To Eat or Not to Eat

DIETS AND IBD

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Disclosures

No relevant conflicts of interest
Outline

• Does the Diet Matter?
• If So, How?
• What Does the Research Say?
• General Tips
Does the Diet Matter?

Genetics

- 163 risk genes
- 22% of IBD patients have family members with IBD
- 27% CD in identical twin of CD patient
- 15% UC in identical twin of UC patient

Environment

- Tobacco
- Pollution
- Medications
- Infections
- Microorganisms
- Oral contraceptives
- Dietary intake

IBD
Illustrations of Diet & IBD Risk

• **Japanese Survey**
  • Surveys from up to 68,000 Japanese (1966-1985)
  • 242 CD patients had ↑ animal protein, ↑ omega-6, ↓ omega-3

• **European Prospective Investigation into Cancer**
  • Surveys from 203,193 Europeans (1991-1998)
  • 126 UC patients had ↑ omega-6

• **Nurses’ Health Study**
  • Surveys from up to 170,000 women
  • Fiber was associated with ↓ risk of CD but not UC
  • Vitamin D was associated with ↓ risk of CD but not UC
Figure 2  Odd ratios (---) and relative risks (→) of food against the occurrence of Crohn’s disease and ulcerative colitis.
Does the Diet Matter?

**Nutrition**
- undigested sugars promote growth
- fiber, omega-3 fats, vitamin D modulate the immune system
- malabsorbed foods lead to diarrhea
- malnutrition leads to poor health

**Inflammation**

**Bacteria**

**“Health”**

**Symptoms**
Million and One Diets

- Abs Diet
- Acid Alkaline Diet
- Atkins Diet
- Biggest Loser Diet
- Body Reset Diet
- DASH Diet
- Dukan Diet
- Eco-Atkins Diet
- Engine 2 Diet
- Fast Diet
- Flat Belly Diet
- Flexitarian Diet
- Glycemic Index Diet
- Gluten-Free Diet
- HMR Diet
- Jenny Craig Diet
- Lactose-Free Diet
- Macrobiotic Diet
- Mayo Clinic Diet
- Medifast Diet
- Mediterranean Diet
- Nutrisystem Diet
- Ornish Diet
- Paleolithic Diet
- Paleolithic Diet
- Raw Food Diet
- Slim-Fast Diet
- South Beach Diet
- Spark Solution Diet
- Specific Carbohydrate Diet
- Supercharged Hormone Diet
- TLC Diet
- Traditional Asian Diet
- Vegan Diet
- Vegetarian Diet
- Volumetrics
- Weight Watchers Diet
- Zone Diet
- [You Name It] … Diet
How Does Nutrition Affect IBD?

**Carbohydrates**
- Lactose-free diet
- Low FODMAP diet
- Specific carbohydrate diet

**Fiber**

**Gluten**
- Gluten-free diet
Carbohydrates

- Sugar molecules
  - Monosaccharides
  - Disaccharides
  - Oligosaccharides
  - Polysaccharides

- Osmotic effect = draws fluid into intestines
  - Analogous to bowel prep

- Undigested carbohydrates are fermented by bacteria
  - Alteration of intestinal microbiota
  - Bacterial growth and overgrowth
  - Bloating
  - Inflammation
Low FODMAP Diet

• **Biologic Premise**
  - Undigested carbohydrates feed gut bacteria
  - Bacterial overgrowth can cause gas, bloating, diarrhea

• Diet improves abdominal pain, bloating, and diarrhea (not constipation) in IBD

• Possible effect on inflammation?
Lactose-Free Diet

• Biologic Premise
  • Lactase (the enzyme that digests lactose) is deficient
  • Leads to lactose malabsorption and diarrhea

• Lactose intolerance reported in 40-70% CD patients

• Lactose malabsorption may be present in active disease … but lactase activity equivalent to that in healthy controls

• May improve symptoms, but no clear effect on inflammation
Specific Carbohydrate Diet

• Originally developed to treat celiac disease
• Popularized by the book “Breaking the Vicious Cycle”

• Elimination of di-, oligo-, and polysaccharides
  • Prohibits high-lactose dairy, starchy vegetables, all grains, and foods with added sugar
  • Permits lactose-free yogurt, fresh fruits, meats, poultry, fish, eggs

• Some anecdotal successes
• Symptomatic benefit in 2 case series (16 children)
• Effect on inflammation unknown
Fiber

- Fiber is non-digestible plant-based substance

- Insoluble Fiber
  - Absorbs water
  - Adds bulk and frequency of stools
  - Sources: beans, bran, fruit/vegetable skins, nuts, seeds, whole wheat

- Soluble Fiber
  - Dissolves in water to form gel
  - Sources: fruits (oranges, peaches, grapes, prunes), oats
Fiber

• Biologic Premise
  • Converted to short chain fatty acids (SCFA)
  • SCFA serve as fuel for colon cells
  • SCFA enhances microbial biodiversity toward “good” bacteria
  • SCFA has immune modulating properties

• Nurses’ Health Study
  • Surveys from up to 170,000 women
  • Fiber was associated with ↓ risk of CD but not UC

• Trial of high fiber in 352 inactive-mild CD found no difference in symptoms, hospitalizations, or surgeries
Fats

• **Japanese Survey**
  - Surveys from up to 68,000 Japanese (1966-1985)
  - 242 CD patients had ↑ animal protein, ↑ omega-6, ↓ omega-3

• **European Prospective Investigation into Cancer**
  - 126 UC patients had ↑ omega-6
Fats

Omega-6
(e.g., linoleic acid)

Arachidonic acid

Tx1, LT4, PG2

Promotes inflammation

Omega-3
(e.g., linolenic acid)

EPA, DHA

PG3, Tx3, LT5

Modulates inflammation
Omega-3 fatty acids

**Crohns’ Disease**
- **Induction**
  - No trials
- **Maintenance**
  - Epanova in Crohn’s Study 1 and 2 → no benefit
  - Cochrane review of 1039 patients → marginal benefit

**Ulcerative Colitis**
- **Induction**
  - Inconsistent results
  - Largest study (86 patients) → no difference
- **Maintenance**
  - 3 trials (138 patients) → no difference in 1-2 year relapse rates
Review: Omega 3 fatty acids (fish oil) for maintenance of remission in Crohn’s disease

Comparison: 1 Omega-3 versus placebo

Outcome: 1 Relapse rate at one year (all studies)

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Treatment n/N</th>
<th>Control n/N</th>
<th>Risk Ratio M-H, Random, 95% CI</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Belluzzi 1996</td>
<td>11/39</td>
<td>27/39</td>
<td></td>
<td>12.0%</td>
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<tr>
<td>Lorenz-Meyer 1996</td>
<td>40/70</td>
<td>36/65</td>
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<td>21.4%</td>
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<tr>
<td>Belluzzi 1997</td>
<td>2/26</td>
<td>5/24</td>
<td></td>
<td>2.2%</td>
</tr>
<tr>
<td>Romano 2005</td>
<td>11/18</td>
<td>19/20</td>
<td></td>
<td>17.6%</td>
</tr>
<tr>
<td>Feagan 2008a</td>
<td>54/183</td>
<td>62/180</td>
<td></td>
<td>21.2%</td>
</tr>
<tr>
<td>Feagan 2008b</td>
<td>84/187</td>
<td>94/188</td>
<td></td>
<td>25.6%</td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>523</strong></td>
<td><strong>516</strong></td>
<td><strong>0.77 [0.61, 0.98]</strong></td>
<td></td>
</tr>
</tbody>
</table>

Total events: Treatment, 202; Control, 243
Heterogeneity: Tau² = 0.05; Chi² = 12.01, df = 5 (P = 0.03); I² = 58%
Test for overall effect: Z = 2.16 (P = 0.031)
Test for subgroup differences: Not applicable
Review: Omega 3 fatty acids (fish oil) for maintenance of remission in Crohn’s disease

Comparison: 1 Omega-3 versus placebo

Outcome: 2 Relapse rate at one year **(enteric coated studies)**

<table>
<thead>
<tr>
<th>Study or subgroup</th>
<th>Treatment</th>
<th>Control</th>
<th>Risk Ratio M-H,Random,95% CI</th>
<th>Weight</th>
<th>Risk Ratio M-H,Random,95% CI</th>
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</thead>
<tbody>
<tr>
<td>Belluzzi 1996</td>
<td>11/39</td>
<td>27/39</td>
<td>0.41 [ 0.24, 0.70 ]</td>
<td>15.6 %</td>
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<tr>
<td>Belluzzi 1997</td>
<td>2/26</td>
<td>5/24</td>
<td>0.37 [ 0.08, 1.73 ]</td>
<td>2.9 %</td>
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<tr>
<td>Romano 2005</td>
<td>11/18</td>
<td>19/20</td>
<td>0.64 [ 0.44, 0.94 ]</td>
<td>22.5 %</td>
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<tr>
<td>Feagan 2008a</td>
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<td>62/180</td>
<td>0.86 [ 0.63, 1.16 ]</td>
<td>26.9 %</td>
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<tr>
<td>Feagan 2008b</td>
<td>84/187</td>
<td>94/188</td>
<td>0.90 [ 0.73, 1.11 ]</td>
<td>32.0 %</td>
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<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>453</strong></td>
<td><strong>451</strong></td>
<td><strong>0.71 [ 0.54, 0.93 ]</strong></td>
<td><strong>100.0 %</strong></td>
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</tbody>
</table>

Total events: 162 (Treatment), 207 (Control)
Heterogeneity: Tau² = 0.05; Chi² = 9.43, df = 4 (P = 0.05); I² =58%
Test for overall effect: Z = 2.45 (P = 0.014)
Test for subgroup differences: Not applicable

Favours treatment | Favours control
--- | ---
0.2 | 0.5 | 1 | 2 | 5
Gluten

- Gluten is a protein found in wheat, barley, rye

- Dietary treatment for celiac disease
- Reduces abdominal pain, bloating, diarrhea
- Popularized for other digestive disorders

- CCFA Partners cohort (1647 IBD patients)
  - 65% on gluten-free diet had reduction of symptoms
  - 38% reported a reduction in severity of flares

- Effect of inflammation yet unknown
Enteral Nutrition

Crohns’ Disease

- Induction
  - Efficacious
  - No difference between elemental and non-elemental
  - No difference according to fat content
  - Steroids are superior to EN

- Maintenance
  - Efficacious

Ulcerative Colitis

- Induction
  - Lack of data

- Maintenance
  - Lack of data
“Half Elemental Diet” for CD

- 51 CD patients in remission

- RCT
  - Half-elemental diet (HED)
  - Free diet

- HED group had less relapses
- No difference in IBDQ score
General Tips

• Much more research is needed
• Lack of research data ≠ lack of effect

• Eat balanced diet
• Reduce red meat and processed fatty foods
• Reduce simple carbohydrate intake
• Consider fish oil and probiotics
• Maintain good hydration
• Eat according to food tolerance
• Tolerance may depend on disease activity
The Flare Diet

• Remain hydrated
• Small, frequent meals
• Reduce fatty/oily food consumption
• Caution with osmotic foods and caffeine
• Avoid dairy products if suspect lactose intolerance
• Decrease insoluble fiber intake
  • Dried fruits
  • Raw vegetables and fruits, particularly skins, pulps, and peels

• Low-residue diet if prone to obstruction
  • Avoid seeds, popcorn, nuts, whole-grain breads and flour
  • Avoid tough and fibrous meats
  • Chew food well, eat slowly
Stanford Research: Nutrition and IBD

- We are interested in learning more about how nutrition affects IBD.

- We want to help advance knowledge in this field as a means to promote overall care.
Thank You

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