

## Clinical Nutrition: The role of diet and supplementation in inflammatory bowel disease- Martyn Caplin- Royal Free Hospital

Martyn Caplin

### Abstract

**Background & Aims:** Inflammatory Bowel Diseases (IBD) is chronic immune disorders of unclear etiology, in which the gastrointestinal tract is inflamed. Diet could also be a possible pathogenic think about the event of IBD and patients often take food supplements with no evidence base. We have thus assessed the evidence for food supplements in the management of IBD.

**Methods:** A PubMed search was being executed for the terms: Inflammatory bowel disease; nutritional deficiencies; dietary add-ons; curcumin; green tea; vitamin D and additional vitamins; folic acid; iron; zinc; probiotics; *Andrographis paniculata* and *Boswellia serrate*. PubMed was went to look for all relevant articles published during 1975-2015. Reference lists from studies selected by the electronic search were searched manually to identify further relevant reports. Reference grades from all existing review articles, primary studies and proceedings of major meetings were also measured. Articles published as abstracts were included, whereas non-English language papers were excluded. The value and asset level of the results were measured. For each nutrient, botanical extract or probiotic bacteria, we excluded most in-vitro and animal studies unless specifically relevant to the human conditions and we focused the review on meta-analyses and systematic reviews, large epidemiological studies and, where available, randomized controlled trials. A total of 2306 records were reviewed and 97 were defined as fulfilling the criteria for final consideration.

**Results:** Curcumin, a bright yellow polyphenol extract from the Indian spice turmeric, has been used in various gastrointestinal disorders and studied for its anti-inflammatory effects. Curcumin has been reported to attenuate inflammatory responses by inhibiting cyclooxygenase-2, lipoxygenase, nuclear factor (NF)- $\kappa$ B, inducible nitric oxide interferon- $\gamma$ -activated or TNF- $\alpha$ -activated macrophages and natural killer cells; as a result, it has been considered alone or in combination with standard medications in the management of IBD. Recently, curcumin has been reported to reduce inappropriate epithelial cell transport and increase anti-inflammatory cytokines, thus reducing inflammation associated with IBD. The maximum indication was for curcumin, green tea, vitamin D and probiotics. Curcumin

supplementation has been reported to be effective in reducing both the symptoms and the inflammatory indices in IBD patients. Similar results have been observed for green tea, however pertinent studies are limited. Vitamin D supplementation may help to both increase bone mineral density in patients with IBD and to scale back disease activity. IBD patients with ileal resections >20 cm may develop vitamin B12 deficiency which needs parenteral supplementation. Conversely, there's no current evidence to support fat soluble vitamin supplementation in IBD patients. Probiotics, particularly VSL#3, appears to scale back disease activity in IBD patients with pouchitis. Complementary and alternative medicines are used by IBD patients and some in vitro and animal studies have showed promising results. Conclusion: Attention to dietary factors such as curcumin, green tea and vitamins, including vitamin D and vitamin B12, appears to be beneficial and, if necessary, supplementation may be appropriate.

In a recent series including a pilot study of 10 IBD patients, five UC patients receiving curcumin 1000-1600 mg daily showed a significant reduction in both the symptoms and the inflammatory indices. Of five CD patients consuming 360 mg three or four times per day, four patients showed a reduction in both the CD activity index (CDAI) and symptomatic parameters. Again, benefit has been reported in UC related to enteropathic arthropathy. In a randomized-controlled trial on 89 UC patients, the addition of 2 g/day of curcumin to standard therapy significantly reduced risk relapse (4.65 vs. 20.51%) and expected clinical activity and endoscopic directories after 6 months. In detail, 45 patients took curcumin, 1g after breakfast and 1g after the evening meal, added sulphasalazine or mesalamine, and 44 patients received placebo plus sulphasalazine or mesalamine for 6 months. In a recent series aimed at assessing the effect of curcumin on the levels of enzymes and signalling proteins that stimulate immune responses in the gut of children and adults with IBD, a suppression of unwanted immune reaction and enhancement in beneficial immune reaction were reported. Moreover, the most recent placebo-controlled, double-blind randomized study in UC showed that the addition of 3 g curcumin to mesalamine therapy was superior to the combination of placebo and mesalamine in inducing clinical

Martyn Caplin  
Royal Free Hospital, UK

and endoscopic remission in patients with mild-to-moderate active UC after 1 month, with no apparent adverse effects. Conversely, a recent randomized, double-blind, single-entre pilot trial was conducted in patients with distal UC (<25 cm involvement) and mild-to-moderate disease activity. Forty-five patients were randomized to NCB-02 (standardized curcumin preparation) enema plus oral 5-ASA or placebo enema plus oral 5-ASA. Although the outcome difference was not statistically significant on intention-to-treat analysis, there was a trend towards better outcomes in the NCB-02 group, which highlights the need for further investigations on this novel promising therapy for IBD patients.

### Other Therapies:

A randomized, double-blind, placebo-controlled trial of oral aloe vera gel for active UC showed benefit for both clinical and histological parameters. Other herbs, including *Andrographis paniculata*, appear to inhibit TNF- $\alpha$ , IL-1s and NF- $\kappa$ B in an in-vitro setting. Chamomile dry extract of chamomile flowers, because of its anti-inflammatory effects and antibacterial, spasmolytic and ulcer-protective potential, has shown initial promising evidence in maintenance therapy of UC. In addition, cannabinoids were found to improve inflammation in an animal model of colitis by reducing inflammatory cytokine release. *Boswellia* spp. (*Boswellia serrata*), which belongs to the family of trees producing resin, has been shown to exert therapeutic effects in the IBD setting. In a single randomized study, 30 patients with UC were randomized to receive either *B. serrata* resin (900 mg/day in three doses, n=20) or sulphasalazine (3 g/day in three doses, n=10) for 6 weeks. Remission of the disease was achieved in 14 of 20 patients who received *Boswellia* gum resin compared with four of 10 who received sulphasalazine. In a randomized double-blind study, 102 patients with active CD were randomized to receive *B. serrata* extract (H15) or mesalazine. The mean reduction in the CDAI was 90 for H15 and 53 for mesalazine.

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