

Diverticular Disease:

MSIII Lecture

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Practice Parameters for Sigmoid Diverticulitis

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Colon and Rectal Surgeons

The American Society of Colon and Rectal Surgeons is dedicated to assuring high-quality patient care by advancing the science, prevention, and management of disorders and diseases of the colon, rectum, and anus. The Standards Committee is composed of Society members who are chosen because they have demonstrated expertise in the specialty of colon and rectal surgery. This Committee was created to lead international efforts in defining quality care for conditions related to the colon, rectum, and anus. This is accompanied by developing Clinical Practice Guidelines based on the best available evidence. These guidelines are inclusive, and not prescriptive. Their purpose is to provide information on which decisions can be made, rather than dictate a specific

physician in light of all of the circumstances presented by the individual patient.

PRACTICE GUIDELINE: SIGMOID DIVERTICULITIS

These guidelines address the evaluation and management of sigmoid diverticulitis and are built on the last set of guidelines for the treatment of diverticulitis published by The American Society of Colon and Rectal Surgeons (ASCRS) in 2000.¹ Additional pertinent information from the published literature from January 2000 to August 2005 was retrieved and reviewed. Searches of MEDLINE were performed by using keywords: diverticulitis, diverticulosis, peridi-

Practice Parameter

- ◆ Published literature from January 2000 to August 2005 was retrieved and reviewed.
- ◆ Searches of MEDLINE were performed by using keywords: *diverticulitis*, *diverticulosis*, *peridiverticulitis*, and *fistula*.

Levels of Evidence

- ◆ **I** Meta-analysis of multiple well-designed, controlled studies, randomized trials with low-false positive and low-false negative errors (high power)
- ◆ **II** At least one well-designed experimental study; randomized trials with high false-positive or high false-negative errors or both (low power)
- ◆ **III** Well-designed, quasi experimental studies, such as nonrandomized, controlled, single-group, preoperative-postoperative comparison, cohort, time, or matched case-control series
- ◆ **IV** Well-designed, nonexperimental studies, such as comparative and correlational descriptive and case studies
- ◆ **V** Case reports and clinical examples

Grade of Recommendation

- ◆ **A** Evidence of type I or consistent findings from multiple studies of Type II, III, or IV
- ◆ **B** Evidence of Type II, III, or IV and generally consistent findings
- ◆ **C** Evidence of Type II, III, or IV but inconsistent findings
- ◆ **D** Little or no systematic empirical evidence

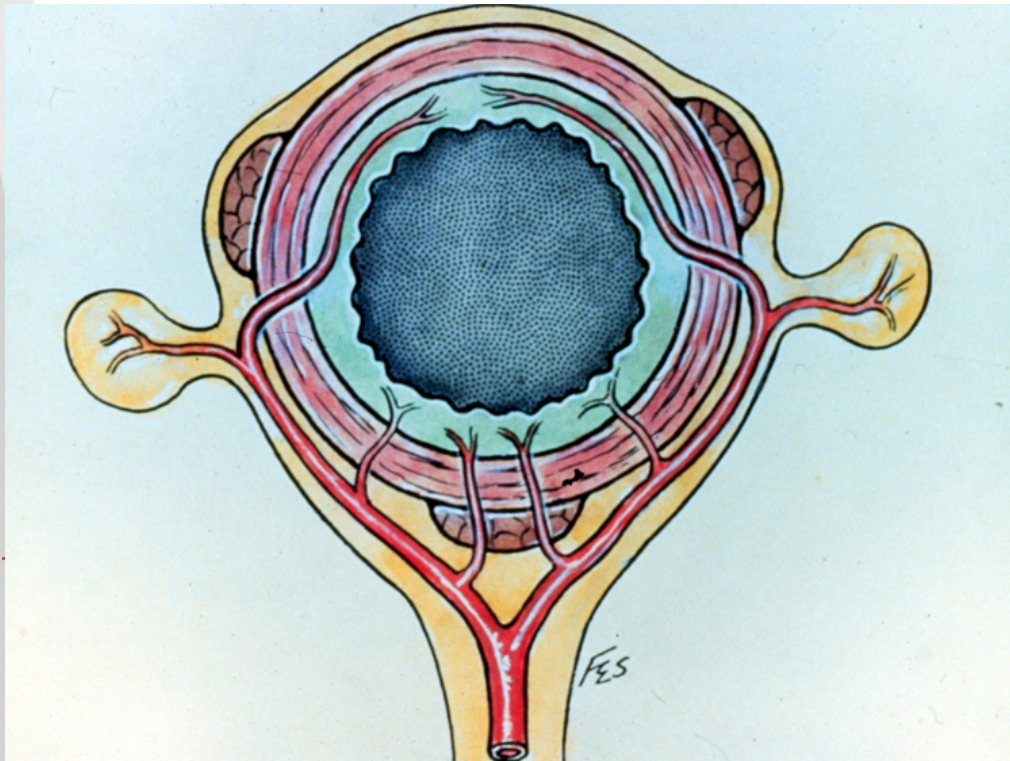
*Adapted from Cook DJ, Guyatt GH, Laupacis A, Sackett DL.
Rules of evidence and clinical recommendations on the
use of antithrombotic agents. Chest 1992;102(4 Suppl):305S-115.*

Statement of the Problem

- ◆ Prevalence correlates with age:
 - * *30 percent by age 60 years*
 - * *60 percent of those 80 years and older*
- ◆ Acquired diverticular disease affects sigmoid colon in 95 percent of cases.
- ◆ 35% with sigmoid diverticulosis also have more proximal diverticuli
- ◆ Diverticula are rare below the peritoneal reflection.
- ◆ 10-25 % of those with diverticulosis -> *diverticulitis*

Diverticular Disease

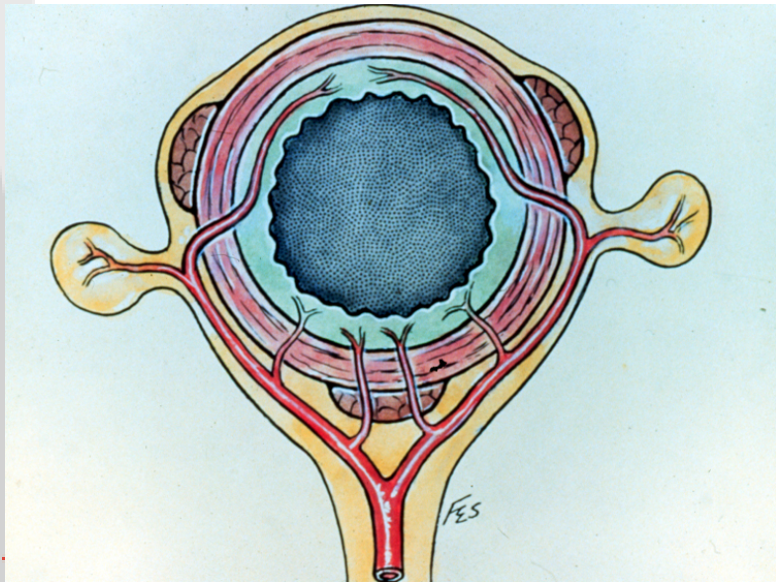
National Hospital Discharge Survey



- ◆ 2007: 276,000 admissions
- ◆ Admissions up 26%
- ◆ 2010: \$5.2 billion
Extrapolated from Sandler, Gastroenterology 2002

www.cms.hhs.gov/statistics
accessed 3/11/2011

Diverticular Disease: Increasing Incidence



- ◆ Increase in # of hospital discharge diagnoses:
 - 271,800 in 2000*
 - 319,959 in 2008*
- ◆ Increase in elective operations; 82% increase in young pts

**National Inpatient Sample discharge data
www.ahrq.gov/
Accessed 3/10/2011*

Left-sided Diverticular Disease~ Etiology

- ◆ Disease of the modern world
- ◆ Geographic variation in fiber intake*
 - Fiber intake inversely related to risk of diverticular disease
- ◆ Socioeconomic status- diet, activity, life expectancy

*Burkitt and Painter Lancet 1972
Aldoori AM J Clin Nutr 1994
Backo BJS 2001;88:1595



SIPRESS

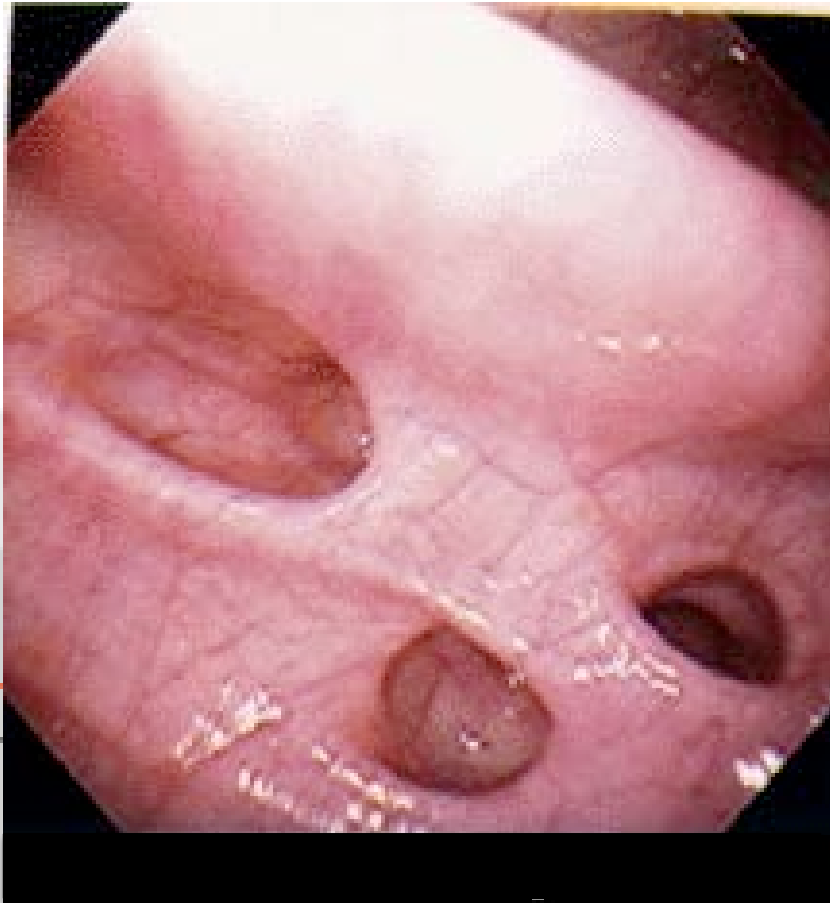
Left-sided Diverticular Disease~ Risk Factors

- ◆ Age (*decreased tensile strength of collagen, muscle*)
- ◆ Gender (M<50, F>50)
- ◆ Genetics (*PKD, Marfan's, Ehler's Danlos*)
- ◆ NSAID use (*23% greater perforation risk*)
- ◆ Smoking, obesity associated with more severe disease

Diverticulitis:

Making the Correct Diagnosis:

history, physical, lab, imaging



History

Fever

LLQ pain +/- mass

Nausea, emesis, urinary sx,
constipation, diarrhea

Physical Exam

LLQ tenderness

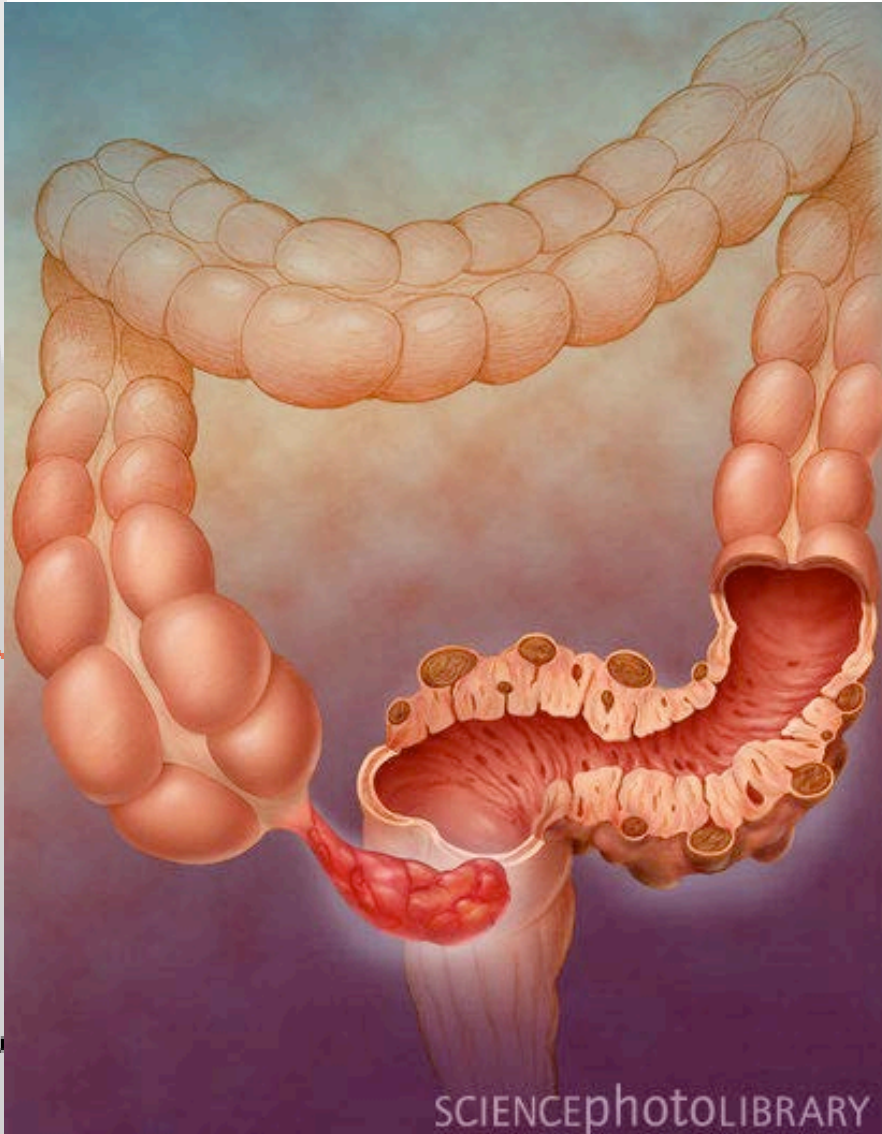
Rebound

Guarding

Diverticulitis:

Making the Correct Diagnosis:

history, physical, lab, imaging



Laboratory

Leukocytosis

Differential Diagnosis

appendicitis	GYN disease
Cancer	ischemia
IBD	pyelonephritis
IBS	

Diagnostic Imaging: *CT Scan is test of choice*

- ◆ Accuracy enhanced by enteral contrast
- ◆ Highly sensitive (91%) and specific (77%)
- ◆ High PPV for inflammation and wall thickness
- ◆ Helps identify associated findings
- ◆ Useful to characterize extent of disease-
“*Severity staging*”
- ◆ *III, A*

CT “Severity Staging”

- ◆ More severe inflammation *predictive* of
 - * *Failure of medical management*
 - * *Future complications*

Detry R, et al.

*Acute localized diverticulitis: optimum management requires accurate staging.
Int J Colorectal Dis 1992;7:38-42*

Chautems RC, et al.

*Long-term follow-up after first acute episode of sigmoid diverticulitis: is surgery mandatory? A prospective study of 118 patients.
Dis Colon Rectum 2002;45:962-6*

Severity of Diverticulitis

CT Criteria

Mild

- ◆ Localized wall thickening (>5 mm)
- ◆ Inflammation of pericolic fat

Severe

- ◆ Abscess
- ◆ Extraluminal air
- ◆ Extraluminal contrast

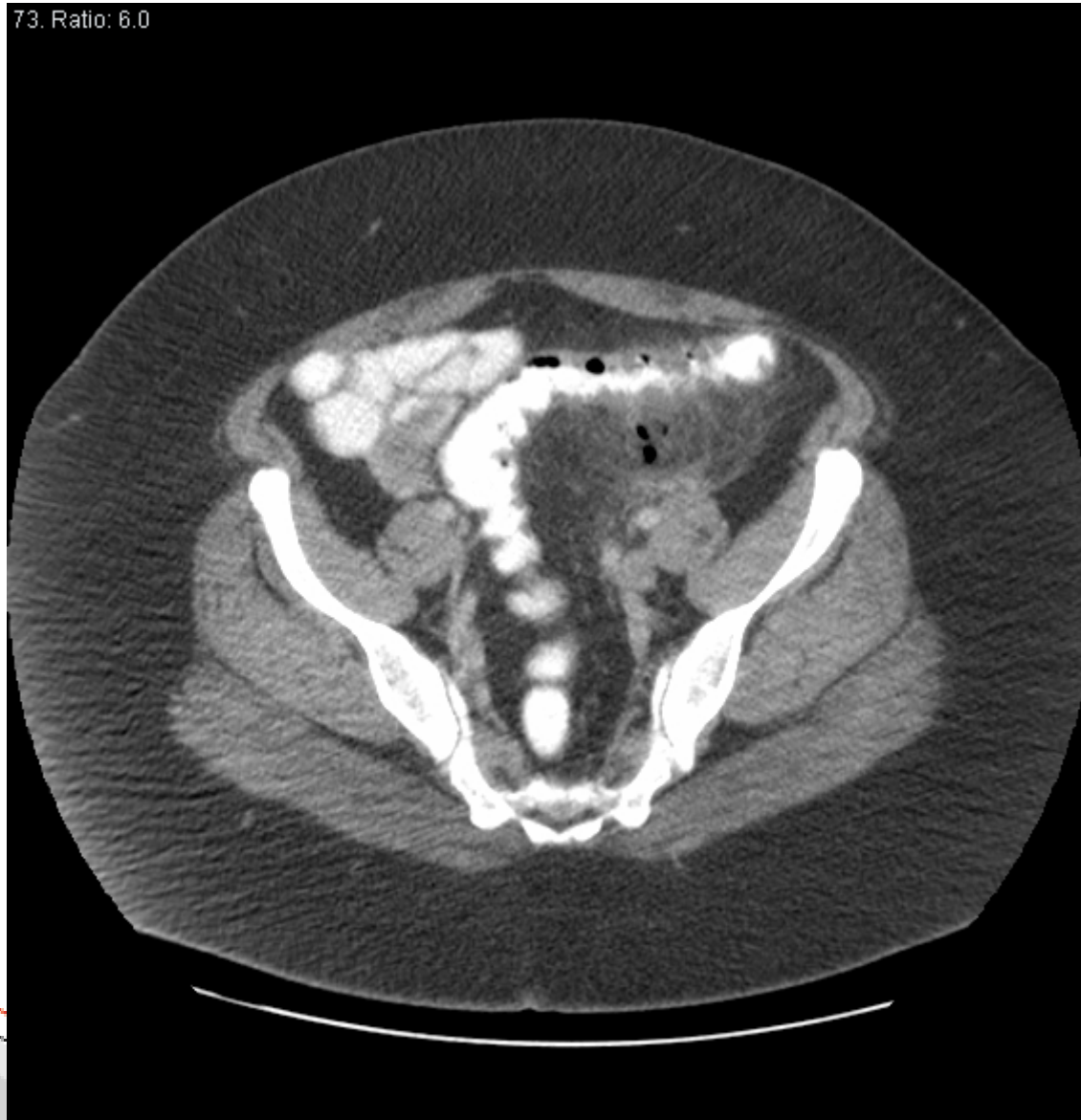
*Ambrosetti et al Dis Colon Rectum
2000;43:1363-7*

“MILD”~Phlegmon



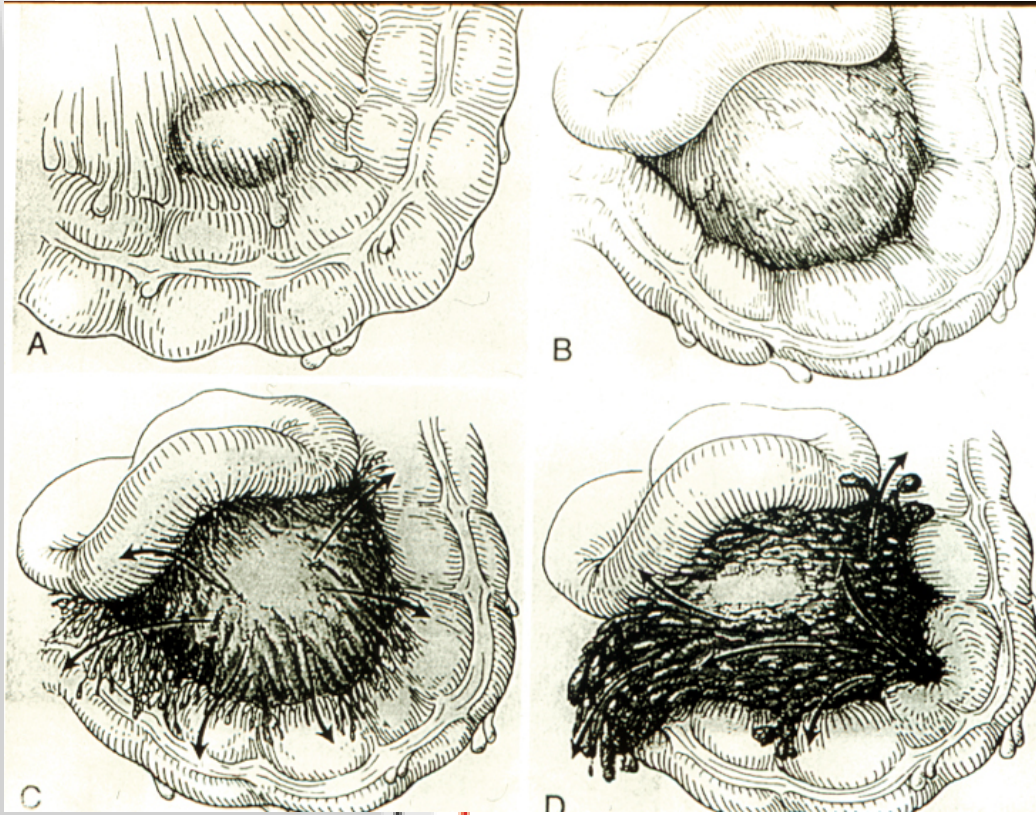
“Severe”

73. Ratio: 6.0



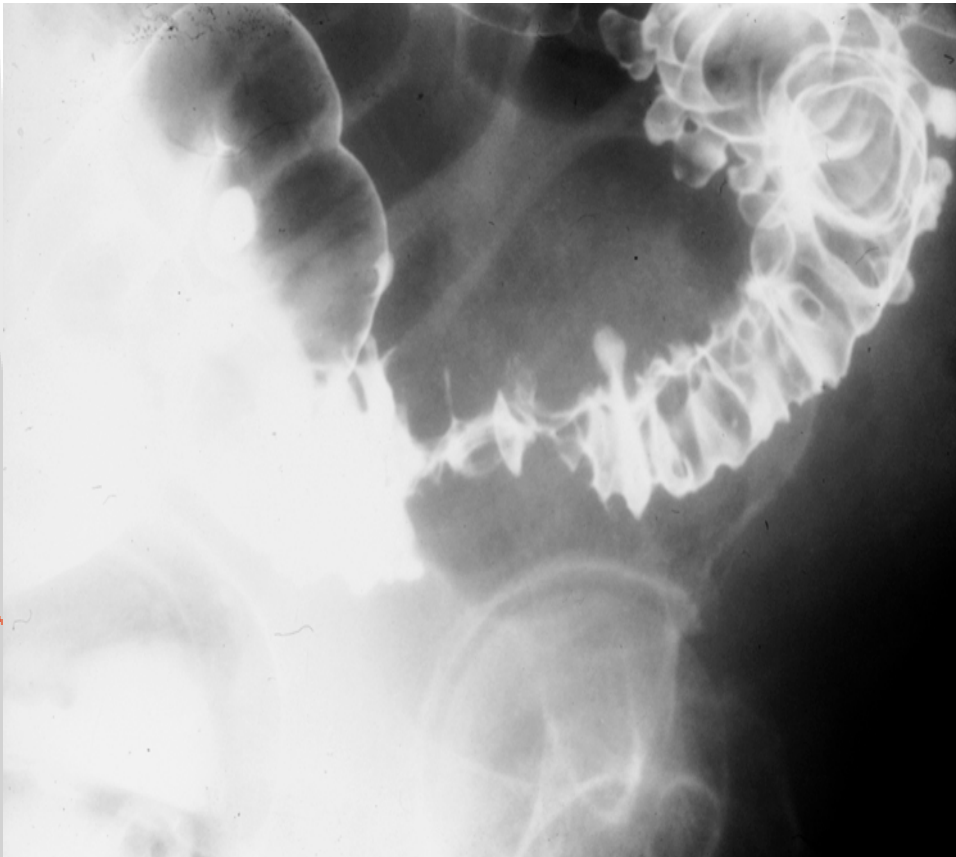
Severity Staging: Hinchey Classification*

- ◆ Stage I Pericolic Abscess
- ◆ Stage II Pelvic, Retroperitoneal or intra-abdominal abscess
- ◆ Stage III Purulent Peritonitis
- ◆ Stage IV Fecal Peritonitis



*Hinchey et al *Adv Surg*
1978;12:85-105.

Contrast enema *(water soluble)*



- ◆ Helpful to define sinus, stricture, fistula
- ◆ “Deformed diverticula”
- ◆ Spasm, edema
- ◆ Diverticulosis

Colonoscopy

- ◆ Critical; frequently overlooked
- ◆ Wall thickening frequently seen in cancer
- ◆ Empiric delay of 4-8 weeks frequently recommended
- ◆ Early colonoscopy appears safe, but exam more likely to be incomplete*

**Lahat A, Yanai H, Menachem Y et al. Feasibility and risk of early colonoscopy in acute diverticulitis; a prospective controlled study. Endoscopy 2007*

Diverticulitis or cancer?



Medical treatment:

In-patient or out-patient?

- ◆ Typically includes dietary modification and antibiotics (*III, B*)
- ◆ **OUTPATIENT MANAGEMENT:** absence of
 - * fever
 - * excessive vomiting
 - * marked peritonitis
- ◆ Should be able to F/U, take PO liquids and antibiotics
- ◆ Should improve within 10-14 days. Repeated antibiotics of limited use

Medical treatment: *In-patient or out-patient?*

- ◆ Out-patient management successful in 70-100% patients
- ◆ In-patient setting likely overused
- ◆ Free fluid on CT: increased risk for out-patient failure

Alonso S, Pera M, Pares D, et al. Out-patient treatment of patients with uncomplicated acute diverticulitis. Colorectal Dis 2009

Diverticulitis: Natural History

- ◆ 10-25% of those with *diverticulosis*
- ◆ After 1 attack, 1/3 will have another attack
- ◆ Half of second attacks occur in 1 yr and 90% in 5 yrs.
- ◆ After two attacks, the majority will have further attacks

Parks TG BMJ 1969

Mandeleka Dis Colon Rectum 1998

“Operate after second episode”

Parks TG BMJ 1969

- ◆ 521 patients 1951- 1965
 - 455 pts treated as an inpt
 - 99.6% follow-up
- ◆ 138 out of 455 required operation
- ◆ Of the 317 treated medically
 - 78 (24.6%) had a subsequent attack
 - 12 (3.8%) had a third attack
 - 5 (1.6%) had a fourth attack
- ◆ **7.7% mortality after second attack**

Natural history

Parks TG BMJ 1969

- ◆ Persistent symptoms were common in both medical *and* surgical patients
- ◆ *Medically* treated
 - 1/3 still had mild symptoms
 - 5% had severe symptoms
- ◆ *Surgically* treated
 - 1/3 still had mild symptoms
 - 3% had severe symptoms

“Operate after second episode”

- ◆ ...if you don't you will perforate and need a colostomy!

Natural history:

first episode often complicated

- ◆ 108 pts, 2 hospitals, admitted urgently or emergently with complicated diverticulitis
- ◆ Only 2.7% had previous admissions for diverticulitis
- ◆ Suggests complications often present on first attack

Somasekar et al J R Coll Surg Edinb 2002

Natural History- *fact*

- ◆ Perforation is most common at 1st episode
- ◆ Risk of requiring a Hartmann resection after recovery from first attack is *1 in 2000 pt-years* of follow-up

“No data to support resection after the second attack” of uncomplicated disease

Janes et al Br J Surg 2005

Natural history:

incidence of recurrence is low

- ◆ Follow up of 3000 patients admitted with this diagnosis
- ◆ Mean follow up 8.9 years
- ◆ Annual recurrence rate 2%
- ◆ *Hospitalization for acute diverticulitis does not mandate elective colectomy*

Broderick-Villa G et al. Arch Surg 140;576, 2005

Recurrence after initial non-surgical management

- ◆ Anaya and Pflum 2005: 3.4%
- ◆ Moreno et al 2007: 7.6%
- ◆ Shaik and Krukowski, 2007: 4.7%

When to operate on *Uncomplicated Diverticulitis*

- ?Wait for the third attack
 - *Richard et al Dig Dis Sci 2002;47:1903-08*
- ?Wait for the fourth attack
 - 0.5% fewer deaths
 - 0.7% fewer stomas
 - \$1,035 saved per pt
 - *Salem et al JACS 2004;199:904-12*

Elective Colon Resection

not without complications

- ◆ 10-14% risk of stoma
- ◆ 26% wound infection
- ◆ 19% overall complication rate
- ◆ One or more complications in 28%
- ◆ 1-5.3% mortality

Foley EE et al. Ann Surg. 2004 May; 239(5):599-605

Guyatt GH et al. Ann Surg. 2009 Jun;249(6):954-9

Gawande AA et al. Ann Surg. 2009 Sep 2

Longo et al. Dis Colon Rectum. 2000 Jan;43(1):83-91

Uncomplicated Diverticulitis: chronic medical therapy?

- Mesalamine
- Rifaxamin
- Probiotics
- Fiber

Natural history of diverticulitis: do younger patients fare worse?

<i>Age/Severity</i> on CT	<i>n</i>	<i>Poor Outcome</i>	Probability at 5 yrs
<50/Mild	14	6	36
<50/ Severe	14	9	54
>50/Mild	74	16	19
>50/ Severe	16	7	44

Chautems et al Dis Colon Rectum 2002;45:962-966

“Severity Staging”

- ◆ More severe inflammation *predictive* of
 - * *Failure of medical management*
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Detry R, et al.

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“Atypical” Diverticulitis

- ◆ Persistent colonic symptoms reported after resolution of infectious enteritis, IBD and diverticulitis
 - Nerve damage (regeneration and hyperinnervation)
 - Increased nerve staining and neurons of smaller diameter (suggesting proliferation in response to inflammation)
Simpson et al Gastroenterology 2002, Stead Ann NY Acad Sci 1992, Brewer J Path 1990
 - Visceral hypersensitivity
Simpson et al Br J Surg 2003

Atypical Diverticulitis

- ◆ ? overlap with irritable bowel syndrome
- ◆ ? Smoldering diverticulitis (chronic LLQ pain)
- ◆ *Horgan et al Dis Colon Rectum 2001: 903 pts*
 - 47 (5%) had atypical diverticulitis and underwent sigmoid resection
 - Only 76.5% had resolution of symptoms
- ◆ *Morson Proc Royal Soc Med 1963: 1/3 of resection specimens had no inflammatory change*

Recommendation:

uncomplicated diverticulitis

- ◆ Assess CT graded severity; predictive of natural history
- ◆ Exclude carcinoma
- ◆ Increasing severity or frequency: operate
- ◆ Immunocompromised patient: operate

Recommendation:

uncomplicated diverticulitis

- ◆ Laparoscopic resection is preferred approach
- ◆ Reduced 30-day mortality, overall cost
- ◆ Faster recovery
- ◆ Decreased pain, superficial infection, blood loss
- ◆ Similar recurrence rates

Tuech J, Surg Endoscopy 2000

Schwander O, Int J Colorectal Dis 2005

Noel J, AM Coll Surg 2007

Russ AJ, Gastroenterology 2010

Conclusion:

uncomplicated diverticulitis

- ◆ Evaluate on case by case basis
- ◆ Beware atypical diverticulitis
- ◆ Elective resection is not without complication
- ◆ Worst episode=first episode
- ◆ ***III, B***

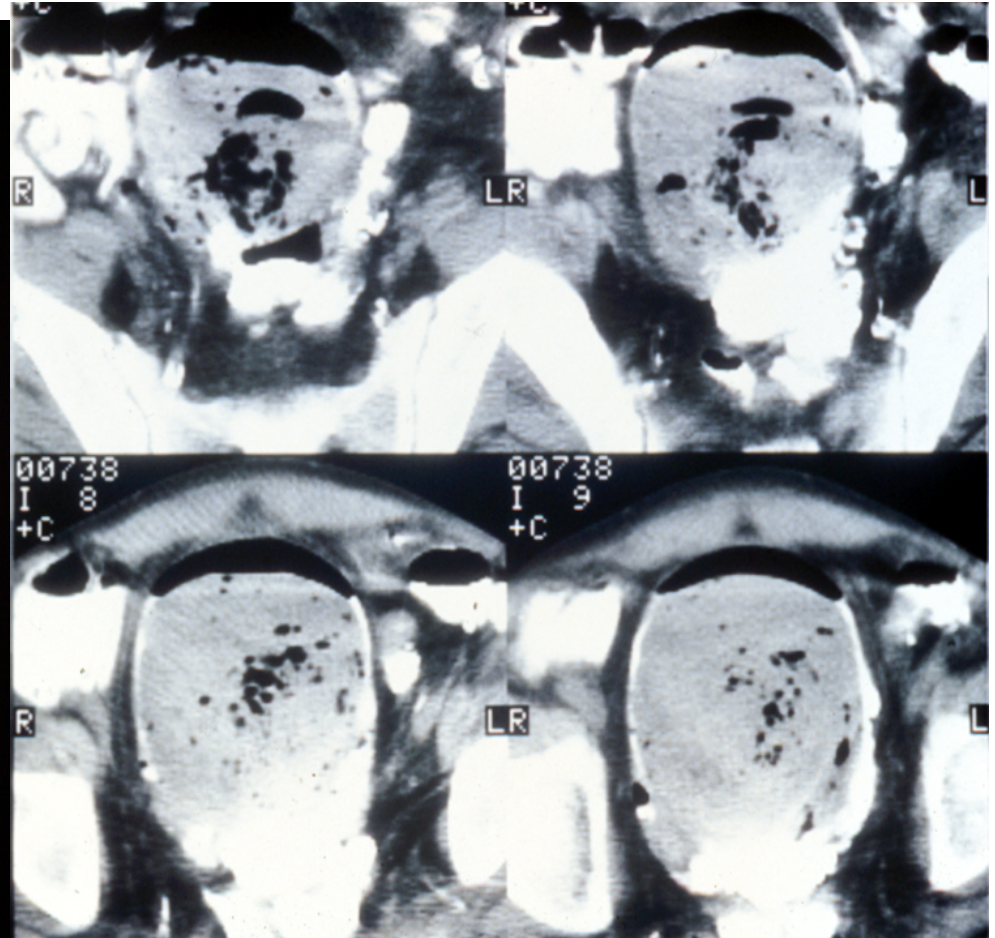
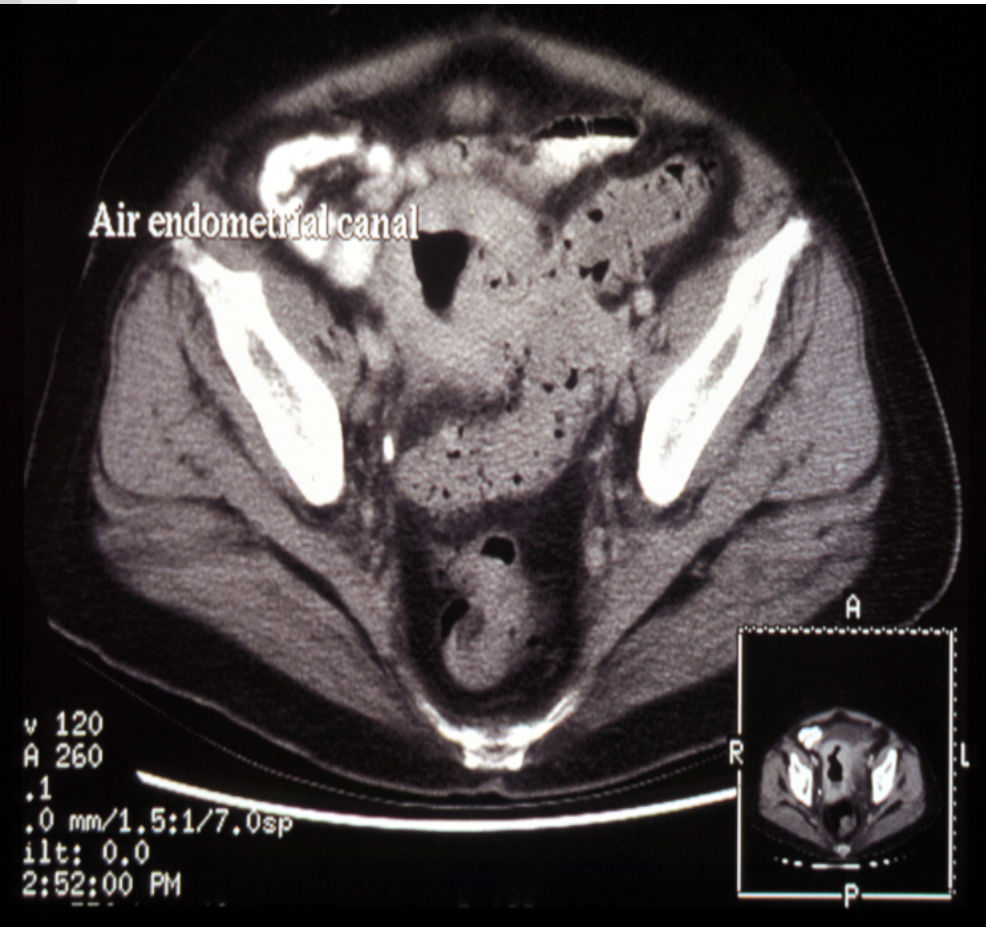
Elective surgery for *Complicated* diverticulitis

- ◆ Abscess
- ◆ Stricture
- ◆ Fistula
- ◆ Bleeding

Stricture



Diverticular fistulas



Courtesy Dr Pat Roberts

Fistula



Diverticular abscess: management

- ◆ 15% have pelvic or mesenteric abscess
- ◆ <2cm abscess: may resolve without drainage
- ◆ >2cm abscess: in-patient care, plus drainage
- ◆ Drainage increases possibility of single stage operation
- ◆ Avoidance of stoma construction
- ◆ *III, B*

Laparoscopic Lavage:

non-resection

- ◆ Irrigation with 3-15 liters
- ◆ Pelvic drain left in
- ◆ Adhesions to perforation left intact
- ◆ Probably converts purulent peritonitis into a phlegmon, avoids stoma

Laparoscopic Lavage

Problems:

- ◆ poor source control*
- ◆ most studies retrospective
- ◆ selection bias:
 - 24% Hinchey I-II; 73% ASA 1-2*
- ◆ severity index scores not consistently reported
- ◆ numbers small

*Killingback M. Surg Clin N Am 1983
Finlay I, Carter D. DCR 1987
Grief J. DCR 1980
Krukowski Z. Br J Surg 1984

Do all patients with abscess
ultimately require
elective resection?

Probably...

- ◆ 33-41% will develop severe recurrent sepsis
- ◆ Elective resection following abscess drainage recommended
- ◆ ***III, B***

Extent of elective resection

- ◆ *Proximal* margin: pliable colon without hypertrophy or inflammation; unnecessary to resect all diverticuli
- ◆ *Distal* margin: soft proximal rectum
- ◆ Risk of recurrence higher with *colosigmoid* anastomosis
- ◆ *III, B*

Level of Anastomosis and Recurrent Diverticulitis

<i>Anastomosis</i>	<i>Number</i>	<i>Recurrence</i>
Colocolostomy	321	40(12.5%)
Coloproctostomy	180	12(6.7%) Total
501	52	

Benn et al Am J Surg 1986;151:269-

Recurrent Diverticulitis

Thaler et al Dis Colon Rectum 2003;46:385-88

- ◆ Sigmoid resection at two tertiary centers (1992-2000)
- ◆ 236 pts - mean follow-up 67 mos
- ◆ Level of anastomosis – only predictor of recurrence (p=0.033)
 - Patients with colosigmoid versus colorectal anastomosis → 4X the recurrence rate

SUMMARY:

Surgery for Diverticulitis

- ◆ **COMPLICATED** After one attack - abscess, fistula, etc.
- ◆ **UNCOMPLICATED**
 - *Inability to exclude carcinoma
 - *Need for chronic immunosuppression
 - *Progressive severity and frequency
- ◆ **LAVAGE** resective-based therapy remains best approach

Potential pitfalls

- ◆ ***BEWARE Atypical diverticulitis and IBS***
- ◆ Document the presence of sigmoid inflammation, ***not just diverticulosis!***

THANK YOU



UC Division of
Colon and Rectal
Surgery





PUT THE SEAT DOWN!

CHRIS McFEE 87/20