Objectives

- The possible role of diet in the development of inflammatory bowel disease (IBD)
- The importance of nutritional deficiencies in IBD
- The potential use of diet as therapy for IBD
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Why is there so little information on diet and IBD?

- Dependent on how well people remember what they ate—“recall bias”
- Diet is very complex
  - Food type ≠ nutritional content
  - Likely not just amount, but ratio of food to other foods
- Expensive to research
- Diets very hard to stick to
21 year old man
3 months of diarrhea, abdominal pain, and rectal bleeding
Colonoscopy showed inflammation in the colon and small intestine

NEW DIAGNOSIS OF CROHN’S DISEASE

“Did my diet cause my IBD?”
Rise of IBD Around the World

{ Rise of the Western Diet }
Incidence of IBD is Increasing

Hou et al. Am J Gastroenterol. 2009;104(8)
Diet and Risk of IBD

• 19 studies- Evaluated diet patterns prior to IBD diagnosis
• 2,609 IBD patients

Increased IBD risk:
- Total fat 2-3X
- PUFA 2-6X
- Omega 6 2-3X
- Meats 3-4X

Decreased IBD risk:
- Fiber < 1/2 X
- Fruits < 1/2 X
Dietary fats

More Inflammation

Omega 6-PUFA increase inflammation

Linoleic acid
- Sunflower oil
- Safflower oil

Arachidonic acid
- Meat
- Eggs
- Dairy

Prostaglandin E2
- Vasodilation
- Potentiate edema

Leukotriene B4
- Chemotaxis

Lipoxygenase

Cyclooxygenase

Less Inflammation

Omega 3-PUFA decrease inflammation

Leukotriene B5

Docosahexaenoic acid
Eicosapentaenoic acid
- Fish oil

α-Linolenic acid
- Rapeseed (canola oil)
- Soybeans
- Walnuts
- Flaxseed (linseed oil)
- Green leafy vegetables

Prostaglandin E3

Hou et al. Therapy. 2010, 7(2)
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28 year woman with Crohn’s disease
- Diagnosed 10 year ago
- Has required surgery 5 years ago for ileal (small bowel) stricture (blockage)
- Over past 1 year has had an increase in abdominal pain- similar to pains prior to last surgery
- Has episodes of abdominal pain after eating

“What can I eat?”
Nutritional Deficiencies

Avoiding over-avoidance
Doctors’ concerns

- Not getting enough food: protein-energy malnutrition
- 20-85% of IBD patients
  - Hospital based studies (1970s)
Most prevalent nutritional abnormality

- Excess body weight
  - 32% overweight
  - 8% obese
  - 2.6% underweight

For most patients now, the problem is not how much to eat, but what they are eating

Nutrition

Diet and IBD

Sousa Guerreiro et al. Am J Gastroenterol. 2007 (11)
### Conflicting Recommendations from online sources

**Include (%)** | **Avoid (%)** | **Internally Conflicting**
--- | --- | ---
Fruits | 24 | 44 | 32
Vegetables | 57 | 22 | 21
Red Meat | 20 | 80 | -
Whole grains | 26 | 56 | 18
Refined grains | 40 | 60 | -
Dairy | 17 | 69 | -
Nuts | 4 | 79 | 17

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**Hou et al. CGH 2014:12(10)**
Food Avoidance among IBD Patients

- High rate of food avoidance among IBD patients
  - 89% of Crohn’s disease
  - 84% of ulcerative colitis
- Crohn’s patients were more likely to avoid vegetables, red meat, and poultry
- Both CD and UC patients avoided nuts
- Exacerbation of symptoms is the most commonly cited reason for food avoidance among IBD patients

Chen T, Cruz G, Sellin J, Hou J. ACG 2014
Nutritional Deficiencies

Percentage of patients who reached daily recommended intake

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>CD patients</th>
<th>Controls</th>
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<tr>
<td>Fiber</td>
<td>15</td>
<td>38</td>
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<tr>
<td>Calcium</td>
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<td>61</td>
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<tr>
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<td>Vitamin C</td>
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<td>Vitamin D</td>
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<td>Vitamin E</td>
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<td>24</td>
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<tr>
<td>Vitamin K</td>
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</tr>
</tbody>
</table>

Diet and IBD

Sousa Guerreiro et al. Am J Gastroenterol. 2007 (11)
IBD patients have 21-40% increased risk of bone fractures

Particular risk in patient who have taken steroids (prednisone)

What you should do:

- DEXA (bone density scan) – history of prednisone
  - Referral to endocrinology (hormone specialist) if abnormal

- Vitamin D (blood test)
  - Calcium/Vit D supplements if low

- You don’t HAVE to avoid dairy products

Calcium and Vitamin D

Bernstein et al. Gastroenterology. 2003;124(3)
Low levels may result in low blood counts (anemia) or increase risk of blood clots

Important for fetal development

Possibly protective against colorectal cancer/dysplasia

Important to supplement if taking:
- Sulfasalazine (azulfidine)
- Methotrexate

Folate/Folic acid
Iron

- Absorbed in first part of small intestine
- Low levels from ongoing bleeding, inflammation, not eating enough iron containing foods
  - Low levels can cause anemia
- Can be replaced by pills or by IV
Deficiencies may cause:

- Low blood counts (anemia)
- Nerve damage (neuropathy)

Absorbed in the last part of the small intestine (terminal ileum):

- Crohn’s disease of the ileum

May require shots or pills for supplementation.

**Vitamin B12**

Lashner et al. Gastroenterology. 1997;112(1)
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55 year man
Diagnosed with ulcerative colitis 20 years ago
In remission on azathioprine and mesalamine for past 10 years
Is worried about side effects of medications
Wants to stop his medications and control his disease with diet

“I read about this diet on the internet...”
Diet as Therapy

No magic bullet
Listen to your body

Diet and IBD
Possible Mechanisms

- Remove toxins or aggravating things
  - Elemental diet
  - Defined diets
- Alter bacteria composition in the intestines (prebiotic)
- Alter gas production/fluid retention
Enteral therapy

- Use of “tube feed” formulas
- Better evidence in children than adults for Crohn’s disease
  - Achieve remission: 20-84%

Limitations
- Poor taste
  - May require nasogastric feeding (feeding tube)

Diet and IBD
Ω Omega-3- fatty acids (Fish oil) and Crohn’s

º Large study of over 700 patients
º No benefit over placebo

º Fiber (butyrate)
º Short chain fatty acid
º Small studies- possible benefit in UC

Nutritional Supplements

Diet and IBD

Defined diets - very little data

- Specific Carbohydrate Diet
  - “Breaking the Vicious Cycle”
- FODMAPs
- Paleo Diet
- “Juicing” diets

Diet and IBD

Hou et al. Clin Gastro Hepat 2014; 12
 Initially proposed by Dr. Sidney Haas as treatment for celiac disease in 1924

 Popularized by Elaine Gottschall, book *Breaking the Vicious Cycle*

**Specific Carbohydrate Diet**
Low Fermentable Oligo-, Di- and Mono-saccharides (FODMAP) Diet

Primarily studied for Irritable bowel syndrome

http://stanfordhealthcare.org/content/dam/SHC/for-patients-component/programs-services/clinical-nutrition-services/docs/pdf-lowfodmapdiet.pdf
TALK TO YOUR DOCTOR

Healthy balanced diet
- Sheryl Crow diet
  "If it makes you happy, it can’t be that bad"

Low Residue diet
- Only for patients with stricture

Dairy/caffeine/alcohol avoidance
- Consider during flare

Recommendations
Supplements

- Folate - patients on sulfasalazine or methotrexate

Unclear role of multivitamins

Unclear role of probiotics

- Pouchitis
- Possibly ulcerative colitis

Recommendations
Thank you