Nutrition and Inflammatory Bowel Disease

Enteral Nutrition and Alternative Diets

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I have nothing to disclose.
Objectives

- Role of nutrition in IBD.
- Diets:
  - Enteral Nutrition
  - Alternative Diets
Diet and Nutrition

• *Diet* is the actual food that is consumed
  “What you eat”
• *Nutrition* refers to properly absorbing food and staying healthy
  “How you eat”
• Incorporating good nutrition into your diet is essential
Background

- IBD chronic immune disorder of unclear etiology.
- Pathogenesis: multiple factors: **Diet**, environment, immunologic, infectious, genetics and the microbiome.
EPIDEMIOLOGY

• IBD is most prevalent in northern Europe and North America.
• Less common in the Asia-Pacific region, with the exception of Australia.
• Incidence of IBD has been rapidly increasing in many parts of the world, including Asia, occurring first in more-industrialized countries.
• Hypothesis that Westernization of our lifestyle is linked to the rising incidence of IBD, as well as other immune-mediated diseases.

Hou JK et al. Am J Gastroenterol. 2011
NUTRITION as MEDICINE

• Eating can cause symptoms, “if it hurts don’t do it”.
• Fear, lack of response or dissatisfaction with current medical or surgical therapies leads to searching for alternate “natural” or complementary options.
• ROLE OF DIET IS VERY COMPLICATED.
• Limited studies: No consistent evidence.
• Overlap of IBD and IBS symptoms.
• Physician expertise.
Sites of Absorption

- Iron
- Folate
- Carbohydrates
- Fats
- Proteins
- Calcium
- Magnesium
- Trace elements
- Vitamins

Water and electrolytes

- Vitamin B₁₂
- Bile salts
- Short chain fatty acids
Malnutrition in IBD

• The malnutrition of IBD is multi-factorial:
  • Chronic inflammation
  • Increased metabolic requirements
  • Anorexia
  • Malabsorption

Growth Failure
Weight loss
Reduced muscle mass
Bone disease
Micronutrient deficiencies

JE Teitelbaum, WA Walker, UpToDate, 2009
## Internet Search

<table>
<thead>
<tr>
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Diets: sorting fact from fiction
Enteral Nutrition (EN) as Primary Therapy for Crohn’s Disease
Exclusive Enteral Nutrition (EEN)

- Only dietary intervention that has been rigorously tested and shown to induce remission of Crohn’s.
- EEN therapy first-line therapy in many parts of the world (Europe 65%, Canada 36% and US 4%).
- Defined formula at 100% of caloric needs for 4–12 weeks.

**HOW DOES IT WORK?**

- Nutritional repletion
- Correct intestinal permeability
- Monotony – minimize exposure
- Modification of intestinal bacteria
- Altered inflammatory cascade
- Reduces symptoms and causes mucosal healing

Spare the use of steroids and other immunosuppressive therapies.
In children, EEN can increase linear growth, bone health, and lean mass.

Lionetti et al. JPEN 2005.
Critch et al. JPGN 2012
Steroids vs. Enteral Nutrition

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Enteral Nutrition</th>
<th>Steroid</th>
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<td>B: Maldow 1990</td>
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<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>192</strong></td>
<td><strong>160</strong></td>
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Total events: 95 (Enteral Nutrition), 120 (Steroid)
Heterogeneity: Chi² = 8.40, df = 6 (P = 0.21); I² = 29%
Test for overall effect: Z = 4.61 (P < 0.00001)

Overall remission rate for steroids 75%, for EN 49% BUT only 2/3 of adult patients tolerated formula.  
Zachos et al. Cochrane 2007
Enteral Nutrition vs. Steroids for active Pediatric Crohn’s disease

LIMITATIONS AND BARRIERS

• Limited adherence due to dislike of formula or flavor fatigue.
• Impact on social life.
• Fear of tube feeding
• Cost of formula, getting insurance coverage.
• Knowledge for management of tube feeding
Enteral Nutrition

- Several prospective studies have shown that both pediatric and adult patients with active CD achieved remission.
- Types of primary enteral formulas include polymeric (P) and elemental (E) enteral formulas.
- Pediatric study with active CD, there were no significant differences between the use of either formulas for inducing remission (P: promoted favorable weight gain).
- Cochrane review comparing 10 studies with 334 CD patients similarly found no difference between the use of elemental, semi-elemental, and polymeric formulas at inducing remission in CD.

PRESCRIPTION

- Induction: At least 8 weeks
- Allow 3-4 weeks to assess efficacy
- 120% of recommended dietary allowance
- PO – Goal 2-4 portions a day
- Allow water or clear fluids (clear soda, soup broth, popsicles) as max 10% of energy intake
- Gum, hard candy are OK
- Vitamin D and Calcium supplementation
- Increase if hunger, activity, weight loss

Critch J et al. JPGN 2012
Maintenance Therapy

Supplemental night feeds
• Patients on nightly feeds relapse less than regular diet (43% vs. 79%)
• May need up to 4-6 nights per week

Partial oral formula diet (50% of needs) vs. unrestricted diet
• Lower Relapse rate 27% vs. 64%

Cyclical exclusive enteral nutrition
• 1 month every 4 months

Wilschanski et al. Gut 1996
Belli, Seidman et al. Gastro 1988
Tagaki et al. Aliment Pharmacol Ther
Low Fiber Diet (AKA Low Residue Diet)

- History: food residue -> GI distress
- “RESIDUE”: Non digestible food
- Restrict dietary fiber in active IBD
- Minimize risk of obstruction in CD strictures.
- Italian study: 70 patients with CD on low residue vs normal Italian diet for 29 months
- Result: No difference in steroids, surgery or clinical disease activity.

Levenstein 1985
Modified Fat Diets

• VEGAN OR VEGETARIAN
  - No Animal Fat
• SEMI VEGETARIAN DIET
  - Reduced Animal Fat

DEFICIENCIES

Iron
Vitamin B 12 (Vegan)
Calcium (Vegan)
Vitamin D (Vegan)
Omega 3 Fatty Acids
Semi - Vegetarian Diet (SVD)

One small study from Japan (Chiba 2010) 22 adults patients with quiescent CD follow SVD for 2 years. Only medication used: mesalamine or Sulfasalazine.

• Results
• Compliance 75% (16) with semi-vegetarian diet.
• Of these 16 compliant patients, remission rate 92% at 2 years
• Limitations: small sample size and no endoscopic and histologic end points
Paleolithic Diet
Paleolithic Diet

- Introduced by Dr. Walter L. Voegtlin “Stone Age Diet”.
- Theory: Human digestive tract has not evolved to handle the modern diet.
- Emphasizes the intake of lean, non domesticated meats and non-cereal, plant-based foods.
- Primary principle is based on assumptions of evolutionary biology, there is no mechanistic theory as to the effect of diet on intestinal inflammation.
- The lack of mechanistic theory has also led to great variations in the recommended foods and restrictions.
- **No formal published studies on the benefits of Paleo diets in the management or prevention of IBD**
RESEARCH : PALEO DIET

- None
- Zero
- Zilch
- Nada

LIMITATIONS AND BARRIERS
- Restriction of carbohydrates and dairy may promote weight loss.
- Expense and time associated with food prep.
- High fat, high protein, high fiber.
- Nutrition Deficiency : vitamin D.
GLUTEN FREE DIET
Gluten Free Diet

- Controversy about possible increased incidence of celiac disease in IBD
- No clear evidence that it affects disease activity
  - Poorly absorbed peptide: Malabsorption
  - Avoidance of gluten may improve symptoms such as diarrhea and bloating.
CCFA Cohort: gluten free diet questionnaire

• 1647 IBD patients
• 65% patients who tried the diet reported reduction in symptoms: fatigue, 38% reduction in flares.

There is a need for a well designed study
THE LOW FODMAP DIET
FODMAPS

F  = Fermentable
O  = Oligosaccharides
D  = Disaccharides
M  = Monosaccharide; A = and
P  = Polyols
FODMAP: How does it work?

- **FODMAPS:** "Intestinal fast food":
  - Increase Bacteria Small Bowel
  - Increase Intestinal Permeability
  - Decrease Barrier Function
  - Proximal Changes luminal content leading to
    - Epithelial
    - Neural
    - Hormonal

- FODMAP diet is highly restrictive on certain fruit and vegetable intake

Gibson PR & Shepard SJ. Personal View: Food for Thought. Western Lifestyle And the susceptibility to Crohn’s Disease. *Aliment Pharmacol Ther* 21, 1399–1409
FODMAP diet: research

• Few small studies have evaluated the diet in IBD patients.
• Pilot cohort study of 52 active CD patients and 20 active UC patients (70% of the patients were compliant did note improvement of abdominal pain, bloating and diarrhea) – 50 % response
• UC patients who had undergone colectomy. Stool frequency dropped. No improvement in pouchitis.
• Data regarding the diet’s effect on intestinal inflammation or disease natural history are lacking at this time.


WE NEED MORE INFORMATION
The Anti-Inflammatory Diet (AID)
The Anti-Inflammatory Diet (AID)

• How does it work? Certain Carbs acting as substrates to pathogenic bacteria in the gut.
• Anti-Inflammatory Diet (IBD-AID) restricts the intake of certain carbohydrates, includes the ingestion of pre- and probiotic foods, and modifies dietary fatty acids to demonstrate the potential of an *adjunct dietary therapy for the treatment of IBD*.

5 components:
• The modifications of specific carbohydrates
• Emphasis on restoring intestinal flora balance
• Decrease total and saturated fats
• Identify food triggers, intolerances and missing nutrients
• Food texture modification to increase absorption and reduce intact fiber.

Olendzi 2014
AID: RESEARCH

• IBD-AID: lean meats, poultry, fish, omega-3 eggs, particular sources of carbohydrate, select fruits and vegetables, nut and legume flours, limited aged cheeses (made with active cultures and enzymes), fresh cultured yogurt, kefir, miso and other cultured products (rich with certain probiotics) and honey.

• Case series

• 11 patients (8 CD, 3 UC)

• 4 weeks

• RESULT: Improvement in clinic symptoms and ability to reduce medications.

Need well controlled trials
Specific Carbohydrate Diet (SCD)
The Specific Carbohydrate Diet

– Dr Sidney Haas in 1920s to treat celiac disease
– in 1950s Elaine Gottschall “breaking the vicious cycle”.

• **HOW DOES IT WORK ?** Disaccharide and polysaccharide Carbs are poorly absorbed in the GI tract -> bacterial overgrowth -> malabsorption -> intestinal injury.

• Restricts complex carbohydrates and refined sugars.
– Lactose, Sucrose, Starches ✗
– Monosaccharide ☑
Specific Carbohydrate Diet

**PHASE I**
- well cooked protein foods, homemade yogurts, pressed apple cider

**PHASE II**
- Expanding with well cooked veggies and fruits. No skins or seeds

**PHASE III**
- Expanding with some raw fruits and cooked veggies, nut flours

**PHASE IV-V**
- Raw fruits and veggies, legumes and tree nuts

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<tr>
<th>Homemade Food</th>
<th>Highly fermented yogurt</th>
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<tr>
<td>No grains</td>
<td>Proteins and healthy fats</td>
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SCD : Research

- Anecdotal success stories but limited studies
- Retrospective case series (7 pediatric active CD patients)
- Prospective case series (10 pediatric active CD patients)
- No published controlled trials
- No studies examining possible mechanisms for an effect of SCD on IBD.
- Improvement in Ped CD activity index score


LIMITATIONS AND BARRIERS

• Complexity of diet.

• Restrictive diet can be difficult to maintain, especially for picky eaters.

• Food prep is time consuming.

• Potential for nutrient deficiencies.

• Potential to cause weight loss
Bottom Line on Popular Diets

- There is scientific evidence that dietary factors may influence both the risk of developing IBD and intestinal mucosal inflammation
- More well-controlled studies are needed
- Some diets may be worth a try BUT…

Individualized nutrition therapy should be based on:
- Symptoms
- Whether the patient is currently in remission or experiencing a flare
- Location of the disease in the GI tract
- Presence or absence of strictures
- Any prior surgeries
- Whether there are any nutritional deficiencies
- Growth patterns, Pediatric patients

Consult your physician and dietitian prior to initiating the diet.
Take home points

• No one diet works for all.
• Attention to weight changes, eating habits, and GI symptoms are the best guides
• Ongoing nutrition and disease assessment.
• The Paleo diet is not recommended for treatment in IBD.
• Enteral therapy option for treatment of CD
• Team – Patient, Family, Physician, Registered Dietician
• Support in the kitchen – time, $$, online
• Decide on “plan B” in advance
The Future
NEXT EXIT
Future Directions

- Nutrition research is a particularly challenging area.
- Study of diet and IBD is more complicated.
- Short-term research priorities should include randomized controlled trials to evaluate the efficacy of different diets.
- A common nutrient in many of the oral diets discussed is carbohydrates.
- All types of research (clinical trials, basic and translational) is important to help clarify the mechanisms of nutrient effect on inflammation.
THANK YOU!