Dietary Considerations in Eosinophilic Esophagitis

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Jeff Lancaster, RD
Carol Henderson, PhD, RD
Cincinnati Center for Eosinophilic Disorders
Cincinnati Children's Hospital Medical Center
Objectives

• Eosinophilic disorders-background
• EoE diagnosis and treatment
• Diet therapy outcomes

• Diet therapy considerations and “how tos”
  – Elemental diet
  – Empiric OR 6-food elimination diet
  – Skin test directed elimination diet
What is an Eosinophil?

- Type of white blood cell
- Elevated in:
  - Eosinophilic disorders
  - Allergy
  - Parasitic infections
  - Connective tissue disease
  - Tumors
- **NOT** typically present in the esophagus
- Is considered normal to have some in stomach and colon
Types of Eosinophilic Disorders

- Esophagus (Eosinophilic esophagitis)
- Stomach (Eosinophilic gastritis)
- Small Intestine (Eosinophilic enteritis)
- Large Intestine (Eosinophilic colitis)
- Blood and any organ (Hypereosinophilic syndrome)
Eosinophilic Esophagitis (EoE)

- Prevalence 1:1000
- No current diagnostic test for diagnosis
- Diagnostic Consensus Criteria:
  - $\leq$ 15 eosinophils/HPF in distal/proximal esophagus
  - Unresponsive to PPI
  - No other eosinophilia
EoE Pathogenesis

- Genetic factors
- Environmental factors
  - Food
  - Aeroallergens

Points of Entry:
1. GI tract
2. Respiratory tract
3. Skin
Symptoms of EoE in Children

- Does not tolerate formula
- Nausea, vomiting
- Poor appetite – gets ‘full’ quickly
- Poor weight gain
- Abdominal pain
- Heartburn
- Difficulty swallowing (dysphagia)
- Food getting “stuck “ while eating
Treatment Rationale

• Treatment is individualized for each child

• Treatment given even if child is not having symptoms
  - The absence of symptoms does not mean disease is not active.
Hypersensitivities

• Allergic vs. Non-allergic
  • Asthma
  • Allergic rhinitis
  • Eczema
  • Pollen-food allergy syndrome (oral allergy syndrome)
  • IgE mediated reaction (immediate reaction)
  • Non-IgE-mediated (delayed onset, chronic)
  • Mixed reaction

• Allergy Testing
  • Skin Prick Test (SPT)
  • Atopy Patch Test (APT)
  • Immunoassays (blood test)
EoE Treatments

- **Drug Therapy**
  - Glucocorticoids
    - Systemic
    - Topical (swallowed) – Flovent, Pulmicort

- **Diet Therapy – antigen elimination**
  - Elemental
  - Elimination-types:
    - Empiric OR 6-food elimination diet (removal of most common allergenic foods: milk, egg, soy, wheat, peanuts/tree nuts, and fish/shellfish *regardless of skin test results*)
    - Directed (based on skin test results)
Diet Therapy Outcomes in EoE

**Elemental diet** – 96 to 100% histologic remission and symptom improvement

**Empiric 6-food elimination diet** – 74 to 85% histologic remission

**Skin test directed elimination diet** – 60-80% histologic remission
Research
The diet puzzle . . .
Diet Therapies
Empiric Elimination Diet
(Six or Eight Foods Eliminated)

- Eliminate most common allergenic foods in the U.S.
  - Milk
  - Eggs
  - Wheat
  - Soy
  - Fish/shellfish
  - Peanuts/tree nuts
6-Food Elimination Diet

• Reading food labels is a key for successfully diet implementation

• Nutritional Considerations - **Protein:**
  – Egg, milk, and fish are great sources of complete dietary protein, but are not allowable
  – Alternative wholesome protein replacements are whole animal meats, beans and legumes, and whole grains
  – Protein powders on the market may not contain a complete protein source
6-Food Elimination Diet

• Nutritional Considerations – **Fat:**
  – Although milk, fish, soy, and nuts are good sources of fat, they are not allowable
  – Allowable alternatives for fat in the diet are olives, avocado, seeds, red meats
  – Use liberal amount of allowable oils
Commonly avoided foods and their vitamin/mineral contribution

<table>
<thead>
<tr>
<th>Fish/Shellfish</th>
<th>Milk</th>
<th>Soy</th>
<th>Egg</th>
<th>Wheat</th>
<th>Nuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omega-3 Fatty Acids, Vitamin B12, Selenium</td>
<td>Calcium, Phosphorus, Pantothenic acid, potassium, Vitamin D, Vitamin B12, Riboflavin</td>
<td>Thiamin, Riboflavin, Vitamin B6, Phosphorus, Magnesium, Iron, Calcium, Zinc</td>
<td>Vitamin D, Vitamin B12, Pantothenic Acid, Selenium, Riboflavin, Biotin, Iron</td>
<td>Thiamin, Riboflavin, Niacin, Iron, Selenium, Chromium</td>
<td>Niacin, Vitamin E, Manganese, Chromium, Pantothenic acid, Magnesium</td>
</tr>
</tbody>
</table>
Nutrition “Power” Foods

- Seeds
- Animal meats
- Beans (dry)
  - Black, garbanzo, chili, white, great northern
- Whole GRAINS
  - Quinoa
  - Buckwheat, millet, amaranth, barley, oat
  - Corn, rice, potato
- Avocados and Olives
- Enriched hemp products
- Fruits
  - Berries
  - Skin
- Vegetables
  - Dark green
  - Orange
  - Colorful
Directed Elimination Diet

• Eliminate foods based on immunologic reaction, usually measured with allergy skin testing by an allergist
• May be used in combination with the 6-food elimination diet
• Nutritional content of diet varies widely
• Formula supplementation is often required
Supplement Considerations

- OTC and prescription vitamin and mineral supplements are often recommended.
- Can use single vitamin and mineral supplementation (example – calcium, Vitamin D).
- Can also use a multivitamin (complete versus non-complete).
- Use based upon what nutrients are needed in the diet.
Formula Supplementation

- Use of a nutritional formula to ensure calories, protein, fat, carbohydrates, vitamins, and minerals in diet
- Elemental formula is commonly used in patients with EoE
- Patients who tolerate milk or soy may use milk or soy based supplements
Putting the Elimination Diet Together

• Step 1 – Identify which foods are to be removed from diet.
  – Start with **reading labels**
  – Identify foods frequently consumed that are not allowable
  – Identify food groups potentially affected

• Step 2 – Identify allowable foods on prescribed diet.
  – Identify allowable nutrient dense foods
  – Identify foods that should be replaced with nutrient dense foods
Putting the Elimination Diet Together

• Step 3: Develop a balanced diet using allowable foods.
  – Identify which foods fit well into each food group
  – Provide age appropriate servings from each food group
  – Provide a variety of foods from each food group
  – Good information: Myplate.gov

• Step 4: Fill in any “nutritional gaps” with supplements.
  – Multivitamin-age appropriate
  – Formula supplementation
Elemental Formulas
Elemental Diet

• Highly specialized diet
  (Neocate®, Neocate Jr®, EO28 Splash®, Elecare®)
  – Nutritionally complete
  – Hypoallergenic formula
  – Proteins are broken down to their smallest form (called free amino acids)

• In the amount prescribed, an elemental diet provides all calories, vitamins and minerals needed
Types of Elemental Formula

- Infant
  - Elecare Infant®
  - Neocate Infant®
    - Both are 20 kcal/ounce standard concentration
    - Powder must be mixed with water, no concentrated liquid available at this time
    - Can be adjusted based on infants growth and calories needs
  - Neocate Nutra®
    - Semi-solid elemental medical food for infants >6 months adjusted age
    - A product that can be used when introducing solids on a very restricted diet
    - NOT A NUTRITIONALLY COMPLETE SUPPLEMENT
Types of Elemental Formula

• Pediatric (recommended for ages 1-10 years)
  - Neocate Jr®
  - Elecare Jr®
  - Eo28 Splash®

  • Standard concentration is 30 kcal/ounce (same as Ensure® or Boost®)
  • Nutritionally complete - can be used in children >10 years of age (although may need additional supplementation)
    - Can be used in conjunction with MVI or single vitamins/mineral supplementation for children above 10 y.o.
    - Can be used to supplement elimination diet
  • Eo28 Splash® is ready to feed; Neocate® and Elecare Jr® come in powder form and need to be mixed with water
Elemental Diet

- Considerations:
  - Can be taken orally or via feeding tube
  - Sample formulas first (to determine taste preference)
  - Goal amount provided by care team
  - Discuss possible need for feeding tube with care team
  - Determine formula coverage with insurance company
  - Formulas require prescriptions, but can be ordered directly from the manufacturer
  - Can also obtain from local pharmacy
  - Highly recommend connection with a Home Health Care Company
Elemental Diet Insurance Coverage

- Many insurance companies pay for formula, but only if given through a feeding tube
- Some offer partial coverage
- Medicaid
- WIC (Women Infants Children) is a supplemental food program sponsored by the government (FDA) that will provide most/majority of coverage for children up to 5 years of age
Elemental Diet Coverage Options

• Specialty pediatric medical programs vary state to state (Ex. In Ohio: Bureau for Children with Medical Handicaps or BCMH)

• Assistance programs set up by Abbott Nutrition and Nutricia
  – Abbott Nutrition – Patient Assistance Foundation
  – Nutricia – Neocate Assistance Program
Elemental Diet – Advantages:

• 98% Effective

• Nutritionally complete

• Typically 3 month trial

• Quick resolution of symptoms
Elemental Diet: Disadvantages

• Repetitive-no variety
• Tastes bad (although new flavors are being developed)
• Inconvenient (powder)
• Expensive
• Constipation
• May not be covered by insurance provider
Food Trials

- Once EoE is in remission, food trials can be initiated.
  - Systematic introduction of eliminated foods back into diet, one or more foods at a time
  - Start with non-allergic foods, as well as non-top 6 foods
  - Skin testing can help direct food selection for food trials (although skin testing is not mandatory)
  - **ALL FOODS TESTED POSITIVE SHOULD BE INTRODUCED WITH SUPERVISION BY AN ALLERGIST.**
Food Trials

• Food reintroduction protocol differs between provider, as well as facilities
  – Sample general protocol:
    • 3+ months between scope to determine if foods are causing EoE
    • Select up to 4 foods
    • Patient eats 1 serving of a food for two weeks
    • If any symptoms develop, stop food - consider failed food
    • Two weeks before scope, should include all 4 foods in diet
    • Top 6 foods and known allergic foods are usually reintroduced as a single trial
    • If pathologist determines that the biopsy is “clear” of eosinophils, food(s) trialed are considered successful
Food Trials - Nutrition Issues

- Determine nutritional value of foods in current diet
  - Help family decide which foods to trial. Consider nutrient density of food, food group representation, and foods that can offer variety in the diet (Ex. Corn trial: corn chips, corn cereals, corn tortillas, whole corn)
  - Consider protein source and fat content of foods
  - Determine if supplementation is necessary (or can be decreased) when a food trial is successful
RULE OF THUMB

“When in doubt, leave it out.”