reason to hope that a longer trial would yield more encouraging results.

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Predictive value of paired plasma and serum viscosity in early rheumatic conditions

Plasma viscosity and erythrocyte sedimentation rate are established indices of disease activity and inflammation. Both are used as screening tests and monitors of disease activity. Plasma viscosity has important technical¹ and clinical^{2,3} advantages over erythrocyte sedimentation rate. Fibrinogen and globulins are the two major plasma components affecting plasma viscosity or erythrocyte sedimentation rate, and a raised value may reflect a rise in either fibrinogen or globulin, or both. Raised fibrinogen values are characteristic of acute tissue necrosis or infection; raised globulin concentrations suggest chronic inflammatory conditions.

As a screening test a raised plasma viscosity/erythrocyte sedimentation rate gives no immediate guide to diagnosis or prognosis because of its inability to differentiate high fibrinogen from high globulin states. Holdstock and Mitchell⁴ improved the specificity of the erythrocyte sedimentation rate by measuring it before and after defibrination. Their technique, however, proved time consuming and was often accompanied by haemolysis (which may affect the rate). Serum is fibrinogen-free, and it is simple to measure the viscosity of plasma and serum separately. We investigated the value of paired plasma viscosity and serum viscosity measurements in predicting the development of chronic rheumatic disease in a population with acute symptoms attending a special early-arthritis clinic.

Patients, methods, and results

We investigated 115 consecutive patients attending a clinic specifically for patients with early rheumatic complaints. All had had symptoms for less than three months, and in most cases it was impossible to make a diagnosis at the initial attendance. The group was reassessed at a minimum six-month follow-up and a diagnosis established. Plasma and serum viscosities were estimated at first attendance and then related to the subsequent diagnosis. Blood was collected into two tubes; one plain, the other containing EDTA. Both samples were spun simultaneously and the viscosity of the supernatants measured on a Harkness viscometer under standard conditions. Normal plasma viscosity is 1.52-1.72 mPa s (cP) and normal serum viscosity 1.40-1.60 mPa s (cP).

Plasma viscosity was raised in 72 patients, 35 of whom subsequently developed chronic arthritis (table). The remaining 37 did not develop chronic arthritis but had varied diagnoses, including polymyalgia rheumatica, synovitis associated with infection, etc. Only 29 patients showed raised serum viscosity. Of these, 28 subsequently developed chronic arthritis. The remaining patient had an underlying carcinoma of the bronchus.

Of those patients with chronic arthritis, eight had Reiter's disease and 29 classical or definite rheumatoid arthritis (ARA criteria), of whom five were seronegative. Fifteen patients (eight with an increased plasma viscosity) included in the group with transient synovitis could have been diagnosed as possible rheumatoid arthritis by ARA criteria at presentation, but at six-month follow-up were completely asymptomatic. The diagnosis of infection-association synovitis was based primarily on a strong clinical history and where possible supported by appropriate laboratory tests. On occasions, however, diagnosis was based on a strong history alone, and we suspect that many of the "transient synovitis" group would also have had precipitating infection.

From the clinical standpoint, plasma viscosity was normal in two patients who subsequently developed chronic arthritis, and serum viscosity in eight. Serum viscosity is highly specific in predicting subsequent chronicity but has a higher false-negative rate.

Paired plasma and serum viscosity: 115 patients with early rheumatic disorders

Diagnosis at six-month follow-up	No	Raised plasma viscosity	Raised serum viscosity
<i>Chronic disease</i>			
Rheumatoid arthritis (includes five patients with seronegative disease)	29	28	24
Reiter's	8	7	4
<i>Self-limiting synovitis</i>			
Polymyalgia rheumatica	6	6	0
Infection-associated (proved or highly probable)	18	16	0
Transient synovitis (no definitive diagnosis)	45	11	0
Others (including osteoarthritis, gout, carcinoma,* ankylosing spondylitis)	9	4	1*
Total	115	72	29

Comment

Plasma viscosity may be increased by raised values of fibrinogen and globulin, serum viscosity only by raised globulin values. Patients with a raised plasma viscosity and normal serum viscosity had acute conditions consistent with a primary increase in fibrinogen—namely, polymyalgia rheumatica and transient synovitis associated with infection. Patients who subsequently developed chronic arthritis had increased globulin concentrations (and possibly fibrinogen as well) and hence an increased serum viscosity.

In our study the serum viscosity very successfully predicted those patients who would develop chronic arthritis from a larger group in which plasma viscosity was increased. A rapid assessment of fibrinogen concentrations can be made from the difference between plasma and serum viscosities. Simultaneous estimation of serum and plasma viscosity improves the value of the latter without appreciable increase in cost or time taken, and compares favourably with the time and cost incurred in estimating globulins and fibrinogen. Moreover, this technique should be applicable to other specialties that deal with chronic inflammatory disease. The advantages of predicting subsequent chronicity at an early stage are self-evident.

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