

carditis patients. The serum anti-streptococcal antibody titres of 20 dental control patients were always less than 1 in 400 and most frequently the titres were 1 in 50 or less.

Discussion

We have demonstrated high serum fluorescent antibody titres against at least one of the three streptococcal antigens used in eight out of nine of the endocarditis patients studied. In contrast, low antibody titres only were found in the 20 dental control cases. A fluorescent antibody titre in the range of 1 in 400 to 1 in 1600 against *Strep. sanguis*, *mitior*, or *mutans* should be considered as suggestive evidence of endocarditis due to a viridans streptococcus. As low antibody titres were found in one case of endocarditis a low titre does not exclude the possibility of streptococcal endocarditis. This patient (case 8) had serum collected only three weeks after the onset of symptoms and this was possibly too early for a significant antibody titre to have developed. The sensitivity of the immunofluorescent method could probably be improved further by including a wider range of streptococci as antigens.

The estimation of the serum fluorescent streptococcal antibody titres against *Strep. sanguis*, *mitior*, and *mutans* may help to diagnose endocarditis due to viridans streptococci when the blood cultures are negative.

We are grateful to Drs W. Bridgen and A. McDonald for sera from cases of endocarditis at the London Hospital and to Dr J. M. Hardie for identifying the strains of *Strep. sanguis*, *mitior*, and *mutans* used in this study.

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Letters to the Editor

Plasma viscosity as a routine laboratory test

It has been proposed that plasma viscosity (PV) measurement should be introduced as a routine laboratory test giving a non-specific measure of plasma protein changes in disease similar to the erythrocyte sedimentation rate (ESR). In order to find out precisely how the ESR and the PV vary with the plasma protein pattern, we have, in this laboratory, been using a Harkness viscometer to measure PV in parallel with Westergren ESR, total proteins, and differential plasma protein estimations on a series of 50 patients. Fibrinogen levels were measured by the

clot weight method.

It was confirmed that there is a direct correlation between the PV and ESR ($r = 0.75$, $P < 0.001$), and between the PV and fibrinogen level ($r = 0.82$, $P < 0.001$). The ESR also correlates with the fibrinogen level ($r = 0.86$, $P < 0.001$). These close correlations indicate that both PV and ESR reflect a spectrum of changes in the plasma protein pattern in disease, but analysis of the results show that false positives and false negatives occur with both tests. Two patients had raised viscosity but normal ESR in the presence of a normal protein pattern, four had a raised ESR but normal viscosity with normal proteins; there were three false

negative ESRs and four false negative viscosities. In no case was both the ESR and the viscosity incorrect. As it happens, none of the patients had low albumin levels, but we and others (Harkness, 1971; Harris, 1972; Hutchinson and Eastham, 1977) have noted that unexpectedly low PV levels are recorded if the plasma albumin is reduced.

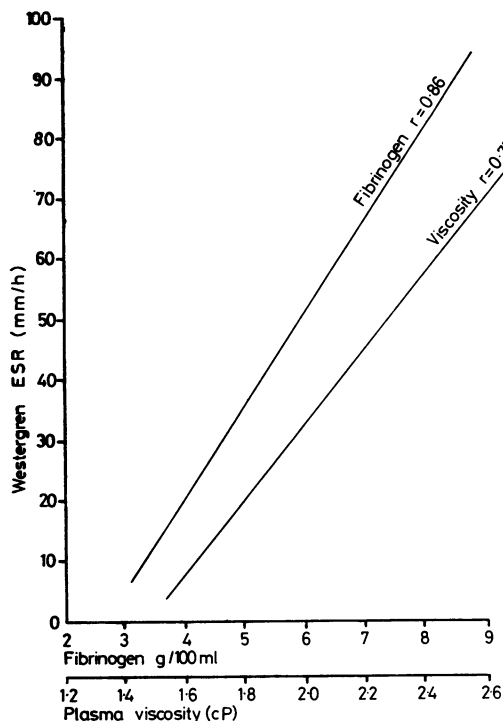
These results are in agreement with the correlations found in a recent paper by Hutchinson and Eastham (1977), and this adds to the evidence that the PV is certainly as useful as the ESR, in some instances more accurate and reliable. Thus it will surely become increasingly accepted

as part of the service offered by routine haematology laboratories.

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Regression lines showing relationship between Westergren ESR and plasma viscosity; and Westergren ESR and fibrinogen, derived from results on 50 blood samples.

Table 1 Regression analyses to show linear correlations between ESR and plasma viscosity and protein levels

	r	No	SE	P
ESR/plasma viscosity	0.75	49	0.06	< 0.001
ESR/fibrinogen	0.86	49	0.05	< 0.001
ESR/total globulin	0.67	49	0.08	< 0.001
Plasma viscosity/fibrinogen	0.82	49	0.05	< 0.001

Table 2 Comparison of Westergren ESR and plasma viscosity with fibrinogen and globulin levels: Concentrations of fibrinogen and globulin

	Fibrinogen and globulin normal	Fibrinogen raised, globulin normal	Fibrinogen normal, globulin raised	Fibrinogen and globulin raised	Totals
ESR raised	0	5	4	9	18
PV raised	2	0	1	2	4
ESR raised	4	2	1	1	8
PV normal	17	1	1	0	19
ESR normal					49
PV normal					