The value of an elimination diet in the management of patients with ulcerative colitis

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Debate exists about the role of diet in both the aetiology and the management of ulcerative colitis. To examine the latter, a group of patients with documented ulcerative colitis was studied at the Groote Schuur Hospital Gastro-intestinal Clinic.

A total of 18 subjects, 9 female and 9 male, were randomised into active or control groups and followed up weekly for 6 weeks. Subjects in the control group were asked to document but not alter their intake of food and drink. Those in the experimental group had their diets systematically manipulated to exclude foods that appeared to provoke symptoms. The symptoms, sigmoidoscopy and biopsy findings of all subjects were compared before and after. 'Remission' was defined as the passage of normal stools with absence of rectal bleeding. 'Improvement' was defined as a decrease in the number of diarrhoeal stools and/or a diminution of rectal bleeding.

At the end of the trial the diet group displayed significantly fewer symptoms than did the controls (P = 0,009; Fisher's exact test). Sigmoidoscopic findings improved in 8 subjects in the diet group compared with 2 of the controls. Histological findings improved in 3 of the diet group as well as in 3 of the controls.

There were no foods that provoked symptoms in all patients, though spiced and curried foods and fruits, especially grapes, melon and the citruses, commonly caused diarrhoea. In only 2 patients were symptoms reproduced consistently on reintroduction of a particular food, pork in 1 case and yellow cheese in another.

S Afr Med J 1995; **85**; 1176-1179.

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Patients with ulcerative colitis frequently complain that certain foods provoke their symptoms and that they therefore avoid their ingestion. Food intolerance and the role of diet in the management of inflammatory bowel disease are the subjects of much speculation.[1-3]

Though the mechanism is not fully understood, dietary intervention in the form of total parenteral nutrition and elemental feeds appears to play a significant role in the management of both active and inactive Crohn's disease.[4-12] It has been suggested, however, that these measures are ineffective in controlling active ulcerative colitis[13,14] and it is perhaps for this reason that dietary manipulation has not been studied extensively in this condition.

Elimination diets, which attempt to isolate individual foods that provoke symptoms and then remove them from the diet, have been found to be effective in Crohn's disease, irritable bowel syndrome and in a single case of ulcerative colitis.[15-17] This study was designed to examine in a controlled way the role of such a diet in the management of patients with mild to moderately active ulcerative colitis.

Subjects and methods

A circular describing the proposed study was sent to all patients registered as having ulcerative colitis in the greater Cape Town area. Responders who reported active disease at initial interview, who had not undergone surgery for their condition and were willing in principle to embark on the diet, were randomised into either the diet or the control group. All patients had ulcerative colitis diagnosed either colonoscopically or radiologically and confirmed on histology. Active disease was defined as the presence of diarrhoeal stools and/or rectal bleeding. Patients with systemic complications were excluded from the study. Those who were or who had been on rectal or oral steroids in the past week were also excluded. Maintenance sulphasalazine use was not an exclusion criterion, altnough patients were asked not to change their dosage during the study period. Smokers were asked not to alter their cigarette consumption during this time.

Prior to entry, patients were addressed in the group to which they had been allocated and their role in the study explained more fully. All patients then filled out a comprehensive questionnaire reporting their symptoms, past and present medication and their smoking and dietary habits. Particular note was taken of any food intolerances. Extent of disease and severity of symptoms were documented and informed consent was obtained. Sigmoidoscopy was performed at entry and completion on all subjects by one of the investigators (J.P.W.) who was unaware of their status in the study. The sigmoidoscopy findings were graded according to presence or absence of the normal vascular pattern, exudate, erythema, ulceration and degree of friability (Table I). At each sigmoidoscopic examination a biopsy was taken and histological evaluation was subsequently undertaken by a pathologist unaware of both the clinical and macroscopic findings.

Table I. Sigmoidoscopy grading

0 – Normal or inactive disease (normal vascular pattern, non-friable, non-erythematous mucosa)
1 – Mild disease (decreased vascular pattern, mild friability)
2 – Moderate disease (absent vascular pattern, marked erythema, friability and erosions)
3 – Severe disease (spontaneous bleeding, ulceration)

Patients were weighed, interviewed and examined clinically at entry to the study and weekly for 6 weeks by S.C. and/or G.B. On day 1, all subjects in the diet group were given a similar menu (allowing for individual food dislikes and intolerances) for the following week. A selection of fruits, vegetables, grains, meat and fish prepared by boiling, grilling, roasting, baking or microwave were included in the menu. The frying of food was prohibited. In the first week one item of food only was allowed at breakfast and lunch. Supper comprised two foods. In this week, no food was repeated more than once. Furthermore, no two foods of the same type were allowed within a 48-hour period. A brief summary of commonly available fruits and vegetables and their respective 'families', based on botanical phylogenetic classification, was provided. Dairy products were excluded from the first week's diet but were introduced over the rest of the trial period in the following order: skim milk, yoghurt, skim-milk cheese, full-cream milk, cream and finally full-cream cheeses. The subject could eat as much as desired of the food. If hungry between meals, they were asked to eat only food allocated to the previous or next meal. Each week the diet subjects were interviewed individually and their symptoms reviewed in relation to the foods eaten. The menu was expanded over the 6-week period to include as great a variety of foods as individual tolerance allowed. Refined sugars, additives and preservatives, all condiments and spices other than salt and beverages other than boiled water were prohibited for the entire period of the trial. Where a particular food appeared to provoke symptoms, it was excluded from the following week's menu. If and when the subject became asymptomatic, the offending food was reintroduced. If symptoms recurred upon reintroduction, the food was excluded for the remainder of the trial.

Patients in the control group were asked simply to document their daily food and beverage intake and diarise their symptoms in relation to intake.

Results

Twenty-one subjects were entered into the study based on an initial assessment of mild to moderate disease activity. They were randomised into either diet (11) or control (10) subjects. After the initial group discussions, 3 of those allocated to the control group were found to have insufficient symptoms to warrant admission and were therefore excluded. A further control completed the trial but refused a final sigmoidoscopy.

Patient characteristics are summarised in Table II. The male/female ratio, median age, maintenance sulphasalazine use and mean time since diagnosis are similar. The groups

differed in respect of disease extent, with anatomically limited disease being more common in the control group. Symptoms in this group were generally less severe at onset of the study than in the diet subjects. These differences were not significant but the sample size was small.

Table II. Patient characteristics

	Diet group (N = 11)	Control (N = 7)
Male/female	6:5	3:4
Median age (yrs)	37	41
Disease extent		
Proctitis	0	4
Left-sided	7	3
Total colitis	4	0
Median duration of symptoms	6 yrs (18 mo. to 15 yrs)	8 yrs (1 yr to 20 yrs)
Maintenance sulphasalazine	9	7
Median grade on sigmoidoscopy	2	1
Smoking	2	2

The median number of diarrhoeal stools decreased significantly in the diet group over the study period (Table III) (P = 0,008, two-tailed signed rank test). Table IV shows those patients with rectal bleeding before and after the trial. Four of the diet group went into full remission with a further 5 improving symptomatically. None of the controls was in remission by the end of the trial, though 1 had improved symptomatically (Table V). This difference is significant (P = 0,009, Fisher's exact test). Changes in rectal mucosa are summarised in Table VI. Eight of the 11 subjects in the diet group, as opposed to 2 of the 6 controls, had improvement in their sigmoidoscopy rating. (This difference is not significant.) Biopsy findings improved in 3 of the subjects in the diet group as well as in 3 of the controls.

Table III. Diarrhoeal stools per day (means and ranges)

	Before	After
Diet group (N = 11)	7 (0 - 12)	0 (0 - 10)
Controls (N = 7)	3 (0 - 7)	3 (0 - 7)

Table IV. Patients with rectal bleeding

	Before	After
Diet group (N = 11)	9	2
Controls (N = 7)	5	4

Table V. Summary of symptoms

	Diet group (N = 11)	Controls (N = 7)
Remission	4	0
Improvement	5	1
No improvement	2	6

P = 0,009 (Fisher's exact test)

Table VI. Changes in rectal mucosa

	Diet group (N = 11)	Controls (N = 6)
Sigmoidoscopy improvement	8	2
Biopsy improvement	3	3

Table VII shows the food intolerances reported by the patients at the outset of the study. By the end of the study, many more foods had been incriminated by the diet group, particularly citrus fruits, pork, fatty meats, grapes and melon.

Table VII. Food intolerances reported by subjects prior to trial

Curry/spicy food	8	Snoek (fish)	1
Tomatoes	7	Vinegar	1
Pineapple	4	Cheese	1
Shellfish	2	Apples	1
Yoghurt	2	Grapes	1

Discussion

The aetiology of ulcerative colitis remains speculative but the possible role of dietary antigens in the inflammatory process is acknowledged.[18] Andreson,[19] in 1942, returning to a hypothesis that he initially put forward in 1925, suggested that ulcerative colitis was a food allergy, with milk the primary antigen. This theory gave rise to much research into hypolactasia and milk antigenicity.[20-25] Though lactose intolerance may be common in ulcerative colitis,[26] its role as a primary aetiological agent no longer has credence and, except in cases of proven lactose intolerance, clinical improvement brought about by the exclusion of milk from the diet is not well explained.

Crohn's disease does appear to be amenable to dietary intervention. Heaton *et al.*[27] reported an improved clinical course in patients on an unrefined carbohydrate, fibre-rich diet, though this has not been substantiated by subsequent studies.[28,29] Evidence is accumulating that a good therapeutic response may be achieved in Crohn's disease with an elemental diet or by means of a whole-protein enteral feed.[11]

Recent epidemiological investigation into the diet of patients who develop ulcerative colitis demonstrates a substantially increased relative risk in those with a high intake of refined sugar, bread and so-called 'fast foods'.[30] The possible efficacy of bowel rest in the management of severe colitis[31] and the anecdotal evidence of patients with individual food intolerances suggest that an alteration in diet may be useful in the management of symptoms.

A suitably controlled study is difficult to undertake. Subject insight into food intake and symptomatology is a prerequisite of an elimination diet. In this study we attempted to overcome the possible therapeutic effect of regular, intensive and personalised care by seeing both groups on a regular basis. Compliance on the part of those on the diet was more difficult to control. The importance of this aspect of the study was stressed at the initial screening.

The mean weight loss of 2,5 kg in the diet group over the 6-week period would suggest that they were, in fact, compliant. Problematic too is the tendency for ulcerative colitis sufferers to avoid foods that they believe provoke symptoms. In this respect the controls themselves may have been practising a form of dietary exclusion.

Although randomised, the subjects were not matched for severity of condition and symptomatology, with the controls having less severe disease than the experimental group. Despite this potential bias, our study has shown a significant decrease in the number of diarrhoeal stools in patients on an elimination diet over a 6-week period. The reduction in rectal bleeding is not significant, but when analysed together with the improvement in diarrhoea, results in a highly significant improvement in overall symptomatology. The fact that the apparent improvement in endoscopic grading did not achieve significance may be due to the small sample size and/or a lag in mucosal improvement behind symptoms. Alternatively it may indicate that the symptomatic improvement represents the successful treatment of irritable bowel symptoms which may be associated with ulcerative colitis.[16,32,33] Impaired colonic salvage of carbohydrate may be a factor in the diarrhoea of ulcerative colitis[34] and this too may explain the apparently disproportionate improvement in diarrhoea in the diet group.

Of the 4 patients who went into remission on the diet, 3 were still symptom-free 8 months later, despite having returned to a normal diet. One of this group appeared to be intolerant of pork, which she now avoids. A 5th subject went into remission early in the study but relapsed just before her final assessment after eating yellow cheese. Since omitting this from her diet, she has been completely well.

Of interest is the fact that the 2 patients who did not improve on the diet had extensive colitis and were the most symptomatic of both groups. Two others with total colitis did, however, improve, which indicates that extensive disease may be amenable to dietary manipulation.

The conventional management of ulcerative colitis is expensive and associated with a variety of side-effects. This study has shown that patients with mild to moderate attacks of ulcerative colitis may be brought into remission by the manipulation of dietary intake.

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Accepted 24 Nov 1994.
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