



UNDERSTANDING ACUTE DIVERTICULITIS IN ADULTS: AN UPDATE OF AN ALWAYS PRESENT DISEASE

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Advanced Clerkship in Radiology



Agenda

- **Definitions**
- **Epidemiology**
- **Risk factors**
- **Anatomy**
- **Pathophysiology**
- **Natural history**
- **Diagnosis**
- **Differential diagnosis**
- **Menu of test**



Definitions

- **Diverticulum: sac-like protrusion of the colonic wall, including mucosa and serosa, sparing the muscularis.**
- **Diverticulosis: Presence of many diverticula.**
- **Diverticulitis: Inflammation, generally due to microperforation of a diverticulum.**
- **Complicated diverticulitis: Acute diverticulitis + bowel obstruction, abscess, fistula or macroperforation.**



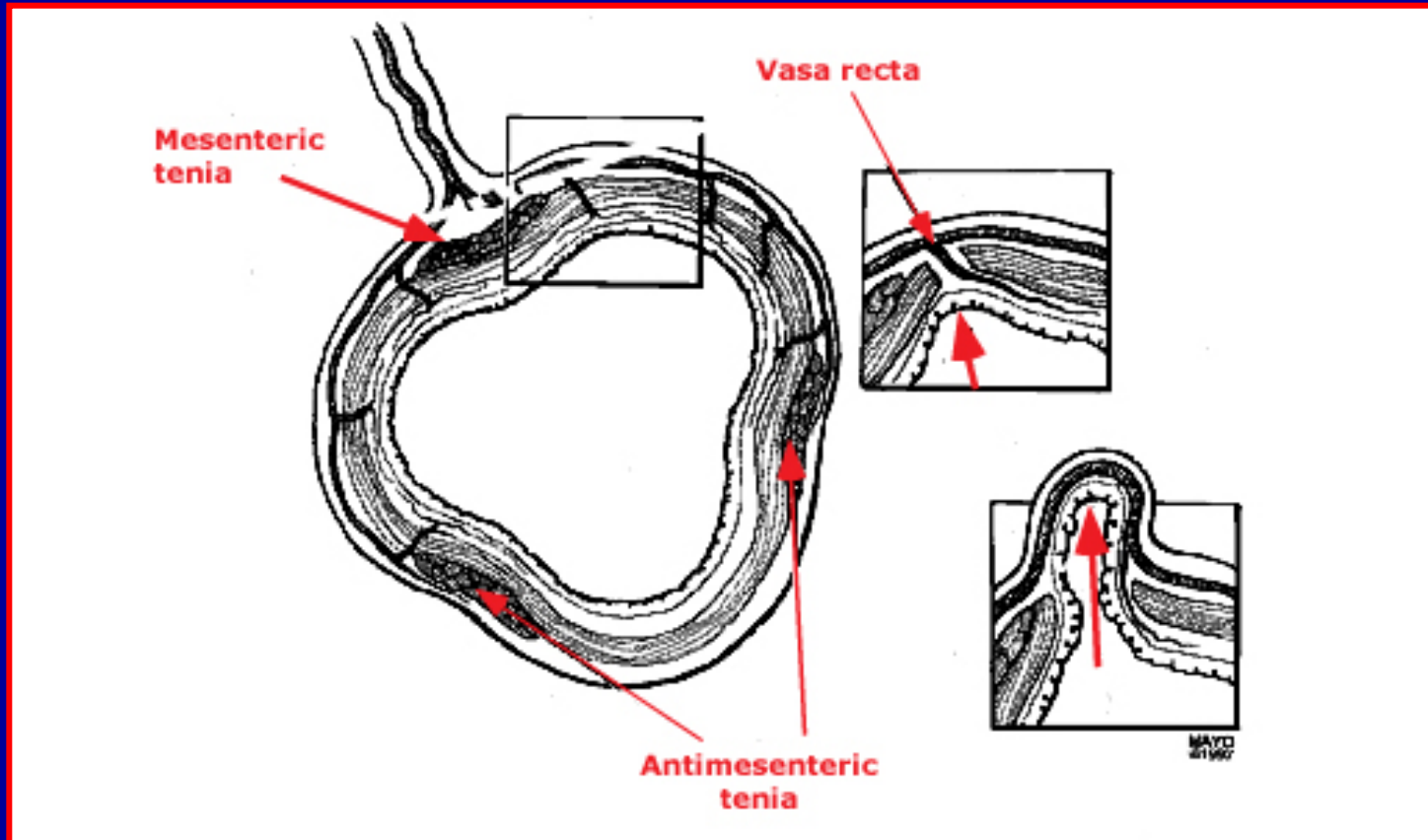
Diverticular disease: epidemiology

- **Age dependent: less than 20% at age 40 to 60% by age 60**
- **Western society: prevalence rates 5-45%, of them 95% are sigmoid diverticula**
- **Asia: <1-5:1 million, predominantly right sided**
- **Risk factors: Low fiber, fat and red meat, obesity, smoking, NSAIDs.**

Colonic diverticulosis and diverticular disease: Epidemiology, risk factors, and pathogenesis. Uptodate. Last update: Dec 12th, 2013



Anatomy of a diverticula



Taken from: Colonic diverticulosis and diverticular disease: Epidemiology, risk factors, and pathogenesis. Uptodate. Last update: Dec 12th, 2013

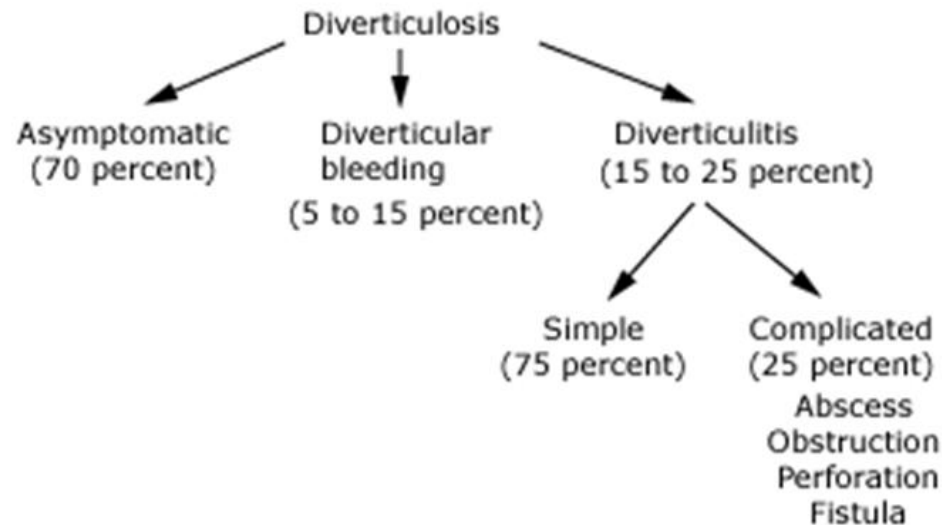


Pathogenesis

- **Abnormal colonic motility: ↑ segmental contractions.**
- **Laplace law: $P=T:r$; sigmoid has the smallest radio→highest pressure.**
- **Erosion of diverticular wall by increased intraluminal pressure.**
- **Microperforation occurs→spill of bowel content→pneumoperitoneum, inflammation of pericolonic fat, abscess formation.**
- **No hypertrophy or hyperplasia of the bowel wall.**



Natural history of diverticulosis



Clinical manifestations and diagnosis of acute diverticulitis in adults.
Uptodate. Last update: April 14th, 2014.



Our patient: presentation

49 yo M presents to the ED with several days of intermittent left lower quadrant abdominal pain.

No nausea, no vomiting. +BM, no BRBPR

T: 101°F. HR: 101 bpm, BP: 143/88 mmHg

Previous medical history: Obesity BMI: 37 kg/m²

No medications



Our patient: relevant findings

Physical examination:

Tender LLQ to palpation

Non-distended abdomen, +rebound

Laboratory:

WBC: 14.000/uL, Hb 11,5 mg/dL, plat: 420.000/mm³



Differential diagnosis?



LLQ pain differential diagnosis

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		



What is the best available image for certifying the presence of diverticulitis?



ACR recommendations

Variant 1:

Typical clinical presentation for diverticulitis, suspected complications or atypical presentations.

Radiologic Procedure	Rating	Comments	<u>RRL*</u>
CT abdomen and pelvis with contrast	9	Oral and/or colonic contrast may be helpful for bowel luminal visualization.	⊕⊕⊕⊕
CT abdomen and pelvis without contrast	6		⊕⊕⊕⊕
CT abdomen and pelvis without and with contrast	5		⊕⊕⊕⊕
MRI abdomen and pelvis without contrast	5		○
MRI abdomen and pelvis without and with contrast	5	See statement regarding contrast in text under “Anticipated Exceptions.”	○
X-ray contrast enema	4		⊕⊕⊕
US abdomen transabdominal graded compression	4		○
US pelvis transrectal	4		○
US pelvis transvaginal	4		○
X-ray abdomen and pelvis	4		⊕⊕⊕

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate

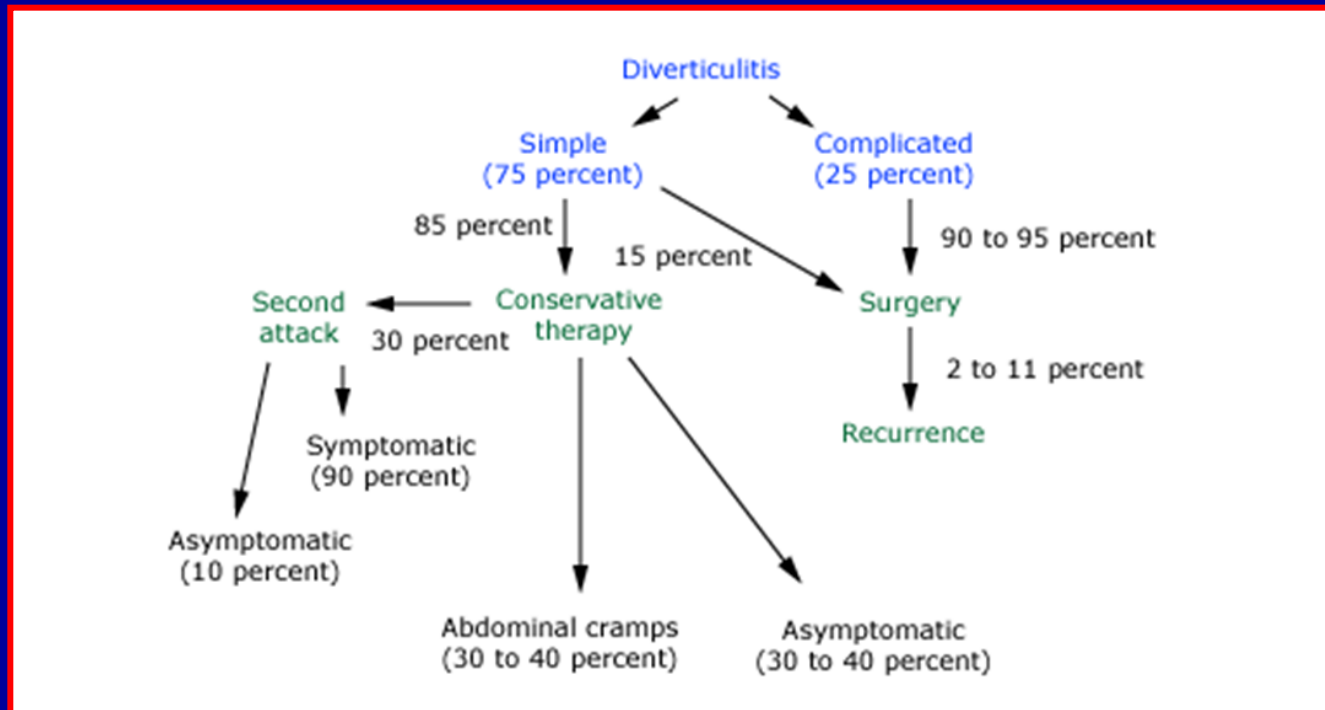
*Relative
Radiation Level



**What is the importance of
choosing the most accurate image
modality?**



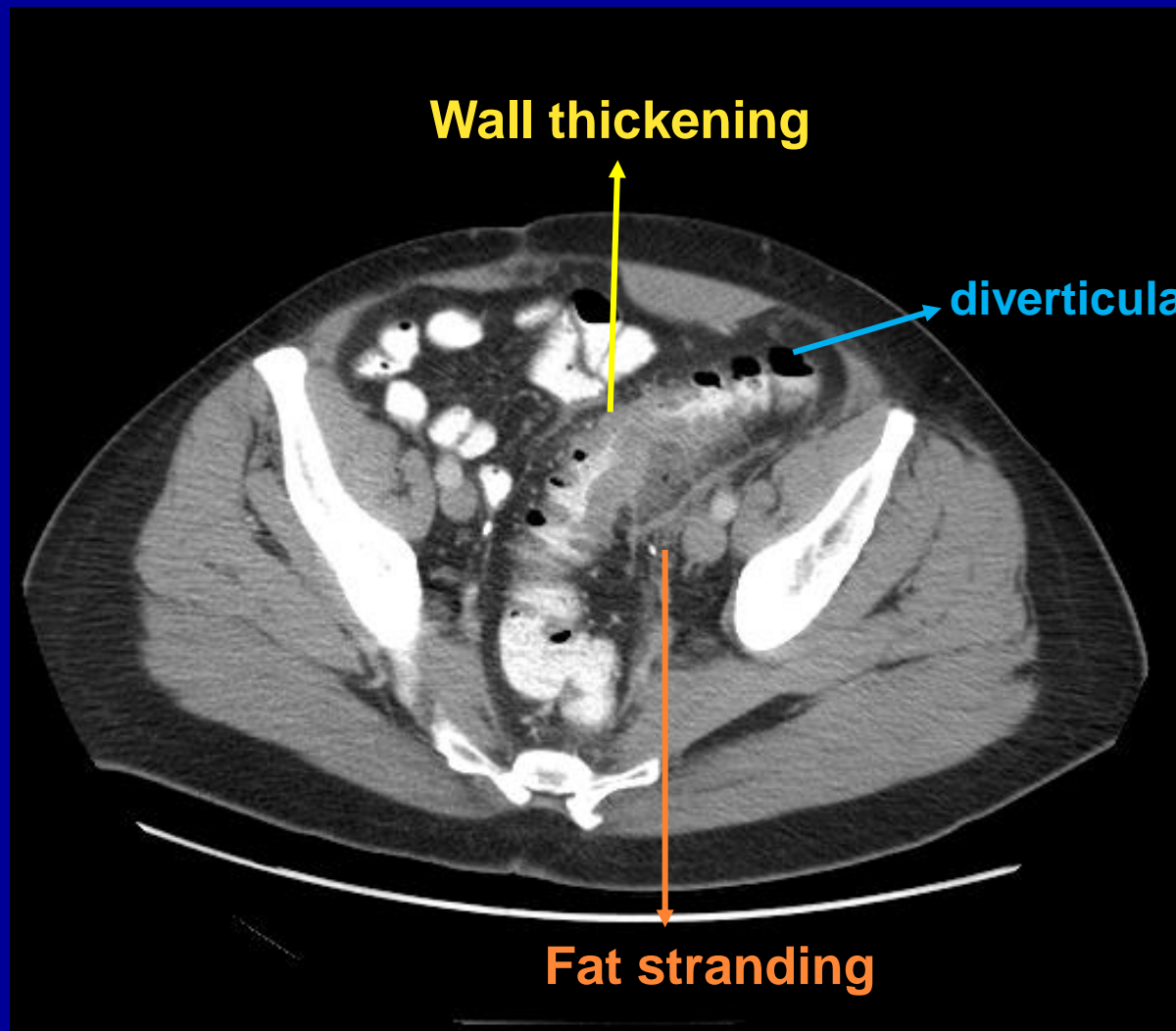
Natural history of diverticulitis





Our patient: axial C+, CT findings

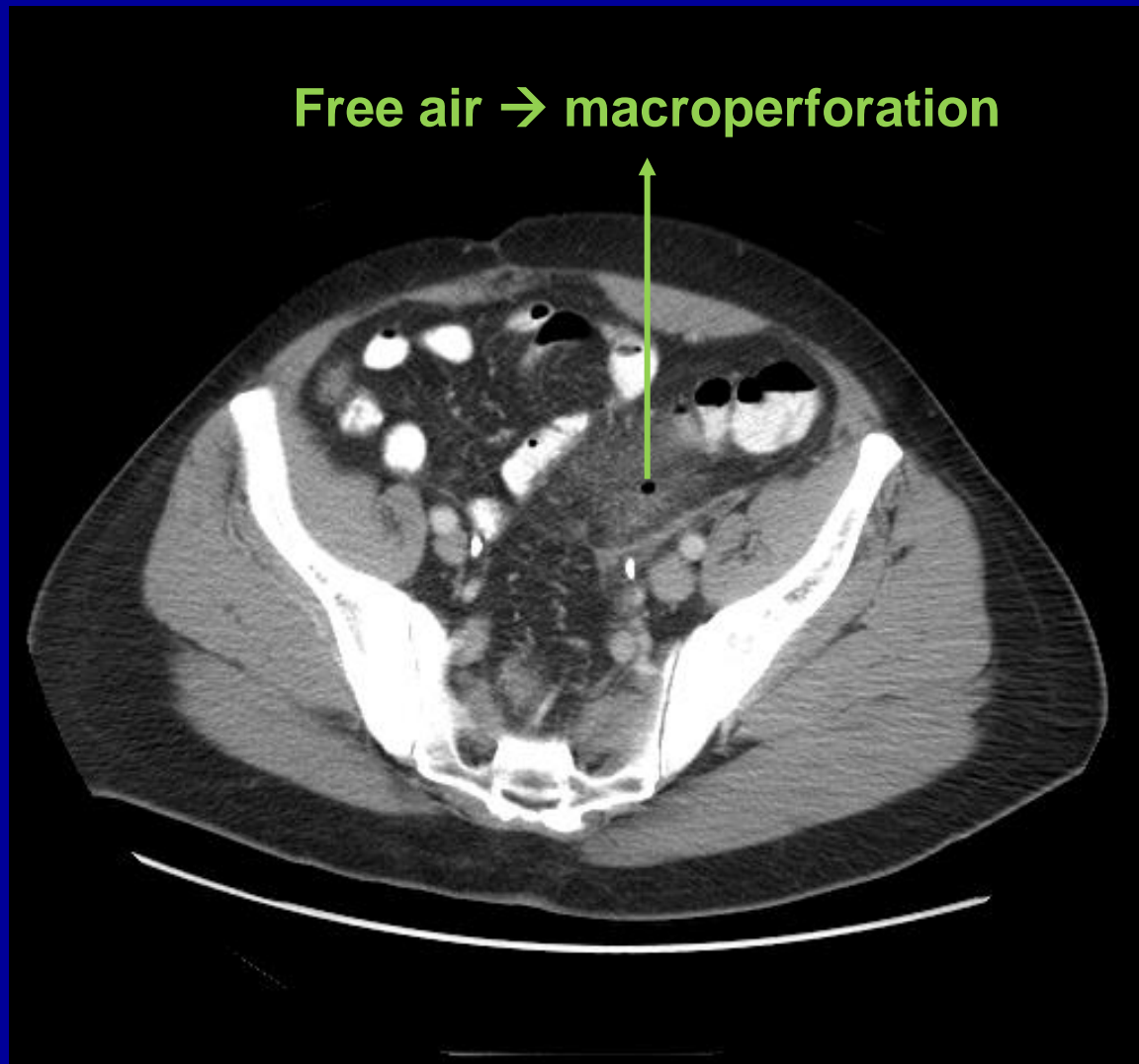
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Our patient: axial C+, CT findings

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Our patient: management and outcomes

- **Conservative management.**
- **Two days of nothing by mouth and IV antibiotics (ampicillin/sulbactam) then switched to oral for two weeks.**
- **Colonoscopy at six weeks showed no mass nor stricture.**

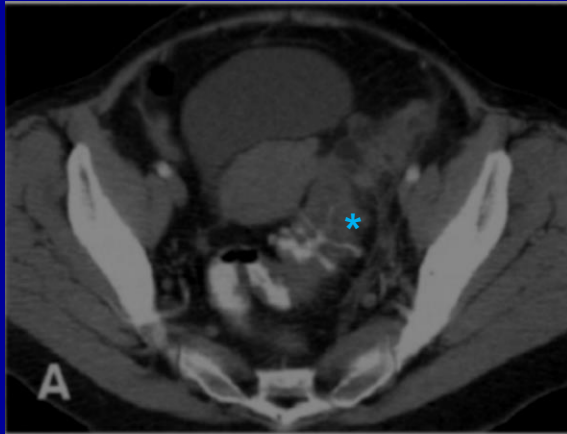


What is the best radiological image for evaluating diverticulitis?

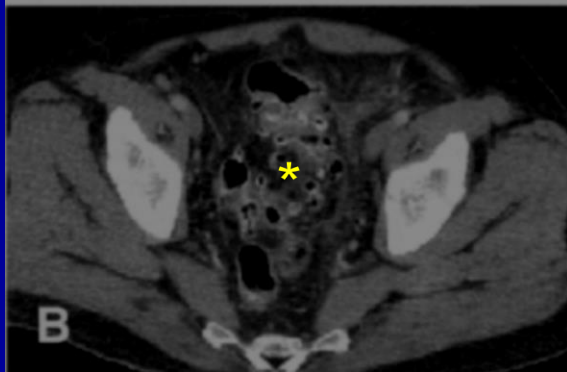
- **Meta-analysis 2008: Accuracy of US and CT→ comparable.**
- **2011 Accuracy of US→ overestimated.**
- **The sensitivity of CT in detecting diverticulitis was significantly higher than that of US: 84% versus 61% (p=0.048).**
- **PPV are comparable.**
- **CT protocol solely using IV contrast is not less accurate than extended contrast agent usage.**



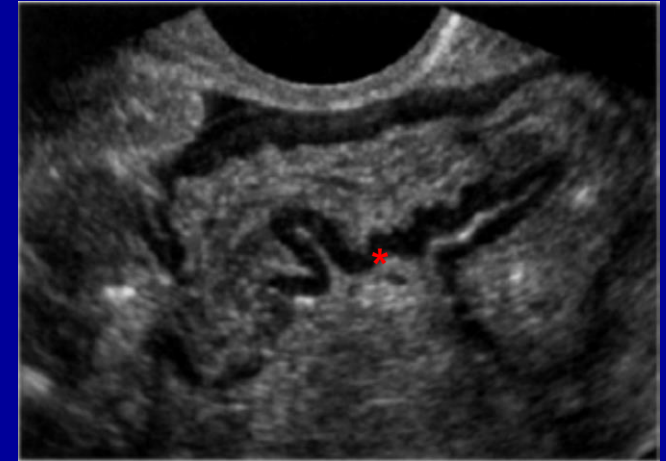
Classic radiological findings of diverticulitis



* **Bowel Wall
thickening
(>4mm)**



* **Sigmoid
diverticula**



**US: Muscular
hypertrophy with
sawtooth appearance**



**Now let's see another interesting
case**



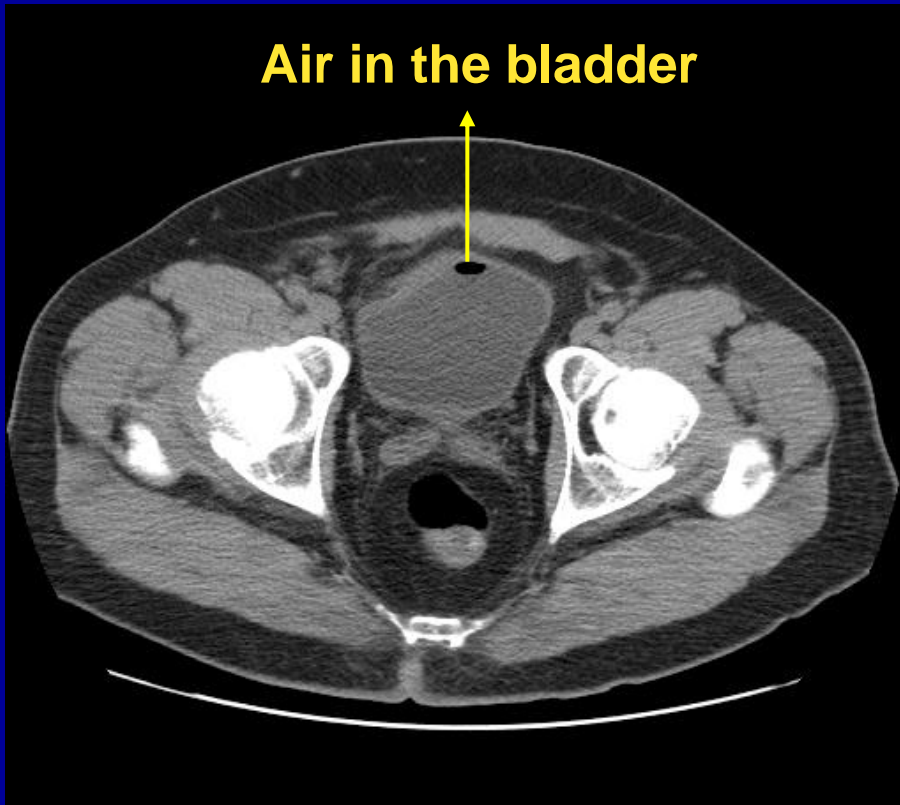
Companion patient 2

61 yo M, with PMH of HTN and 3 episodes of uncomplicated diverticulitis. 3 months prior to visit the ER he experienced a new onset of pneumaturia. 4 weeks later experienced a significant UTI and was treated with ATB by his PCP, not responding and seeing significant amount of stool coming out in his urine. For that reason decided to consult to ER.

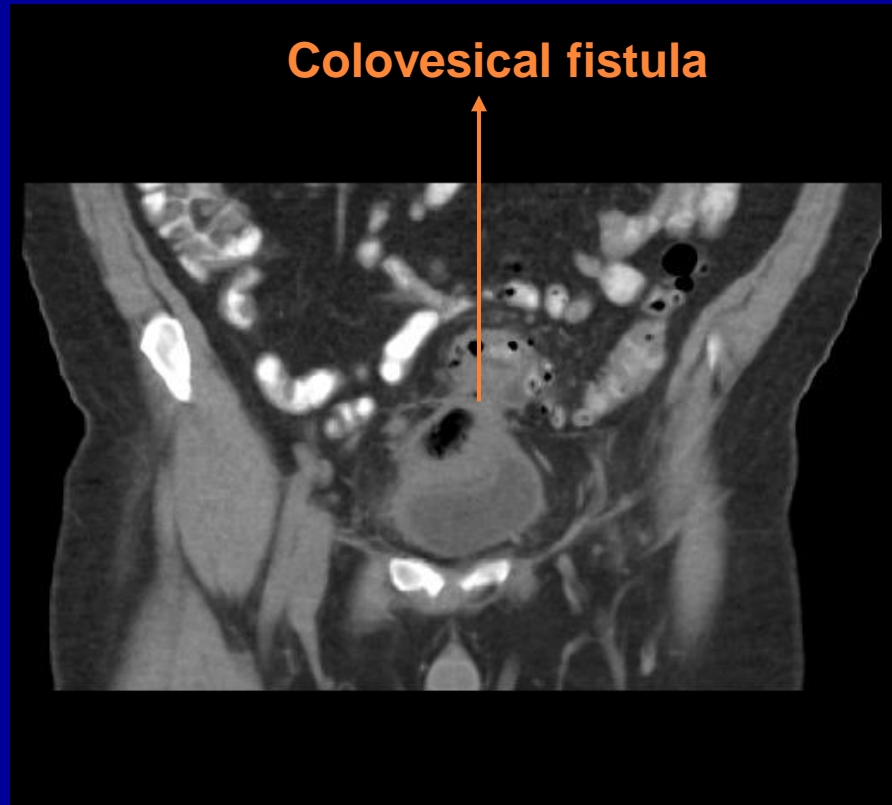


Companion pt 2: axial C+, CT findings

Air in the bladder



Colovesical fistula





Fistula as a complication of diverticulitis

- **Fistula formation account for up to 20% of surgically treated cases of diverticular disease**
- **The most frequent fistulas are colovesical (65%), colovaginal (25%), coloenteric and colouterine fistulas**
- **Diverticulitis: most common cause of a colovesical fistula**
- **Symptoms of colovesical fistula: pneumaturia, dysuria or irritative symptoms, and fecaluria**

Woods RJ, Lavery IC, Fazio VW, et al. Internal fistulas in diverticular disease. Dis Colon Rectum 1988; 31:591.



Companion pt 2: Outcomes

- **Urine culture: (+) Klebsiella and E. coli.**
- **4 weeks later he underwent open sigmoid colectomy+ end colostomy.**
- **8 weeks post-op: Colorectal anastomosis.**
- **No complications on follow ups.**



Companion patient 3

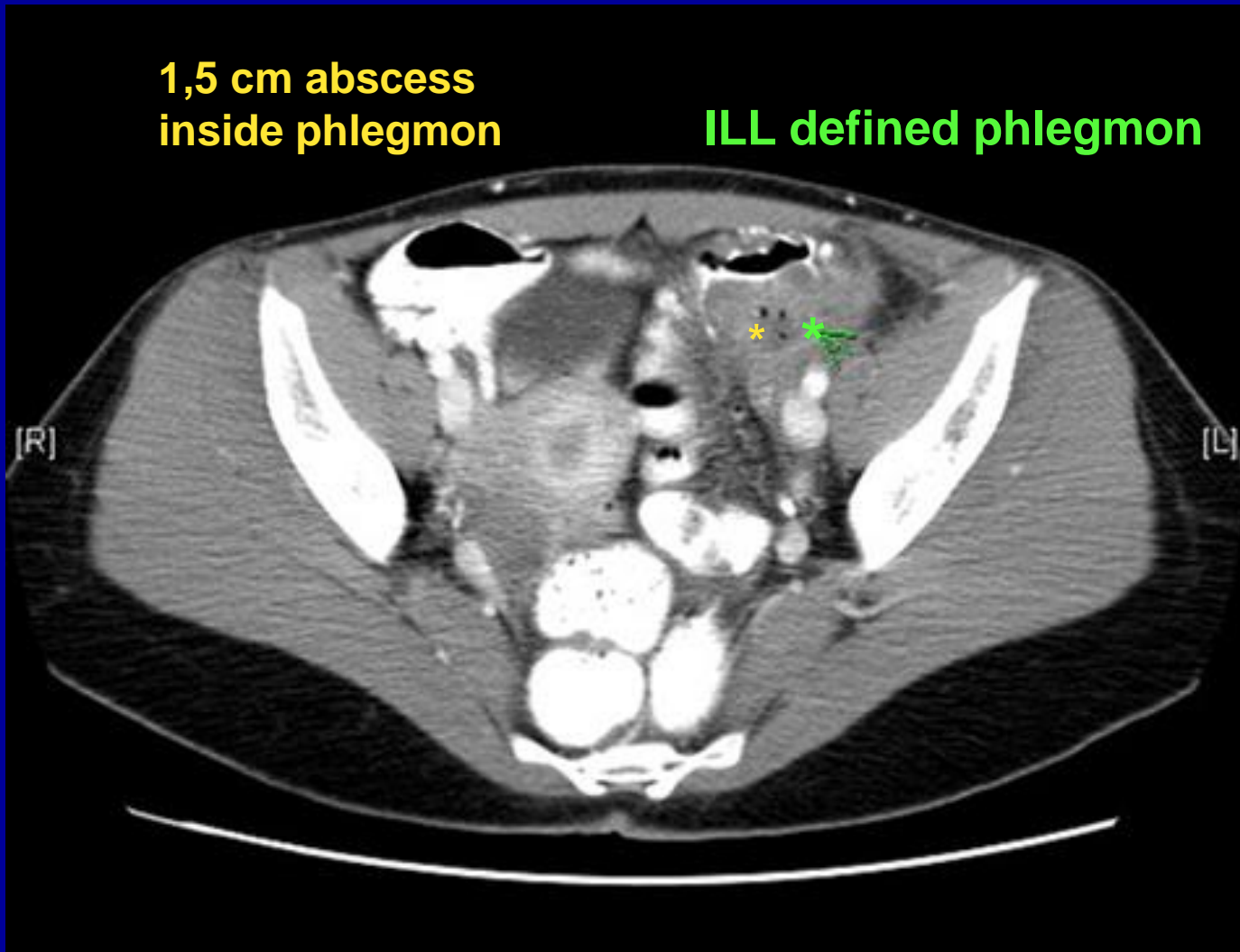
- **27 yo F, previously healthy presents to ER with severe left lower quadrant pain.**
- **No nausea, no vomiting. +BM, no BRBPR.**
- **T: 101,4°F. HR: 106, BP: 134/86.**
- **No medications. Menses last date: 1 week ago.**
- **PE: Tender LLQ to palpation. Mildly distended abdomen, +rebound.**
- **Labs: WBC: 16.500 uL, Hb: 11,9 mg/dL, plat: 420.000 mm³.**



Companion pt 3: axial C+, CT findings

1,5 cm abscess
inside phlegmon

ILL defined phlegmon



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HARVARD MEDICAL SCHOOL
TEACHING HOSPITAL

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**How would you stage the severity
of acute diverticulitis?**



Hinchey classification for colonic perforation due to diverticular disease

HINCHEY CLASIFICATION	
Stage I	Diverticulitis with confined paracolic abscess
Stage II	Diverticulitis with pelvic abscess
Stage III	Diverticulitis with purulent peritonitis
Stage IV	Diverticulitis with fecal peritonitis

Hinchey, E.J., Schaal, P.G. and Richard, G.K. Treatment of perforated diverticular disease of the colon. *Advances in Surgery* 12:85-109, 1978



Now try to give a complete diagnosis



Taken from: Clinical manifestations and diagnosis of acute diverticulitis in adults.
Uptodate. Last update: April 14th, 2014.



Take home points

- **Diverticulosis Vs diverticulitis**
- **LLQ abdominal pain+tenderness**
- **Up to 25% of patients with acute diverticulitis have associated complications: bowel obstruction, abscess, fistula or perforation**
- **Best available images: CT**
- **Colonoscopy has no role in diagnosis but must be performed six weeks later for ruling out masses**
- **Most of cases of acute diverticulitis just require conservative management**



References

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