Diverticular disease: three studies

Part I—Relation to other disorders and fibre intake

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Summary

The fibre intake of 40 patients with diverticular disease was compared with that of 80 age- and sex-matched controls. The daily crude-fibre intake of the patients was significantly lower than that of the controls, and the incidence of haemorrhoids, varicose veins, hiatus hernia, gall stones, and abdominal hernias was significantly higher than in the control group. These findings suggest that a fibre-depleted diet may be a causative factor in diverticular disease and several other conditions.

Introduction

Diverticular disease of the colon has become the commonest disorder of the large intestine in Britain. Its incidence still seems to be increasing,[1 2] and mortality from the disease has risen in the last 50 years despite advances in surgery, anaesthesia, and therapeutics.[3]

Painter and Burkitt have suggested that the condition may be a dietary deficiency disorder caused by an inadequate intake of dietary fibre.[4] Evidence for this view has been obtained from epidemiological studies relating the fibre content of the diet to the incidence of diverticular disease at different times in Britain and other areas of the world. It has been supported by studies showing the therapeutic effect of cereal fibre in the form of bran[5] and by fibre deprivation experiments in rats[6] and rabbits.[7] A further line of inquiry which has not been pursued is an assessment of the actual fibre intake of patients with diverticular disease compared with that of the general population. While being aware of the difficulties in obtaining accurate information on this subject, we have attempted such a study.

Patients and methods

Forty patients presenting over 12 months at the Royal Berkshire Hospital with the symptoms and barium enema findings of diverticular disease were studied. Their dietary fibre intake was estimated by the hospital dietitians. The patients were asked in a questionnaire whether they had suffered from any of the following conditions: gastric or duodenal ulcer, hiatus hernia, gall stones, appendicectomy, rectal polyps, haemorrhoids and fissures, urinary calculi, urinary infections, abdominal hernias (inguinal, femoral, or incisional), varicose veins, arterial disease, hypertension, or diabetes. In each case the condition for which the answer was positive had been confirmed by a doctor.

The findings were compared with those in a group of 80 controls, two of whom were matched for age and sex with each patient with diverticular disease. A similar dietary assessment was carried out by the same dietitians and a similar questionnaire on other disorders was completed.

The controls were selected by the dietitians, who were supplied with the patients' ages and sex. They took the first people they could find of the right age and sex, enlisting the help of hospital employees, relatives, and acquaintances. Some orthopaedic patients and a few geriatric patients attending the day unit for social reasons were included. The only subjects rejected from the control group were those on a strict weight-reducing diet, patients with severe diabetes or seriously debilitating conditions such as malignant disease, and those incapable of giving a reliable assessment of their dietary intake. Fewer than 10% of subjects approached were rejected and no one declined to co-operate. The geographical distribution and socio-economic status of patients and controls were comparable.

Dietary assessment was based on the eating habits of the subjects, and the crude-fibre content was estimated using Platt's tables.[8]

Except when otherwise indicated, the significance of difference was assessed by non-parametric statistical methods.[9]

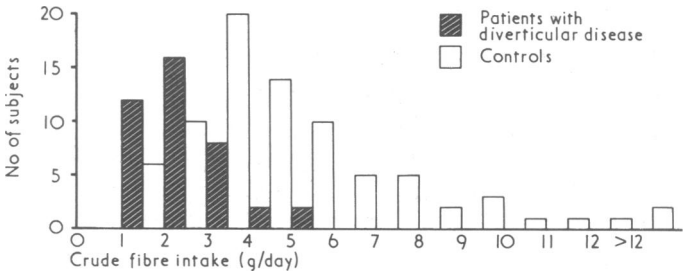
Results

The age and sex distribution of the patients with diverticular disease is shown in table I. The daily crude-fibre intake of both groups is shown in the figure. The mean crude-fibre intake for the patients with diverticular disease was 2·6 g/day and for the control group 5·2 g/day; this difference was highly significant ($z = 5{\cdot}61$; $P < 0{\cdot}00003$).

The incidence of other disorders in patients with diverticular disease compared with that in the controls is shown in table II.

TABLE I—*Age and sex distribution of 40 patients with diverticular disease*

Age (years):	25–35	–45	–55	–65	–75	–85
Men	1	1	3	3	2	0
Women		2	5	8	11	4
Total	1	3	8	11	13	4



Reported daily crude fibre intake of 40 patients with diverticular disease compared with that of 80 age- and sex-matched controls.

TABLE II—*Reported incidence of other conditions in 40 patients with diverticular disease and 80 age- and sex-matched controls*

	% of patients	% of controls	Significance P	Significance χ^2
Haemorrhoids	57½	24	<0·01	10·86
Varicose veins	50	22½	<0·01	8·87
Appendicectomy	40	26	NS	
Urinary infections	37	24	NS	
Abdominal hernias	25	5	<0·01	8·48
Hiatus hernia	22½	5	<0·01	6·72
Gall stones	20	4	<0·02	6·60
Hypertension	20	21	NS	
Duodenal ulcer	12½	2½	NS	
Arterial disease	12½	12½	NS	
Urinary calculi	10	2½	NS	
Gastric ulcer	7½	2½	NS	
Diabetes	5	9	NS	
Rectal polyps	7½	1	NS	
Fissures	5	1	NS	

NS = Not significant.

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Discussion

FIBRE INTAKE

Our findings showed that the patients with diverticular disease had a lower crude-fibre intake than matched controls. Tables are not yet available to assess the total dietary fibre content of foods,[10] and crude fibre is mainly a measure of the cellulose and lignin content of the food and considerably underestimates the total dietary fibre because it does not take the hemicelluloses into account.[11]

The accuracy of a dietary history depends on the reliability of the subject and this applied equally to both groups, who were assessed by the same dietitians. Our control group showed a fairly typical distribution pattern, and the mean fibre intake of 5·2 g compared with reported crude-fibre intakes in Britain of 4 to 8 g/day.[12 13]

Questioning disclosed no obvious evidence that patients with diverticular disease had changed their diet after the emergence of symptoms, and none had been advised to alter their fibre intake because of other disease—for example, peptic ulcer. Only the patients with gall stones had a lower fibre intake than the rest of the group. Some of the controls may have been exposed to pro-fibre propaganda, but there was no evidence that their fibre intake had changed. Possibly the small difference between the mean fibre intake of our controls and Robertson's figure of 4·2 g/day for the general population[12] might have been due to an increased dietary health consciousness among the controls. Nevertheless, there seemed to be a genuine difference in fibre intake between the patients and the controls, which was unlikely to have been artificially created by either an exaggeration in the fibre intake of the control group or a reduction in the intake of those with diverticular disease. Eating patterns in this age range appear to be stable over many years.

ASSOCIATION WITH OTHER CONDITIONS

The questionnaire elicited a significantly increased incidence of haemorrhoids, varicose veins, abdominal hernias, hiatus hernia, and gall stones in the patients with diverticular disease. This type of assessment may not be very reliable in the case of haemorrhoids, as patients are sometimes told that they have piles without proctoscopy being carried out, and it was not feasible to examine the controls.

The method of selecting the controls was unlikely to have caused significant bias in the incidence of associated disorders, despite the rejection of a few subjects. The patients with diverticular disease had been attending their doctor and had been more thoroughly investigated than the controls, which may have increased the number of disorders diagnosed. The results must be interpreted in the light of these factors, but it is unlikely that they could have accounted for such large differences in the incidence of some conditions and the negligible difference in the incidence of others, such as hypertension and arterial disease.

The reported incidence of hiatus hernia in patients with diverticular disease has varied from 11% to 16%.[14-16] Similarly, the incidence of gall stones has varied from 11% to 31%.[14-16] These differences are probably due to different methods of selecting patients and obtaining information and to geographical differences. A relation between diverticular disease and varicose veins has been reported by Latto *et al*:[17] 73% of 110 patients with diverticular disease had some evidence of varicose veins on examination compared with 33% of age- and sex-matched controls. A relation to peptic ulceration has been reported by Boles and Jordan,[15] who found ulcers in 18% of patients with diverticular disease and Painter,[14] who found ulcers in 13% of patients. We know of no similar reports of an association with abdominal hernias.

Cleave *et al*[3] suggested that diverticular disease and many other disorders common in Western civilization were different manifestations of a common causal factor related to the intake and refinement of dietary carbohydrate. Burkitt has produced epidemiological evidence to support this and has suggested that hiatus hernia, abdominal hernias, haemorrhoids, and varicose veins may be caused by intermittent high intra-abdominal pressure due to straining at stool secondary to a low-fibre diet.[19] Our findings support the concept that a fibre-depleted diet is a causative factor in diverticular disease and is also associated with several other conditions.

Acknowledgments are given at the end of Part III.

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Part II—Treatment with bran

Summary

Forty patients with diverticular disease were treated with wheat bran 24 g/day for at least six months. Thirty-three patients showed a very satisfactory clinical response. Sixty per cent of all symptoms were abolished, and a further 28% were relieved. After treatment the transit times accelerated in patients whose initial times were slower than 60 hours and slowed down in those whose initial transit times were faster than 36 hours. Stool weight increased significantly. The number of intracolonic high pressure waves decreased, especially during and after eating. Barium enema studies showed less spasm in eight patients and no diverticula in three patients after taking bran. As well as relieving the symptoms of diverticular disease a high-fibre diet may also prevent the condition from developing.

Introduction

In the past a low-residue diet was generally prescribed for patients with diverticular disease of the colon. This was accepted without any real proof of its therapeutic value.[1] Medical opinion has now swung in favour of a high-fibre regimen, which has been reported to produce clinical improvement[2 3] and reduce the