Surgery in IBD
Updates and Quality of Care Guidelines

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Indications for Surgery in IBD

Ulcerative Colitis
- Failed medical Rx
- Refractory to medical Rx
- Impaired quality of life
- Dysplasia/Colon Cancer
- Hemorrhage
- Toxic Mega colon
- Perforation

Crohn’s Disease
- Failed medical Rx
- Refractory to medical Rx
- Impaired Quality of life
- Intestinal Obstruction
- Intestinal Fistulae
- Intra-Abd. Abscess
- Inflammatory Mass
- Hemorrhage
- Perforation
- Perianal Disease

Surgical Objectives
Goal is not to avoid surgery but to be well!

Ulcerative Colitis
- Removal of Colon/Rectum as a Cure
- Diminish cancer risk
- Improve Quality of Life
- Get off UC medications

Crohn’s Disease
- Improve quality of life
- Provide relief of debilitating symptoms
- Preserve bowel
- Surgery is not a CURE!

Key Factors in Surgical Acceptance and Decision-making
- Educate early on at diagnosis!
- Collaboration/Multidisciplinary Approach!
- Pt./family education!
- Referrals to other patients/websites!
- Pt./family acceptance and support!

Laparoscopic Approach
- Used whenever possible!
- Advantages
  - Less postoperative pain
  - Less injury to tissue
  - Minimal scarring – less adhesions
  - Less blood loss
  - Shorter hospital stay
  - Faster return to normal ADLs
  - Better cosmetic results
  - Reduced risk for incisional hernia with small incisions or low incision

J Gastrointest Surg. 2011
First Generation in Abdominal Incisions – Open Technique

Second Generation abdominal Incisions

Laparoscopic-assisted Fornell incision

Single Incision Laparoscopic Total Abdominal Colectomy


Surgical Evolution in UC TAC: Proctocolectomy

Surgical Evolution in Incisions

Use of Robotic Surgery in IBD?
The Da Vinci Surgical System Robotic Surgery

- Surgeon Console
- Patient-side Cart
  - EndoWrist Instruments
- Vision System

Vision System

- 3D Vision System
dual lens endoscope coupled with two 3-chip cameras
depth perception
- High-Resolution Image Processing
depth perception, progressive scan color monitors
depth perception, progressive scan color monitors
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depth perception, progressive scan color monitors
- Visual Continuity
  - Camera control through the hand controls and foot pedals

Instruments

- Enhanced dexterity
  - 7 degrees of freedom
  - 90 degrees of articulation
  - Finger tip control
  - Motion scaling and Tremor reduction


Surgeries for Removal of Rectum
Proctocolectomy, IPAA or Completion Proctectomy

- Pelvic autonomic nerve preservation
- Circumferential resection margin

Total Mesorectal Excision
Proctocolectomy, IPAA or Completion Proctectomy

Complications:

- Urinary Retention
  - Result from opiates, anticholinergics, pre-existing mechanical urinary obstruction
- Sexual Dysfunction
  - Impotence 2-3% males
  - Retrograde ejaculation 5% of males
  - Mild dyspareunia 5-10% of females
  - Female fertility - slightly diminished but does not preclude full term pregnancy and normal vaginal delivery

Circumferential resection margin

Pelvic autonomic nerve preservation
### Table 7: Functional outcomes after IPAA: sexual function

<table>
<thead>
<tr>
<th></th>
<th>RP-IPAA (6)</th>
<th>LP-IPAA (8)</th>
<th>p value</th>
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<tbody>
<tr>
<td>Change in sexual desire</td>
<td>Increased 1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decreased 0</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Same        5</td>
<td>6</td>
<td>0.66a</td>
</tr>
<tr>
<td>Ability to achieve orgasm</td>
<td>Pre-procedure 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-procedure 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ability to achieve erection</td>
<td>Pre-procedure 4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-procedure 4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Quality of erection</td>
<td>Same or stronger 1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weaker      3</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td>Use of medication for sex</td>
<td>Yes 1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No          3</td>
<td>5</td>
<td>1.0</td>
</tr>
</tbody>
</table>

RP-IPAA robotic-assisted IPAA, LP-IPAA laparoscopic IPAA

† Statistical analysis utilized Fisher’s exact test where possible, Pearson chi-squared

A Two men in the LP-IPAA group declined to answer

Robotic proctectomy is a safe and effective technique for patients with IBD and comparable to laparoscopic with regards to complications and short term functional results!


### Advantages of Using Robotic Surgery

- Stabilization of instruments within the surgical field
- Mechanical advantages over traditional laparoscopy
- Improved ergonomics for the operating surgeon
- Superior visualization including three-dimensional imaging of the Operative field

### Limitations of Using Robotic Surgery

- Lack of haptics (sense of touch)
- Large size of the devices
- Instrumentation limitations
- Inflexibility of certain energy devices
- Problems with multiquadrant surgery

Li et al Rb ti S Li m it ti ons o f Usi ng R o b o tic Surgery

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- Large size of the devices
- Instrumentation limitations
- Inflexibility of certain energy devices
- Problems with multiquadrant surgery


Robotic surgery is a safe and effective and has benefits for use in IBD surgery

### Proctocolectomy with Ileal Pouch-Anal Anastomosis (IPAA)

- Removes Colon & Rectum
- Formation of J-Pouch
  - Ileal Pouch attached to anus i.e.
    - Hand sewn or stapled
- Preserves Anal Sphincters
- Anal
- Restores bowel Continuity
  - Performed in 1, 2 or 3 stages
    - Ileostomy between

### Ileal Pouch Anal Anastomosis

Hand Sewn Anastomosis

Stapled Anastomosis

**Stapled Anastomosis**

- ATZ is intact with ± 2 cm of mucosa
- Less Trauma to Sphincters, 1 manipulation
- Preservation of Sensations
- Technically easier
- Less tension on anastomosis
- Better Function: discriminate gas from solid, ↓ contamination rate - initially to 3% ↓ need for protective pads, ↓ perforation rate ↓ dietary modification ↓ QOL
- ↓ risk anastomotic strictures/dehiscence

**Hand Sewn Anastomosis**

- All Rectal Mucosa Is Removed and Pouch is attached to anus
- Eliminates Risk of ‘Anusitis’ or "Cuffitis"
- Avoid Risk of Cancer In ATZ
- Used mostly in cases who have known dysplasia or a cancer already at time of colectomy

Most all anastomosis are performed using the Stapled Technique!


Most all anastomosis are performed using the Stapled Technique.
Proctocolectomy

- Total Abdominal Colectomy
- Hartmann’s Pouch (Initial Step)
- Proctocolectomy, Ileoanal J-Pouch, Diverting Ileostomy (Two Step)
- Proctocolectomy, Ileoanal J-Pouch (One Step)

J Pouch Stages

- Mucosectomy, Ileoanal J-Pouch, Loop Ileostomy (2nd Step)
- Closure of Ileostomy (2nd Step)
- Closure of Ileostomy (3rd Step)
- Completion Proctectomy

Proctocolectomy with Ileal Pouch-Anal Anastomosis (IPAA)

- 1 Stage – Proctocolectomy with IPAA without Diverting Loop Ileostomy – no tension on anastomosis, relatively thin patient is ideal
- 2 Stage – Proctocolectomy with IPAA with Diverting Loop Ileostomy – tension present on anastomosis, Closure of Ileostomy – 3 months later, dynamic proctography prior

When is a 3 step IPAA recommended?

- High risk of infections post-operative complications
- High dose steroid/biological tx.
- Nutritionally depleted
- Urgent - toxic mega colon/perforation
- Uncertain Dx.
- Obesity
- Female pt. desires to get pregnant prior to IPAA

Reasons:

Must Later be Followed by Either:

- Proctectomy and Permanent Ileostomy
- Proctectomy with one or two stage IPAA

Minimally Invasive Staged Pouch Surgery Postoperative Complications

<table>
<thead>
<tr>
<th></th>
<th>2 stage (%) (n=68)</th>
<th>3 stage (%) (n=50)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>55.2</td>
<td>52.1</td>
<td>.40</td>
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<tr>
<td>Reuse</td>
<td>23.0</td>
<td>16.0</td>
<td>.85</td>
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<tr>
<td>Bowel obstruction (&lt;30 d)</td>
<td>11.8</td>
<td>9.0</td>
<td>.80</td>
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<tr>
<td>Wound infection</td>
<td>8.8</td>
<td>7.0</td>
<td>.78</td>
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<tr>
<td>Abdominal abscess</td>
<td>10.9</td>
<td>11.9</td>
<td>.63</td>
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<tr>
<td>Pouch leak</td>
<td>13.3</td>
<td>7.5</td>
<td>.05</td>
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<tr>
<td>Pulmonary complication</td>
<td>4.4</td>
<td>1.0</td>
<td>.18</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>2.9</td>
<td>3.0</td>
<td>.67</td>
</tr>
<tr>
<td>Portal vein thrombosis</td>
<td>11.8</td>
<td>6.0</td>
<td>.14</td>
</tr>
</tbody>
</table>

Result: 3-stage approach results in less pouch leak, pelvic sepsis than a 2 stage.
TABLE 1. Patient Characteristics

<table>
<thead>
<tr>
<th></th>
<th>2 stage (n=68)</th>
<th>3 stage (n=69)</th>
<th>P</th>
</tr>
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<tbody>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Mean SD</td>
<td>37±12.5</td>
<td>38±10.9</td>
<td>.23</td>
</tr>
<tr>
<td>Range</td>
<td>18-65</td>
<td>19-56</td>
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</tr>
<tr>
<td>Sex (M/F)</td>
<td>34/34</td>
<td>30/20</td>
<td>.19</td>
</tr>
<tr>
<td>Duration of disease in years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean SD</td>
<td>98</td>
<td>56</td>
<td>.004</td>
</tr>
<tr>
<td>Range</td>
<td>1-28</td>
<td>1-20</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean SD</td>
<td>24.2 ± 2.5</td>
<td>22.8 ±3.1</td>
<td>.19</td>
</tr>
<tr>
<td>Range</td>
<td>18-28</td>
<td>18-30</td>
<td></td>
</tr>
<tr>
<td>Electrolyte imbalance, n (%)</td>
<td>20 (30)</td>
<td>28 (41)</td>
<td>.001</td>
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<tr>
<td>C difficile infection, n (%)</td>
<td>7 (10)</td>
<td>14 (24)</td>
<td>.01</td>
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<tr>
<td>Elective indication for surgery, n (%)</td>
<td>4 (6)</td>
<td>4 (8)</td>
<td>.02</td>
</tr>
</tbody>
</table>

BMI = body mass index, TNF = tumor necrosis factor

Elective indication for surgery, n (%)         16 (23.5)                    4 (8)            .02
C difficile infection, n (%)                            5 (5.8)                       7 (14)          .24
Anti-TNF, n (%)                                         11 (16)                      21 (43)          .01
Steroids, n (%)                                          46 (67)                     48 (96)          .0001


Ileal Pouch-Anal Anastomosis

Potential Complications

- Anastomotic Leaks 6-10%
- Pelvic Sepsis 1-2%
- Pouch fistula/sinus tract 10%
- Strictures 10%
- VTE/Pelvic vein thrombosis 5-10%
- Sexual dysfunction 15-50%
  - male erectile 15-45%
  - ejaculatory 30-45%
  - Female dyspareunia 10-35%

- Female fertility reduced by approx. 35-50%
- Pelvic adhesions 10%
- Crohn’s disease 10%
- Dysplasia
- Poor pouch function - atomic/ mega pouch 10%

Ileal Pouch Disorders and Associated Complications

<table>
<thead>
<tr>
<th>Surgical/ Mechanical</th>
<th>Inflammatory/ Infectious</th>
<th>Functional</th>
<th>Dysplastic/ Neoplastic</th>
<th>Systemic/ Metabolic</th>
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</thead>
<tbody>
<tr>
<td>Anatomotic leaks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fistula</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Pelvic sepsis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pouch failure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allergic leak</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intraabdominal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual dysfunction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portal Vein thrombosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pouch prolapse</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign bodies</td>
<td></td>
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</tr>
</tbody>
</table>

- Pouchitis
- Ulceration
- Crohn’s disease
- Fistula
- Intraabdominal
- Inflammatory polyps

- Irreducible Pouch syndrome
- Anus
- Poor pouch compliance
- Pouch obstruction
- Hyperplenism
- Squamous cell Ca
- Pouchitis
- Pouch/ATZ dysplasia or ca
- Gastrointestinal symptoms
- Celiac disease

2010 - 2011 IBD Guidelines: Increased awareness of pouch complications!

Shen B, CCFA 2007 & DDW 2007
Shen B, Faso VW, Remo PH et al. AUG 2006

- Pouchoscopy/Biopsy of pouch to confirm
- Ca
- Squamous cell
- Lymphoma
- Pouch/ATZ dysplasia or cancer
- Celiac disease
- Malabsorption - Vit. B12, bile salts
- Anemia
- Bone loss
- Irritable Pouch syndrome

IPAA Follow Up Recommendations

Follow pts. close initially 1st year and lifelong to:

- Assess for potential complications, i.e. dehydration, stenosis, Crohn’s disease, perianal skin breakdown, pouchitis, fistula/sinus tract, malabsorption - Vit. B12, bile salts etc.
- Pouchoscopy/Biopsy of pouch to confirm
  - If chronic inflammation in pouch – POUCHITIS/Crohns suspected
  - Stapled ATZ assess every 3-5 yrs. to assess dysplasia/cancer
- Assess for QOL satisfaction
- Provide pt. teaching and emotional support
  - Educate on meds. to avoid
  - Provide IPAA pt. referrals as a resource/support
  - Websites/support groups, j-pouch.org, CCFA.org

Surgery in Crohn’s Disease - What’s new and what are we learning:

<table>
<thead>
<tr>
<th>Chance of needing surgery for Crohn’s disease</th>
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</thead>
<tbody>
<tr>
<td>Within 1 year</td>
</tr>
<tr>
<td>40%</td>
</tr>
</tbody>
</table>

Websites/support groups, j-pouch.org, CCFA.org
Surgery in Crohn’s Disease

- Resection of inflamed segments to treat complications or refractory disease only
- Surgery does not cure!
- Disease usually recurs after resection
  - Typically at previous resected site and same length of bowel
  - Less after an ostomy
  - Repeated Operations
  - SB disease: 50% of pts. come to 1st surgery at 5 yrs
  - LB disease: 75% of pts. come to their 1st surgery at 5 yrs.
  - Only 20% of pts. have avoided surgery as far out as 20 yrs.

What we know about Crohn’s recurrence?

Surgery is not a cure and recurrence can be expected

- Clinical recurrence:
  - 30% by 3 yrs
  - 60% by 10 yrs
- Endoscopic recurrence:
  - 70-90% one year after resection
- Histologic recurrence:
  - Occurs as early as one week after surgery

Proposed Strategies for Treatment to Achieve Mucosal Healing (and Modify outcomes) in IBD

2010-2011 IBD Guidelines

- Treat early with the most effective therapy – early aggressive approach!
- Limit steroids and combination induction and maintenance
- Don’t rely on symptoms alone: use objective measures of disease response
  - Best is probably endoscopic assessment (3-6 months initially)
  - Assess drug levels
  - CRP if the patient demonstrates prior ability to generate it
  - Fecal markers show promise
- Serial MR or US may have a future role

Post-op in Crohn’s disease: starting with complete healing!

- Postoperative maintenance treatment: AntiTNFs - may help reduce post-op recurrence
- Post-op ileocolonoscopy in 6 months to assess mucosal healing!

SONIC: Corticosteroid-free clinical remission and mucosal healing in CD at week 26

- Patients (%) Patients (%)
- p=0.006
- p=0.022
- p<0.001
- p=0.055
- AZA, 2.5 mg/kg, oral
- IFX, 5 mg/kg, intravenous infusion
- PBO, placebo (oral capsule [+IFX] or intravenous infusion [-IFX] administered together with test drug)

Steroid-free clinical remission = absolute Crohn’s Disease Activity Index (CDAI) score <150, no oral or systemic steroids for at least 3 weeks

Mucosal healing = absence of mucosal ulceration in patients with confirmed ulcerations at baseline

What are the surgical strategies in Crohn’s Disease?

- Laparoscopic whenever possible!
- Robotic for rectal dissections?

Resection and Anastomosis

- Resection and Stoma
  - Protectomy with Colostomy
  - Total Proctocolectomy with Ileostomy
  - Temporary Diverting or Protecting Ileostomy
  - Strictureplasty (non-resectional techniques)

Intestinal Bypass
- Gastrojejunostomy
- Perianal Procedures
- Incision and Drainage
- Fistulotomy
- Seton Placement
- Rectal Advancement Flap
- Other
  - Closure and repair of Fistula
  - Drainage of Abscess

Exciting time in Crohn’s Surgery!

- Surgical technique – Kono S anastomosis (antimesenteric)

Dr. Kono, Diseases of Colon and Rectum 2011:54:986-992
Surgical procedures for S anastomosis

The nearby mesentery of the intestinal loop which is to be excised.

Surgical recurrence for anastomotic restenosis between S anastomoses and conventional anastomoses.

What should we tell our Crohn’s patients after surgery?

- Adhere to maintenance health and IBD treatments – want to maintain overall health i.e. Vaccinations, flu shots, etc. and maintain remission and mucosal healing of crohn’s
- Comply with follow up visits/evaluations/blood work, etc. Follow up with colonoscopy in 6-12 months post op to evaluate disease recurrence - mucosal healing
- Notify GI of any changes or complications in health status that may signal disease recurrence – EIMS
- Do not smoke – women smokers 5X higher risk & recur more quickly, medications do not work as effectively in smokers, 2nd and 3rd hand smoke!
- Avoid NSAIDS

What about recurrence of Crohn’s disease?

- New medications, treatments and surgical techniques may change the coarse of recurrence!

Surgical Quality Improvement Post op?

- IBD/Hospitalized Surgical patients are at increased risk of Venous Thromboembolic Event
  - Second-most common medical complication
  - Second-most common cause of excess length of stay
  - Third-most common cause of excess mortality and excess charges
- Evidence-Based Best Practice Guidelines
  - American College of Chest Physicians
  - ACS NSQIP
  - UHC
- Prophylaxis
  - Pharmacological - Heparin/Enoxaparin postop
  - Mechanical - SCD’s
- Early ambulation – new IBD Guidelines increased risk of VTE

Geerts WH et al. Chest 2003
Take Home Points

- Goal is not to avoid surgery but to be well!
- Minimally Invasive surgery always attempted
- Robotic proctectomy is a safe and effective technique
- IPAA most performed using the stapled technique, 3-stage IPAA approach more common, increased awareness of IPAA complications and follow pts. close initially 1st year and lifelong
- Kono S Anastomosis may be promising surgical technique to prevent surgical recurrence of Crohn’s
- VTE prophylaxis postop for all surgical patients
- Colonoscopy in 6 months to assess mucosal healing, avoid smoking & NSAIDS & begin early post-op treatment to prevent Crohn’s recurrence