Nutrition Considerations with Pediatric Inflammatory Bowel Disease

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Objectives

- **Define** the basics of Inflammatory Bowel Disease including disease process and treatment
- Review nutrition **assessment**, nutrition concerns, and nutrition therapy in IBD
- **Understand** the past and present research regarding the role of nutrition in IBD
- Gain a strong knowledge base regarding the role of nutrition in IBD to make an **impact** on your patient’s care
Define the Basics of IBD
What is inflammatory bowel disease?

- Chronic lifelong disease with times of relapse and remission
- Genetic Predisposition
  - Most common in Caucasian and Ashkenazic Jewish origin
- Environmental factors
  - Most common in Westernized (developed) countries
  - More common in urban areas
- Potential diet factors
  - Saturated fat, Omega-6 PUFA, red meat

1. CDC 2015: [http://www.cdc.gov/ibd/ibd-epidemiology.htm](http://www.cdc.gov/ibd/ibd-epidemiology.htm)
2. Crohn’s and Colitis Foundation of America
Differentiating Inflammatory Bowel Disease\(^{(1,4)}\)

- Chronic inflammatory disorders that can affect GI tract of children and adults with up to 25% of cases being diagnosed before age 20 \(^{(4)}\)

- Crohn’s Disease
  - Can occur anywhere in GI tract from mouth to anus and can affect entire thickness of bowel wall
  - Signs & symptoms: cramps, pain, rectal bleeding, diarrhea, constipation, weight loss, malnutrition, fatigue, joint pain

- Ulcerative Colitis
  - Occurs in colon and affects lining of colon
  - Signs & Symptoms: urgent and loose BMs often with blood or mucous, crampy abdominal pain, decreased appetite, joint pain

1. [http://www.ccfa.org](http://www.ccfa.org)
Nutrition Concerns & Assessment
Nutritional Concerns in IBD

- **Malnutrition/Poor Growth** (5,6)
  - Anorexia or fear of eating due to pain, frequent stooling, social anxiety, exhaustion
  - Risk for malabsorption (high stool output, frequent flare ups, mucosal damage or resections)
  - Growth failure
    - Linear growth failure common in Crohn’s Disease
  - Delayed onset of puberty
  - Inflammation – cytokine interaction with IGF-1 leading to suppression of growth factor
  - Steroids may inhibit insulin like growth factor

- **Metabolic bone disease**

- ** Micronutrient deficiencies**
  - Consider checking Folate, B12, Vitamin D, Iron studies, and Zinc at diagnosis & at least once yearly

### Micronutrient Concerns

<table>
<thead>
<tr>
<th>Folate</th>
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<tbody>
<tr>
<td>- Studies: Serum Folate, often checked in conjunction with B12</td>
</tr>
<tr>
<td>- Possible cause of deficiency: inadequate folate intake, small bowel resection, medications that interfere with metabolism: Sulfasalazine, Methotrexate</td>
</tr>
<tr>
<td>- Symptoms of Deficiency: fatigue, glossitis, poor growth, megaloblastic anemia</td>
</tr>
<tr>
<td>- Excessive supplementation can mask B12 deficiency</td>
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<tr>
<td>- Primary site of absorption: Jejunum/Ileum</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Vitamin B12</th>
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<tbody>
<tr>
<td>- Studies: Vitamin B12, Methylmalonic Acid (MMA) &amp; Homocysteine levels</td>
</tr>
<tr>
<td>- If both increased - early B12 deficiency</td>
</tr>
<tr>
<td>- If Homocysteine increased - Folate deficiency</td>
</tr>
<tr>
<td>- Possible cause of deficiency: surgery or resection of terminal ileum, bacterial overgrowth, increased risk with Crohn’s disease</td>
</tr>
<tr>
<td>- Symptoms of Deficiency: paresthesias, megaloblastic anemia, mood change, fatigue, pale skin, SOB ,smooth tongue</td>
</tr>
<tr>
<td>- IM replacement</td>
</tr>
<tr>
<td>- Primary site of absorption: Terminal Ileum</td>
</tr>
</tbody>
</table>

### Zinc

- **Studies:** Alk Phos, Serum Zinc, Albumin, inflammatory markers (CRP)
- Possible cause of deficiency: increased GI losses from stool or fistula, malabsorption
- Symptoms of Deficiency: poor growth, anorexia, impaired taste and smell, hypogonadism, decreased immune function, dry, flaky skin, hair loss, diarrhea, impaired wound healing
- Excessive replacement can cause Copper Deficiency
- Supplement short term 2-3 weeks
- Primary absorption site: Duodenum/Jejunum/small amount Ileum

### Iron

- **Studies:** Hgb, Hct, Serum Iron, TIBC, Transferrin, Ferritin
- Possible cause of deficiency: increased losses (blood in stool), malabsorption, decreased intake
- Symptoms of Deficiency: pale, fatigue, SOB, brittle nails, fast heartbeat, poor appetite, PICA
- Mode of supplementation debatable due to risk for GI upset
- Primary absorption site: Duodenum & Jejunum

Micronutrient Deficiencies – Calcium and Vitamin D

- Recommendations taken from “A Clinical Report of Skeletal Health of Children and Adolescents with Inflammatory Bowel Disease” 8
- Peak bone mass for males: 18-20 years & 16 for females
- Studies have shown that inflammation has a negative effect on the accrual of bone mass and actual quality of bone
- Studies:
  - Serum Calcium, Ionized Ca, Alk Phos, PTH, Phosphorus
  - 25-OH D – check at the end of winter (goal >30 ng/mL)
- Possible cause of deficiency: lactose intolerance, inadequate intake, steroid use, malabsorption, hypoparathyroid
- Steroids reduce absorption (Ca) and negatively affect bone turnover

8. Papa et al. JPGN.2011
Calcium & Vitamin D

- Symptoms of Deficiency:
  - Calcium: muscle spasms, dry, scaly skin, memory loss, abnormal heart rhythm, osteopenia/osteoporosis, tetany
  - Vitamin D: muscle weakness, possible rickets, bone pain
- Primary absorption site: Duodenum/Jejunum
- Replacement:
  - Calcium: Baseline: 1000 – 1300 mg of elemental Calcium daily in children >4 y.o. (500 mg/dose)
  - Recommended to limit bisphosphonates
  - Vitamin D: Cumulative doses over 8-12 weeks of 400,000 IU if level <20 (~ 5700 IU/d) and 250,000 IU over 8-12 weeks if level is 20-32 (~ 3600 IU/d)
  - baseline 800-1000 IU daily

Calcium and Vitamin D

• Monitoring:
  – DXA (Dual-energy x-ray absorptiometry) – two dimensional test where bone mineral density = sum of cortical and trabecular bone mass within a projected area
  – Recommended for suboptimal growth velocity or height z-score < -2 or downward trend; weight or BMI Z-score < -2.0 or downward trend; secondary or primary amenorrhea; delayed puberty; severe inflammation (albumin < 3); steroid use ≥ 6 months
  – Repeat scan every 1-2 years if Z-score ≤ -1.0 SD
    – lower spine & hip
  – Check 25-OH D at least yearly, more frequently w/ replacement

• Weight bearing exercise

Nutrition Assessment

Growth History
- Weight, height, & BMI using Z scores
- Weight/length under 2 & FOC if under 3 y.o.
- Outside growth records if new to practice

GI symptoms
- N/V, pain, stool output (volume and frequency), floating stools, mouth sores, Onset of symptoms
- History of strictures, fistula, or surgery/resection

Intake
- Appetite
- 24 hour food recall
- Special diets (past or present)
- Trigger foods or food groups avoided
- Food allergies
# Nutrition Assessment

<table>
<thead>
<tr>
<th>Labs/Tests</th>
<th>• Vitamins, minerals, inflammatory markers, DXA scans</th>
</tr>
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<tbody>
<tr>
<td>Nutrition Support</td>
<td>• Exclusive enteral nutrition or TPN &amp; bowel rest</td>
</tr>
<tr>
<td>Physical exam</td>
<td>• Muscle wasting (MUAC, TSF, MAMC, handgrip strength)</td>
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<tr>
<td>Physical assessment</td>
<td>• Hair, skin</td>
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<tr>
<td></td>
<td>• 75 adult patients w/ Crohn’s disease assessed for malnutrition(^9)</td>
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<tr>
<td></td>
<td>• 26.7% considered malnourished with MAC, MAMC = 29.3%, SGA=18.7%, BMI=6.7%, TSF=37.3%, handgrip strength=73.3%</td>
</tr>
</tbody>
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Nutritional Requirements

• Calorie needs ultimately based off intake and growth trend
  – Highest need if malnourished, active inflammation, and in need of catch up growth (REE x 1.5-2)
  – If inadequate energy stores and inflammation energy needs are 5-35% above estimated needs \(^{(10)}\)

• Kleinman R, et al. summarized refeeding studies in undernourished children w/ Crohn’s disease \(^{(6)}\)
  – Short term refeeding results in catch up growth (average gain of 8.7 kg in 6 weeks) when receiving 170% REE
  – Long term refeeding results in catch up growth (7 kg/year) when providing 133% estimated needs

• Wiskin A, et al. studied 55 children (37 w/ Crohn’s disease and 18 w/ UC ) revealing no significant relationship between disease activity and REE \(^{(11)}\)
  – Does REE decrease due to severe anorexia and illness similar to prolonged starvation with Anorexia Nervosa?
Nutritional Requirements

- Hill R, et al. compared measured REE against Schofield, Oxford, FAO/WHO/UNU, and Harris Benedict $^{13}$
  - 63 children had repeated measurement for total of 243 measurements in study
  - All equations underestimated

<table>
<thead>
<tr>
<th>Predictive equation</th>
<th>Difference from measured value</th>
<th>Ulcerative Colitis</th>
<th>Crohn’s Disease</th>
</tr>
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<tbody>
<tr>
<td>Schofield</td>
<td>-159</td>
<td>-42</td>
<td></td>
</tr>
<tr>
<td>Oxford</td>
<td>-202</td>
<td>-95</td>
<td></td>
</tr>
<tr>
<td>FAO/WHO/UNU</td>
<td>-162</td>
<td>-54</td>
<td></td>
</tr>
<tr>
<td>Harris Benedict</td>
<td>-190</td>
<td>-108</td>
<td></td>
</tr>
</tbody>
</table>
Nutritional Requirements

• Protein
  – No established guidelines but increased need with inflammation and increased losses – recommend increasing by 50%
  – Highest need with fistula losses
  – Protein markers
Treatment & Research of IBD
Treatment of IBD

• Pharmaceutical Therapies
• Nutrition Therapies
  – Diet (SCD, FODMAP, Elimination)
  – Exclusive Enteral Nutrition
  – Parenteral Nutrition
  – Probiotics/prebiotics
  – Omega 3
• Surgery
  – Ulcerative Colitis – total proctocolectomy for cure
    • Ileo pouch-anal anastomosis if possible
  – Crohn’s Disease – surgery in not a cure
Pharmaceutical Treatment

- **Aminosalicylates**: Used to achieve and maintain remission in colonic disease
  - 5–ASA: Mesalamine (Asacol, Lialda, Rowasa), Sulfasalazine
- **Corticosteroids**: Used for moderate to severe disease not responsive to initial treatment
  - Prednisone
- **Immunomodulators** – Target the immune system to suppress inflammation
  - Imuran, Methotrexate, Azathioprine, 6-MP
- **Biologics** – Used for moderate to severe disease refractory to other treatments
  - TNF Alpha inhibitors
  - Remicade/Humira
- **Antibiotics** - Used for Crohn’s disease especially in setting of fistulas or abscesses or Ulcerative Colitis with fever
  - Flagyl, Cipro
## Side Effects of Pharmaceutical Treatment

<table>
<thead>
<tr>
<th>Medication</th>
<th>Nutrition Related Side Effects</th>
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<tbody>
<tr>
<td>Prednisone</td>
<td>Hyperglycemia, fluid retention, increased blood pressure, mood swings, growth suppression, osteoporosis</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>Abdominal discomfort, diarrhea&lt;br&gt;Long-term use: overgrowth of resistant pathogens, loss of good bacteria</td>
</tr>
<tr>
<td>Remicade</td>
<td>N/V, abdominal pain, increased LFTs, lymphoma</td>
</tr>
<tr>
<td>Azathioprine</td>
<td>N/V/D, swollen joints, leukopenia, hepatotoxicity, lymphoma</td>
</tr>
<tr>
<td>6-MP (mercaptopurine)</td>
<td>Anorexia, N/V, mucositis, hepatotoxicity, lymphoma</td>
</tr>
<tr>
<td>Methotrexate</td>
<td>Oral ulcers, N/V, hepatotoxicity, renal damage, diarrhea</td>
</tr>
<tr>
<td>Aminosalicylic acids</td>
<td>Abdominal discomfort, N/V, headache</td>
</tr>
</tbody>
</table>
Specialized Diets

- Gluten free
- Exclusion Diet
- Low FODMAP
- Specific Carbohydrate Diet (SCD)
- Semi-Vegetarian Diet
- Paleo Diet
- GAPS (The Gut and Psychology Syndrome)
- Anti-Inflammatory Diet
Diet Recommendations

• Food/symptom diary
  - Eliminate trigger foods if able to find a pattern

• Common trigger foods: high fat, lactose containing, spicy, insoluble fiber, gas forming foods, caffeine, artificial sweeteners, alcohol

• Consume small, frequent meals

• Sip fluids between meals, don’t use straw and ensure adequate intake
  - monitor urine output and color
Diet Recommendations

• Fiber
  − Soluble fiber
    ▪ slows transit time
    ▪ peeled fruit: apples, bananas, peaches, pears, well cooked vegetables such as carrots, broccoli, barley, oats, and psyllium.
  − Insoluble fiber: more difficult to digest
    ▪ increases bulk
    ▪ whole-wheat flour, wheat bran, brown rice, fruit with seeds and edible peels, cauliflower, celery
  − Consider cooking/steaming fruit & vegetables and removing skins

• Low Residue diet may be effective during Crohn’s Disease flare especially if narrowing or strictures

• Avoid nuts, seeds, & popcorn if at risk for strictures – Crohn’s disease
Total Parenteral Nutrition

- **Indications**
  - Refractory disease in acute flare especially if malnourished
  - High output fistulas or obstructions
  - Severe malnutrition with planned surgery
  - Bowel rest required for > 5 days

- Consider additional zinc if high output

- Ensure balanced macronutrient provision with adequate protein

- May need high volume if increased output
Exclusive Enteral Nutrition (EEN)

- Distinct therapy found to be beneficial in Crohn’s Disease
- Administration of 100% formula based diet via feeding tube or consumed orally
- Exclusion of normal diet
- Many variations in protocols
  - Duration
  - Formula type
  - Provision of anything else PO
  - Mode of transitioning back to PO
Use of Enteral Nutrition for the Control of Intestinal Inflammation in Pediatric Crohn Disease

• *Journal of Pediatric Gastroenterology and Nutrition (2012)*\(^{(15)}\)
  - NASPGHAN developed enteral nutrition workgroup with 5 pediatric gastroenterologists & 1 dietitian with expertise in management of Crohn’s Disease to review & summarize current literature

Conclusions

• Up to 85% of newly diagnosed Crohn’s Disease achieve remission with EEN

• Limited conclusions regarding use of medications in addition to EEN to induce remission

• Increased mucosal healing with EEN vs. steroids

• Superior improvement in linear growth w/ EEN

• Polymeric formula equivalent success to elemental
Use of Enteral Nutrition for the Control of Intestinal Inflammation in Pediatric Crohn Disease

Conclusions Continued

• More studies needed regarding effectiveness of partial enteral nutrition to obtain remission

• Disease location – more studies need to be completed although current research reveals it may not be as beneficial in colonic disease

• Duration required – highly variably between institutions (3-12 weeks)
  − most commonly 6-8 weeks

• Reintroduction of diet
  − International Survey results revealed varied protocols
    ▪ 52% of centers recommended gradual reintroduction of food with decrease in enteral feeds,
    ▪ 50% recommended initial fiber avoidance
    ▪ allergen free diet or low fat
Polymeric Diet Alone Versus Corticosteroids in the Treatment of Active Pediatric Crohn’s Disease: A Randomized Controlled Open-Label Trial

- Clinical Gastroenterology and Hepatology 2006\(^{(16)}\)
  - Studied 37 children with newly diagnosed Crohn’s disease
  - Randomized, prospective 10 week trial of patients diagnosed with Crohn’s disease within 12 weeks of enrollment and disease activity of moderate to severe
    - Oral methylprednisolone vs. EEN
    - Ileocolonoscopy performed before start of study and at 10 weeks
    - PCDAI calculated at 2, 4, 6, 8, & 10 weeks
    - Clinical remission: 15/19 EEN & 12/18 steroids
    - 14 /19 EEN patients showed mucosal healing vs. 6 /18 steroid
    - No significant difference in linear growth but greater weight gain in EEN group
Expert Summaries of EEN

- NASPGHAN Recommendations (2012) (4)
  - EEN can be used as primary therapy in children with mild to moderate Crohn’s Disease for induction of remission and has shown comparable efficacy to steroids
  - Polymeric formula acceptable
  - Maintenance medication required once in remission
  - Supplemental enteral nutrition is indicated in all IBD children with linear growth failure

- ECCO/ESPGHAN consensus guidelines (2014) (17)
  - EEN is recommended to induce remission in children with active luminal Crohn’s Disease
  - Partial Enteral Nutrition should not be used to induce remission

Exclusive Enteral Nutrition

• Partial enteral nutrition
  - 2 Canadian studies showed benefit with partial enteral nutrition including improved growth, decrease in steroid use, decrease in symptom index & prolonged remission (28,29)

• Efficacy in adults
  - Adult studies have shown less benefit
  - Poor compliance, poor palatability, and poor motivation
    ▪ Better for adults who are treatment naïve
    ▪ Further research needed for newly diagnosed and those with ileal involvement

Possible Mechanism of Action – EEN \(^{(15,18)}\)

- Improvement in overall nutritional state due to consistent delivery of essential nutrients
- Direct anti-inflammatory effects
  - Increased level of anti-inflammatory protein
  - Exposure to formula decreases response to proinflammatory agents
  - Decrease in inflammatory cytokines
- Alteration of intestinal microflora
- Avoidance of food that may trigger inflammation


Barriers to use/possible side effects of EEN

• Physician recommendation
• Nausea, abdominal pain, gas, loose stools, early satiety
  – Fewer side effects than steroids
• Potential for Refeeding Syndrome although not common
• Cost/coverage
  – Cheaper than TPN
  – Often not covered by insurance if consumed orally
• Quality of life
  – Social anxiety, decreased school attendance
  – UK study revealed improved QOL scores in 24 out of 26 children treated w/ Crohn’s Disease (19)
    • 90% of these children obtained remission so likely related to improvement in GI symptoms
    • Only 3 of them had NG tube

Probiotics in IBD

- Probiotics and prebiotics influence the intestinal microbiota and can alter metabolic properties of our gut microbiome
  - Increased SCFA may lower pH of colon (prevent growth of pathogenic microorganisms)
  - Some probiotic strains may help to preserve immune regulation

- Probiotics ("good bacteria"): living organisms (bacteria and yeast) which should produce health benefit to host
  - VSL #3 – commonly studied
  - Use cautiously with neonates and immunodeficiency
  - Should technically survive gastric acid and bile in order to reach small intestine and colon
  - Yogurts using term live active cultures must have $10^8$ live lactic acid organisms per gram

- Crohn’s Disease – studies have not shown superiority of probiotics to placebo when using as additive to standard care to induce or maintain remission\(^{(20)}\)
Probiotics in Ulcerative Colitis

- Probiotics have shown benefit in ulcerative colitis (20)
  - VSL #3 (3.5 trillion cfu/day) has shown increased symptom improvement during flare but not improvement of endoscopic scores
- VSL #3 has also shown to be of benefit in prevention of pouchitis after surgical take down with UC
- 1 year placebo controlled, double blind study with 29 pediatric patients assessing induction and maintenance of remission in active UC (21)
  - VSL #3 (450-1800 billion bacteria/day) or placebo
  - Induction therapy was steroids with Mesalamine maintenance therapy
  - Remission achieved in 92.8% of VSL #3 + induction therapy & 36.4% treated w/ placebo and induction therapy

Expert Summaries

- World Journal of Gastroenterology conclusions 2014 \(^{(23)}\)
  - Probiotic as addition to standard therapy for active UC may be beneficial with VSL #3 showing the most promise
  - Probiotics such as VSL #3 may be as efficient as Mesalamine for maintenance therapy in UC
  - Probiotics show no advantage over placebo in maintenance of remission for Crohn’s disease

- Consensus guidelines of ECCO/ESPGHAN 2014 \(^{(17)}\)
  - Probiotics are not recommended for maintenance of remission in IBD
  - Probiotics may be effective in reducing inflammation in colitis and may be of benefit in some situations such as pouchitis and Ulcerative Colitis
Prebiotics

• Prebiotics: nondigestible but fermentable carbohydrate that may change the composition of gut microbiota
  – Favor beneficial bacteria

• Plantago ovata seeds (fermentable dietary fiber) vs. Mesalamine therapy in Ulcerative Colitis\(^{(25)}\)
  – 102 patients randomized into three groups

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Plantago Ovata seeds</th>
<th>Mesalalamine</th>
<th>Seeds + Mesalalamine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment failure rate after 12 months</td>
<td>40%</td>
<td>35.1%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Prebiotics – Germinated Barley Foodstuff (26)

- Treatment of ulcerative colitis patients by long-term administration of germinated barley foodstuff
  - Multi-center open trial
  - GBF: dietary fiber and glutamine rich protein

- 21 patients with mild to moderate UC received 20-30 grams/day of GBF x 24 weeks in conjunction with standard treatment

- Clinical activity index score: # of episodes diarrhea; nocturnal diarrhea; visible blood in stools; fecal incontinence; use of anti-diarrheal drugs; abdominal pain, cramping, and tenderness; general well being
  - Some people had colonoscopies before and after

- Results:
  - After 6 months – blood in stool and nocturnal diarrhea were decreased
  - Further studies needed

Omega-3 Supplementation & Research

- Theoretically, Omega 3 intake would reduce inflammation.
- EPIC trials (27)
- “Omega-3 Fatty Acids for the maintenance of remission in Crohn Disease”
  - Randomized, double blind, placebo controlled
  - January 2003-February 2007 conducted between 98 Centers around the world
- EPIC-1: Eligible patients had experienced disease exacerbation within the past year but had been in remission for 3-12 months

EPIC Trials

- EPIC-2: Eligible patients had active disease and were treated with 16 week tapering course of Prednisone or Budesonide
  - Enrolled w/ CDAI score of less than 150 which indicates remission
  - Checked CDAI score at 8 weeks
    - CDAI score: joint pain, anal fissures, fistula, fever, # loose BM, abdominal pain, use of Lomotil for diarrhea, height, weight, Hct

- Exclusions: use of 5-ASA, immunosuppressive medications, TNF antagonist, ostomy, short bowel, severe medical disease outside of Crohn’s, substance abuse
  - Medications – no new allowed and current therapies were weaned including Corticosteroids, Budesonide, Prednisone

- Patients were given 4 (1 gram) capsules of Omega-3 fatty acids vs. 4 placebo capsules/day
EPIC Trials- Results

- Relapse was classified as increase of more than 70 points on CDAI score from baseline or score of >150
- Concluded that Omega-3 supplementation was not statistically beneficial

<table>
<thead>
<tr>
<th>Study</th>
<th># Patients</th>
<th>1 year relapse rate w/ placebo</th>
<th>1 year relapse rate w/ Omega 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPIC-1</td>
<td>363</td>
<td>35.7%</td>
<td>31.6%</td>
</tr>
<tr>
<td></td>
<td>188 (Omega-3)</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>186 (Placebo)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPIC-2</td>
<td>375</td>
<td>48.8%</td>
<td>47.8%</td>
</tr>
<tr>
<td></td>
<td>189 (Omega-3)</td>
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<tr>
<td></td>
<td>190 (Placebo)</td>
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- Secondary finding – decrease in Triglyceride level
  - EPIC-1 – decrease of 21.5 mg/dL
  - EPIC-2 – decreased by 27.1 mg/dL
Omega – 3 Supplementation

• Consensus Guidelines of ECCO/ESPGHAN \(^{(16)}\)
  – Omega 3 fatty acids are not recommended for maintenance of remission in IBD

• Westernized diet is high in Omega-6 fatty acids and typically low in Omega 3 fatty acids which may increase inflammation
Summary
Patient Resources

- Crohn’s and Colitis Foundation of America (CCFA)
  - Local Support Groups

- [www.gikids.org](http://www.gikids.org)


  - (interactive videos)
Summary of Nutrition Considerations with Pediatric Inflammatory Bowel Disease

- Nutritional needs (calorie, protein, micronutrient) may change with Inflammatory Bowel Disease
- There are multiple ways to provide nutrition to a child with IBD including: nutrition support and multiple specialized diets/supplements
- Nutrition care for the pediatric patient with IBD is constantly evolving and research is ongoing
- Patients and families need professional support when choosing and following a specialized nutrition plan
Thank you!

Questions?
References

References Continued


References Continued


