Sex-linked Differences in Acne vulgaris

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Sub-populations of leucocytes, complement C3, CRP, α_2 macroglobulin and immunoglobulin levels were measured in the peripheral blood of 28 (14 male, 14 female) normal control subjects and 108 (53 male, 55 female) acne patients. Significantly increased levels of inflammatory mediators were found much earlier in female than in male acne patients. The female defence system would seem to be more competent at responding to the acne assault; may account for the milder forms of acne found in young women; and have relevance both in treatment and the design and interpretation of clinical trials. *Key words: Inflammatory responses.* (Received April 3, 1985.)

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In acne clinics at the Dermatology Department of Leeds General Infirmary, it has been observed that there is a higher incidence of severe acne in young (18–25 years) males than in females. The majority of young women have milder forms of acne (1). It is possible that the nature and magnitude of the inflammatory responses in acne are influenced by the sex of the patient.

It is well documented in the literature that females respond more vigorously than males to a variety of immunogens. The different responses of the immune systems appear to be influenced by the hormonal balance of the animal; testosterone has been found to inhibit and oestrogen to enhance the activity of immunocytes to antigens (2). A significant difference in median IgM levels between men and women has been found, women having higher values (3). Also the greater prevalence of auto-immune diseases among women, such as lupus (4) and rheumatoid arthritis (5), is indicative of a difference in response in females as opposed to males.

In this study, various antisera (including the OKT-monoclonal antibodies) have been used to estimate the subpopulations of peripheral blood leucocytes, complement C3, immunoglobulins and other serum protein levels in normal subjects and acne patients

MATERIALS AND METHODS

Subjects. This study was carried out on 28 control subjects, 14 males and 14 females with mean ages of 22.86 and 20.50 years respectively, and 108 acne patients, 53 males and 55 females, with mean ages of 20.71 and 21.39 years. The control subjects were free of acne with no history of the condition. The acne patients were receiving no treatment at the time of this investigation and had received no treatment in the previous six weeks. Their degree of acne was assessed using the grading scheme of Burke & Cunliffe (6). Grades 0–3 were classified as mild, 3–6 as moderate.

Total leucocyte count. A Coulter counter was used for total white cell counts; total neutrophils and lymphocytes were calculated from the latter after a differential count.

Antisera. Anti-human IgG, IgA, IgM, C3, CRP and α_2 macroglobulin antisera (nephelometric grade) were obtained from Seward. Orthoclone monoclonal antibodies OKT 3, 4 and 8 were used to label T-lymphocytes and were obtained from Ortho Pharmaceutical Corporation. Behring fluorescein conjugated anti-human Ig/F $(ab)_2$ fragments were used to label B-lymphocytes.

Single radial immunodiffusion assay. Concentrations of IgG, IgA, IgM, C3, CRP and α_2 macroglobulin in sera were determined by the Mancini method.

Enumeration of T and B lymphocytes. This method was performed according to Holland, Gowland & Cunliffe (7).

RESULTS

Table I shows those parameters of inflammation which were significantly raised in male and female patients with mild or moderate acne.

In females, with mild acne, total white cells, neutrophils and C3 were all significantly raised ($p<0.01$) and remained so in moderate acne ($p<0.05$) where in addition total T-cells and helper T-cells were elevated ($p<0.01$). This indicates a rapid mobilisation of both the non-specific and cellular elements of the specific immune system.

The male response was totally different. In mild acne, inflammatory parameters remained at control levels. It was not until patients had moderate acne that neutrophil numbers and C3 levels were noticeably increased ($p<0.01$). Males with moderae acne also showed increased IgG production.

DISCUSSION

Our results show not only that inflammatory responses in acne vary with the severity of the condition, but also with the sex of the individual. Females apparently recognise and

Table I. *Male/female inflammatory responses in acne*

	Mild acne		Moderate acne	
Investigation	Female	Male	Female	Male
WBC's	+		+	+
Neutrophils	+		+	+
Total lymphocytes			+	
T-cells			+	
Helper T-cells			+	
Suppressor T-cells				
B-cells Sm Ig's				
Complement C3	+		+	+
CRP				
α_2 macroglobulin				
IgG				+
IgM				
IgA				

+ = p at least <0.05.

respond to their acne very rapidly. The prediction would therefore be that the majority of females adequately control their acne initially and do not allow it to deteriorate to severity.

Males on the other hand appear to be very slow to respond, the inflammatory responses in males with moderate acne only being equivalent to the female response to mild acne. This much slower response in the male would allow the condition to become established, persist and progress to a more chronic state.

These results not only provide a further example of the more vigorous response of the female in pathological conditions but also would account for the spectrum of patients seen in acne clinics. This study also indicates that clinicians might have to consider different approaches to the sexes with regard to treatment. Furthermore the male/female differences described may be of particular relevance not only in the design of clinical trials but in the analysis of data on patient responses to trial treatments.

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