Capsule Endoscopy for the Assessment of Abnormal Intestinal Permeability in Crohn’s Disease Relatives

Leo Dieleman, MD PhD
Associate Professor, University of Alberta
Edmonton, Alberta, Canada
Pathogenesis Crohn’s disease

Genetic susceptibility

Immune dysregulation

Environmental triggers

IBD
Small intestine is a selective barrier

10-20% of first-degree relatives are likely to develop IBD
10-20% of first-degree relatives also have abnormal intestinal permeability
Study Questions

• Do relatives have abnormal intestinal permeability, because they have:

  1. early or mild Crohn’s disease?
  
  or

  2. an inherently abnormal gut barrier, as part of the etiology?
• Different sugars pass through gut barrier at different rates based on size
• Absorbed sugars not used by the body and passed into the urine
• Increased lactulose/mannitol ratio indicates “leaky small bowel”
Capsule Endoscope: EC Type 1

- Basics
- 1. 8 hours battery life time
- 2. Sterilized and single use.
- 3. Compact size of 11mm x 26mm for patient to easily ingest.
- 4. Transfer 2 frames per second to the Recorder Unit through the Antenna Lead Set.
Recruiting healthy CD relatives is not easy...

Contacts Made
- Total: 391
  - Pediatric: 105
  - Adult: 286

Probands Consented
- Total: 146
  - Pediatric: 34
  - Adult: 112

Potential Subjects
- Total: 236
  - Pediatric: 68
  - Adult: 168

Subjects Consented
- Total: 99
  - Pediatric: 31
  - Adult: 68

Capsules Completed
- Total: 42
  - Pediatric: 9
  - Adult: 33
Frequency of Abnormal vs Normal Intestinal Permeabilities Among First Degree Relatives

- % Abnormal: 21%
  - N=17/80
- % Normal: 79%
  - N=63/80
Subject Gender vs Abnormal Intestinal Permeability Frequency

Gender

Males

10%

N=3/25

Females

27%

N=13/45
Pathological small intestinal lesions seen by wireless capsule endoscopy

Figure 2 Examples of endoscopic findings of Crohn’s disease at capsule endoscopy. A: Edema; B: Ulceration; C: Strictureing.


<table>
<thead>
<tr>
<th>Maximum tertile score</th>
<th>Villous appearance</th>
<th>X</th>
<th>X</th>
<th>Subtotal</th>
</tr>
</thead>
<tbody>
<tr>
<td>(taken from tertile with highest overall score)</td>
<td>Ulcer</td>
<td>X</td>
<td>X</td>
<td>Subtotal</td>
</tr>
<tr>
<td>Stenosis score</td>
<td>Stenosis</td>
<td>X</td>
<td>X</td>
<td>Subtotal</td>
</tr>
</tbody>
</table>

**Index of Inflammatory Change:**

- **< 135** NORMAL (not significant)
- **135 – 790** MILD
- **≥ 790** MODERATE – SEVERE

(circle appropriate category)
<table>
<thead>
<tr>
<th></th>
<th>Abnormal Permeability</th>
<th>Normal Permeability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild Lewis Score</td>
<td>5/7 = 71%</td>
<td>7/18 = 39%</td>
</tr>
<tr>
<td>Normal Lewis Score</td>
<td>2/7 = 29 %</td>
<td>11/18 = 61%</td>
</tr>
</tbody>
</table>
Conclusions

• 21% of first degree relatives display an abnormal intestinal permeability

• This is mainly found in young and female relatives

• Using VCE we found a trend linking abnormal intestinal permeability and mild small bowel lesions

• Small group sizes prevent further conclusions at this time
Our Team

• Dr. Leo Dieleman
• Dr. Chris Teshima
• Dr. Wael El Matary
• Dr. Jon Meddings
• Ronda Blasco
• Peter Ho
• Daniel Wong
• Marilyn Gordon
Questions?
Vragen?