Nutrition Therapy for Pediatric Gastroenterology

Presented by:
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About Me

- Graduated from MSU with Bachelor of Science in Dietetics
- Completed dietetic internship at University of Michigan Health System
- Employed as Registered Dietitian at Children’s Hospital of Michigan since 2006
- 5 years experience providing nutritional care for inpatients in acute care from newborn to 18 years old
- Outpatient pediatric GI since 2011

Nutrition Therapy for GI Disorders

- Multiple Food Protein Allergies
- Cow’s milk protein allergy
- Food Protein Induced Enterocolitis Syndrome
- Eosinophilic Esophagitis
- Inflammatory Bowel Disease
- Celiac Disease
Objectives

- Describe pediatric gastrointestinal conditions
- Identify nutritional risks associated with these conditions
- Discuss nutritional management

Food Allergy Defined

- “An adverse health effect arising from a specific immune response that occurs reproducibly following exposure to a given food”


IgE Mediated vs. Non-IgE Mediated Food Allergies

<table>
<thead>
<tr>
<th>IgE Mediated</th>
<th>Non-IgE Mediated</th>
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<tbody>
<tr>
<td>Antibodies called Immunoglobulin E (IgE) are produced</td>
<td>Do not involve IgE</td>
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<tr>
<td>Reaction is immediate</td>
<td>Delayed onset (hours to days after ingestion)</td>
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<td>Usually involves respiratory symptoms and/or immediate nausea, vomiting, or diarrhea</td>
<td>More difficult to diagnose</td>
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<td>Can be diagnosed by blood test and/or skin testing</td>
<td>Symptoms often GI related</td>
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Atkins, D. American Partnership for Eosinophilic Disorders. What’s the difference between a food allergy and food intolerance?, 2013.
Food Allergies

- Most often present in the first 2 years of life
- According to Food Allergy Research and Education (FARE), the top eight allergens are milk, egg, crustacean shellfish, fish, peanuts, tree nuts, wheat, and soy
- These eight allergens account for 90% of all food-allergic reactions
- Most allergies, except nuts and seafood, are outgrown during childhood


Nutrition Therapy for Food Allergies

- Complete diet elimination of food protein(s)
- Can result in very restricted diets, inadequate in macronutrients and/or micronutrients
- Label reading can be challenging
- Consider multivitamin with minerals

Food Allergen Labeling and Consumer Protection Act of 2004

- Food labels are required to state clearly whether the food contains a “major food allergen.”
- Must identify any of eight allergenic foods: milk; eggs; fish; crustacean shellfish; tree nuts; peanuts; wheat; and soybeans.
- Statements of food processing handling are not mandatory

Ingredients: Corn, Whole Grain Wheat, Sugar, Whole Grain Rolled Oats, Brown Sugar, Rice, Vegetable Oil (Canola Or Sunflower Oil), Wheat Flour, Malted Barley Flour, Salt, Corn Syrup, Whey (from Milk), Wildflower Honey, Malted Corn And Barley Syrup, Caramel Color, Natural And Artificial Flavor, Annatto Extract (Color). Bht Added To Packaging Material To Preserve Product Freshness.

Vitamins and Minerals: Reduced Iron, Niacinamide, Vitamin B6, Vitamin A Palmitate, Riboflavin (Vitamin B2), Thiamin Mononitrate (Vitamin B1), Zinc Oxide (Source Of Zinc), Folic Acid, Vitamin B12, Vitamin D. Contains : Wheat, Milk.

Calcium and Vitamin D Needs

- Recommended Dietary Allowance for Children
  - Calcium
    - 1-3 years: 700 mg/day
    - 4-8 years: 1000 mg/day
    - 9-18 years: 1300 mg/day
  - Vitamin D
    - 1-13 years: 600 IU/day
- Calcium/vitamin D supplement may be needed if needs cannot be met through alternative foods

Alternative “Milks”

- Important to include as source of calcium and vitamin D
- Options:
  - Soy milk
  - Rice milk
  - Almond milk
  - Coconut milk
  - Extensively hydrolyzed or amino acid based formula (i.e. Nutramigen, Elecare, or Neocate)
Cow’s Milk Protein Allergy (CMPA)

- Most common food allergy in infants and children less than 3 years of age
- Affects 2-3% of the infant population


GI Symptoms of CMPA

- Vomiting
- Diarrhea +/- blood
- Occult blood loss
- Frequent regurgitation
- Failure to thrive
- Refusal to feed
- Dysphagia
- Colic
- Constipation
- Iron deficiency anemia


Other Symptoms of CMPA

- Respiratory: wheezing, runny nose, chronic cough
- Skin: hives, swelling of lips or eyelids, atopic eczema
- General: anaphylaxis, food protein induced enterocolitis syndrome
- Likelihood of CMPA increases when at least 2 organ systems are involved

Diagnosis of CMPA

- Blood serum for IgE or skin prick testing may be useful
- According to the World Allergy Organization, “60% of milk allergic reactions are IgE mediated”
- Atopy patch test not recommended at this time
- Diagnostic elimination of cow’s milk


CMPA in Exclusively Breastfed Infant

- Estimated to occur in 0.5-1% of exclusively breastfed infants
- Infant reacts to small amounts of cow’s milk protein excreted in mom’s milk
- Commonly present with blood in the stool but are well-appearing otherwise


CMPA in Exclusively Breastfed Infants

- Initiate milk free diet in mother
- Includes complete elimination of all dairy products such as milk, cheese, cream cheese, ice cream, yogurt, etc. as well as other foods with “hidden” milk ingredients
- Proper diet education for mom is essential

CMPA in Exclusively Breastfed Infants

- Will see symptom improvement in 72-96 hrs in most cases
- Wait 2-4 weeks before considering further diet elimination
- Further diet elimination may include restriction of soy, egg, citrus, nuts, peanuts, wheat, corn, and/or chocolate


CMPA in Exclusively Breastfed Infants

- Management of breastfed infants with severe symptoms
  - Trial of therapeutic formula for up to 2 weeks while mother transitions to milk free diet
  - Allows for child's condition to stabilize while mother expresses milk
  - If symptoms reoccur when breast milk is reintroduced, further maternal diet restriction or use of therapeutic formula needs to be considered


CMPA in Formula Fed Infants

- Eliminate cow's milk based formula and supplementary foods containing cow's milk protein
- Soy based formula and other mammalian milks (i.e. goat's milk, sheep's milk) are not an ideal alternative
- Common approaches to management:
  - Start with extensively hydrolyzed infant formula
  - If no improvement in 2 weeks, change to amino acid based formula


Infant Formulas for CMPA
Extensively hydrolyzed protein  Amino acid based

Infant Foods and CMPA
- Introduction of single ingredient infant foods at 6 months of age is encouraged
- WIC approved infant cereals, fruits, and vegetables can be utilized
- Parents still need to be educated to check ALL food labels for presence of milk protein
- Infant must avoid all milk containing foods until advised by his/her doctor

Challenge with Cow’s Milk
- Consider after at least 6 months on diet or at 9-12 months of age
- Patient should be asymptomatic
- Should be demonstrating appropriate growth
- Challenge in home setting vs. doctor’s office dependent on history of patient’s symptoms

Failure of Challenge

- Ideally RD is involved to assess child’s diet and recommend appropriate alternative
- May still require extensively hydrolyzed or amino acid based formula beyond 1 year of age to meet nutritional needs
- Continue elimination diet for 6-12 months before considering challenge again


Food Protein Induced Enterocolitis Syndrome (FPIES)

- Food allergy affecting the GI tract
- Most common in early infancy
- Acute symptoms: profuse vomiting, diarrhea, and dehydration
  - Leads to severe lethargy, changes in body temperature and blood pressure
- Chronic symptoms: weight loss, FTT
- Food allergy testing is generally negative
- Reaction to causative food is delayed


Triggers for FPIES

- Cow’s milk or soy based infant formula
- Reaction to proteins in breastmilk is less common
- Solid foods: rice and oats are most common triggers
- Other common triggers for solid foods: barley, poultry, peas, sweet potatoes, green beans, and squash

Treatment for FPIES

- Elimination of the offending protein(s)
- Change to formula containing extensively hydrolyzed protein
- “About 10-20% of infants may require amino acid based formula”
- Introduce yellow fruits and vegetables at 6 months instead of cereal
- Wait until >12 months of age to introduce grains, poultry, and legumes
- Consider challenge with cow’s milk and/or soy after 12 months of age


Eosinophilic Esophagitis (EoE)

- According to the 2011 EoE Updated Consensus Recommendations, “Eosinophilic Esophagitis represents a chronic, immune/antigen mediated, esophageal disease characterized clinically by symptoms related to esophageal dysfunction and histologically by eosinophil-predominant inflammation”

Symptoms of EoE

- Dysphagia
- Feeding difficulty
- Chest pain
- GERD, non-responsive to medical and surgical treatment
- Vomiting
- Abdominal pain
- Early satiety
- Food impaction
Treatment of EoE

- Topical swallowed corticosteroids
  - Fluticasone: puffed and swallowed via inhaler
  - Budesonide: taken as a viscous suspension
- Diet management
- Acid suppression
- Esophageal dilation

Diet Therapy for EoE

- Elemental diet
  - All food proteins removed from diet
  - Strict use of amino acid based formula
  - May require enteral feedings
  - Simple sugars, salt, and oils are allowed
- Targeted elimination diet
  - Involves elimination of foods based on food allergy testing and history
- Six food elimination diet
  - Involves elimination of six major food allergens
  - Milk, soy, wheat, tree nuts/peanuts, egg, fish/shellfish

Factors to Consider

- Ability to manage complex diet
- Potential nutritional risks
- Access to amino acid based formula
- Expected compliance
Food Challenges

- Usually managed by gastroenterologist and allergist
- Repeat endoscopy(s) with biopsy may be performed to assess progress
- Allergist may perform additional or repeat food allergy testing to identify ideal foods to introduce
- One new food added at a time

Inflammatory Bowel Disease (IBD)

- Crohn’s Disease
  - Chronic inflammation of GI tract
  - Can affect any part of GI tract
  - Can affect entire thickness of bowel wall
- Ulcerative Colitis
  - Inflammation and ulceration of lining of colon

Epidemiology of IBD

- According to the CDC, it is estimated that 1.4 million people in the United States suffer from IBD
- Approximately 10% of these cases are individuals <18 years of age
- Peak age of onset is 15-30 years
Inflammatory Bowel Disease

- Micronutrient and macronutrient deficiencies are common in pediatrics
- Result of inadequate intake, decreased absorption, and/or increased losses
- Deficiency of certain micronutrients can depend on severity and location of disease
- MVI with minerals recommended for all patients

Poor Growth in Pediatric IBD

- Is multifactorial: inadequate intake, inflammation, malabsorption, increased energy expenditure, use of glucocorticoids
- Routine monitoring of growth parameters is key

Nutrition Interventions for IBD

- Counsel patient and family on well-balanced, calorically adequate diet to promote normal growth
- Calorie requirements for catch-up growth range from 125-150% of the DRI for age/sex
- No food restrictions unless specific intolerances are noted by the patient
Nutrition Interventions for IBD

- Consider oral nutrition supplements such as Pediasure, Pediasure 1.5, or Boost Kid Essentials 1.5.
- Low cost alternative nutrition supplement for purchase such as Carnation Instant Breakfast.
- Scientific literature does not strongly support use of formula with intact proteins vs. semi-elemental or elemental.
- Semi-elemental formulas could be trialed if patient does not tolerate formula with intact proteins.


Oral Nutrition Supplements

- Intact protein oral supplements
- Peptide based oral supplements

Enteral Nutrition for Crohn’s Disease

- Enteral nutrition therapy
  - Exclusive enteral feeds: sole dietary source utilized with goal of inducing remission. All foods excluded.
  - Partial enteral feeds: given overnight along with regular diet during the day to improve nutritional status.
  - Not shown to be effective for ulcerative colitis.
- Parenteral nutrition therapy

Celiac Disease

- Chronic autoimmune intestinal disorder
- Inflammation of the small intestine due to sensitivity to gluten
- Villi in the intestine become inflamed and flattened resulting in malabsorption and GI symptoms
- Golden diagnosis is endoscopy with intestinal biopsy
- Must be exposed to gluten through diet for accurate diagnosis


Gluten Free Diet (GFD)

- Only treatment option
- Requires lifelong adherence
- Complete dietary elimination of gluten (wheat, rye, barley)
- Concern for cross-contamination
- Possible lactose intolerance initially


Oats and Gluten Free Diet

- Commercial oat products likely to be contaminated with gluten
- A small number of individuals may react to the protein in oats
- Most experts agree that pure, uncontaminated gluten free oats can be safely consumed in limited amounts (1/4 cup of dry rolled oats for children)
- Follow up with gastroenterologist and monitoring of antibody levels is important

Example


Gluten Free Diet

Foods to avoid:
- Bread, cereal, pasta, baked goods, etc. containing wheat, rye, or barley as well as any cross-breeds or derivatives of these grains
- Processed food products containing gluten

Foods allowed:
- Fruits and vegetables
- Most dairy products
- Gluten free grains such as rice, corn, buckwheat, amaranth, quinoa, uncontaminated GF oats, etc.
- Plain meat, fish, or poultry
- Eggs
- Beans, peas, lentils
- Nuts and peanuts
GF Options and WIC Package

- Whole grains: rice, corn tortillas
- Cereals: Rice and Corn Chex, Cream of Rice
- Beans, lentils, and peas
- Peanut butter
- Milk, soy beverage, cheese, eggs
- Juice

Gluten Free, Casein Free Diet for Autism

- Involves dietary elimination of gluten and casein
- Thought to help improve behavior, speech, and social skills of child with autism
- Scientific evidence is lacking
- If parent chooses to implement diet restrictions for their child, consultation with pediatric RD is strongly recommended


Non-Celiac Gluten Sensitivity

- Symptoms may include abdominal pain, bloating, diarrhea, constipation, headaches, fatigue, depression, etc.
- Testing is negative for celiac disease and wheat allergy
- Symptoms alleviated with elimination of gluten and return when gluten is reintroduced
- Only treatment is gluten free diet
- Quantity of gluten tolerated may vary from one individual to the next

Questions?