Platelet stickiness in multiple sclerosis

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Nathanson and Savitsky (1952) were the first to study platelet adhesiveness in patients suffering from multiple sclerosis (60 in all). Increased adhesiveness was found in the groups of patients with acute exacerbations or a fluctuating course: the average 'adhesive index' for the stationary group was within the normal range. More recently two preliminary communications were published on the same subject in the Lancet: Caspary, Prineas, Miller, and Field (1965) found increased platelet adhesiveness in 43 patients suffering from active multiple sclerosis. Wright, Thompson, and Zilkha (1965) also found platelet adhesiveness to be increased in 24 patients suffering from acute severe multiple sclerosis. However, 12 patients were receiving or had recently received corticotrophin therapy. Sharp (1965) found no increased adhesiveness when the disease was quiescent and the proportion of cases showing abnormal adhesiveness increased with the activity of the disease.

METHOD

The method used measures the adhesion of platelets to a glass surface. A venous sample of blood is taken and anticoagulated with heparin, and a platelet count is done (initial count). A sample of the blood is then placed in a non-siliconized glass bulb which is slowly rotated for 20 minutes and a further platelet count is done (final count). The final count is expressed as a percentage of the initial count and this gives the platelet stickiness; the lower this figure the higher the proportion of platelets which have adhered to the glass surface and therefore the more sticky the platelets. The platelet counts shown in the tables are the number of platelets counted in a field $\frac{1}{8}$ sq. mm.

MATERIAL

Fifty patients, 17 men and 33 women, suffering from multiple sclerosis, were studied. The majority were outpatients; none was bedridden or suffering from urinary infection or vascular disease. The only treatment they had received during the previous year was aneurin. The patients were divided into active and inactive groups. The active group consisted of 16 patients in whom the disease appeared to be active or in relapse and the inactive group consisted of 34 patients in whom the disease process was stationary or in remission. Thirty-three apparently healthy persons, some of whom were medical students or nurses, comprised the control group.

METHOD OF ANALYSIS

The index of platelet stickiness, i.e., a subject's final platelet count as a percentage of his initial count, being a ratio of two variables, does not lend itself to valid statistical analyses, such as t tests and analysis of variance, designed to test the significance of differences between groups in terms of 'average' stickiness. Consequently, in what follows, comparisons between groups have been made in terms of average final counts 'adjusted' to a common level of initial platelet count. Moreover, as there is little evidence about the possible influence of age and sex on platelet stickiness we have treated each sex separately, giving three groups of male patients and three groups of female patients, and we have examined the possible effect of age on the comparisons between adjusted group means. The method of analysis is essentially that of the analysis of covariance (Quenouille, 1952).

RESULTS

Table I gives the average age and average initial and final counts in each of the six groups. It also includes the average index of platelet stickiness estimated in the usual way, i.e., if $y$ is the final count and $x$ the initial count the average index is the sum of, say $n$ values, of $100y/x$ divided by $n$. These indices suggest that platelet stickiness is increased in active cases of multiple sclerosis compared with either control subjects or inactive cases of multiple sclerosis; the differences between the groups are more striking for females than for males.

For each of the six groups we derived a regression equation of average predicted final count on initial count and age but in only one of the groups did age make any significant (at the probability level of 5% used throughout) contribution to the prediction of average final count. Even in this case the contribution was small, namely, an average decrease of 1·6 in predicted final count for an increase of one year of age with initial count held constant. Consequently age was ignored and six new regression equations of
average predicted final count on initial count were derived. These took the form of

\[ Y = a + bx \]

where \( Y \) = average predicted final count, \( x \) = observed initial count, and \( a \) and \( b \) are constants. Within each sex there was no evidence (see Table II) of any significant differences between the three group regressions, i.e., between the \( b \) values, so that the relevant data were pooled within each sex to derive an average regression (\( b \)) within groups. As Table II shows, completion of the covariance analysis revealed significant differences for each sex between the group means of the final platelet counts after they had been adjusted to a common initial platelet count. The adjusted means and the size and nature of the differences between them are shown in Table III. The main conclusions from this table are that the adjusted mean final counts were significantly less among patients with active multiple sclerosis than among either patients with inactive multiple sclerosis or control subjects. These results indicate for each sex separately that, on average, the platelet stickiness of patients with active multiple sclerosis is signifi-

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<td><strong>AVERAGE ADJUSTED FINAL PLATELET COUNT BY SEX AND GROUP</strong></td>
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1Significant at \( P < 0.05 \). Standard errors of difference follow the ± sign.
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Platelet stickiness is increased in patients suffering from active multiple sclerosis compared with patients suffering from inactive multiple sclerosis and normal controls.

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