

## MANAGEMENT OF COMPLICATED SIGMOID DIVERTICULITIS

### *Pathophysiology of diverticula formation*

A diverticulum is a sac-like protrusion of the colonic wall, diverticulosis describes the presence of diverticula, whereas diverticulitis refers to inflammation of diverticula. A colonic diverticulum is a false diverticulum because it does not contain all layers of the wall. Mucosa herniates through the muscle layer, covered only by serosa. The points at which diverticula develop are considered to be points of weakness in the bowel wall, where the vasa recta penetrate. These areas are especially susceptible to increases in intraluminal pressure. The law of Laplace explains the development of diverticula, where pressure P is proportional to wall tension T, and inversely proportional to bowel radius R:  $P=kT/R$

Since the sigmoid colon is the segment of the colon with the smallest diameter, it will tend to be the site of the highest pressure. 95% of diverticulitis presents in the sigmoid

Under normal circumstances pressure should be the same throughout the colon, however, segmentation of the colon ( a motility process in which segmental muscular contractions separate the lumen into chambers) is exaggerated in diverticulosis, occluding both ends of the chamber during muscular contraction, thus predisposing to herniation of mucosa. Subsequent inflammation of diverticula, via micro- or macroscopic perforation, lead to diverticulitis. Obstruction by fecolith increasing intraluminal pressure and causing perforation, is thought to be rare. The primary process is thought to be erosion of the diverticular wall by increased intraluminal pressure or inspissated food particles. Inflammation and focal necrosis ensue, resulting in perforation. The inflammation is frequently mild, and a small perforation is walled off by pericolic fat and mesentery. This may lead to a localized abscess or, if adjacent organs are involved, a fistula or obstruction. In comparison, poor containment results in free perforation and peritonitis.

### *Clinical characteristics*

#### **Signs & Symptoms**

LLQ pain occurs in 70% of patients, usually present for several days prior to presentation. The pain may extend across the suprapubic region and into the RLQ if the sigmoid is redundant. Generalized tenderness suggests free perforation and peritonitis. Low grade fever and mild leukocytosis are common, but diverticulitis can be present in the absence of fever and WBC count. Up to 50% have had one or more previous episodes of similar pain. Other symptoms include nausea and vomiting, constipation, diarrhea, and urinary symptoms. Sterile pyuria indicates adjacent inflammation in the sigmoid. Colonic or mixed bacteria on urine culture suggest a colovesical fistula.

## ***Diagnosis and Imaging***

### **CT scan**

evaluates extramural inflammation features of diverticulitis on CT include: increased soft tissue density in pericolic fat, colonic diverticula, bowel wall thickening, soft tissue masses representing phlegmon, or pericolic fluid collections representing abscesses

### **Contrast enema**

Used when diagnosis is unclear on CT scan. In the presence of free air, BE is contraindicated, but water soluble contrast is safe and may indicate the site of perforation.

### **Endoscopic evaluation**

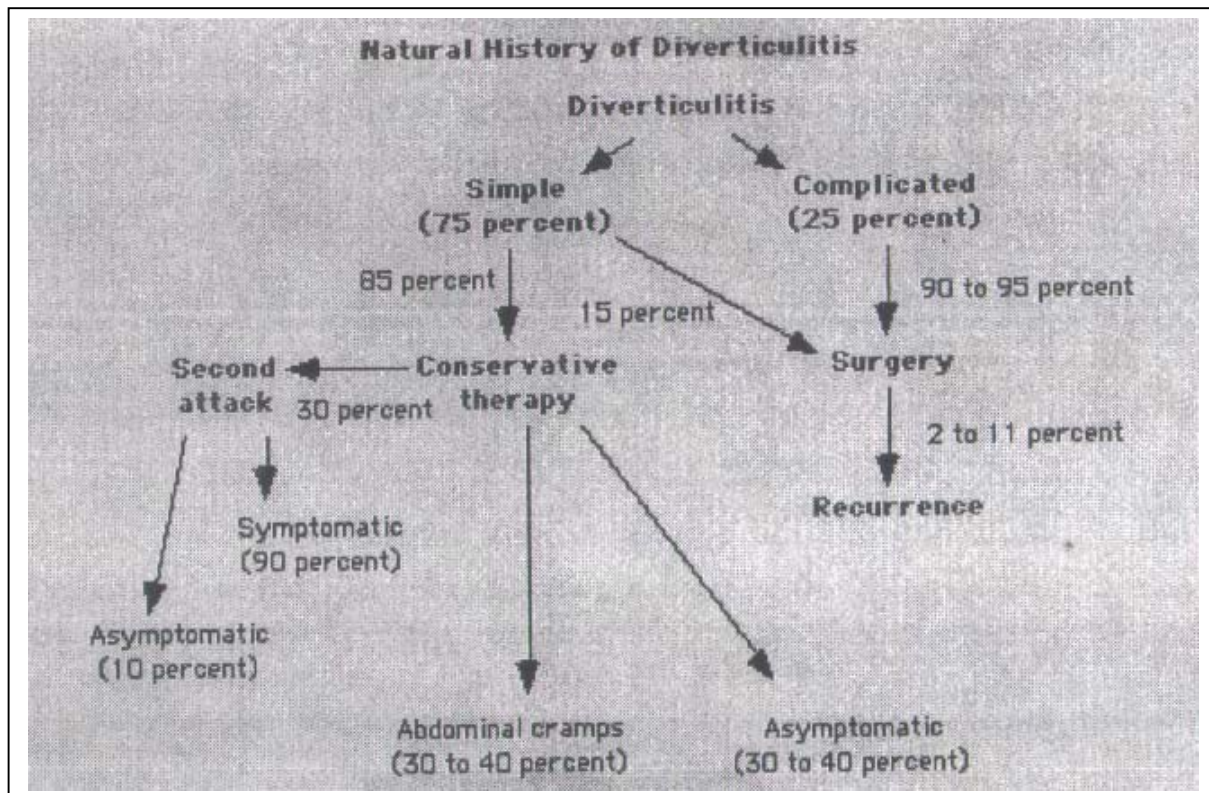
Relatively contraindicated in acute diverticulitis, as air insufflation may cause a sealed perforation to become a free leak. Colonoscopy or flexible sigmoidoscopy +BE is indicated 6-8 weeks after resolution of acute simple diverticulitis to evaluate the colon.

## ***Management***

From a therapeutic standpoint, diverticulitis can be divided into complicated and uncomplicated presentations.

**Complicated** diverticulitis refers to the presence of a perforation, obstruction, an abscess, or a fistula. Approximately 25% of patients diagnosed with diverticulitis for the first time present with complicated diverticulitis

**Uncomplicated** diverticulitis accounts for 75% of cases, refers to diverticulitis without the above noted features. The majority of these patients respond to medical therapy (bowel rest and antibiotics), although up to 30% require surgical intervention.



### ***Medical management***

Bowel rest and antibiotics are successful in treating 70-100% of patients with acute uncomplicated diverticulitis. Approximately 6 weeks after recovery, patients should undergo evaluation of the colon to exclude other diagnoses and to evaluate the extent of diverticulosis.

### ***Indications for surgery***

Emergency surgery is indicated in patients exhibiting signs of diffuse peritonitis, and deterioration/failure to improve with conservative therapy.

#### **Absolute**

- perforation
- obstruction
- abscess –in patients with contraindications to surgery, percutaneous drainage may be adequate to relieve symptoms
- fistula
- clinical deterioration or failure to improve with medical therapy
- recurrent episodes
- intractable symptoms
- inability to exclude carcinoma

#### **Relative**

- symptomatic stricture
- immunosuppression
- right sided diverticulitis
- ?young patients

### ***Hinchey classification***

**Stage I-** pericolic or mesenteric abscess

**Stage II-**walled off pelvic abscess

**Stage III-**generalized purulent peritonitis

**Stage IV-**generalized fecal peritonitis

### ***Surgical procedures:***

#### **Resection and primary anastomosis (w/ on table lavage)**

In elective or semi-elective cases, this approach is often possible because the disease is well localized or has significantly resolved.

**Hartmann procedure** (resection of the diseased colon, an end-colostomy, and creation of a rectal stump; followed by colostomy closure after 3 months)

Typically used in emergency situations with peritoneal contamination, associated medical conditions, poor nutrition, uncertain viability of bowel, and immunosuppression are present.

**Resection, primary anastomosis with proximal diverting stoma(colostomy or ileostomy) with later stoma closure**

Used when there are relative contraindications to primary anastomosis, but no purulent or fecal peritonitis and the bowel is nonedematous, less difficult for later stoma closure.

Three stage procedure (transverse colostomy + drainage w/o resection, followed by resection and primary anastomosis, and then by stoma closure)

Rare, when inflammatory changes are deemed so extensive as to preclude mobilization and resection.

### **Regenet, et al.**

Prospective study of 60 patients undergoing emergent laparotomy for diverticular peritonitis, comparing outcome data for primary anastomosis w/ intraoperative colonic lavage (PAIL) vs. Hartmann's procedure in Hinchey III-IV.

Group 1-27 patients underwent primary resection Group 2-33 patients underwent Hartmann's, criteria for laparotomy were clinical signs of acute peritonitis or perforated diverticulitis

Mortality: Group 1-11% (n=3) Group 2-12% (n=4)

Overall hospital stay: Group 1-18.4+/-10.9, Group 2-38.2+/-28.5 (p=0.001)

69% of stomas were closed (20/29) after a mean of 151+/-71.7 days from resection. 30% patients undergoing Hartmann's procedure are left with a permanent stoma

The morbidity rate in HP reversal was 24%

Study concluded that PAIL and HP are both adequate approaches for treating generalized peritonitis complicating diverticular disease of the colon, but PAIL is preferable in light of the morbidity associated with stoma closure in HP, the longer overall hospital stay, and permanent stoma rate.

### References

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June 21, 2004