provost[20] and this is important when one tries to explain the pathophysiologic mechanisms involved in the production of the LBT. This will be discussed in more detail later.

There was a significant correlation between the presence of a positive LBT in NLSE skin with the presence of the LE cell phenomenon ($p = 0.04$) and

anti-dsDNA antibodies (p = 0.02). The correlation of LE cell positivity and LBT positivity is interesting although 2 other studies[12,23] did not show any correlation. As the number of patients involved in all 3 studies (24-27 patients each) is too small to be significant, a bigger study may help ascertain whether such a relation exists. If so, perhaps the LE cell should be recalled from retirement! The positive relationship with anti-dsDNA antibody is borne out in other studies as well[8,9]. There was no correlation of the LBT with hypocomplementaemia. However, Gillian et al[9] noted that 90% of their SLE patients with anti-dsDNA antibodies and hypocomplementamia also had a positive LBT.

No significant correlation was noted between a positive LBT in NLSE skin with overall clinical activity, renal disease, active skin lesions or any other laboratory indices of activity (anti-dsDNA antibody or complement). However, others have shown a correlation between a positive LBT in NLSE skin and overall clinical activity[12,24-26].

As shown by earlier studies[13,21], we too, found no correlation between the presence of a positive LBT in lesional and NLSP skin with overall clinical activity, renal disease, activity of skin lesions or any laboratory indices of activity viz leucopenia, thrombocytopenia, ESR, LE cell, complements, ANA or anti-dsDNA antibodies. The value of a positive LBT as a marker for patients with SLE with more severe renal disease is currently debated. Some workers [7-9,20] have demonstrated a correlation between a positive LBT with more severe renal disease. Many other studies[11-14,21,27,] including ours, did not show such a correlation.

There was no correlation between the presence of a specific immunoglobulin class in lesional and NLSP skin with overall clinical activity, renal disease, skin lesions, complement levels, or with the presence of anti-dsDNA antibodies. This is similar to data published by Jacob et al[21]. There was a significant correlation between IgG LBT with serum hypocomplementamia (p = 0.03) and anti-dsDNA antibodies (p = 0.04). Other studies[2,8,9,12] have shown a similar relationship.

The immunoglobulin class deposited at the DEJ (dermoepidermal junction) has been the subject of much controversy in terms of its prognostic significance with regards to renal disease. Some studies[8,9,28] have demonstrated a correlation between the presence of IgG in the LBT and more severe renal disease. The presence of IgM without IgG was seen in patients with milder or no renal disease. However, Noel et al[29] showed a correlation between more severe renal pathological index of activity and IgM and Clq in the LBT. Our study demonstrated no statistical relationship between IgG or IgM and renal disease. Nonetheless, a trend was noted with IgG in the NLSE skin and severity of renal disease. Ten out of 17 (59%) patients had a positive IgG LBT with respect to renal disease whilst only 4 out of 15 (27%) without renal disease had a positive IgG LBT. Others[9,23] have also observed a similar trend.

In the 9 patients with renal biopsies, only IgG deposition in the kidney was almost always accompanied by IgG deposition at the DEJ (86%). This is in contrast to Provost's[8] report of a concordance rate of 50% between all immunoglobulin classes deposited at the DEJ and in the kidney. Bernstein et al [30] found a higher propensity for IgM to localize in the kidneys versus IgG. Others[14] found no correlation at all. However, Adam et al[10] and Gillian et al[9] noted a high concordance of immunoglobulins in both the kidney and the skin and concluded that they shared a common pathogenetic mechanism.

Although the number of patients with renal disease is small in our study cohort, all those biopsied show a proliferative histology. Seven of these 9 had a positive LBT in the NLSE skin. Seven of them had low complement levels. It is highly tempting to speculate that the association of a positive LBT and hypocomplementamia not only signifies the presence of lupus nephritis but also a more serious form of renal disease. Others[9,10,23,29] have reported similar findings. The pathogenesis of kidney lesions in SLE is believed to be mediated by immune complex deposition[31,32]. It is associated with hypocomplementamia and circulating immune complexes. Our finding of an association between immunoglobulin deposition in NLSE skin and the presence of serious renal disease and low serum complement levels suggests that immune complex deposition also occurs in the skin.

What then is the pathophysiologic mechanism responsible for these skin deposits? At present, there are 2 working hypotheses. One is that the immunoglobulin deposition is the result of circulating immune complexes. It is hypothesized that complexes similar to those deposited in the kidney diffuse across the terminal arterioles in the region of the DEJ of the

skin. This theory would explain our finding of a high concordance of IgG in both the skin and kidney lesions (86%).

Alternatively, Gillian[25] has proposed the hypothesis that the dermo-epidermal immunoglobulin and complement deposits may originate under the influence of local factors such as blood supply, epidermal proliferation and ultraviolet light exposure. It is thought that epidermal nuclear antigens may be released locally following ultraviolet light radiation damage with release of the epidermal nuclear DNA. The epidermally derived DNA could then diffuse across the basement membrane and interact with circulating antinuclear antibodies at the DEJ. If true, this hypothesis would explain the apparent higher incidence of a positive LBT in SLE patients in the light exposed than non-light exposed areas[7,33]. Indeed, a striking difference in the incidence of a positive LBT exists between NLSE and NLSP sites when these tests are performed simultaneously as shown convincingly by Ahmed and Provost[20] and also by us!

Our results would suggest that these 2 hypotheses need not be mutually exclusive especially in SLE where many pathogenetic mechanisms may operate concurrently.

Conclusion

The prevalence of a positive LBT in lesional, NLSE and NLSP skin in our local SLE patients is similar to that reported in most other series. We therefore agree that for the diagnosis of SLE, the best site for the LBT would be lesional or NLSE skin. We believe that the immunofluorescent skin test is of value primarily as an adjunct to other tests in the diagnosis of SLE and cannot replace the serologic and pathologic studies required in SLE patients. The relationship between LBT, lupus activity and prognosis still remains controversial. However, NLSE LBT positivity did correlate with the LE cell phenomenon and anti-dsDNA antibody. IgG LBT positivity in NLSE skin is significantly associated with hypocomplementaemia and anti-dsDNA and demonstrated a trend towards more severe renal disease. Finally, our study suggests that both the current hypotheses for the pathogenesis of the LBT in SLE patients may occur concurrently in a disease as complex as SLE.

Acknowledgements

The authors wish to thank Prof. Dr K. G. Rampal for his help in statistical analysis. We also thank the Dean of the Faculty of Medicine, National University of Malaysia and the Director-General of Health for their kind permission to publish these data.

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