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Experimental colitis is ameliorated by inhibition of nitric oxide synthase activity

EDITOR.—We congratulate Rachmilewitz and colleagues for their paper discussing the effects of nitric oxide synthase inhibition on experimental intestinal inflammation (*Gut* 1995; **37**: 247-55). Using a rat model of colitis induced by 30 mg trinitrobenzenesulphonic acid in 0.5 ml 50% ethanol (TNBS/E) we have similarly shown the importance of the L-arginine-nitric oxide pathway on mucosal inflammation.¹ L-arginine given by mouth, the biosynthetic precursor of nitric oxide, promoted the inflammatory response in experimental colitis. Addition of N^G-nitro-L-arginine methyl ester (L-NAME) to the arginine supplemented diet reduced both colonic inflammation and weight loss. In accordance with Rachmilewitz and colleagues, we have also found that oral administration of L-NAME alone, as an oral solution (500 mg/l) or as an enema, (1 g/l)

reduced colonic inflammation in this model of colitis.

Bacteria, bacterial products, and cytokines may all promote induction of calcium independent nitric oxide synthesis in the colonic mucosa. There is evidence that enteric bacteria and their products can penetrate the gut mucosal barrier in patients with inflammatory bowel disease (IBD) and in experimental models of colitis.^{2,3} Increased faecal concentrations of tumour necrosis factor have also been shown in both IBD and TNBS/E induced colitis.^{4,5} In addition we have recently shown that administration of an anti-tumour necrosis factor antibody reduces the inflammatory response in this model of colitis.⁶ It is therefore possible that these bacterial products and cytokines may exert a pro-inflammatory action in patients with IBD by the induction of nitric oxide synthesis.

We agree with the authors that modulation of nitric oxide synthase activity may have therapeutic potential in IBD. As shown by Rachmilewitz and colleagues L-NAME given by mouth has potent hypertensive effects, which may limit its usefulness in the treatment of patients with chronic IBD. Topical administration, however, may confer beneficial anti-inflammatory effects with reduced cardiovascular complications.

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Heartburn in patients with achalasia

EDITOR.—We were interested to read the thought provoking paper on heartburn in patients with achalasia, in which the authors hypothesised that the heartburn described by 48% of achalasia patients eligible for review was related to gastro-oesophageal reflux disease (GORD) and documented on manometry a relative reduction in basal lower oesophageal sphincter pressure in such patients (*Gut* 1995; **37**: 305-8).

They themselves note that there are many alternative causes for heartburn in patients with achalasia and performed no pH monitoring to support what they admit remains speculation. However, if such a group of patients did exist and could be reliably selected they would clearly be candidates for an antireflux procedure at the time of treatment by surgical myotomy.

Following an initial study examining the need for an antireflux procedure during laparoscopic Heller's cardiomyotomy,¹ we have prospectively evaluated patients with achalasia undergoing such surgery with a protocol that includes pre and postoperative 24 hour pH monitoring.

The 12 patients who have undergone preoperative pH monitoring had a median composite DeMeester score² of 0.45 (range 0.2-16.8) (upper limit of normal 14.72 at pH threshold <4) only one patient showed abnormal oesophageal acidity at this stage. Postoperatively in 10 patients the median score increased to 6.00 (range 0.2-19.6) with two patients lying outside the normal range, one of whom had probably had an inadequate myotomy.

Preoperatively significant reflux was extremely uncommon and these results do not support the hypothesis that the heartburn experienced by patients with achalasia is due to acid reflux. Even after a myotomy completely dividing the lower oesophageal sphincter very few patients showed significant GORD despite their aperistaltic oesophagus and it seems likely that factors such as the crural fibres of the diaphragm³ continue to effectively prevent reflux in most patients. A review of 75 papers reporting 5002 patients with achalasia gave an average incidence of postoperative GORD of 8.6%.⁴ It is improbable therefore that large numbers of such patients refluxed significantly before the development of their achalasia as speculated by your authors.

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BOOK REVIEWS

Atlas of Clinical Hepatology. By N Gitlin, R M Strauss. (Pp 183; illustrated; £92). Philadelphia: W B Saunders, 1995. ISBN 0-7216-4356-6.

The explosion in information technology has revolutionised the way knowledge is sought and processed, but in a manner that reduces the impact of pictorial images on education. The role of the classic textbook as pivotal to teaching is increasingly challenged by