



Acute Sigmoid Diverticulitis and its Complications

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Year III

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Agenda

- What Acute Sigmoid Diverticulitis is
- Role and Goals of Imaging
 - Why image?
 - Menu of Tests
 - Strength/weaknesses
- Findings and Complications

Diverticulosis 1

- Diverticulosis- presence of many diverticula
- Diverticulum- pouch or a pocket-like opening in the bowel wall
 - Mucosa/submucosa/serosa
- 2/3 of 65 years and older
 - 1/4 of those will get diverticulitis



Source: McPhee SJ, Papadakis MA: *Current Medical Diagnosis and Treatment 2011*, 50th Edition: <http://www.accessmedicine.com>
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accessmedicine.net



Diverticulosis 2

- Usually left sided-
descending colon and
sigmoid
- Can be anywhere
- Asian population right
sided predominance
- Diverticulum bleed





Diverticulitis

- Location
 - Most diverticulitis- sigmoid
- Inflammation or infection of the diverticulum
 - Microperforations
 - Intraluminal pressure, inspissated stool
 - Edema
 - Wall thickening
 - Pericolic inflammation- inflamed fat



Diverticulitis: Complications

- Anatomy
 - Pericolonic, intraperitoneal, retroperitoneal
- Abscess
- Fistula
- Macroperforation



Clinical diagnosis vs. Imaging

- Many patients present with typical clinical picture
 - LLQ pain, fever, and leukocytosis-
 - Most common cause is acute sigmoid diverticulitis
 - Age, history of diverticulosis or diverticulitis
 - Many patients can then be managed medically with antibiotics
- Why image?



Goal of Imaging

- Narrow differential diagnoses to a diagnosis
- Management



Differential Diagnosis

Table 1. Differential Diagnosis of Left Lower-Quadrant Pain

Gastrointestinal	Gynecologic	Vascular
Constipation	Ectopic pregnancy	Aortitis/vasculitis
Incarcerated hernia	Endometriosis	Dissection/aneurysm
Infectious colitis	Hemorrhagic or ruptured ovarian cyst	Other
Inflammatory bowel disease	Malignancy	Abdominal wall abscess
Ischemic bowel	Miscarriage	Abdominal wall hematoma
Omental infarction	Mittelschmerz	Psoas abscess
Sigmoid diverticulitis	Ovarian torsion	Retroperitoneal hemorrhage
Genitourinary	Pelvic congestion syndrome	
Prostatitis	Ruptured corpus luteum	
Seminal vesiculitis	Uterine fibroids	
Ureterolithiasis		
Urinary tract infection		

Hammond, Nancy. Paul, Nikolaidis. Frank, Miller. Left lower-quadrant pain: guidelines from the american college of radiology appropriateness criteria. *American Family Physician*.2010; 82(7):766-70.



Goal of Imaging

- Narrow differential diagnoses to a diagnosis
- Management
 - Extent of disease
 - Staging (CT)
 - **Complications**
 - 15-30% will need surgery– imaging helps decide



Menu of Tests

- Computed Tomography With Contrast
- Compression Ultrasonography (U/S)
- Barium Enema (BE) radiography



CT with Contrast

- Direct examination of lumen, wall, pericolonic, intraperitoneal and retroperitoneal spaces
 - Ability to diagnose other conditions
 - Ability to stage extent of disease and presence of complications
- 79-99% sensitivity
- High specificity
- Pitfall– perforated colon cancer can mimic diverticulitis clinically and radiographically
 - f/u BE or colonoscopy



CT Staging- Hinchey's Criteria

- Stage 0- bowel wall thickening
 - Medical management
- Stage 1- small pericolic abscess
 - medical management
- Stage 2- large abscess not extending beyond pelvis
 - Drain percutaneously/surgery
- Stage 3- abscess beyond pelvis
 - surgery
- Stage 4- free rupture of diverticulum into peritoneal cavity- fecal peritonitis
 - surgery



Now Let's Look at a Patient

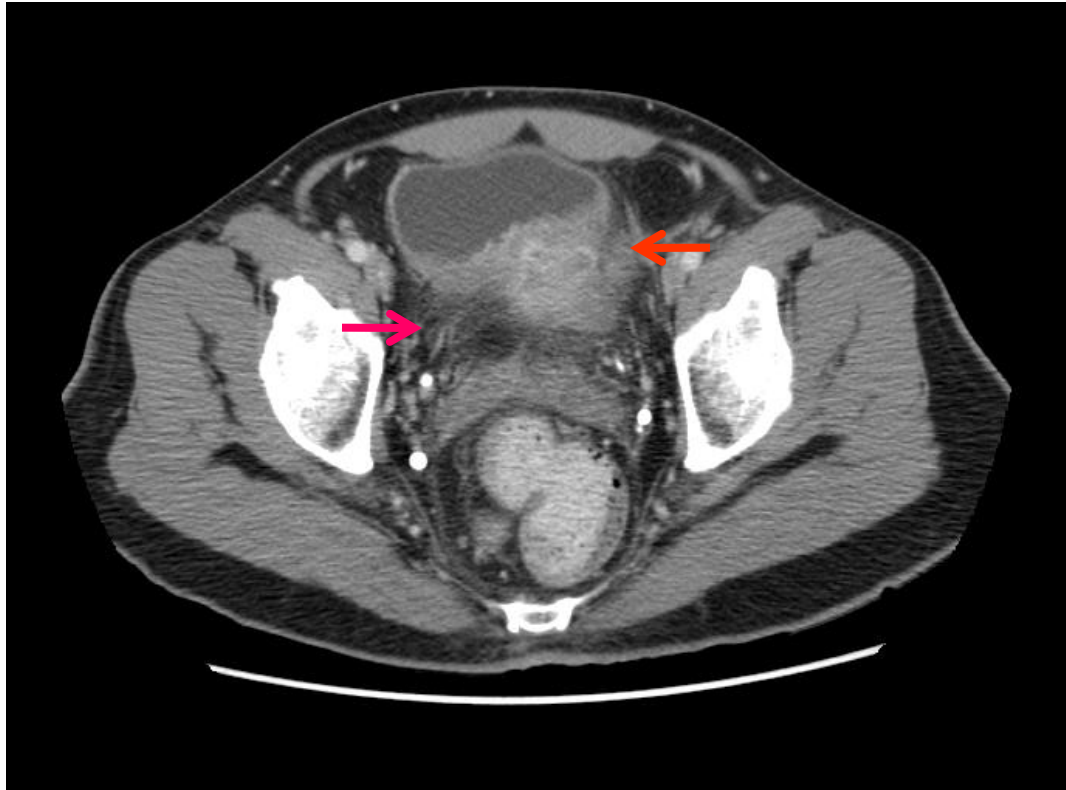
Our Patient: Classic CT findings 1

- 53 yr old man with mild LLQ abdominal pain for 2 days and low grade fever
- Axial CT with contrast
- Inflamed diverticulum-
air pockets with
surrounding edema
- Wall thickening



PACS, BIDMC

Our Patient: Classic CT findings 2



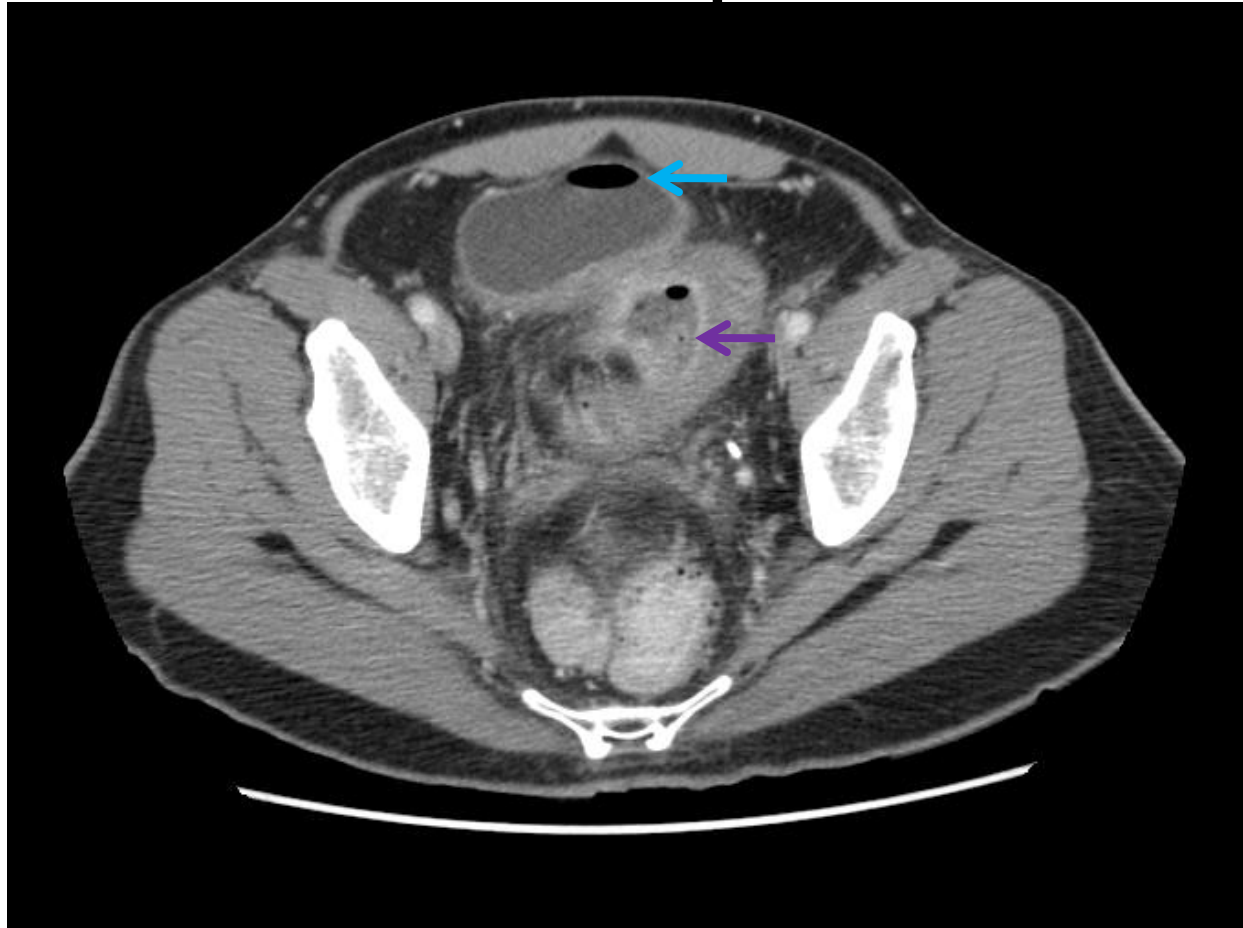
PACS, BIDMC

- Axial CT with contrast
- Fat stranding
- Pericolonic inflammation abutting/adherent to bladder



Now Let's Look at Complications of Diverticulitis seen in Our Patient

Our Patient: Complications on CT 1



- Air within bladder suggestive of colovesical fistula

PACS, BIDMC

- Axial CT with contrast
- Pericolonic rim-enhancing gas and fluid collection consistent with a diverticular abscess



More on Abscess Complication

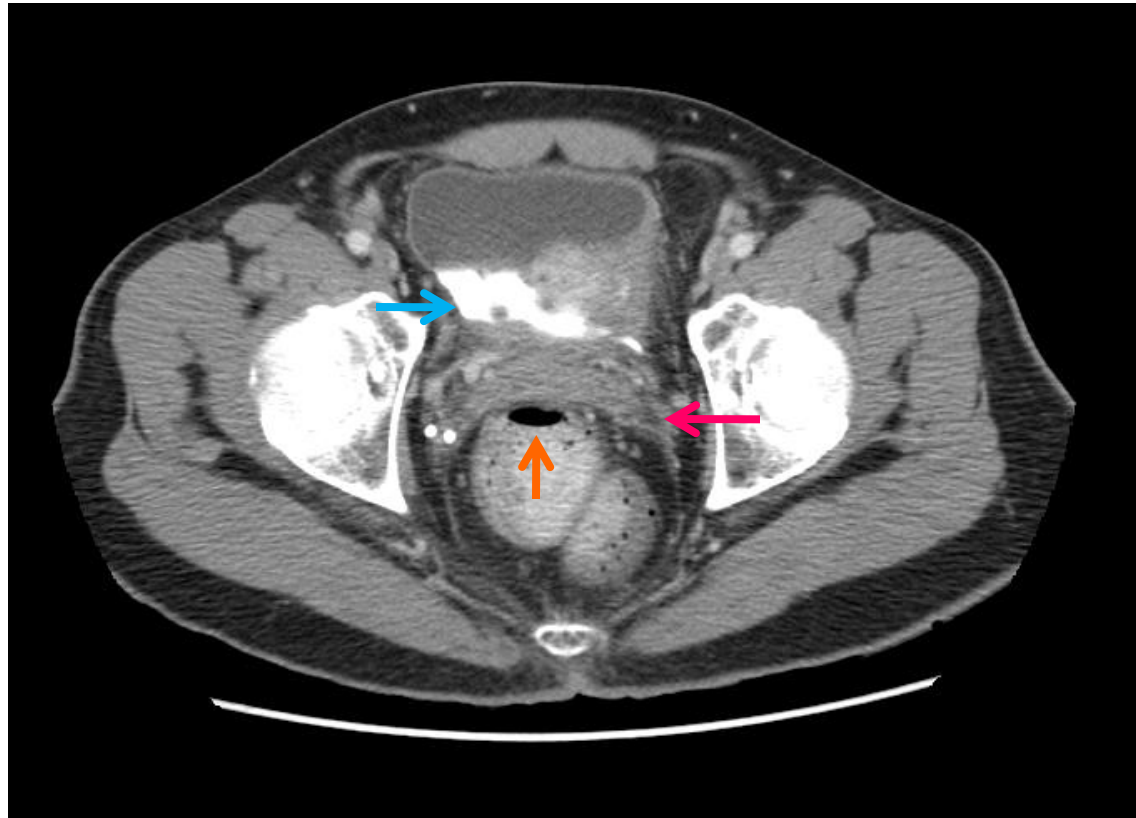
- Most common complication of diverticulitis
- Presence, size, and location used to determine staging
- Plegmnon and/or abscess seen on 35% of cases of diverticulitis imaged with CT
- Can be drained percutaneously with CT guidance or surgically



More on Fistula Complication

- 20% of surgically treated diverticulitis
- Colovesical- most common (65%)
 - Male predominance
 - Uterus protects bladder
- Colovaginal (25%)
- Coloenteric (<10%)
- Colouterine- rare
- Colocutaneous- rare

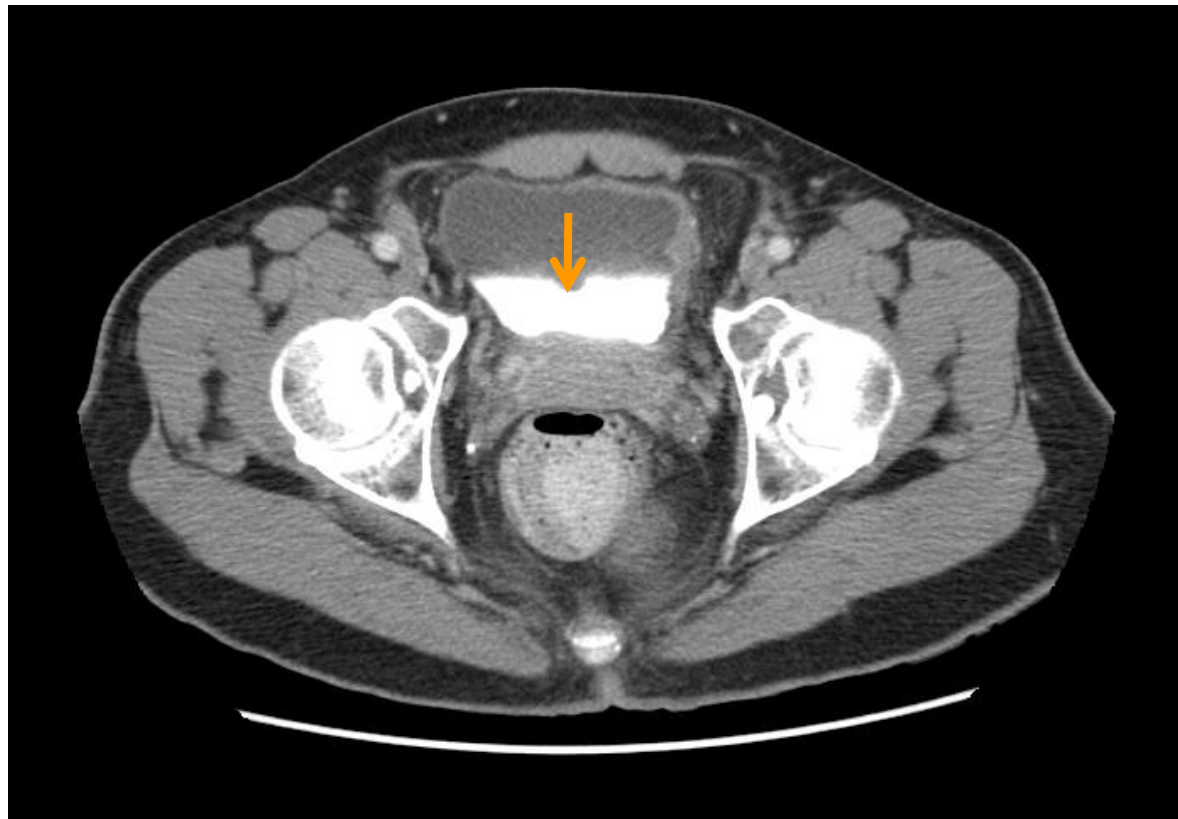
Our Patient: Complications on CT 2



PACS, BIDMC

- Axial CT with contrast
- Contrast in bladder, further evidence of colovesical fistula
- Pericolonic inflammation
- Large inflamed diverticulum

Our Patient: Colovesical Fistula




PACS, BIDMC

- Axial CT with contrast
- Contrast in bladder, further evidence of colovesical fistula



Our Patient: More history

- Pneumaturia with dysuria, consistent with colovesical fistula seen on CT
- History of known diverticulosis
- Third episode of diverticulitis week prior to presentation
 - managed conservatively as an outpatient.
 - Was not imaged at that time



We will now examine other complications using images of companion patients



Companion Patient 1: Colocutaneous Fistula



- Axial CT with contrast
- Fistula track from colon through subcutaneous tissue to cutaneous tissue

Stocchi, Luca. Current indications and role of surgery in the management of sigmoid diverticulitis. *World Journal of Gastroenterology*. 2010;16(7): 804-817.

Companion Patient 2: Perforation



<http://brighamrad.harvard.edu/Cases/bwh/hcache/124/full.html>

- Axial CT with contrast
- Pneumoperitoneum
(Extraluminal air)



Other Imaging Modalities

- Graded Compression Ultrasonography
- Barium Enema

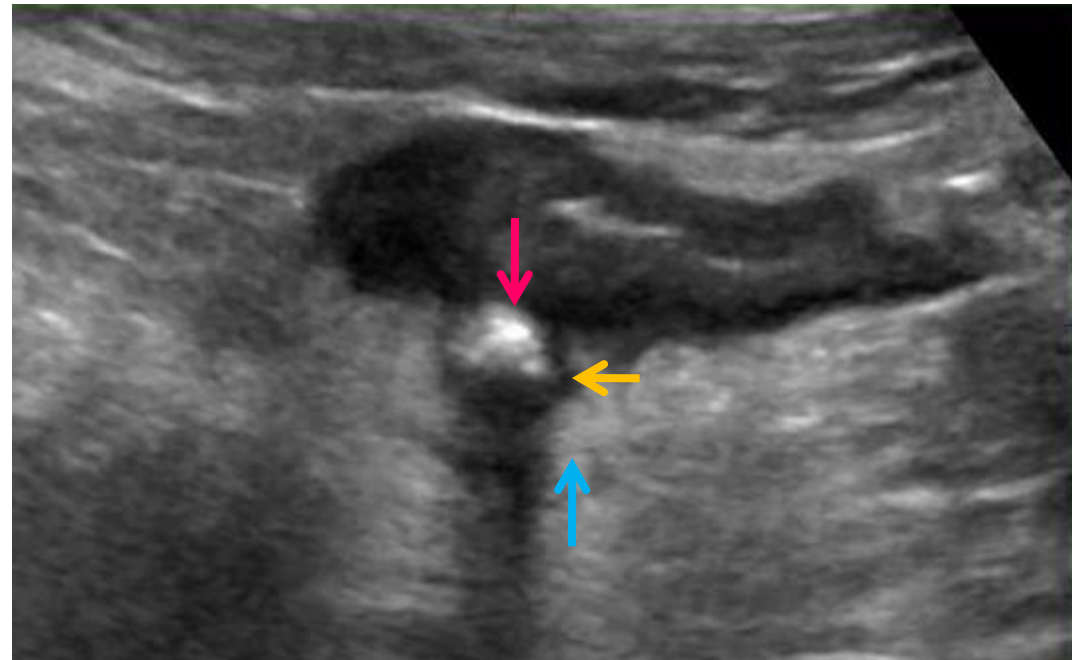


Graded Compression U/S

- Women of childbearing age or pregnant patients
 - Best for GYN differential
 - No radiation
- Sensitivity- 77-98%
- Specificity- 80-99%
- Operator dependent
 - Direct physician involvement in examination recommended

U/S Findings

- Wall thickness (hypoechoic)
- Pericolonic fat inflammation (echogenic)
- Identify abscess (hypoechoic)
- Identify fistula (hypoechoic, bubbles)



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- Echogenic material filling inflamed diverticulum- air, fecal material, enterolith
- Hypoechoic colonic wall thickening
- Echogenic pericolonic fat inflammation

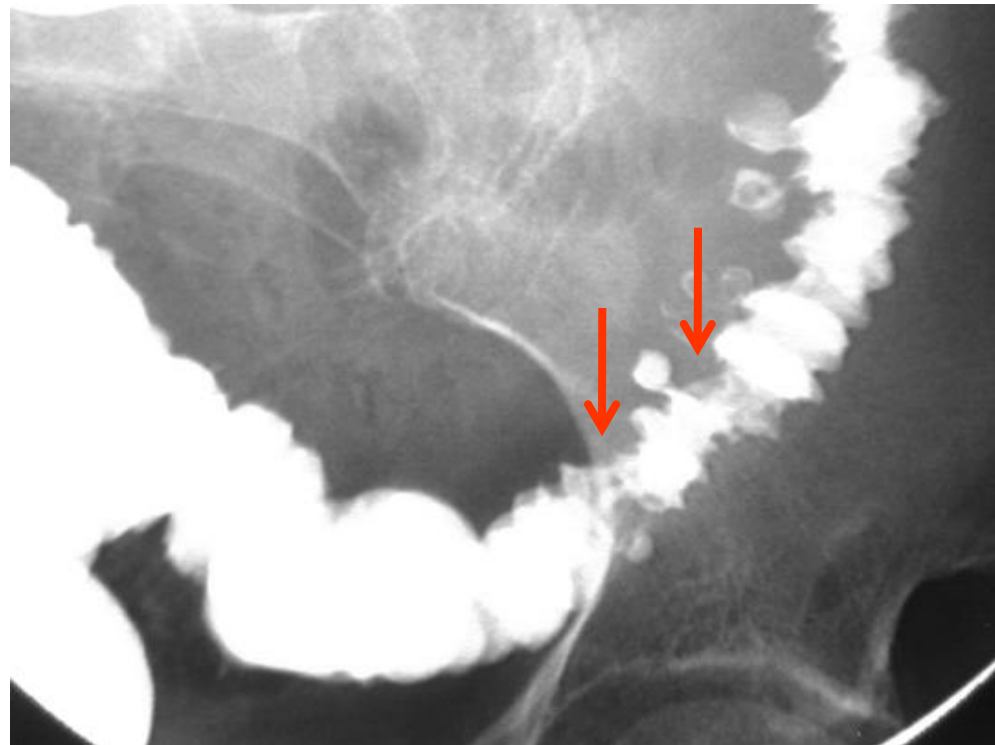


Barium Enema

- Former primary imaging modality
- Differential limited
- Only detects secondary affects of inflammation on colon
 - Not sensitive to primary pericolonic inflammation
 - Not sensitive to complications
- Sensitivity- 59-90%
- More invasive
- Can be follow up study if CT is equivocal

BE Findings

- Fold thickening
- Segmental spasm
- Sinus tract
- Fistula
- Mass effect from abscess or free air



<http://radiology.healthcommunities.com/diverticulitis/index.shtml>

• Segmental spasm



Summary

- Acute inflammation and infection of diverticulum
- Microperforations leading to extraluminal inflammation
- Abscess, Fistula, Macroperforation complications
- CT with contrast imaging modality of choice



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Acknowledgments

- Dr. Gillian Lieberman
- Dr. Tamuna Chadashvili