Surgery Grand Rounds

“Reoperative Surgery”

Crohn’s Disease

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Crohn’s Disease

- Chronic inflammatory condition of unknown etiology
- Transmural inflammation
- Mouth to anus
- Most commonly affects the ileum
Crohn’s Disease

- 400,000 to 600,000 people per year in NA
- Increasing incidence - 2-10 fold increase
- Peak incidence: 2nd to 3rd decade and 6th to 7th decade of life
- 15% rendered disabled after 10-20 yrs
- Slightly higher mortality than general population
- Most common indication for small intestinal surgery
Vienna Classification

- Age at dx <40, >40
- Anatomic location - terminal ileum, ileocolon, colorectal, and upper gastrointestinal
- Disease behaviour
  1. Non-stricturing, non-penetrating (inflammatory)
  2. Stricturing
  3. Penetrating
- Changes over time
  - 15% change in location
  - 80% inflammatory - progress to stricturing or penetrating
Penetrating Crohn’s Ileitis
Clinical Course

- 75% chronic intermittent, 10% chronic active
- 15% asymptomatic
- 50% undergo resection within 5 yrs from initial diagnosis
- 80% require operation during lifetime
- Obesity and Crohn’s – more virulent?
“Crohn’s disease is a chronic, unremitting, incurable, inflammatory disorder that can affect the entire intestinal tract”

Scott Strong, Surgery for Crohn’s Disease, Ch 42
ASCRS Textbook, p 584
Recurrent Crohn’s Disease

- Endoscopic: 60-80%
- Clinical recurrence: 10-20%
- Surgical recurrence
  - 5% re-resection 1 year
  - 40% - 70% at 5 yrs, 15 yrs
Risk Factors for Recurrence

- Anatomic location - ileocolonic disease
- Phenotype – penetrating disease
- Smoking – reoperation rates at 5, 10 yrs
  - Non smokers – 20%, 41%
  - Smokers – 41%, 70%
- Type of resection influences recurrence
Figure 1. Time to recurrence. Log-rank test: $P = 0.017$. SC vs. TAC: $P = 0.97$. TAC vs. TPC: $P = 0.23$. TPC vs. SC: $P = 0.014$. SC = segmental colectomy; TAC = total abdominal colectomy; TPC = total proctocolectomy.
Predictor of Recurrence: Endoscopy Findings

Fig. 1. Endoscopic view of recurrence score (example of I1, I3, and I4 findings).
Table 1
Endoscopic recurrence score*6

<table>
<thead>
<tr>
<th>Endoscopic Score</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>i0</td>
<td>No lesions</td>
</tr>
<tr>
<td>i1</td>
<td>≤ 5 aphthous lesions</td>
</tr>
<tr>
<td>i2</td>
<td>&gt;5 aphthous lesions with normal mucosa between the lesions, or skip areas of larger lesions, or lesions confined to the ileocolic anastomosis</td>
</tr>
<tr>
<td>i3</td>
<td>Diffuse aphthous ileitis with diffusely inflamed mucosa</td>
</tr>
<tr>
<td>i4</td>
<td>Diffuse inflammation with already larger ulcers, nodules, and/or narrowing</td>
</tr>
</tbody>
</table>

Remission: endoscopic score of i0 or i1; Recurrence: endoscopic score of i2–i4.

Medical Prophylaxis

Table 2
Clinical and endoscopic 1-year recurrence rates from randomized treatment trials

<table>
<thead>
<tr>
<th>Medication Class</th>
<th>Clinical Recurrence (%)</th>
<th>Endoscopic Recurrence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placebo</td>
<td>25–77</td>
<td>53–79</td>
</tr>
<tr>
<td>5-ASA</td>
<td>24–58</td>
<td>63–66</td>
</tr>
<tr>
<td>Budesonide</td>
<td>19–32</td>
<td>52–57</td>
</tr>
<tr>
<td>Nitroimidazole</td>
<td>7–8</td>
<td>52–54</td>
</tr>
<tr>
<td>AZA/6MP</td>
<td>34–50</td>
<td>42–44</td>
</tr>
<tr>
<td>Infliximab</td>
<td>0</td>
<td>9</td>
</tr>
</tbody>
</table>

Recurrence – Terminal ileal disease

Indications for Reoperation

- Anatomic location – proximal to anastomosis
- Stricture and bowel obstruction (stenosing)
- Penetrating disease
  - Abscess
  - Fistulization
- Intractable abdominal pain – inflammatory, stenosis, or fistulizing disease with abscess
- Hemorrhage
Bowel Preservation

- Preserve 100-125 cm small bowel
- Status of ileocecal valve
- Ileum - greater absorptive function
- Role of percutaneous drainage of intraabdominal abscess
- Balloon dilation – short strictures
- Maximize medical therapy
Patient Evaluation

- Careful history and PE
- Abdominal pain, bowel habits, functional status
- Continence
- Nutritional status, weight loss
- Previous and current medical therapy
- Stomas, incisions, draining wounds, anal disease, sphincter status
Patient Evaluation

- Review previous operative reports
- Pathology reports
- Estimate residual bowel
- CT scan abdomen/ pelvis – evaluate for abscess, fistulas
- Percutaneous drainage of abscess
- SBFT or CT enterography/ MR enterography
- Colonoscopy
Patient Preparation

- Nutritional support
- Bowel preparation
- Prophylactic antibiotics
- Stoma marking
- DVT prophylaxis
- Ureteral stenting – liberal use
Reoperation for Recurrent Crohn's Disease

- First case, limited schedule
- Adequate assistance
- Intraoperative endoscopy available
- Lithotomy position if fistulizing disease, colonic pathology
- Ureteral stents, stoma marking
- Bowel preserving surgery
Operative Technique

- Complete exploration - ligament Treitz to pelvic floor, and palpation of bowel and mesentery
- Fistula encountered, leave secondary non-inflamed bowel (if possible)
- Mesenteric division – suture ligation
- End stoma - critically ill, peritonitis, coagulopathy, lengthy operation
- Laparoscopic technique?
Comparison of laparoscopic and open ileocecal resection for Crohn’s disease: a metaanalysis

- 15 studies, 783 patients, 338 laparoscopic
- Laparoscopic: longer OR time (29.6 min)
- EBL, morbidity comparable
- Laparoscopic - earlier return bowel function, tolerance diet and shorter LOS (<2.7d, p<.001)
- Overall conversion rate 6.8%
- Factors for conversion cited: large fixed masses, multiple fistulas, abscesses
- Body image, QOL - favored laparoscopy
- Recurrence of disease - no difference.

Factors That Predict Conversion

Alves et al, DCR 2005;48:2302-08

- Prospective cohort, 69 pts (32m), single operation (ileocecal resection),
- Consecutive patients
- First resection, ileocecal
- Conversion defined: incision greater than 6 cm
- Conversion - 21/69 (30%)
- Multivariate analysis:
  - Multiple recurrent episodes of Crohn’s flare
  - Operative finding of intraperitoneal abscess, fistula
Contemporary Management for Ileosigmoid Fistulas in Crohn’s Disease

- 104 pts, period 2000 - 2007
- 63% diagnosed preoperatively
- 75 open, 29 laparoscopic
- 2/29 converted 7% conversion rate
  - Reason – complex anatomy, unable to mobilize colon
- Additional fistula –
  - 11 ileovesical, 11 ileoileal, other SB disease 21, other colonic disease 7
Length of Resection

- Serosal changes - erythema, fat creeping
- *Mesenteric thickening* - feel for “step off”
- Determine length of residual bowel prior to resection
- Preserve ileocecal valve if > 5-7 cm ileum is normal
- Intra-operative inspection of mucosa of resected specimen – 2 cm grossly normal bowel mucosa
- Skip areas – normal intervening segment
  - >10 cm preserve – depends on surrounding bowel, status of mesentery, bowel length (residual)
Stricturoplasty

- Reoperation, repeat resection - previous resection > 100 cm
- Performed for strictures of duodenum, jejunum, ileum, colon and anastomosis
- Jejunoileal disease, multiple short strictures
Intraoperative

- Palpation of mesentery
- Measure small bowel, anticipated length of resection
- Mark all strictures with sutures
- ? Not sure if clinically relevant:
  - 1.5 cm balloon - Foley, Baker tube, or marble
  - insert resection site or definite stricturoplasty site
Stricturoplasty

- Biopsy site to exclude cancer
- Various types depending on length of stricture
- Single layer or two layered sutured repair
- Leave metallic clip for future reference
Stricturoplasty

**Indications**
- Multiple strictures, large length of bowel
- Prior significant SB resection
- Pt with short bowel syndrome
- Stricture without phlegmon or fistula

**Contraindications**
- Malnutrition (alb <2.0)
- Perforated bowel
- Multiple strictures over short length bowel
- Stricture close to resection
- Bleeding from planned site
- Neoplasia
Heineke - Mikulicz Stricturoplasty

S Gorfine “Reoperative Surgery for IBD”, in Reoperative Pelvic Surgery, ed RP Billingham 2008
Finney Strictureplasty
Side to Side Isoperistaltic
Strictureplasty for Crohn’s Disease
Systematic Review and Meta-Analysis

- 1975 – 2005, 23 studies
- 1112 pts, 3259 stricturoplasties
  - Heineke-Mikulicz 81%
  - Finney 10%
  - Side-side isoperistaltic 5%
- Septic complications – 4%
- Overall recurrence 23%
  - 90% occurred at non-stricturoplasty site
  - 3% site specific recurrence
- Two pts developed CA at site

### Stricturoplasty: Risk Factors for Complications

#### Table 3.
Factors Affecting Complication Rates After Strictureplasty

<table>
<thead>
<tr>
<th>Study (yr)</th>
<th>No. of Patients</th>
<th>Complications (%)</th>
<th>Risk Factors</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fazio et al. (1993)(^{54})</td>
<td>116</td>
<td>23 (20%)</td>
<td>Albumin level</td>
<td>0.01, Univariate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 3 g/dl, 55% vs. 17% (≥3 g/dl)</td>
<td></td>
</tr>
<tr>
<td>Ozuner et al. (1996)(^{57})</td>
<td>162</td>
<td>26 (16%)</td>
<td>Albumin level</td>
<td>&gt;0.05 NS, Univariate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&lt; 2.5 g/dl, 30% vs. 11% (≥2.5 g/dl)</td>
<td></td>
</tr>
<tr>
<td>Hurst and Michelassi (1998)(^{31})</td>
<td>57</td>
<td>7 (12%)</td>
<td>Unscheduled cases,</td>
<td>&lt;0.02, Univariate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>45% vs. 4% (elective cases)</td>
<td></td>
</tr>
<tr>
<td>Yamamoto and Keighley (1999)(^{62})</td>
<td>87</td>
<td>7 (8%)(^{c})</td>
<td>Intra-abdominal sepsis at laparotomy, 24% vs. 3%</td>
<td>0.01, Univariate</td>
</tr>
<tr>
<td>Sampietro et al.(^{a}) (2000)(^{63})</td>
<td>104</td>
<td>6 (6%)</td>
<td>Low hemoglobin level</td>
<td>&lt;0.05, Multivariate</td>
</tr>
<tr>
<td>Dietz et al. (2001)(^{36})</td>
<td>314</td>
<td>57 (18%)</td>
<td>Older age</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Preoperative weight loss</td>
<td>0.004, Multivariate</td>
</tr>
<tr>
<td>Dietz et al.(^{b}) (2002)(^{69})</td>
<td>123</td>
<td>25 (20%)</td>
<td>Older age</td>
<td>0.08 NS</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Preoperative weight loss</td>
<td>0.09 NS, Univariate</td>
</tr>
<tr>
<td>Sampietro et al. (2004)(^{42})</td>
<td>102</td>
<td>3 (3%)(^{c})</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

NS = not significant.

\(^{a}\) This study included strictureplasty and/or miniresection.

\(^{b}\) This study included diffuse jejunoileal disease alone.

\(^{c}\) Septic complications only.
25 yo male, prior jejunal resection and abdominal pain, constipation.
Restricting Crohn’s Disease
Large Intestinal Disease

- Ileocolon, colon rectum
- Rectal sparing in 30% Crohn’s colitis
- TPC ileostomy – lowest incidence recurrence
- Segmental resection of colon if possible
- Perianal disease, incontinence, cancer
- Clinical presentation – abd pain, diarrhea, bleeding, stricture, fistulas, neoplasia
# Recurrence of Crohn’s Colitis

<table>
<thead>
<tr>
<th>Author</th>
<th>No. of patients</th>
<th>Recurrence (%)</th>
<th>Follow-up (y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>de Dombal et al.</td>
<td>42</td>
<td>37</td>
<td>15</td>
</tr>
<tr>
<td>Sanfey et al.</td>
<td>13</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Stern et al.</td>
<td>5</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Longo et al.</td>
<td>18</td>
<td>62</td>
<td>5</td>
</tr>
<tr>
<td>Allan et al.</td>
<td>36</td>
<td>66</td>
<td>15</td>
</tr>
<tr>
<td>Prabhakar et al.</td>
<td>33</td>
<td>42</td>
<td>14</td>
</tr>
<tr>
<td>Bernell et al.</td>
<td>134</td>
<td>49</td>
<td>10</td>
</tr>
<tr>
<td>Andersson et al.</td>
<td>31</td>
<td>39</td>
<td>11</td>
</tr>
<tr>
<td>Martel et al.</td>
<td>84</td>
<td>43</td>
<td>9</td>
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</table>

Recurrence of Colitis

<table>
<thead>
<tr>
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<th>No. of patients</th>
<th>Recurrence (%)</th>
<th>Follow-up (y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allan et al. 197</td>
<td>63</td>
<td>53</td>
<td>15</td>
</tr>
<tr>
<td>Longo et al. 202</td>
<td>131</td>
<td>65</td>
<td>10</td>
</tr>
<tr>
<td>Flint et al. 203</td>
<td>37</td>
<td>41</td>
<td>6</td>
</tr>
<tr>
<td>Buchmann et al. 204</td>
<td>105</td>
<td>30</td>
<td>8</td>
</tr>
<tr>
<td>Ambrose et al. 205</td>
<td>63</td>
<td>48</td>
<td>10</td>
</tr>
<tr>
<td>Goligher 206</td>
<td>47</td>
<td>49</td>
<td>15</td>
</tr>
<tr>
<td>Martel et al. 207</td>
<td>39</td>
<td>41</td>
<td>10</td>
</tr>
<tr>
<td>Bernell et al. 199</td>
<td>106</td>
<td>53</td>
<td>15</td>
</tr>
<tr>
<td>Andersson et al. 200</td>
<td>26</td>
<td>46</td>
<td>9</td>
</tr>
</tbody>
</table>
Recurrence After Colectomy in Crohn’s Colitis


Table 1.
Numbers, Median Times, and Crude Recurrence Rates in 394 Patients who Underwent Colectomy for Crohn’s Colitis

<table>
<thead>
<tr>
<th>Procedure</th>
<th>n</th>
<th>Median Time from Diagnosis to Resection</th>
<th>Median Follow-Up After Resection</th>
<th>Crude Recurrence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colectomy + stoma</td>
<td>65</td>
<td>3.4</td>
<td>7.6</td>
<td>18.5</td>
</tr>
<tr>
<td>Proctocolectomy + stoma</td>
<td>89</td>
<td>3.3</td>
<td>12.9</td>
<td>40.4</td>
</tr>
<tr>
<td>Colectomy + IRA</td>
<td>106</td>
<td>2.2</td>
<td>15.4</td>
<td>52.8</td>
</tr>
<tr>
<td>Segmental resection</td>
<td>134</td>
<td>0.6</td>
<td>10.4</td>
<td>49.3</td>
</tr>
<tr>
<td>Totals</td>
<td>394</td>
<td>2.1</td>
<td>12.4</td>
<td>43.9</td>
</tr>
</tbody>
</table>

Figures are number of years unless otherwise specified.

Risk factors for recurrence
• Perianal fistulas          RR 1.5
• Colectomy & IRA           RR 2.9
• Segmental colectomy       RR 3.0
Recurrence: Large Bowel

- Indications for surgery
  - Intractable colitis
  - Fistulization
  - Stricture
  - Neoplasia

- Status of rectum, perianal disease

- Continence

- Previous operation(s)
Patient Evaluation

- Careful history and PE
  - Pain, bowel habits, weight loss, functional status
  - Continence
  - Nutritional status
  - Previous and current medical therapy
  - Stomas, incisions, draining wounds, anal disease, sphincter status

- Review previous operative reports, pathology reports
Evaluation

- Colonoscopy, biopsies
- Barium enema
- CT scan abd/pelvis
- UGI SBFT
- CT enterography, MR enterography
Surgical Options

- Completion proctocolectomy, ileostomy
  - Incontinent
  - Severe rectal, perianal disease
  - Neoplasia
- Colectomy, ileorectal anastomosis
  - Rectal, anal sparing
- Repeat segmental colectomy
  - Focal disease (stricture), minimal distal inflammation
Penetrating Colonic Crohn’s
Ileal Mesenteric Window

Derotation Ascending Colon

Conclusion

- Crohn’s disease remains extremely challenging disease.
- Incurable – recurrence expected
- Identify high risk patients - consider prophylaxis
- Smoking cessation imperative
- Maximize medical therapy, multi-disciplinary decision process
- Reoperation - bowel sparing surgery (strictureplasty), segmental resection