Seasonal variation of disease activity of systemic lupus erythematosus in Finland: a 1 year follow up study

T Hasan, M Pertovaara, U Yli-Kerttula, T Luukkaala, M Korpela

Objectives: To study the role of different seasons in the disease activity of patients with systemic lupus erythematosus (SLE). Additionally, to evaluate whether the outdoor behaviour during the summer or a photoprovocation test affects disease activity.

Methods: 33 patients with SLE were examined by a rheumatologist and a dermatologist at a university hospital in winter, spring, and summer. The activity of SLE was assessed by the ECLAM index. Their outdoor behaviour was recorded by a questionnaire during the summer. In the winter, 12 patients were photoprovoked by ultraviolet A and B radiation on a small skin area.

Results: The ECLAM scores were higher in spring and tended to be higher in summer than in winter (p = 0.006 and p = 0.051). This finding, as well as the outdoor behaviour, were independent of the patients’ own impression of their photosensitivity. Overall, the sun protection actions were inadequate. The photoprovocation had no statistical effect on disease activity, but one patient had a violent exacerbation of SLE manifestations shortly after the photoprovocation.

Conclusions: In the northern climate SLE may be activated in spring and summer. Therefore, more effort should be focused on sun protection of patients with SLE.

It is widely known that sunlight can aggravate skin symptoms in systemic lupus erythematosus (SLE). However, the data on aggravation of systemic LE symptoms by ultraviolet (UV) radiation are conflicting. These data will be even more important if the preliminary good effect of UVA1 phototherapy leads to its more extended use in patients with SLE.

One reason for this study was our previous observation of a violent exacerbation of systemic manifestations in a female patient with SLE shortly after photoprovocation on a small skin area. Previously, such a photoprovocation test in patients with SLE has been regarded as safe.

The modern western lifestyle favours outdoor activities. If a patient notices that sun exposure worsens the skin symptoms, he/she is motivated to use sun protection. However, systemic symptoms are more difficult to link with a specific lifestyle. A relevant question is whether all patients with SLE should strictly avoid sunlight, regardless of the photosensitivity of their skin.

In this study we prospectively investigated the disease activity of patients with SLE during different seasons and compared it with the patients’ own impression of their photosensitivity and with their outdoor behaviour during three summer months. We also examined whether the outdoor behaviour is affected by the patients’ own impression of the photosensitivity. Furthermore, the disease activity was determined after a photoprovocation test.

Methods: The study was conducted at the Departments of Internal Medicine and Dermatology, Tampere University Hospital. Of all the 52 patients with SLE of Finnish origin treated at the Department of Internal Medicine during 1996–98 and fulfilling at least four of the American College of Rheumatology (ACR) criteria for SLE, 30 women and 3 men (63%) volunteered for the study after signing an informed consent. The study was approved by the ethics committee of the hospital.

The study protocol included three clinical and laboratory examinations in 1999 by a rheumatologist and a dermatologist: in January-February, May-early June, and August-early September. When major changes in drugs occurred during the study, the data of the subsequent visits were not evaluated. Of the 33 participating patients, 12 volunteered for a photoprovocation test. In this test, two small (5x8 cm) areas of intact upper back skin were irradiated in the winter with maximally two minimal erythral doses of UVA (UVASUN 3000 equipment, emission spectrum 340–400 nm) and 1–2 minimal erythral doses of UVB (Philips TL 20W/12 light bulbs, main emission spectrum 280–370 nm) on three consecutive days, as described previously. The mean total doses of UVA and UVB were 283 J/cm² and 511 mJ/cm², respectively. An additional examination was performed for the photoprovoked patients 12–15 days after the photoprovocation and for another 12 non-photoprovoked patients 13–43 days after their first examination.

Blood cell counts, erythrocyte sedimentation rate (ESR), serum creatinine, creatinine clearance, 24 hour urinary protein excretion, urine analysis, creatine kinase, indirect Coombs test, components of complement (C3, C4, and CH50), and antibodies to double stranded DNA antigens (anti-dsDNA) were examined on each visit. On the first visit, antinuclear antibodies, antibodies against extractable nuclear antigens, anticardiolipin antibodies, anti-β2-glycoprotein antibodies, electrocardiography, and a chest x ray examination were also carried out.

The ECLAM (European Consensus Lupus Activity Measurement) score, a combination of 15 clinical and laboratory variables, was used as the disease activity index. The clinical signs included articular, mucocutaneous, pleuropulmonary, intestinal, and neuropsychiatric manifestations, pericarditis, myositis, fever, and fatigue. Laboratory measures included tests of renal functions, blood cell counts, ESR, C3, C4, and CH50. The theoretical maximal ECLAM score was 17.5, of which mucocutaneous manifestations included 1.5 points.

Each patient was asked to complete a previously introduced questionnaire on their daily outdoor behaviour in June, July, and August 1999. The following questions were asked:...
Table 1  Characteristics of patients with SLE

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Male</th>
<th>Female</th>
<th>Indoor workers</th>
<th>Age (years), mean (SD)</th>
<th>Duration of SLE (years), mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>9</td>
<td>31</td>
<td>47 (12)</td>
<td>17 (10)</td>
</tr>
<tr>
<td>Previous or present clinical features</td>
<td>Haemotological manifestations</td>
<td>Musculoskeletal symptoms</td>
<td>Skin/mucosal manifestations</td>
<td>Peripheral vascular disease</td>
<td>Cardiopulmonary disease</td>
</tr>
<tr>
<td></td>
<td>29 (88)</td>
<td>28 (85)</td>
<td>23 (76)</td>
<td>22 (67)</td>
<td>12 (36)</td>
</tr>
<tr>
<td>Antibodies present at the start of the study</td>
<td>ANA</td>
<td>DNA</td>
<td>ENA</td>
<td>cRF</td>
<td>Anti-β2-GPI</td>
</tr>
<tr>
<td></td>
<td>28 (85)</td>
<td>16 (48)</td>
<td>21 (64)</td>
<td>26 (79)</td>
<td>2 (6)</td>
</tr>
</tbody>
</table>

Results are given as No (%) unless otherwise stated. ANA, antinuclear antibodies; ENA, extractable nuclear antigens; cRF, anticentromere antibodies; anti-β2-GPI, anti-β2-glycoprotein I.

Table 1 gives the characteristics of the patients. Two patients discontinued the study after one or two visits. Their data were included: (a) How long did you spend outdoors today? (b) How long did you spend outdoors between 11:00 am and 3:00 pm? (c) Did you keep your arms covered? (d) Did you use a hat or a scarf? (e) Did you apply a sunscreen and, if you did, what was the sun protection factor?

For comparison between two groups or paired differences, the Mann-Whitney, Wilcoxon signed ranks, or sign test was used. *P* < 0.05 was considered significant.

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owing to the small number of the patients in these two groups.

We conclude that in our cohort of patients with mild or moderate symptoms of SLE, the disease was activated during the sunny season most probably owing to UV exposure. Because the sun protection of the patients was inadequate, we should focus on better patient guidance.

ACKNOWLEDGEMENTS
The study was supported by a grant from the Medical Research Fund of Tampere University Hospital.

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Accepted 16 February 2004

REFERENCES