Sigmoid Diverticulitis: Indications for surgery and review of the modern literature

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Case Presentation

• 60 yo F with a 10 yr history of diverticular disease
  o LLQ pain x 1 day – similar to previous episodes
    • 2 prior episodes of acute diverticulitis over the past 6 months treated with oral antibiotics
  o 12 hours following colonoscopy
  o Colonoscopy in preparation for interval sigmoidectomy
    • tattooing of the involved area of colon – preserve area or resection
  o (+) subjective fevers (-) diarrhea, blood per rectum
  o (-) pyuria, fecaluria, pneumaturia
• PMH: HLD, COPD, DM, allergic asthma, fibromyalgia
• PSH: tubal ligation
• Allergies: Loratadine, pseudophedrine
• Meds: nexium, colace, gabapentin
• SH: 15 pack year smoking hx – quit 9 years prior
Physical Exam

- T 98.3    HR 74    R 20    BP 120/75    SpO2 – 100% on RA
- Gen: AAOx3, NAD
- CVS: RRR
- Resp: CTA b/l
- GI: soft, non-distended, mild tenderness in LLQ, no CVA tenderness, no masses, hemias, or organomegaly
- Rectal: no gross blood, soft stool in vault

- Labs:
Hospital Course

- CT - Infiltrative changes in the proximal sigmoid colon suggestive of mild acute diverticulitis - no focal collections.
- Admitted to the medical service for acute uncomplicated diverticulitis
  - Started on Levaquin and Flagyl
  - Made NPO and placed on IVF until pain resolved
  - Diet advanced HD#2
  - Discharged HD#3 on oral abx
  - Follow up with surgery as an outpatient for interval sigmoidectomy.
Questions?
Sigmoid Diverticulitis

- Epidemiology
- Anatomy
- Physiology
- Risk Factors
- Diagnosis
- Treatment
  - Acute Diverticulitis
  - Chronic and Recurrent Diverticulitis
  - Current Data
Epidemiology

- Age-specific incidence of diverticulosis
  - <30 years - <2%
  - 30-39 years - 5%
  - >50 years - 30-50%
  - >80 years - 60%

- Incidence of developing diverticulitis – 4 – 25%
- 300,000 admissions in US over the last decade
- $1.8 billion of annual direct medical costs
- 1.5 million outpatient visits yearly.
- Diverticulosis is a disease of affluent society and refined food products – decreased dietary fiber.
Pathologic Anatomy

- **False diverticula**
  - Hemiation of the mucosa and submucosa through the circular muscular layer

- **Herniations occur at well-defined points**
  - Along either side of the mesenteric tenia and on the 2 antimesenteric teniae,
  - Where the vasa recta penetrate the circular muscular layer

*FIGURE 71.1* Cross section of the colon illustrating the relation of diverticula to the blood vessels penetrating the circular muscle layer, the taeniae, and the appendices epiploicae.
Pathophysiology

- Increased intraluminal pressure causes mucosal and submucosal outpouching through the muscular layer adjacent to the vasa recta – acquired pulsion diverticulum.
- Stasis or obstruction of the diverticulum lead to bacterial overgrowth and derangement of the colonic microenvironment.
- Localized tissue inflammation and venous stasis which leads to ischemia.
- Contained perforation and formation of a peridiverticular abscess or free perforation with peritonitis.
- Inflammatory process can also form fistula into adjacent organs such as the small bowel, bladder, and vagina.
- The most commonly isolated organisms are anaerobes and Gram-negative aerobes, especially E. coli.
Risk Factors

- **DIET**
  - Low Fiber, High fat
  - Nut, corn, and popcorn myth debunked as increased cause of diverticulosis and complications of diverticular disease

- **SMOKING**
  - Increased risk of symptomatic diverticulosis and perforation/abscess compared to non-smokers

- **OBESITY**
  - Increased risk with increasing BMI
  - Physical activity decreases diverticular complications

- **MEDICATIONS**
  - Aspirin, NSAIDS, Opioids, and Corticosteroids increase chance for diverticulitis and diverticular bleeding.
Diagnosis

- Clinical presentation – fever, LLQ abdominal pain/tenderness, leukocytosis
  - Previous episodes
  - Alterations in bowel habit, urinary symptoms
    - Colovesicular fistula - fecaluria, pneumaturia, pyuria

- Imaging
  - CT scan with PO and IV contrast
    - Staging – Hinchey classification
    - 98% sensitive and 99% specific

- Differential
  - bowel obstruction, UTI, appendicitis, IBS, IBD, ischemic bowel, neoplasia, gynecologic disorders

- Uncomplicated vs. complicated
  - Inflammation in the absence of abscess, fistula, stricture, perforation, or obstruction
  - Oral antibiotics if patient can tolerated a PO diet
Hinchey classification

- Acute complicated diverticulitis
- Grading system to reflect the degree of perforation:
Treatment of Acute Complicated Diverticulitis

• Hinchey I/II: antibiotics +/- percutaneous drainage
• Hinchey III/IV: Surgical intervention
  o Hartmann’s procedure - sigmoid colectomy with end colostomy and rectal stump.
    • Wound infection of 24%
    • Mortality rate of 18%
    • 30-45% never have their stoma reversed
  o Resection and primary anastomosis with defunctioning stoma
    • Similar mortality rate
    • Increased rate of stoma reversal
    • Better long term quality of life
    • Anastomotic leak rates about 6% in suitable patients.
  o Laparoscopy and peritoneal lavage – for Hinchey II/III
    • Damage control - Bridge to elective resection with primary anastomosis
    • Low conversion rates (5%)
    • Decreased length of stay
    • Complication rate 20%
    • Overall mortality rate of 0.25 per cent
Follow up

Follow up with flexible endoscopy or colonoscopy?
- Following an episode of diverticulitis patients should have an additional colonoscopy screening to rule out a colorectal malignancy
  - De Vries et al. 2014
    - 1.16% chance of concurrent CRC
    - 10% low grade adenoma
    - 2.2% advanced adenoma
  - Unless colonoscopy is regarded for screening in individuals aged 50 years and older, routine colonoscopy in the absence of other clinical signs of CRC is not required

Interval Sigmoidectomy?
- After the second episode of uncomplicated diverticulitis?
- Individualized
Systematic review of recent primary reports on the decision making, technical aspects, and outcomes of surgery for acute, recurrent, and chronic sigmoid diverticulitis

• (1) What are the indications for surgical resection?
• (2) Should a specific surgical approach or technique be recommended?
• (3) What are the outcomes of surgical treatment?
**Acute Diverticulitis - 6 studies**

- Urgent surgery was performed for those with sepsis and diffuse peritonitis or those who fail to improve despite medical therapy and/or percutaneous drainage.
- 15-20% of patients undergo colectomy during their index hospitalization for acute diverticulitis.
- High morbidity - more patients undergoing non-operative therapy in absence of signs of sepsis.
- Resection following non-operative treatment of acute diverticulitis?
  - Following non-operative management risk of recurrence is higher than for those who undergo urgent colectomy.
  - Large majority of patients with complication of abscess will eventually require surgical intervention - either acutely or electively.
  - Newer literature showing that non-operative treatment no more likely than those with uncomplicated disease to have future recurrence or complication.
Recurrent and Chronic Diverticulitis – 11 studies

- Old adage - Elective resection recommended after 2 episodes of uncomplicated diverticulitis or 1 episode in young patients.
- Recurrence after first episode of uncomplicated diverticulitis is 10-35% and re-recurrence 1-5%.
- Severity of attacks generally does not increase.
  - 3-5% of patients experience a complicated episode after uncomplicated episode.
- Free perforation occurred in 25% of patients presenting with their first episode of acute diverticulitis, but only 12% with their second, 6% with their third, and 1% thereafter. (Ritz et al.)
- Patient specific risk factors for recurrence and complications – 14 studies
  - No longer age but severity of initial episode as risk factor for recurrence.
  - Family history, retroperitoneal abscess, length of colon segment involved
  - Immunosuppression, collagen vascular disease, glucocorticoid use.
• **Individualized approach to consider elective resection**
  o Severity of prior episodes
  o Patient-specific factors
  o Ongoing symptoms – Colectomy relieved symptoms in 77-89% of patients in 2 reports
  o Number of episodes and age of onset should be considered secondary
  o Prophylactic surgery to prevent severe septic complications is not necessary in most cases.

• **Technical considerations**
  o Acute – Hartmann’s vs. Primary anastomosis – 3 RCT
    • Short term outcomes comparable
    • Reasonable and safe in selected patients
    • Oberkofler et al – primary anastomosis vs. Hartmann’s
      o Mortality 9 vs. 13%
      o Complications 75% vs. 67%
      o Stoma closure 90% vs. 58%
      o Complications of stoma closure 0% vs. 20%
  o Laparoscopic vs. open
    • Decreased incidence of major complication, reduced hospital stay, reduced postoperative pain, and improved quality of life at 6 months.
  o Margins of resection (Thaler K et al., Dis Colon Rectum. 2003)
    • Most important contributor to the likelihood of recurrent diverticulitis after resection
    • Presence of colocolonic anastomosis with retained distal sigmoid colon increased 4 fold compared with creation of colorectal anastomosis.
# Practice Parameters for the Treatment of Sigmoid Diverticulitis

Daniel Feingold, M.D. • Scott R. Steele, M.D. • Sang Lee, M.D. • Andreas Kaiser, M.D. • Robin Boushey, M.D. • W. Donald Buie, M.D. • Janice Frederick Rafferty, M.D.

Prepared by the Clinical Practice Guideline Task Force of the American Society of Colon and Rectal Surgeons

## Table 5. Systematic Review of Evidence Regarding Surgical Decision Making, Compared With Practice Parameters From the American Society of Colon and Rectal Surgeons

<table>
<thead>
<tr>
<th>Indications and Considerations</th>
<th>Current Review</th>
<th>ASCRS</th>
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<tbody>
<tr>
<td><strong>Indications for Surgery, Acute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sepsis</td>
<td>Urgent surgery is performed for those with sepsis and diffuse peritonitis or those who fail to improve despite medical therapy and/or percutaneous drainage</td>
<td>B (I)</td>
</tr>
<tr>
<td>Free air on CT</td>
<td>In absence of severe clinical signs of sepsis, 2 single-institution studies suggest potential for nonoperative treatment even for patients with complicated, perforated acute diverticulitis</td>
<td>B (Ilb)</td>
</tr>
<tr>
<td>Failure to improve with medical management</td>
<td>Urgent surgery is performed for those who fail to improve despite medical therapy and/or percutaneous drainage</td>
<td>B (I)</td>
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### Indications for Surgery, Elective Setting

<table>
<thead>
<tr>
<th>Indication</th>
<th>Description</th>
<th>Level</th>
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<tbody>
<tr>
<td>Abscess drained at acute presentation</td>
<td>Patients who recover from acute inflammation with nonoperative management in presence of perforation are typically encouraged to undergo elective resection because of higher incidence of late complications.</td>
<td>B (IIa)</td>
</tr>
<tr>
<td>Recurrent disease</td>
<td>Evidence supports an individualized approach to consideration of elective resection, which takes into account severity of prior episodes, patient-specific risk factors, ongoing symptoms, and patients’ preferences.</td>
<td>B (IIa)</td>
</tr>
<tr>
<td>Chronic symptoms</td>
<td>Elective surgery is decided on a case-by-case basis, weighing risks and benefits of expectant and surgical treatment.</td>
<td>C (IIa)</td>
</tr>
<tr>
<td>Patient age</td>
<td>Age at onset of diverticulitis should be considered secondary to severity and frequency of episodes.</td>
<td>B (IIa)</td>
</tr>
<tr>
<td>Comorbid disease</td>
<td>Patients with immunosuppression, collagen vascular disease, glucocorticoid use, and malnutrition are at increased risk for recurrence and perforation with recurrent episodes and might therefore have lower threshold to consider elective resection.</td>
<td>C (IIa)</td>
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### Technical Considerations

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<tr>
<td>Ostomy formation</td>
<td>Data suggest some preference for primary anastomosis with proximal diversion in acute setting when clinical conditions allow.</td>
<td>B (IIa)</td>
</tr>
<tr>
<td>Margins of resection</td>
<td>Proximally, resection should include thickened and chronically inflamed or fibrotic colon segment, but need not remove all of the colonic diverticula; a colorectal anastomosis, not a colocolonic anastomosis, should be performed.</td>
<td>B (I)</td>
</tr>
<tr>
<td>Laparoscopic peritoneal lavage</td>
<td>Insufficient evidence to recommend laparoscopic lavage as alternative to resection in patients who truly fail nonoperative management.</td>
<td>C (III)</td>
</tr>
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Abbreviations: ASCRS, American Society of Colon and Rectal Surgeons; ATE, acute tender abdomen.

* The practice parameters from the ASCRS are from the article by Rafferty et al.
Conclusions

- Urgent colectomy for those in sepsis or peritonitis
- Non-operative management for acute complicated diverticulitis without evidence of sepsis or peritonitis.
- Interval colectomy should be based on severity of initial presentation, persistence of symptoms and patient specific factors – not number of episodes or age.
- Data to support primary anastomosis with proximal diversion over Hartmann’s when clinical conditions allow
- Insufficient evidence for laparoscopic washout
- Margins of resection at the level of distal anastomosis has a large determinant of recurrence – recommend colorectal anastomosis
References

- **Current Surgical Therapy - Cameron.** 11th ed., 2014
Thank You
Which of the following statements is TRUE regarding surgical treatment of diverticular disease?

- (A) A single episode of uncomplicated sigmoid diverticulitis mandates resection.
- (B) Two separate episodes of uncomplicated sigmoid diverticulitis mandate resection.
- (C) Surgical resection should include all areas of diverticulosis.
- (D) The distal resection margin should be at the peritoneal reflection.
- (E) The proximal resection margin should be located in an area without hypertrophy of the muscularis propria.
Which of the following statements is TRUE regarding surgical treatment of diverticular disease?

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