

Steroids and Bowel Rest Versus Elemental Diet in the Treatment of Patients With Crohn's Disease: The Effects of Protein Metabolism and Immune Function

The traditional management of acute attacks of inflammatory bowel disease (Truelove regimen) consists of bowel rest, intravenous fluids, steroids, and antibiotics. However, there have been studies suggesting that an elemental diet is as effective as steroids in inducing remission from an acute attack of Crohn's disease. This study was undertaken to investigate the metabolic and immunological effects of these 2 disparate therapies.

Six patients with chronic Crohn's disease who met the inclusion criteria of a palpable inflammatory mass, elevated erythrocyte sedimentation rate (ESR), nausea, abdominal cramps, weight loss, and absence of obstruction were randomly assigned to receive a 1-week course of either steroids (400 mg/dL) plus bowel rest and intravenous fluids, or an elemental diet alone. At full strength, the elemental formula (Elemental ED), infused via a nasogastric tube, provided 2,000 calories from glucose polymers, MCT oil, and 84 g of amino acids. Amino acid and protein turnover ratios, assessed by ^{14}C -labeled tracers, plus immunological status were assessed initially and again on day 7 of treatment. Total nitrogen losses were estimated by adding 2 g of nitrogen to the 24-hour nitrogen excretion.

Clinical and symptomatic improvement occurred in all patients. Improvement was also reflected by more normal ESR values, platelet counts, and serum albumin and globulin concentrations. The steroid therapy resulted in higher levels of glucose, insulin, and cortisol, but lower T-lymphocyte counts, immunoglobulin concentrations, and IgG synthesis rates. Plasma amino acid concentration, protein breakdown, and albumin synthesis increased in the steroid-treated patients whereas they fell in the patients who received the elemental formula. Nitrogen excretion increased in both groups over the duration of the study, but the mean nitrogen balance on day

7 was +2.4 g/d for the group receiving the elemental diet and -8.9 g/d for those who received the steroid regimen. Both therapies were associated with increased rates of plasma amino acid flux, amino acid oxidation, whole body protein turnover, and suppressed lymphocyte subsets, lymphocyte transformation, and serum complement concentrations.

The authors conclude that the primary difference with the steroid therapy was greater immunosuppression and higher nitrogen loss.

O'Keefe SJD, Ogden J, Rund J, et al. *J Parent & Ent Nutr* 1989; 13:455-460.

Editor's Comment—*This study is very important; it is the first well-designed scientific study that attempts to evaluate the effects of bowel rest with steroid therapy versus an elemental diet for the management of an acute attack of Crohn's disease. In this prospective, blinded study, the authors demonstrate that both treatments induced clinical and symptomatic improvement of the disease; however, the treatment with steroids plus bowel rest was associated with greater immunosuppression and a more severe loss of nitrogen than occurred with the elemental diet. With the steroid-based therapy there was a cumulative loss of 55 g of body nitrogen (equivalent to 360 g of protein or 1.5 kg of lean body mass). This high catabolic state persisted even after the disease was in remission, suggesting that steroids may interfere with normal adaptation to fasting. In contrast, an elemental diet reversed this process and resulted in a small gain in body nitrogen.*

The data clearly show that from a nutritional point of view, it is difficult to support the use of a starvation regimen in patients with acute disease. Additionally, the data point to a possible role of dietary proteins in the perpetuation of the inflammatory

process of patients with Crohn's disease. For the individual patient, the Truelove regimen of bowel rest, steroids, and antibiotics should always be complemented at least with IV nutrition or preferably with an elemental diet. The prompt reversal of the negative nitrogen balance with an elemental diet during acute relapses of the disease may allow children with Crohn's disease to sustain more normal growth. Therefore, I agree with the authors that diet restriction is contraindicated and that there are times when it may be advantageous to avoid the use of steroids.

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Germ-line Mosaicism in Osteogenesis Imperfecta

Germ-line mosaicism is the presence of more than 1 population of germ cells within a gonad. It is suspected when multiple children affected with an autosomal dominant disorder or a disorder that results from a new mutation of an X-linked gene are born to normal parents. Although evidence for such mosaicism is usually circumstantial, Cohn et al document the phenomenon in a family with lethal osteogenesis imperfecta (OI) type II. Two affected sons were born to an "unaffected" father by 2 separate wives. Electrophoretic abnormalities typical of OI type II were detected in type I collagen synthesized by skin fibroblasts from both affected infants, but not from the father or from 2 unaffected sisters of the second son. Further analysis pointed to an abnormality in the $\alpha 1(I)$ collagen chain; ultimately, a single nucleotide change resulting in a substitution of aspartic acid for glycine at position 883 of the triple helix was detected. Since the base change disrupted a restriction endonuclease cleavage