Extent of resection for sigmoid diverticulitis

Falk Symposium
Munich June 2005
Extent of resection for sigmoid diverticulitis

- Elective:
- Urgence:
  - Hinchey I/II vs Hinchey III/IV
  - Bleeding
  - Fistula
  - Pseudotumoral

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Hypothesis

the cause of diverticulosis of the sigmoid colon may be attributed to sudden contractions in a high-pressure zone. 

Beranbaum Radiology 1972

Mann Rob and Smith’s Operative Surgery 1983
Extent of resection

- Digestive tract
- Mesentery
- Vessels
- +/- other organs
Extent of resection: digestive tract

- an “appropriate” length of resection should correlate with:
  a) low (acceptable) rate of recurrence
  b) a safe anastomosis
  c) satisfactory patient comfort
Extent of resection in elective colectomy: proximal limit

- Modern standard: resection of the entire sigmoid colon
  - Publication from Mayo clinic (Judd) (1955)
    - even when diverticula were present in the transverse or right colons
    - sigmoid colon site of severe complications in over 98% of cases

- According the other recommendations, the upper limit should remove all proximal foci of inflammation, leading to a safe anastomosis. This implies performing sometimes a left colectomy
Extent of resection: distal limit

- 1) **Sigmoid rectal juncture** Mann, Goligher, and Hughes, in their respective text book chapters, as well as more modern authors including Wexner and Bergamachi

- 2) **Anastomosis between proximal colon and upper rectum**
  - rates of recurrence and reoperations were higher when this was not the case
  - rectum itself rarely involved

Frizelle *J R Coll Surg Edinb* 1997
Extent of resection: distal limit

1) implies
   • simple posterior mobilization of the rectum
   • removing no more than the intraperitoneal segment of the upper rectum

2) CR juncture classically determined by
   • the disappearance of the taeniae coli
   • and accessorially, a change in the aspect of the serosa

[Diagram of the colon with an arrow pointing to the distal limit of resection]
Emergency situation: Extent of resection

- Same rules
- especially since one or two stage treatment should include resection of the infected segment of colon as part of source control, completed by at least that of the sigmoid colon for the remaining diverticulae, as indicated above
## Table 4.
Summary of Outcomes in Primary Anastomosis

<table>
<thead>
<tr>
<th></th>
<th>PA Overall</th>
<th>PA Alone</th>
<th>PA + Stoma</th>
<th>PAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mortality</strong></td>
<td>9.9</td>
<td>8.1</td>
<td>9.2</td>
<td>9.6</td>
</tr>
<tr>
<td>No. of studies</td>
<td>48</td>
<td>29</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>No. of cases</td>
<td>548</td>
<td>297</td>
<td>109</td>
<td>52</td>
</tr>
<tr>
<td><strong>Anastomotic leak</strong></td>
<td>13.9</td>
<td>19.3</td>
<td>6.3</td>
<td>9.6</td>
</tr>
<tr>
<td>No. of studies</td>
<td>29</td>
<td>14</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>No. of cases</td>
<td>353</td>
<td>145</td>
<td>64</td>
<td>52</td>
</tr>
<tr>
<td><strong>Wound infection</strong></td>
<td>9.6</td>
<td>16.4</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>No. of studies</td>
<td>17</td>
<td>6</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>No. of cases</td>
<td>219</td>
<td>55</td>
<td>25</td>
<td>50</td>
</tr>
</tbody>
</table>

PA = primary anastomosis; PAIL = primary anastomosis and intraoperative colonic lavage.
Emergency situation: Extent of resection

- Same rules

Problems:
- degree of inflammation
- severity of peritonitis

difficult decisions as to the extent of resection necessary
Special situations

- Hinchey I/II
  - Drain and operate later
  - Beware of retractions (pseudotumoral formation)
    • Dangers: ureter, nerves, bladder, pelvic organs

- Hinchey III/IV
  - Primary resection vs colostomy +/- drainage
Emergency: Resection or not?

2 Randomized controlled trials
Emergency: Resection or not?

2 Randomized controlled trials
### Treatment of perforated sigmoid diverticulitis: a prospective randomized trial

62 patients, 14 years, 27 surgeons, no scoring system

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Suture Colostomy</th>
<th>Resection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Hinchey III († %)</td>
<td>21 (0) p&lt;0.02</td>
<td>25 (24)</td>
</tr>
<tr>
<td>Hinchey IV († %)</td>
<td>10 (60) p=0.6</td>
<td>6 (33)</td>
</tr>
<tr>
<td>Reoperations resection</td>
<td>17</td>
<td>15 H reversal</td>
</tr>
<tr>
<td>Stoma: permanent closure</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

Kronborg *Br J Surg* 1993
### MRCT of I°ry vs II°ry sigmoid resection in generalized peritonitis complicating sigmoid diverticulitis

105 patients, 7 years, 34 surgeons, MPI score

<table>
<thead>
<tr>
<th></th>
<th>Suture</th>
<th>Resection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Colostomy</td>
<td>Hartmann</td>
</tr>
<tr>
<td>Number of patients</td>
<td>48</td>
<td>55</td>
</tr>
<tr>
<td>Hinchey III († %)</td>
<td>34 (18)</td>
<td>43 (21)</td>
</tr>
<tr>
<td>Hinchey IV († %)</td>
<td>14 (21)</td>
<td>12 (33)</td>
</tr>
<tr>
<td>MPI ≥ 21 († %)</td>
<td>39 (31)</td>
<td>36 (25)</td>
</tr>
<tr>
<td>Reoperations (early)</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td># total operations</td>
<td>107</td>
<td>93</td>
</tr>
<tr>
<td>Permanent stoma</td>
<td>2</td>
<td>5</td>
</tr>
</tbody>
</table>

*FASR Br J Surg 2000*
Laparoscopic management of diverticular disease
Laparoscopic management of generalized peritonitis due to perforated colonic diverticula

- Lavage
- Glue
- Suture
- Omentoplasty
- +/- Drainage
Extent of resection: laparoscopy

- laparoscopic resection as efficient as open \(^{a}\)

\(^{a}\) Thaler *Dis Colon Rectum* 2003
Extent of resection: implications

a) the splenic flexure should be taken down routinely to ensure a safe tensionless anastomosis,
b) the upper limit of the proposed resection should be marked with a clip before starting the dissection in order to be sure the entire proximal sigmoid is resected in the specimen
c) the sigmoid rectal juncture must be identified and resected in all cases
d) the anastomosis has to be performed intracorporeally, to the upper rectum
Extent of resection: implications

Whether through a traditional laparotomy or by laparoscopy
Extent of mesentery resection

- Coloepiploic detachment: better release of the splenic flexure
Arteries and Veins
Extent of vascular resection

- Division of inferior mesenteric vein
  - Preserver left colic artery
  - Preserver superior rectal artery
Preservation of the inferior mesenteric artery

- Randomized Controlled Trial: 163 patients (laparotomy) with complicated diverticular disease
  - Preservation: n = 86; ligation origin, n = 77

\[ P = 0.03 \]
\[ P = 0.02 \]
\[ P = 0.07 \]
Preservation of the inferior mesenteric artery

- 163 patients (laparotomy) with complicated diverticular disease
  Preservation: n = 86; ligation origin, n = 77

Tocchi Am J Surg 2001
Special situations

• Bleeding:
  – Source identified (<50%): segmental colectomy
  – Source not identified: ???
    • Segmental colectomy: no
    • Sub-total colectomy???
Special situations

• Fistula:
  – resection of diseased segment of colon and repair of contiguous organ

• Stricture:
  – Absence of proof of benign lesion: oncologic resection of diseased segment

• Recurrent diverticulitis after resection
  – Consider repeat resection of (insufficiently resected) proximal and/or distal colon (beware of associated irritable bowel syndrome)
Risk factors for recurrence

- Defined as left lower quadrant pain, fever, and leukocytosis, with consistent CT and/or contrast enema findings on admission and after six weeks
- Anastomosis level was based on muscle layer configuration (taeniae coli) at the distal resection margin
- Twelve (5%) patients developed a recurrence at a mean of 78+/- 25 (range, 34–109) months with reoperation in one (0.4%).
- The level of anastomosis was the only independent predictor of recurrence in regression analysis ($P= 0.033$)
ASCRS standards task force general principles I

Elective or nonurgent cases

1) Removal of entire sigmoid colon
   • + all thickened, diseased colon
   • but not necessarily all proximal diverticula-bearing colon
   . It may be acceptable to retain proximal diverticular colon if not hypertrophied

2) when anastomosis is elected
   – made to normal rectum
   – free of tension
   – and well vascularized

Practice parameters for the treatment of sigmoid diverticulitis Dis Colon Rectum 2000,
ASCRS standards task force general principles II

Urgent or emergent cases

1) resection and diversion are generally required

2) In selected cases where sepsis can be removed, definitive resection with anastomosis (with or without proximal stoma) may be appropriate

3) on-table colonic lavage may be a useful adjunct to resection and anastomosis

Practice parameters for the treatment of sigmoid diverticulitis *Dis Colon Rectum* 2000,
Thank you for your attention

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