Functional Disorders of the Ileal Pouch

Bo Shen, MD
The Cleveland Clinic Foundation
Cleveland, OH
December 4, 2009

Imaging Quiz

- IUD
- Bladder stones
- Jewelry smuggler
- Atherosclerotic plaques
- ?
Anatomy of Pelvic Pouches

“Afferent limb (neo-TT)”

Tip of “J”

Efferent limb

Outlet/cuff

Inlet

Efferent limb

Pelvic J Pouch

J, S, K Pouches vs. Ileostomy

Brooke Ileostomy

Kock Pouch

Pelvic J Pouch
Ileal Pouch Disorders and Associated Complications

- Anastomotic leaks
- Pelvic sepsis
- Pouch sinuses
- Pouch fistulae
- Strictures
- Afferent limb syn.
- Efferent limb syn.
- Infecundity
- Sexual dysfunction
- Portal vein thrombi
- Pouch prolapse
- Foreign bodies

- Pouchitis
- Cuffitis
- Crohn’s dis.
- Small bowel bacterial overgrowth
- Inflammatory polyps

- Irritable pouch syn.
- Anismus
- Pouch inertia
- Pseudo-obstruction
- Levator ani syn.
- “Pouchalgia”

- Pouch/ATZ dysplasia or cancer
- Lymphoma
- Squamous cell cancer

- Anemia
- Bone loss
- B12 deficiency
- Celiac dis?

Practice Model in Pouch at Cleveland Clinic

<table>
<thead>
<tr>
<th></th>
<th>Pouch Database</th>
<th>Pouchitis Database</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>3500</td>
<td>1000</td>
</tr>
<tr>
<td>Established</td>
<td>1983</td>
<td>2002</td>
</tr>
<tr>
<td>Maintenance</td>
<td>RNs</td>
<td>MD</td>
</tr>
<tr>
<td>Population</td>
<td>All CCF</td>
<td>CCF, non-CCF</td>
</tr>
</tbody>
</table>
**Evolution of Pouchitis Clinic**

- **2002**:
  - Cuffitis: 7%
  - Active Pouchitis: 21%
  - Refractory Pouchitis: 10%
  - Cuffitis: 13%
  - Functional Disease: 0%
  - Surg Complication: 6%

- **2007**:
  - IPS: 18%
  - NL Pouch: 11%

- **2009**:
  - N pouch: 15%
  - IPS: 18%

**Disease Classification**

- Irritable pouch syndrome
- GI-pouch inertia/pseudo-obstruction
- Anismus
- Pouch prolapse
- Pouch-associated pain syndrome
  - “Pouchalgia fugax”
  - Levator ani syndrome
  - Phantom pain
Functional Pouch Disorders:
Spectrum of Pathophysiologica{l Processes

- **HYPOMOTILITY/HYPERSENSIVITY** (irritable pouch syndrome)
- **MIXED**
- **HYPERMOTILITY** (GI/pouch inertia, Pseudo-obstruction)

- Small bowel bacterial growth
- Phantom pain
- Poucholgia
- Levator ani syndrome
- Anismus

**Diagnostic Tools**

- Pouchoscopy
- Sugar breath test for small bowel bacterial overgrowth?
- Ano-pouch manometry
- KUB, small bowel series or CT enterography
- Gastrograffin enemas
- Barium defecography
- MRI defecography
- Barostat?
Ano-pouch Manometry

- Pouch volume
- Reflex
- Balloon expulsion
- Synergistic contraction
- Sphincter tune

Pouch-pelvic Dyssynergia-Anismus

Strain  Squeeze
Barostat

Anterior Pouchoccele-Gastrograffin Enema
Distal Pouch Prolapse

Predominant Symptoms

- Diarrhea
- Urgency
- Cramp
- Dyschezia
- Incomplete Evacuation
- Nausea
- Vomiting
- Bloating
- Pain
- Endoscopy probed
- Differential nerve block
- Pouchitis
- Cuffitis
- Crohn’s dz
- Infectious
- Irritable Pouch Syn.

Diagnostic Algorithm

- Pouch endoscopy
  - Labs
- Gastrograffin enema
- MRI/Ba defecography
- Manometry
- KUB/SBS
- CT enterography
- Gastrograffin enema
- Endoscopy probed
- Differential nerve block
- Pouch Strictures
- GI Inertia
- SBBO
- Neuroma
- Adhesions
- Poucholgia
- Phantom
Predominant Symptoms

- Diarrhea
- Urgency
- Cramp
- Dyschezia
- Incomplete Evacuation
- Anismus
- Pouch Inertia
- Medical Therapy
- Nausea
- Vomiting
- Bloating
- Nausea
- Vomiting
- Bloating
- Pain
- GI Inertia
- Miralax/Lactulose Surgery
- Poucholgia
- Phantom
- Albuterol Inhaler
- Neurotin/Lyrica
- B & O suppositories
- Nerve ablation

Irritable Pouch Syndrome
Irritable Pouch Syndrome

Differential Diagnosis- Those with Normal Pouch Endoscopy/Biopsy

- Celiac disease
- Small bowel bacterial overgrowth
- Fructose intolerance
- Infectious diarrhea (Giardia, crypto)
- *Clostridium*-associated pouchitis
### Logistic Regression Model for Risk Factors

<table>
<thead>
<tr>
<th>N</th>
<th>Variable</th>
<th>OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>61</td>
<td>Pouchitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Colectomy for dysplasia</td>
<td>3.89 (1.69, 8.98)</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>NSAID use</td>
<td>3.24 (1.71, 6.13)</td>
<td>0.0003</td>
</tr>
<tr>
<td></td>
<td>Never smoked</td>
<td>5.09 (1.01, 25.69)</td>
<td>0.049</td>
</tr>
<tr>
<td></td>
<td>Ex-smoker</td>
<td>0.44 (0.11, 1.80)</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>Arthralgia</td>
<td>1.01 (0.53, 1.92)</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>Non-use of anti-anxiety agents</td>
<td>5.19 (1.45, 18.59)</td>
<td>0.01</td>
</tr>
<tr>
<td>39</td>
<td>Crohn’s Pouch</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Duration of IPAA</td>
<td>1.20 (1.12, 1.30)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td></td>
<td>NSAID use</td>
<td>0.47 (0.21, 1.06)</td>
<td>0.068</td>
</tr>
<tr>
<td></td>
<td>Current smoking</td>
<td>4.77 (1.39, 16.25)</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>Ex-smoker</td>
<td>0.67 (0.16, 2.80)</td>
<td>0.58</td>
</tr>
<tr>
<td>41</td>
<td>Cuffitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Young Age</td>
<td>1.16 (1.01, 1.33)</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>Arthralgia</td>
<td>4.13 (1.91, 8.94)</td>
<td>0.0003</td>
</tr>
<tr>
<td>50</td>
<td>Irritable pouch syndrome</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Anti-depressant use</td>
<td>4.17 (1.95, 8.92)</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>Anti-anxiety agent use</td>
<td>3.21 (1.34, 7.47)</td>
<td>0.007</td>
</tr>
</tbody>
</table>

Shen B, et al. DCR 2006

### Comparison of Cleveland Global QOL Scores

![Comparison of Cleveland Global QOL Scores](image)

Shen B, et al. DCR 2006
Comparison of IBS-QOL Scores

![Chart showing comparison of IBS-QOL scores for different conditions.](chart1)

Shen B, et al. DCR 2006

Pouch Tone

![Chart showing pouch tone for different time periods.](chart2)

Pouch Compliance

\[ P > 0.05 \]

Visceral Hypersensitivity-Visual Analogue Scale

<table>
<thead>
<tr>
<th></th>
<th>Pressure 8</th>
<th>Pressure 16</th>
<th>Pressure 24</th>
<th>Pressure 36</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPS</td>
<td>2.0 ± 0.5</td>
<td>4.5 ± 0.7</td>
<td>5.7 ± 0.6</td>
<td>7.4 ± 0.5</td>
</tr>
<tr>
<td>NI Pouch</td>
<td>0.3 ± 0.2</td>
<td>0.8 ± 0.3</td>
<td>1.6 ± 0.6</td>
<td>2.3 ± 0.7</td>
</tr>
<tr>
<td>Pouchitis</td>
<td>1.0 ± 0.4</td>
<td>1.9 ± 0.4</td>
<td>3.4 ± 0.5</td>
<td>4.4 ± 0.6</td>
</tr>
<tr>
<td><strong>Pain</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPS</td>
<td>1.9 ± 0.6</td>
<td>3.8 ± 0.8</td>
<td>4.9 ± 0.8</td>
<td>6.2 ± 0.8</td>
</tr>
<tr>
<td>NI Pouch</td>
<td>0.1 ± 0.04</td>
<td>0.6 ± 0.2</td>
<td>1.3 ± 0.6</td>
<td>1.8 ± 0.6</td>
</tr>
<tr>
<td>Pouchitis</td>
<td>0.7 ± 0.3</td>
<td>1.3 ± 0.5</td>
<td>2.2 ± 0.6</td>
<td>3.7 ± 0.7</td>
</tr>
<tr>
<td><strong>Urge</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPS</td>
<td>1.9 ± 0.5</td>
<td>3.3 ± 0.7</td>
<td>5.9 ± 0.7</td>
<td>7.6 ± 0.5</td>
</tr>
<tr>
<td>NI pouch</td>
<td>0.1 ± 0.1</td>
<td>0.9 ± 0.3</td>
<td>1.7 ± 0.6</td>
<td>2.9 ± 0.9</td>
</tr>
<tr>
<td>Pouchitis</td>
<td>0.9 ± 0.5</td>
<td>2.3 ± 0.7</td>
<td>3.3 ± 0.8</td>
<td>4.9 ± 0.9</td>
</tr>
</tbody>
</table>

Sample size: IPS=18, nl pouch = 12, pouchitis=11
Normal Pouch  Irritable Pouch Syndrome

Serotonin 20X

Enterochromaffin Cell Hyperplasia in IPS

<table>
<thead>
<tr>
<th>Variable</th>
<th>IPS</th>
<th>Normal Pouch</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 35</td>
<td>N = 25</td>
<td></td>
</tr>
<tr>
<td>PMN infiltration score</td>
<td>0.40 ± 0.50</td>
<td>0.52 ± 0.51</td>
<td>0.36</td>
</tr>
<tr>
<td>Ulcer score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>35 (100%)</td>
<td>25 (100%)</td>
<td>1.00</td>
</tr>
<tr>
<td>&lt;25%</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>25-50%</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>&gt;50%</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Intraepithelial lymphocytes</td>
<td>22.3 ± 12.1</td>
<td>20.8 ± 11.4</td>
<td>0.52</td>
</tr>
<tr>
<td>CD3</td>
<td>233.5 ± 104.3</td>
<td>219.5 ± 82.5</td>
<td>0.59</td>
</tr>
<tr>
<td>CD25</td>
<td>3 (0 – 6.2)</td>
<td>3 (1 – 6)</td>
<td>0.62</td>
</tr>
<tr>
<td>Serotonin</td>
<td>54.8 ± 24.9</td>
<td>36.7 ± 17.5</td>
<td>0.005</td>
</tr>
<tr>
<td>Tryptase</td>
<td>363.2 ± 144.6</td>
<td>386.5 ± 132.8</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Shen B, et al.  AJG 2008
Association between EC cells and mucosal immune cells with Symptoms

Proposed Pathophysiology of IPS

Central Nervous System → Psychosocial factors

Neuroenteric System → Visceral hypersensitivity

End Organ (pouch) → Abnormal serotonin pathway
Proximal small bowel bacterial overgrowth
Treatment of Irritable Pouch Syndrome

- Low-carb diet
- Antispasmodics
- Amitriptyline 25-75mg QHS
- Opium tincture/Paragoric
- Belladonna-Opioid suppository

Pouch Failure Is Uncommon!

Irritable Pouch Syndrome and Pouch Failure – A Nomogram Model

Shen B. DDW 2010
Classification of Prolapse

- Mucosal vs. full-thickness
- Proximal vs. distal pouch
- Intermittent vs. persistent

Pouch Prolapse
### Prolapse in K Pouch

![Image of K Pouch prolapse](image)

Joyce M, et al. ACRSR 2007

### Pouch Prolapse

<table>
<thead>
<tr>
<th>Age</th>
<th>Gender</th>
<th>Indication for pouch</th>
<th>Pouch type</th>
<th>Time to Prolapse yrs</th>
<th>Treatment</th>
<th>Pouch loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>34</td>
<td>M</td>
<td>UC</td>
<td>J, DS</td>
<td>6</td>
<td>Biofeedback</td>
<td>No</td>
</tr>
<tr>
<td>32</td>
<td>F</td>
<td>FAP + Ca</td>
<td>J, M</td>
<td>1</td>
<td>Pouchpexy</td>
<td>No</td>
</tr>
<tr>
<td>15</td>
<td>F</td>
<td>UC</td>
<td>J, DS</td>
<td>5</td>
<td>Pouchpexy</td>
<td>No</td>
</tr>
<tr>
<td>48</td>
<td>M</td>
<td>UC + Ca</td>
<td>S, M</td>
<td>1</td>
<td>Mucosal excision</td>
<td>No</td>
</tr>
<tr>
<td>38</td>
<td>F</td>
<td>Inertia</td>
<td>J, DS</td>
<td>2</td>
<td>Pouchpexy</td>
<td>Yes</td>
</tr>
<tr>
<td>21</td>
<td>F</td>
<td>UC</td>
<td>J, DS</td>
<td>4</td>
<td>Pouchpexy</td>
<td>No</td>
</tr>
<tr>
<td>40</td>
<td>M</td>
<td>UC</td>
<td>S, M</td>
<td>1.5</td>
<td>Biofeedback</td>
<td>No</td>
</tr>
<tr>
<td>22</td>
<td>M</td>
<td>UC</td>
<td>Redo J, M</td>
<td>1</td>
<td>Pouchpexy</td>
<td>Yes</td>
</tr>
<tr>
<td>34</td>
<td>M</td>
<td>UC</td>
<td>J, M</td>
<td>6</td>
<td>Ripstein</td>
<td>Yes</td>
</tr>
<tr>
<td>41</td>
<td>M</td>
<td>UC</td>
<td>Redo J, M</td>
<td>1</td>
<td>Local procedure</td>
<td>No</td>
</tr>
<tr>
<td>23</td>
<td>F</td>
<td>UC</td>
<td>J, DS</td>
<td>2</td>
<td>Pouchpexy mesh</td>
<td>No</td>
</tr>
</tbody>
</table>
“Pouchalgia fugax”

GI/Pouch Inertia

Lactulose? Miralax? Ileostomy
Pouch-Pelvic Dysynergia

Summary

- Functional complications are common in patients with ileal pouches
- Functional disorders can be associated structural abnormalities
- Combined endoscopic, manometric, imaging, and histologic evaluations are often needed
- Treatment is still empiric