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# Fermentable carbohydrates (FODMAPs) as triggers of functional gastrointestinal symptoms in patients with inflammatory bowel disease: a randomised, double-blind, placebo-controlled, cross-over, re-challenge trial

S. Cox[1], A. Prince[1], C. Myers[1], P.M. Irving[1,2], J.O. Lindsay[3], M.C. Lomer[1,2] and K. Whelan[1]
[1]*Diabetes and Nutritional Sciences Division, King's College London, London, UK,*
[2]*Department of Gastroenterology, Guy's and St Thomas' NHS Foundation Trust, London, UK and*
[3]*Department of Gastroenterology, Barts Health NHS Trust, London, UK*

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There is preliminary evidence that dietary restriction of fermentable carbohydrates (a 'low FODMAP') diet may ameliorate functional gastrointestinal symptoms (FGS) in quiescent inflammatory bowel disease (IBD)[1,2] although evidence from randomised controlled trials is lacking. While fermentable carbohydrates have been established as triggers of FGS in irritable bowel syndrome (IBS)[3], it is not known whether a similar effect on FGS occurs in IBD. Our aim was therefore to determine whether individual fermentable carbohydrates induce FGS in IBD using a randomised, double-blind, placebo-controlled, cross-over re-challenge trial.

Patients with Crohn's disease or ulcerative colitis in clinical and biochemical remission (Physician Global Assessment, CRP < 10 mg/L and faecal calprotectin <250 μg/g) and meeting the Rome III criteria for a functional bowel disorder were included. Patients were required to report a marked improvement in FGS following a low FODMAP diet, as determined by an affirmative answer to the Global Symptom Question (adequate relief). Participants were allocated to a series of 3-day fermentable carbohydrate challenges provided in random order (12 g/d fructans; 6 g/d galacto-oligosaccharides GOS; 6 g/d sorbitol; and 12 g/d glucose placebo). Each 3-day challenge was separated by a 4-day washout period. During the 3-day challenges, symptoms were measured daily using the Global Symptom Question and the Gastrointestinal Symptom Rating Scale, and stool output was measured using the Bristol Stool Form Scale. Data were compared across the challenge arms using Friedman's test and repeated measures ANOVA with Bonferroni post hoc adjustment, as appropriate.

Thirty-two patients with IBD were recruited and trial data was available for 29 patients who completed all arms of the trial (12 Crohn's, 17 ulcerative colitis; mean age 40·1 ± 14·4 years; 32 % male). All met Rome III criteria for irritable bowel syndrome (n = 12), functional bloating (n = 12) or functional diarrhoea (n = 5). Significantly fewer patients reported adequate relief of symptoms on the final day of the fructan challenge (18/29, 62 %) compared to placebo (glucose) (26/29, 90 %) (P = 0·033). On the final day of the fructan challenge compared to placebo, there was significantly greater severity (0 = absent, 1 = mild, 2 = moderate, 3 = severe) of pain (1·1, SD 0·8 vs. 0·5, SD 0·6, P = 0·004), bloating (1·3, SD 0·9 vs. 0·6, SD 0·7, P = 0·002), flatulence (1·5, SD 0·8 vs. 0·7, SD 0·7, P = 0·004) and faecal urgency (0·9, SD 1·1 vs. 0·4, SD 0·6, P = 0·014). There was a significantly softer stool consistency during the fructan (4·2, SD 1·3, p = 0·007) and GOS challenges (4·0, SD 1·0) compared to placebo (3·5, SD 1·0; P = 0·033). There were no significant differences in any symptoms during the GOS or sorbitol challenges compared to placebo.

In the relatively high doses used, fructans, but not GOS or sorbitol, induced FGS in patients with quiescent IBD. Increased FGS in response to fructan challenge is consistent with a re-challenge trial in irritable bowel syndrome[3]. However, further research is required to determine the effects of fermentable carbohydrate dose on FGS in IBD, whether a low FODMAP diet is effective in managing FGS in IBD, and the degree of FODMAP restriction required for symptom improvement.

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