Empiric Four Food Elimination Diet Induces Remission in Pediatric Eosinophilic Esophagitis: Subsequent Reintroduction Identifies Food Triggers

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Disclosure

I have the following financial relationship to disclose:

- Consultant for: Nestle Nutrition.
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- Honoraria from: Speaker’s Bureau for Nutricia

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

Background

Empiric Elimination Diet: Six Food Elimination Diet (SFED)

- Clinical improvement: 97%
- 80.2 → 9.4  p<0.0001
- Histologic Remission: 74%

**Background**

Identification of trigger foods in children who responded to SFED

**Hypothesis**

- Four food elimination diet (4-FED) excluding cow’s milk, wheat, egg, and soy should induce histologic remission in a majority of pediatric patients with EoE.
### Treatment Endpoints

**Primary**
- Histologic remission: <15 eos/hpf

**Secondary**
- Symptom improvement
- Endoscopic improvement
- Identification of food triggers

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### Methods

**Inclusion criteria:**
- Patients ages 1-18 years
- Symptoms of esophageal dysfunction
- Isolated esophageal eosinophilia, ≥15 eos/hpf after pre-treatment with PPI for 6-8 weeks

**Exclusion criteria:**
- Patients on oral or swallowed steroids
- Patients with concurrent EG or EC
- Other causes of eosinophilia


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**Study Design**

- FED (8 Weeks)
  - Egg
  - Soy
  - Mil
  - Wheat

- Non responder
  - ≥15 eos/hpf
  - Egg washout (8 weeks)
  - Soy washout (8 weeks)

- ≥15 eos/hpf
  - Egg washout (8 weeks)
  - Soy washout (8 weeks)

- Trigger Food(s) Identified
  - Mil
  - Wheat
  - Soy
Recruitment

- 64 subjects enrolled
- 5 dropped out
- 3 post treatment EGD pending
- 55 underwent histologic assessment after 4-FED

Patient Characteristics

- n = 55
  - Mean age (range): 9.3 (1.8-18.4)
  - Male, n (%): 41 (75)
  - Ethnicity, n (%):
    - White: 43 (78)
    - Hispanic: 5 (9)
    - Asian: 3 (5)
    - Black: 2 (4)
    - Other: 2 (4)
  - Atopy, n (%): 50 (91)
  - Asthma: 16 (30)
  - Allergic Rhinitis: 35 (65)
  - Eczema: 26 (47)
  - Allergic Conjunctivitis: 11 (20)
  - Food Allergies (IgE-mediated): 19 (42)

Histologic Results

- 55 subjects post 4-FED EGD
- 64±11 → 6±1 (p<0.0001)
  - 29% (16) Failure (≥15 eos/hpf)
  - 71% (39) Remission (<15 eos/hpf)
  - 44% (17) Complete Remission (0-5 eos/hpf)
  - 56% (22) Partial Remission (6-14 eos/hpf)
Symptoms in Responders

<table>
<thead>
<tr>
<th>Clinical Symptoms</th>
<th>Pre 4-FED (n)</th>
<th>Post 4-FED (n)</th>
<th>Resolution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdominal pain</td>
<td>21</td>
<td>8</td>
<td>86</td>
</tr>
<tr>
<td>Slow eating</td>
<td>12</td>
<td>8</td>
<td>67</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>11</td>
<td>4</td>
<td>64</td>
</tr>
<tr>
<td>Regurgitation / Spitting up</td>
<td>10</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Vomiting</td>
<td>10</td>
<td>2</td>
<td>80</td>
</tr>
<tr>
<td>Food impaction</td>
<td>6</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Feeding difficulties</td>
<td>6</td>
<td>1</td>
<td>83</td>
</tr>
</tbody>
</table>

- 82% of responders had resolution of one or more of their presenting symptoms following 4-FED
- Symptoms completely resolved in 18% of responders

Endoscopic Features of Responders

<table>
<thead>
<tr>
<th>Endoscopic Features</th>
<th>Pre 4-FED n (%)</th>
<th>Post 4-FED N</th>
<th>Resolution (%) P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edema</td>
<td>25 (71)</td>
<td>12</td>
<td>52                     0.002*</td>
</tr>
<tr>
<td>Rings</td>
<td>4 (11)</td>
<td>1</td>
<td>75                     1.000</td>
</tr>
<tr>
<td>Edematosis</td>
<td>21 (60)</td>
<td>2</td>
<td>90                     &lt;0.001*</td>
</tr>
<tr>
<td>Furrowing</td>
<td>29 (83)</td>
<td>15</td>
<td>48                     0.001*</td>
</tr>
<tr>
<td>Stricture</td>
<td>0 (0)</td>
<td>0</td>
<td>0                      NA</td>
</tr>
</tbody>
</table>

- 83% had improvement in endoscopic findings
- 31% had complete resolution of all the abnormal endoscopic features

Food Triggers Identified

- Milk (n=16): 80%
- Egg (n=8): 31%
- Wheat (n=5): 23%
- Soy (n=5): 18%

n = 27
Patient Distribution by Number of Food Triggers

Summary of 4-FED
- Histologic remission achieved in 71% of children with EoE
- Symptoms improved in 82% of responders
- Endoscopic improvement in 83% of responders
- Specific trigger foods identified

Conclusions
- Histologic, endoscopic and clinical improvement was achieved in a majority of children treated with 4-FED.
- 4-FED is an effective dietary treatment option to treat children with EoE and compares favorably with SFED.
Collaborating Centers

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Mount Sinai Medical Center, New York, NY
- M. Chehade, M. Groetch, M. Liftie

Texas Children’s Hospital, Houston, TX
- A. Olive, C. Davis

Cincinnati Children’s Hospital Medical Center, Cincinnati, OH
- M. Collins