Elemental, Empiric or Directed for EoE: Oh My!

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Disclosure

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I will not discuss off label use and/or investigational use of any pharmaceutical in my presentation.

Objectives

1. Natural history of EoE
2. Different Dietary approaches
3. Efficacy of different diets

Remodeling of the esophagus in eosinophilic esophagitis

- Furrowing
- Stricture
- Trachealization
- Basal cell hyperplasia
- Subepithelial fibrosis
- Muscularis propria

Fibrosis in the lamina propria extending into the muscularis of mid-esophagus in a child with EoE

- Masson’s Trichrome Stain
- Hyperplastic epithelium
- Lamina propria
- Muscularis
Natural History of EoE

- For every 10-year increase in age the odds of developing fibrostenotic EoE more than doubled. 1
- With increasing delay in diagnosis the fibrotic features of EoE increased from 46.5% (diagnostic delay 0-2 yrs) to 87.5% (diagnostic delay >20 yrs). 2


Eosinophilic Esophagitis

Historical

1995 Kelly & Sampson
- A dense accumulation of eosinophils in the esophagus of 10 children with intractable GERD unresponsive to anti-reflux medical therapies
- Symptoms and histology improved with elimination of intact protein from their diet and controlled reintroduction of standard foods resulted in recurrence of symptoms
- On subsequent challenge specific foods responsible for symptoms identified in 9/10:
  - Cow’s milk (7), soy (4), wheat (2), peanut (2) & egg (1)

Empiric diet
- Elemental diet- An exclusive amino acid based formulation
- SFED- Exclusion of selected foods: cow’s milk, wheat, egg, soy, peanuts/tree-nuts and fish/shellfish
- 4-FED- Exclusion of the four most common trigger foods of EoE: cow’s milk, wheat, egg and soy
- Milk Elimination- Exclusion of the most common trigger food of EoE: cow’s milk

Directed elimination diet
Exclusion of food proteins based on the results of allergy testing
- Skin Prick Testing
- Skin Prick & Patch Testing
- Patch Testing Only
- PPT

Amino acid diet is highly efficacious in children and adults

- Kelly (n=10)
  - 10/10 Clinically Improved
  - 41 → 0.5 p=0.005
- Liacouras (n=164)
  - 160/164 Clinically resolved
  - 36.7 → 11.1 p<0.001
- Kagalwalla (n=25)
  - 25/25 Clinically Improved
  - 58.8 → 3.7 p<0.001
- Peterson (n=18)
  - No clinical improvement
  - 54 → 10 p=0.0006

Limitations of Elemental Diet
- Poor taste and palatability
- NG or PEG requirement to deliver required volume and calories
- Monotonous
- Compliance
- Cost
- Food reintroduction process is long & requires multiple endoscopies often over months & years.
Children (N = 35) • 97% Clinically improved • 80.2 → 9.4 p<0.0001 • 74.06% ≤ 10 eos/hpf • Most common foods: milk (80%), soy, wheat, egg

Adults (N = 50) • 94% Clinically improved • 44 → 13 p<0.0001 • 70% ≤ 10 eos/hpf • Most common foods: wheat (60%), milk (50%), soy, egg


Types of Allergy testing performed in EoE

- Serum food specific IgE
- Skin prick tests ✔
- Atopy patch testing ✔

Response to Elimination Diet based on SPT & APT Tests in children

- Clinical improvement: 89% (131/146)
- Histologic improvement: 72% (105/146)
- Specific foods identified in 39 pts.
- Average # food allergens identified = 4.7 / patient
- Most common foods: milk, egg, soy, meats, grains.


Limitations of SFED

- Simultaneous elimination of multiple foods, if even for a limited time, is difficult.
- Multiple endoscopies to identify the incriminating food trigger(s).

Diets based only on skin prick test (SPT)?

- Teitelbaum
  All 8 children failed to demonstrate clinical improvement with elimination of foods that tested positive to SPT.
- Noel
  All 10 children failed to respond to dietary elimination of food antigens identified by SPT.
- Gonsalves
  SPT accurately predicted the causal foods in only 13%.
- Lucendo
  SPT sensitivity 22.8% and specificity 78.9%


APT in adults & children is not uniformly reproducible in different centers.....
Case study

JF, a 12-year-old small for age, Caucasian male presented with a six month intermittent history of food impaction and antecedent history of slow eating, requiring fluids to wash down solids. 

EGD after 8 weeks of twice-daily PPI demonstrated isolated esophageal eosinophilia. 

Different treatment options including topical steroids and elimination diets; the efficacy of different approaches and their potential drawbacks discussed with family. 

Family indicated preference for empiric six-food elimination diet. 

Dietitian met with the family and educated and familiarized the family on the elimination diet. 

EGD repeated six weeks after the SFED.
Elimination of food antigens from the diet results in endoscopic improvement.

Resolution of esophageal EMT in subjects with ZOE: Comparison with eosinophil load.

Potential nutritional pitfalls of elimination diets:

- Impaired growth
- Kwashiorkor
- Rickets

Determinants of success with dietary Rx:

- Motivated and resourceful parents
- Participation of dietitian skilled in food elimination (i.e., cross contamination)
- Acceptance of nasogastric/gastrostomy tubes for elemental diet
- Acceptance of the need for multiple endoscopies.

Different dietary interventions in children & adults: A meta-analysis.

<table>
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<tr>
<th>Diet Type</th>
<th>Response Rate</th>
<th>Children</th>
<th>Adults</th>
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<tbody>
<tr>
<td>Elemental Diet</td>
<td>90.8%</td>
<td>n=429</td>
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<tr>
<td>Six Food Elimination Diet</td>
<td>72.1%</td>
<td>n=197</td>
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<tr>
<td>Allergy Test Directed</td>
<td>45.5%</td>
<td>n=626</td>
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