Study 3—At the end of this four-month uncontrolled study the length of the RAS episodes had been halved while the median number of ulcers per outbreak had dropped from five to two (table III). The diameter of the lesions had decreased in 32 of the 33 patients, and only two patients still had (moderately) painful ulcers during the last month of the study. All indices studied showed a significant improvement from the second month onwards (table IV).

Discussion and conclusions

Our studies have confirmed earlier reports which suggested that levamisole had a beneficial effect in preventing new episodes of RAS. This prophylactic effect is not the result of a placebo influence. Improvement seemed to occur earlier in study 3, which strongly suggests that the flexible regimen used in the last trial is better than the more rigid one used in studies 1 and 2. Other investigators have since confirmed our study 3 findings in a placebo-controlled experiment.⁸

We thank Dr J Bresseleers, Dr R Loncke, Dr G Mattelin, Dr R

Mertens, Dr J Morias, Dr J Slecckx, and Dr K Van de Put for their highly appreciated co-operation with these trials. Thanks are also due to Janssen Pharmaceutica, B-2340 Beerse, for supplying the samples for this series of studies.

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(Accepted 31 December 1976)

Cholestyramine in treatment of postvagotomy diarrhoea—double-blind controlled trial

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British Medical Journal, 1977, **1**, 674-676

Summary

A double-blind controlled trial was performed to assess the effectiveness of cholestyramine in treating severe continuous postvagotomy diarrhoea. Each patient and a clinician assessed the results, and those treated with cholestyramine showed a considerable improvement over those given placebo. There were no significant side effects or changes in laboratory values in the cholestyramine group. Although the numbers were too small for statistical analysis, these results suggest that cholestyramine may be of value in the management of some patients with severe continuous postvagotomy diarrhoea who are unresponsive to other forms of treatment.

Introduction

Truncal vagotomy and drainage is at present the most common operation for duodenal ulcer. Continuous diarrhoea, which produces considerable upset in working and social life,^{1 2} is a major side effect in about 1% of patients. Treatment of the diarrhoea with diphenoxylate or mebeverine is usually disappointing.^{3 4}

We have previously shown that patients with severe, continuous postvagotomy diarrhoea excrete excessive amounts of

bile acids in the faeces, the principal bile acid present being chenodexychoic acid.⁵ The cathartic action of these bile acids on the colon may be a major factor in causing the diarrhoea. Continuous postvagotomy diarrhoea may therefore be similar to the "cholerheic" diarrhoea that follows ileal resection or severe Crohn's disease of the terminal ileum.⁶ Cholerheic diarrhoea may respond satisfactorily to treatment with cholestyramine.⁷

This paper reports the results of a double-blind controlled trial of cholestyramine in the management of patients with severe continuous postvagotomy diarrhoea.

Patients and methods

Sixteen patients, nine women and seven men, who had had continuous postvagotomy diarrhoea for at least two years were studied. In all patients the diarrhoea had started immediately after the operation. All had been unresponsive to dietary and other non-specific treatment. Each patient passed at least three watery, unformed, urgent stools a day.

Eight of the patients were given cholestyramine, 4 g three times a day, and eight were given a placebo three times a day. The placebo consisted of 3.8 g of sucrose and 1.2 g of inert excipient. Both the active preparation and the placebo were supplied in packets containing propylene glycol alginate and sucrose flavouring. The patients were allowed an unrestricted diet but stopped all non-essential treatment during the trial. No vitamin supplements were given and the patients were allowed to take the medication mixed with milk, fruit juice, or any liquid of their own choosing.

The drugs were given by one doctor, and another made an independent clinical assessment at the start of the treatment, after four weeks, and after eight weeks. The assessing clinician was unaware of the treatment given to each patient. The patients were asked to record on a specially designed card the number of stools passed a day, the time of defaecation, the consistency of the stool, and the degree of urgency. They also reported any feeling of distention or abdominal cramp. Blood was taken before the trial and at each visit for estimation of haemoglobin, white cell count, platelets, and concentrations of serum

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B₁₂ and folate, calcium, proteins, iron, sodium, potassium, chloride, and urea. Standard liver function tests were also performed.

The breaking of the code showed that five men and three women had had cholestyramine. Their mean age was 46.8 years. Four had a pyloroplasty as the drainage procedure and four a gastroenterostomy. The mean age of the two women and six men in the placebo group was 46.5 years. Again, four patients had had a pyloroplasty and four a gastroenterostomy.

Each patient and the doctor separately assessed the treatment. The overall state at the start of treatment was graded as 0. Definite improvement was +1, cessation of diarrhoea +2, definite deterioration -1, and considerable deterioration -2. The final assessment was made after eight weeks' treatment with cholestyramine.

Results

The clinical assessment in the cholestyramine-treated group is shown in table I. All but one of the patients considered that the drug had improved the symptoms, and three considered that it had completely relieved them. In most patients the degree of urgency was reduced, and most noted an improvement in the consistency of the stool. The assessments by the doctor and the patient correlated in all but case 4. In that patient the clinician did not consider that a reduction in stool frequency from six to three constituted a cure.

The assessments in the placebo-treated group are also shown in table I. Two patients considered that treatment had produced an improvement, two considered that it had made them worse, and four noted no significant change. Both the patients who claimed benefit considered that the reduction of urgency was considerable. One of the patients who felt worse developed severe abdominal cramps and stopped treatment. The other gave no satisfactory explanation for her assessment, which did not correlate with the medical assessment.

We did not statistically analyse the differences between the two groups because of the difficulty of interpreting results with such small numbers, but the improvement in all five indices of assessment in seven of the eight patients in the cholestyramine group seems likely to be more than coincidence.

The side effects encountered in both groups are shown in table II. Five of the patients on cholestyramine experienced some side effects but most of these were mild. Three of the eight patients in the placebo group experienced side effects, and one developed alopecia. This had happened spontaneously in the past, however, and did not particularly alarm the patient.

No significant changes were noted in the laboratory values. In one patient in the cholestyramine-treated group concentrations of both

serum transaminases rose slightly at eight weeks but this was attributed to the patient's alcohol ingestion. Review of his case sheet showed a similar increase at the time of the initial surgery.

Discussion

The cause of the increased faecal excretion of bile acids, especially dihydroxy bile acids, is unknown but appears to be related to truncal vagotomy. The incidence of the diarrhoea can be considerably reduced by operative procedures that include selective vagotomy.⁸ A high concentration of chenodeoxycholic acid in the colon is considered to be the principal factor in causing diarrhoea after ileal resection,^{7,9} and Mekhjian *et al* showed, using a perfusion technique, that dihydroxy bile acids in the colon cause net secretion of water and electrolytes by the human colonic mucosa.¹⁰ Cholestyramine preferentially binds dihydroxy bile acids *in vitro*¹¹ and may therefore be expected to be of clinical value in patients with a high faecal excretion of dihydroxy bile acids.

The result of our double-blind controlled trial shows that cholestyramine has a considerable advantage over placebo in the management of patients with severe continuous postvagotomy diarrhoea. The trial did not have a crossover design because of the difficulties in making a placebo taste and smell like cholestyramine. Two patients in the placebo group underwent some improvement, and this proportion is comparable to the accepted figures for placebo improvement in short-term trials. Recent metabolic studies on patients with postvagotomy diarrhoea treated with cholestyramine also showed clinical improvement, reduction of stool weight, and reduction in water content of the stool.¹² Condon *et al* also found that the bowel habit of the patients was reduced to an acceptable one or two stools a day,¹² which was rather fewer than in our patients who received cholestyramine. In the study of Condon *et al*, however, the patients in the trial all had less severe diarrhoea than the patients we investigated. In an earlier uncontrolled study Ayulo showed improvement in 11 out of 13 patients with postvagotomy diarrhoea treated with cholestyramine.¹³

None of our patients were made worse by cholestyramine, and the side effects were minimal. Cholestyramine may therefore

TABLE I—Clinical assessment of patients with postvagotomy diarrhoea treated with cholestyramine and placebo before and after treatment

Case No	No of stools		Consistency		Degree of urgency†		Doctor's assessment		Patient's assessment	
	Before	After	Before	After	Before	After	Before	After	Before	After
<i>Patients on cholestyramine</i>										
1	3-4	1	Unformed	Formed	+	-	0	+2	0	+2
2	5-7	2	"	"	+	+	0	+1	0	+1
3	4-5	2-3	"	Loose	-	-	0	0	0	0
4	6-7	3	"	Formed	++	+	0	+1	0	+2
5	5	2	Loose	"	+	-	0	+2	0	+2
6	4-5	2	"	Loose	-	-	0	+1	0	+1
7	5-6	2-3	"	Formed	+	+	0	+1	0	+1
8	2-3	1-2	Unformed	Loose	+	-	0	+1	0	+1
<i>Patients on placebo</i>										
9	9-10	8-9	"	Unformed	-	-	0	0	0	-1
10	3	2	Formed	Formed	+	+	0	0	0	0
11	6-7	3-4	Unformed	Loose	+	+	0	+1	0	0
12	4	4	"	Unformed	-	-	0	0	0	0
13	5-6	5-6	"	"	-	-	0	0	0	0
14*	5-6	5-6	"	"	-	-	0	-1	0	-1
15	9-10	8-9	"	Loose	+	-	0	+1	0	+1
16	4	2	"	"	+	-	0	+1	0	+1

*Discontinued treatment after three weeks.

†+ = Urgent. ++ = Very urgent. - = Not urgent.

TABLE II—Side effects in patients on cholestyramine and placebo

	Vomiting	Nausea	Lethargy	Heartburn	Abdominal cramp	Anorexia	Alopecia
No on cholestyramine	1	3	1	1	2	0	0
No on placebo	0	0	0	0	1	1	1

be of value in managing patients with severe postvagotomy diarrhoea who have not responded to other measures.

We thank Bristol Laboratories for assistance in performing this study.

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(Accepted 6 January 1977)

Prevalence of intestinal parasitic infestation, salmonellosis, brucellosis, tuberculosis, and hepatitis B among immigrant children in Glasgow

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British Medical Journal, 1977, **1**, 676-679

Summary

Two hundred Asian and 100 each of African, Chinese, and Scottish children were screened for intestinal parasitic infestations, salmonellosis, brucellosis, hepatitis B antigen (HBsAg), and tuberculosis. There was a fairly high incidence of *Giardia lamblia* among Asian and Scottish children and of *Trichuris trichiura* among the Chinese. Hookworm ova were seen only in African children. There were no chronic carriers of *Salmonella* or *Brucella*, and no one was suffering from salmonellosis or brucellosis. Tuberculin sensitivity was found in only 4% of immigrant and 1% of Scottish children: the difference was small and neither figure suggests a continuing high incidence of tuberculosis in Glasgow. Only seven immigrant children were found to be HBsAg carriers. Among the families of these carriers there was a high incidence (84%) of HBsAg or antibody (HBsAb).

The survey shows that immigrant children in Glasgow do not constitute a health hazard to the indigenous population. Moreover, severe overcrowding is not a prominent feature among the immigrant families in Glasgow but is greatest among the local Scots.

Introduction

Large-scale immigration into the United Kingdom has brought with it the problem of imported infections.¹⁻⁶ To assess whether immigrant children from tropical and subtropical countries have transmissible infections and infestations that might constitute a health hazard to native Scottish children we designed a survey

to compare health and nutrition in Asian, African, and Chinese children with those in Scottish children of similar social background.⁷ We report here our preliminary findings on the prevalence of intestinal parasitic infestations, salmonellosis, brucellosis, hepatitis B antigen (HBsAg), and tuberculosis among children who were examined in 1974. The Asians were all from the Indian subcontinent, the Africans from various parts of Africa, and the Chinese from Hong Kong. The term Scottish means local White children.

Patients and methods

There are about 12 000 Asians, 1100 Africans, and 3000 Chinese in Glasgow. The immigrant community is mainly concentrated within two major areas on either side of the River Clyde. The children studied came from two schools north of the Clyde. Preschool siblings in the same families were also asked to attend. Forms explaining the purpose of the survey with translations into Urdu, Punjabi, Hindi, and Chinese were given to the parents of each family. The children of parents who agreed to participate were studied at a special clinic held by one of us (KMG) at the Royal Hospital for Sick Children, Glasgow.

Five hundred children (200 Asians and 100 Africans, 100 Chinese, and 100 Scots) from 172 families were studied (table I). The children were aged 6 months to 16 years. Two hundred and eighty-eight of the immigrants were born in the United Kingdom. Almost half the children (217; 102 Asians, 12 Africans, 38 Chinese, and 65 Scots) came from homes with more than two people per room. Sanitation in most of these homes was relatively good, however, and almost all had inside lavatories.

Examination of faeces—A total of 1015 stool specimens from 457 children were examined.⁸ One, two, or three specimens of faeces were submitted by 30%, 34%, and 36% of children respectively. Faeces emulsified in (a) saline and (b) Lugol's iodine were examined microscopically for vegetative parasites, ova, and cysts. Other specimens were similarly examined for ova after zinc sulphate and formol ether concentration. Specimens were cultured by direct plating on MacConkey and deoxycholate citrate (DCA) plates and by inoculation of Selenite F and tetrathionate enrichment broths, which were subcultured on MacConkey and DCA plates after overnight incubation at 37°C. MacConkey plates were examined for enteropathogenic *Escherichia coli* serotypes by screening lactose-fermenting colonies with polyvalent antisera (Wellcome), and positive colonies were taken to titre with specific antisera. Non-lactose-fermenting colonies on MacConkey and DCA plates were subcultured on urea and nutrient-agar slopes. Urea-negative colonies were then screened for salmonellae and shigellae using polyvalent antisera (Wellcome). Agglutinating

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