walks because of the initial training effect. The time chosen to assess exercise tolerance by walking tests is not critical. Shorter times are easier for both patient and investigator and are as reproducible but discriminate slightly less well and have less of a training role. The six-minute walk may represent a sensible compromise.

- ¹ McGavin CR, Gupta SP, McHardy GJR. Twelve minute walking test for assessing disability in chronic bronchitis. *Br Med J* 1976;i:822-3.
- ² Mungall IPF, Hainsworth R. Assessment of respiratory function in patients with chronic airways disease. *Thorax* 1979;34:254-8.
- ³ Cooper KH. A means of assessing maximal oxygen intake. *JAMA* 1968; 203:201-4.

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Brompton Hospital, London SW3 6HP

R J A BUTLAND, MA, MRCP, registrar (present address: Brook Hospital, London SE18)

JACK PANG, MA, MRCP, registrar (present address: University College Hospital, London WC1E 6AU)

E R GROSS, MA, RRT, research technician

A A WOODCOCK, BSC, MRCP, registrar

D M GEDDES, MD, MRCP, consultant physician

Effect of high-fibre diet on haemostatic variables in diabetes

Raised values of factor VIIc, factor VIIIc, and fibrinogen are associated with increased cardiovascular mortality.¹ Treatment of hyperlipidaemia with a fat-modified diet causes substantial falls in plasma factors VIIc, VIIIc, and Xc, and an increase in fibrinolytic activity.² Patients with diabetes have a greatly increased risk of cardiovascular morbidity and mortality; values of factors VIIc and fibrinogen are significantly higher in diabetics than in non-diabetics, especially those with retinopathy or proteinuria.³ We report a randomised crossover study of the effects of dietary treatment of diabetes on haemostatic function.

Patients, methods, and results

We studied 11 non-insulin dependent and 10 insulin-dependent patients with diabetes mellitus. Each group was randomised to the control or trial diet. The control low-fibre diet was a traditional diabetic diet, giving 40% of energy as carbohydrate and containing not more than 20 g/day of fibre. In the trial diet carbohydrate provided 60% of total energy, and the mean fibre content was 95 g/day,⁴ mainly from leguminous vegetables. The two diets were isocaloric.

After six weeks the patients were admitted to hospital for 24 hours to assess diabetic control. Two samples of blood were taken for estimating plasma clotting factors. Patients were discharged taking the alternative diet to return six weeks later for a second admission and blood sampling. Fibrinogen concentrations were measured at once. Plasma aliquots were stored in liquid nitrogen for assays of biological or clotting activity of factors VIIc, VIIIc, and Xc. Factor VIII-related antigen (VIIIaG) was also measured. The same standard was used throughout. Full details of clinical and laboratory methods are given elsewhere.^{1,4} The results were assessed by analysis

Mean values of clotting factors in non-insulin-dependent and insulin-dependent diabetics after high-fibre (trial) and low-fibre (control) diets for six weeks. Results pooled for each period

	Factor VIIc (%)	Factor VIIIc (%)	Factor VIIIaG (%)	Factor Xc (%)	Fibrinogen (g/l)
Non-insulin dependent					
High fibre	92.7	87.4	40.3	82.7	3.56
Low fibre	115.4	82.3	48.9	95.3	3.57
Change	-22.7**	5.1	-8.6	-12.6**	-0.01
SE of change	6.21	3.26	2.42	3.56	0.12
Insulin dependent					
High fibre	110.0	85.2	65.8	69.9	3.09
Low fibre	108.9	83.2	76.4	76.8	3.25
Change	1.1	2.0	-10.6*	-6.9	-0.16
SE of change	11.58	12.86	4.73	4.65	0.26

Clotting factor values expressed as percentage of one standard; not directly comparable with values in other reports on Northwick Park Heart Study based on other standards.

* $p < 0.05$.

** $p < 0.01$.

of variance for dietary effects, for any effects of order of treatment, and for sex differences in response to treatment.

The main findings were based on the replicates at the end of each six-week period from all the patients, according to whether they were on the high-fibre or low-fibre diet. The effect of the high-fibre diet on factor VIIc in the non-insulin-dependent group was a fall of over 20%. (The fall was more pronounced in the five men, in whom it was about 30%.) The high-fibre diet also caused a significant fall in factor Xc in the non-insulin-dependent group, though in this case there was no difference between the sexes. There were no changes in the non-insulin-dependent group in factor VIIIc or fibrinogen. In the insulin-dependent group, the only significant effect attributable to the high-fibre diet was a fall in factor VIIIaG. Diabetic control improved significantly on the high-fibre diet in both groups.⁴

Comment

The results show that some plasma clotting factor values can be reduced by diet alone. Since most patients had previously had a low-fibre intake, the changes can reasonably be described as decreases due to the high-fibre rather than increases due to the low-fibre content. The effects of the high-fibre diet on factors VIIc and Xc in the non-insulin-dependent group were similar to changes seen after the dietary treatment of hyperlipidaemia.² In some circumstances, therefore, dietary modifications may exert clinical benefits partly through their effects on clotting factor values. There is other evidence⁵ for this possibility. The lack of any effect of high-fibre on factors VIIc and Xc in the insulin-dependent group may be due to the nature of insulin-dependent diabetes or to an effect of exogenous insulin.

This study and the study of men with hyperlipidaemia² were both in small numbers of patients. There is a strong case for larger studies on the dietary control of clotting factor values and of the extent to which any effects of diet on the incidence of ischaemic heart disease are mediated through haemostatic function.

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¹ Meade TW, North WRS, Chakrabarti R, Stirling Y, Haines AP, Thompson SG. Haemostatic function and cardiovascular death: early results of a prospective study. *Lancet* 1980;ii:1050-4.

² Elkeles RS, Chakrabarti R, Vickers M, Stirling Y, Meade TW. Effect of treatment of hyperlipidaemia on haemostatic variables. *Br Med J* 1980;281:973-4.

³ Fuller JH, Keen H, Jarrett RJ, *et al.* Haemostatic variables associated with diabetes and its complications. *Br Med J* 1979;ii:964-6.

⁴ Simpson HCR, Lousley S, Geekie M, *et al.* A high carbohydrate leguminous fibre diet improves all aspects of diabetic control. *Lancet* 1981;ii:1-5.

⁵ Meade TW. Diet, haemostatic function and ischaemic heart disease. In: Turner MR. *Nutrition and health*. Lancaster: MTP Press, 1982.

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Diabetes Research Laboratories and Department of Community Medicine and General Practice, Radcliffe Infirmary, Oxford OX2 6HE

H C R SIMPSON, MRCP, research registrar

J I MANN, DM, PHD, honorary consultant and lecturer in community medicine

MRC Epidemiology and Medical Care Unit, Northwick Park Hospital, Harrow, Middlesex HA1 3UJ

R CHAKRABARTI, MRCPATH, scientific staff

J D IMESON, MA, technical officer

YVONNE STIRLING, FIMLS, chief laboratory technician

MARION TOZER, medical laboratory scientific officer

LINDA WOLF, BSC, medical laboratory scientific officer

T W MEADE, DM, FRCP, director

Correction

Smoking habits and inflammatory bowel disease: effect on nutrition

An error occurred in this paper by Dr A D Harries and others (17 April, p 1161). In the table the heading "Mid-arm circumference" should have read "Mid-arm muscle circumference."