Società Medico Chirurgica di Ferrara
12 maggio 2012

Malattia diverticolare del colon

La TC in fase acuta

Pier Marco Cervi
U.O. Radiodiagnostica Ospedaliera
Direttore Dott. Stefano Bighi

Azienda Ospedaliera Universitaria S. Anna di Ferrara
Dipartimento Diagnostica per Immagini e Medicina di Laboratorio
Direttore Dott. Luciano Feggi

Conventional radiography is commonly the initial imaging examination performed in the diagnostic work-up of patients who present with acute abdominal pain to the ED, and is used to exclude major illness such as bowel obstruction and perforated viscus

Imaging Patients with Acute Abdominal Pain
Jaap Stoker et al
***Radiology,* 253 31-46, 2009**

The accuracy values for conventional radiography in the diagnostic work-up of patients with acute abdominal pain are not convincing.

Some study investigators have reported an accuracy of 53%

Imaging Patients with Acute Abdominal Pain
Jaap Stoker et al
***Radiology,* 253 31-46, 2009**

CT can therefore be considered the primary technique for the diagnosis of acute abdominal pain, except in patients clinically suspected of having acute cholecystitis.
In these patients, ultrasonography (US) is the primary imaging technique of choice.

Imaging Patients with Acute Abdominal Pain
Jaap Stoker et al
***Radiology,* 253 31-46, 2009**

Computed tomography is the preferred test in evaluating clinically suspected diverticulitis.
It is used to evaluate the severity and extent of disease and to identify complications, but it also may diagnose other causes of left lower-quadrant pain that can mimic diverticulitis

Left Lower-Quadrant Pain: Guidelines from the American College of Radiology Appropriateness Criteria
NANCY A. HAMMOND, MD; et.al,
Am Fam Physician. 2010 Oct 1;82(7):766-770

Transabdominal ultrasonography with graded compression is another effective technique but is limited by its high operator dependency and technical difficulties in scanning patients who are obese. Pelvic ultrasonography is the preferred imaging modality in women of childbearing age and children

Left Lower-Quadrant Pain: Guidelines from the American College of Radiology Appropriateness Criteria
NANCY A. HAMMOND, MD; et.al,
Am Fam Physician. 2010 Oct 1;82(7):766-770

American College of Radiology Appropriateness Criteria for Left Lower-Quadrant Pain in Older Patients with Suspected Diverticulitis

Procedure	Rating*	Comments
Abdominal and pelvic CT with contrast	8	oral or colon contrast may be helpful for bowel luminal visualization
Abdominal and pelvic CT without contrast	6	
Radiography with contrast enema	5	
Abdominal and pelvic MR with or without contrast	4	
Abdominal and pelvic Radiography	4	
Abdominal US with Compression	4	
Transrectal or transvaginal US	4	

*—American College of Radiology rating scale: 1, 2, 3 = usually not appropriate; 4, 5, 6 = may be appropriate; 7, 8, 9 = usually appropriate.

Diagnoses	N	Sensitivity US (%)	Sensitivity CT(%)
Appendicitis	284	76 (71–81)	94 (92–97)
Diverticulitis	118	61 (52–70)	81 (74–88)
Bowel Obstruction	68	63 (52–75)	69 (58–80))1.00

A comparison of the Accuracy of Ultrasound and Computed Tomography in common diagnoses causing acute abdominal pain

Adrienne van Randen, et al

European Radiology , 2011

PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

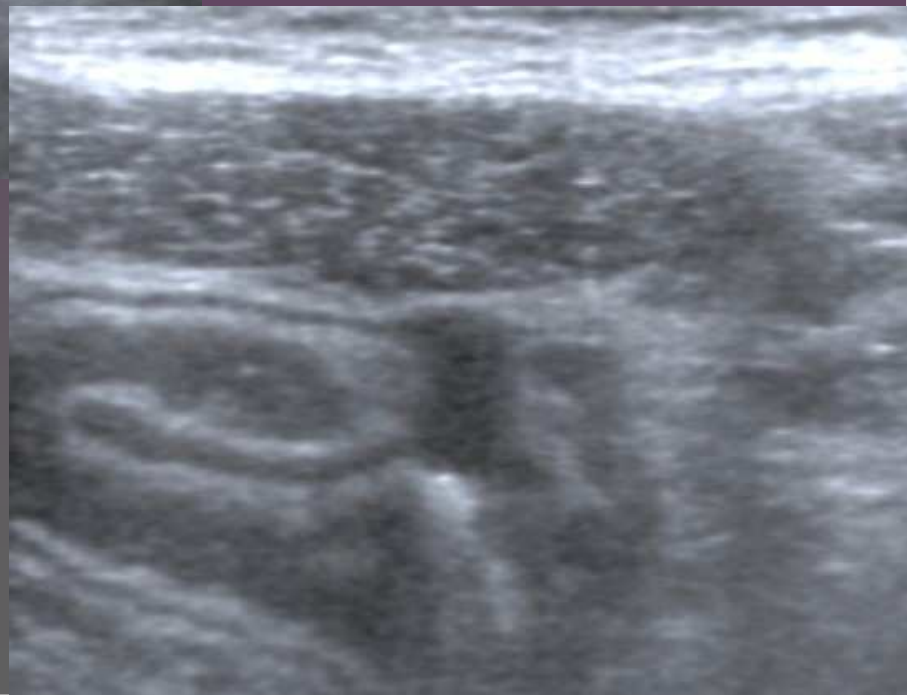
PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

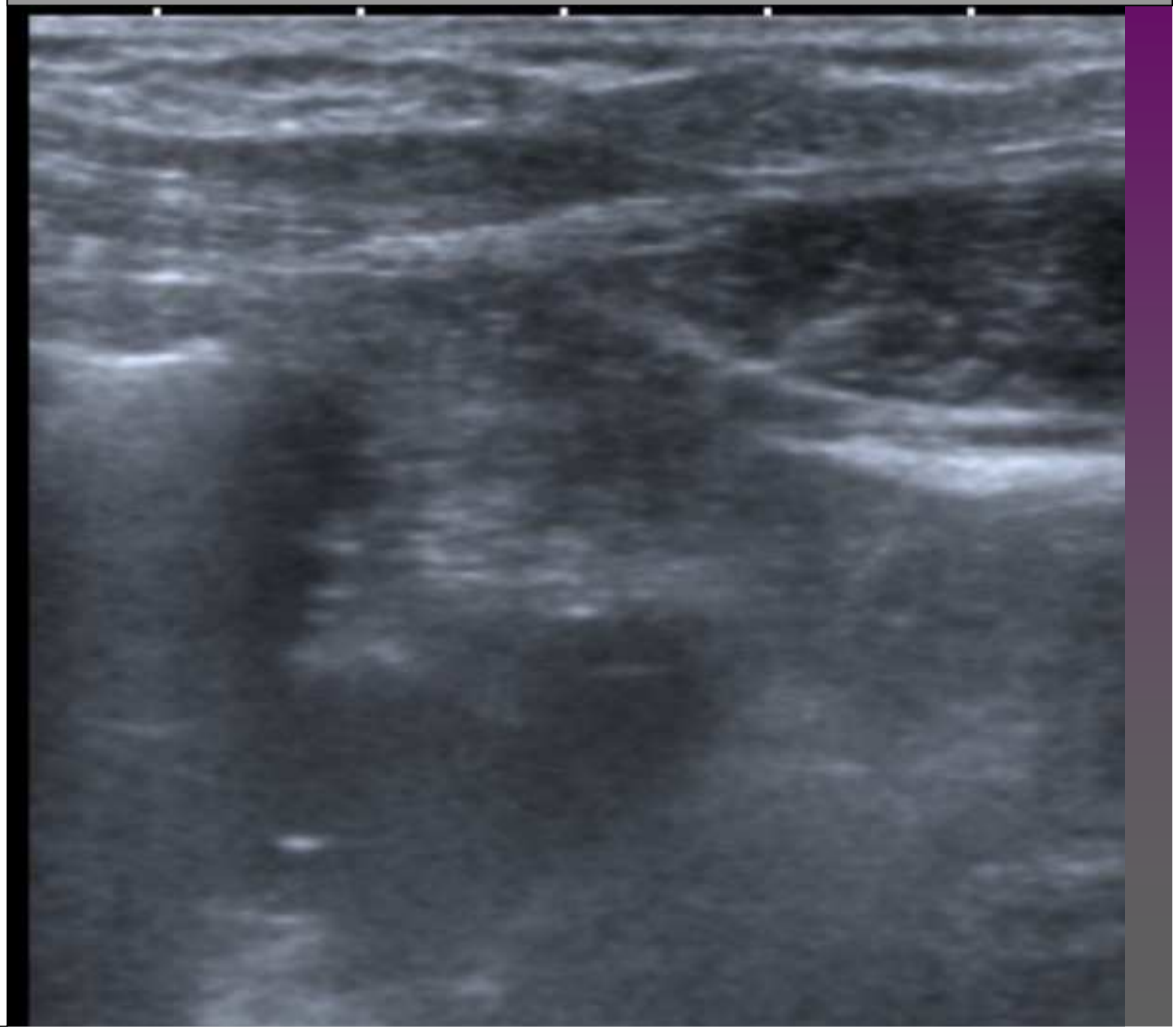
Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon



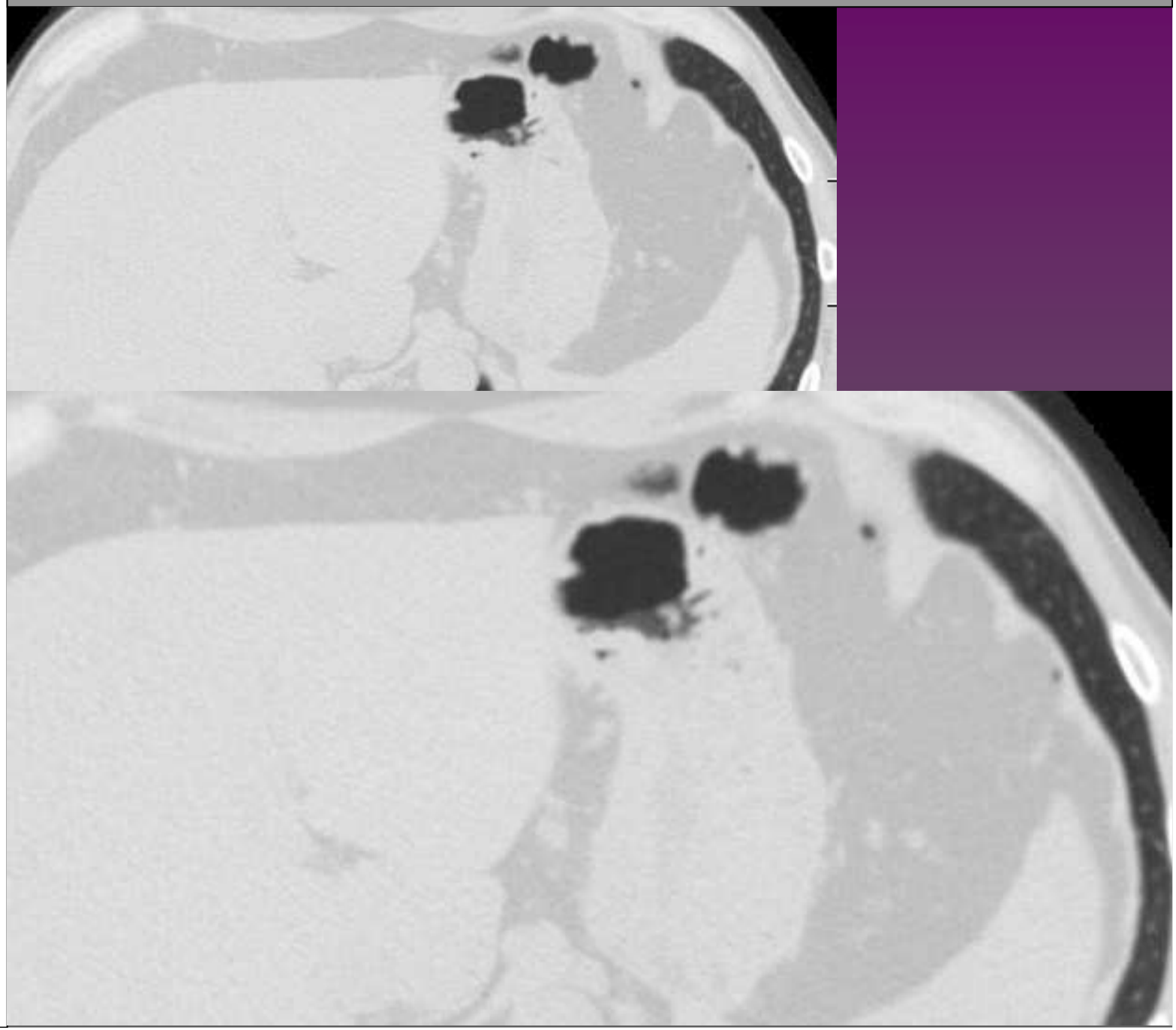
Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE



Società Medico Chirurgica di Ferrara

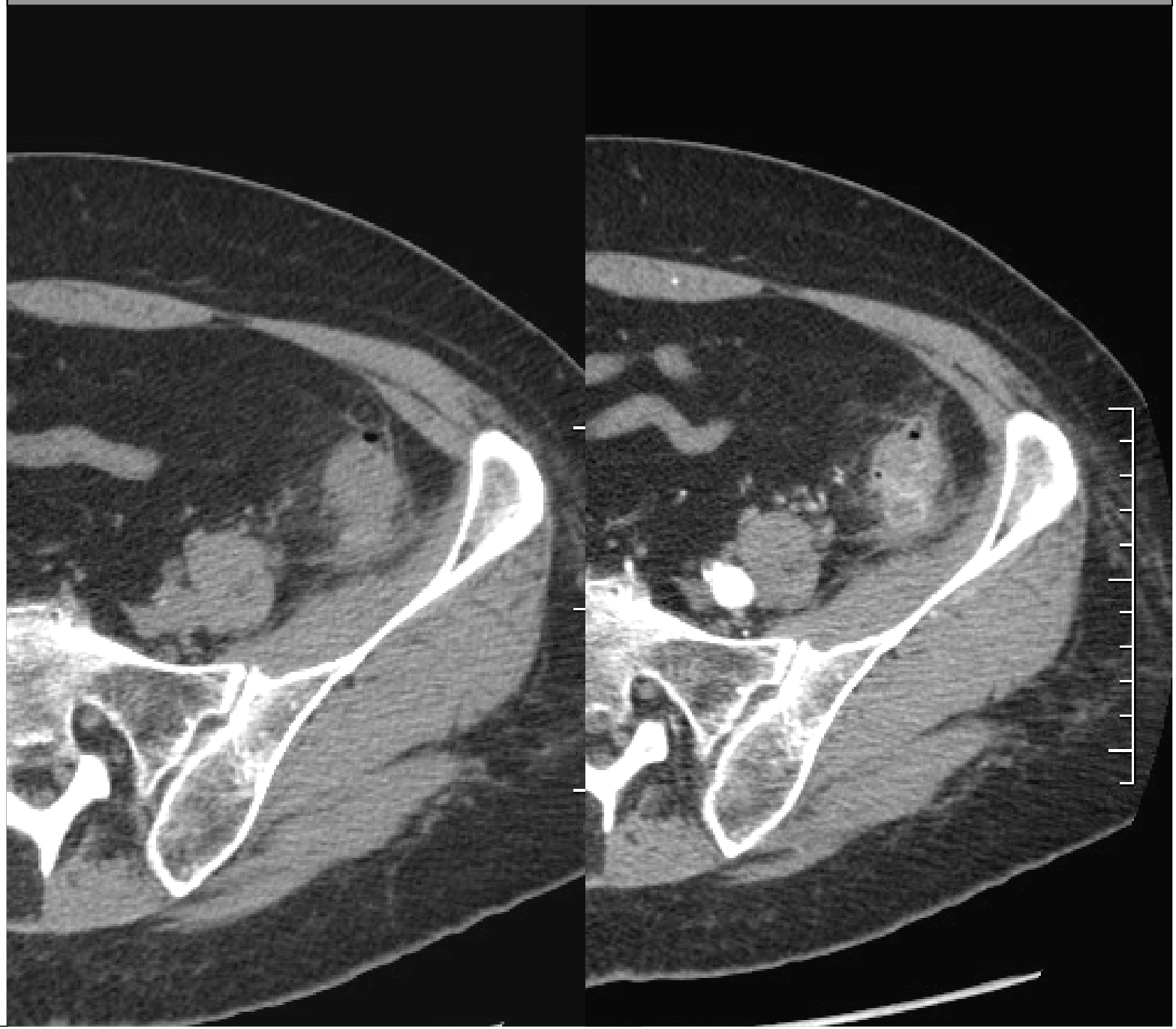
PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

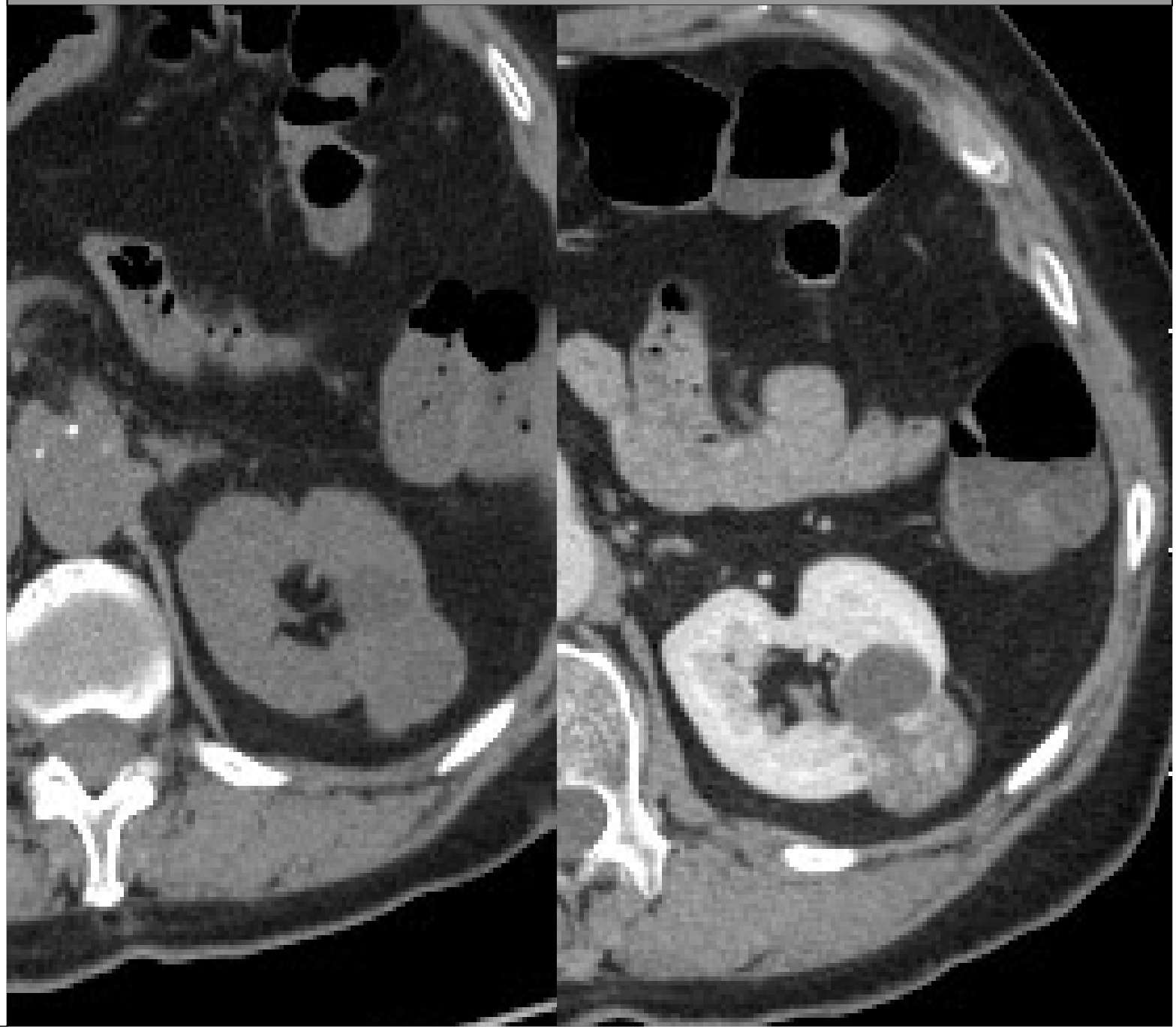
Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

The preferred examination for evaluation of acute left lower quadrant pain and suspected diverticulitis is CT of the abdomen and pelvis with oral, rectal, and intravenous (IV) contrast

Società Medico Chirurgica di Ferrara

Imaging Update: Acute Colonic Diverticulitis
Kristen K. DeStigter, M.D.1 and David P. Keating, M.D.1
***Clin Colon Rectal Surg.* 2009 August; 22(3): 147–155**

The American College of Radiology rates CT of the abdomen and pelvis with oral and/or colonic contrast as the preferred procedure in the setting of left lower quadrant pain with or without fever, except in women of childbearing age when ultrasound (US) is the initial preferred modality for unexplained left lower quadrant pain

Imaging Update: Acute Colonic Diverticulitis
Kristen K. DeStigter, David P. Keating
***Clin Colon Rectal Surg.* 2009 August; 22(3): 147–155**

Colonoscopy and sigmoidoscopy are typically avoided when acute diverticulitis is suspected because of the risk of perforation or other exacerbation of the disease process

Diverticulitis
Danny O. Jacobs, M.D., M.P.H.
N ENGL J MED 2007; 357:2057-2066

CT serves the following functions in the setting of left lower quadrant pain:

(1) confirms diagnosis of diverticulitis

(2) evaluates the severity and extent of disease,

(3) allows for treatment planning of complications such as abscess,

(4) demonstrates other causes of abdominal pain that may mimic diverticulitis.

Imaging Update: Acute Colonic Diverticulitis
Kristen K. DeStigter, M.D.1 and David P. Keating, M.D.1
***Clin Colon Rectal Surg.* 2009 August; 22(3): 147–155.**

The CT technique used to examine patients with acute abdominal pain generally involves scanning of the entire abdomen after intravenous administration of an iodinated contrast medium.
Although abdominal CT can be performed without contrast medium the intravenous administration of contrast material facilitates good accuracy

Imaging Patients with Acute Abdominal Pain
Jaap Stoker et al
***Radiology,* 253 31-46, 2009**

Although rectal or oral contrast material may be helpful in differentiating fluid-filled bowel loops from abscesses in some cases, the use of oral contrast material can markedly increase the time these patients spend in the ED.
The lack of enteral contrast medium does not seem to hamper the accurate reading of CT images obtained in patients with acute abdominal pain

Imaging Patients with Acute Abdominal Pain
Jaap Stoker et al
***Radiology,* 253 31-46, 2009**

Società Medico Chirurgica di Ferrara

TABLE 1

European Association for Endoscopic Surgeons classification for diverticulitis.

Grade	Clinical description	Symptoms
I	Symptomatic uncomplicated disease	Fever, crampy abdominal pain, CT evidence of diverticulitis
II	Recurrent symptomatic disease	Recurrence of above
III	Complicated disease	Hemorrhage Abscess Phlegmon Perforation Purulent and fecal peritonitis Stricture Fistula Obstruction

DIVERTICULITIS: THE MOST COMMON COLON EMERGENCY FOR THE ACUTE CARE SURGEON

Scandinavian Journal of Surgery 99: 86–89, 2010

D. E. Lopez, C. V. R. Brown

Hinckey classification for diverticulitis.

Stage	Description
I	Pericolic or mesenteric abscess
II	Walled off pelvic abscess
III	Generalized purulent peritonitis
IV	Generalized fecal peritonitis

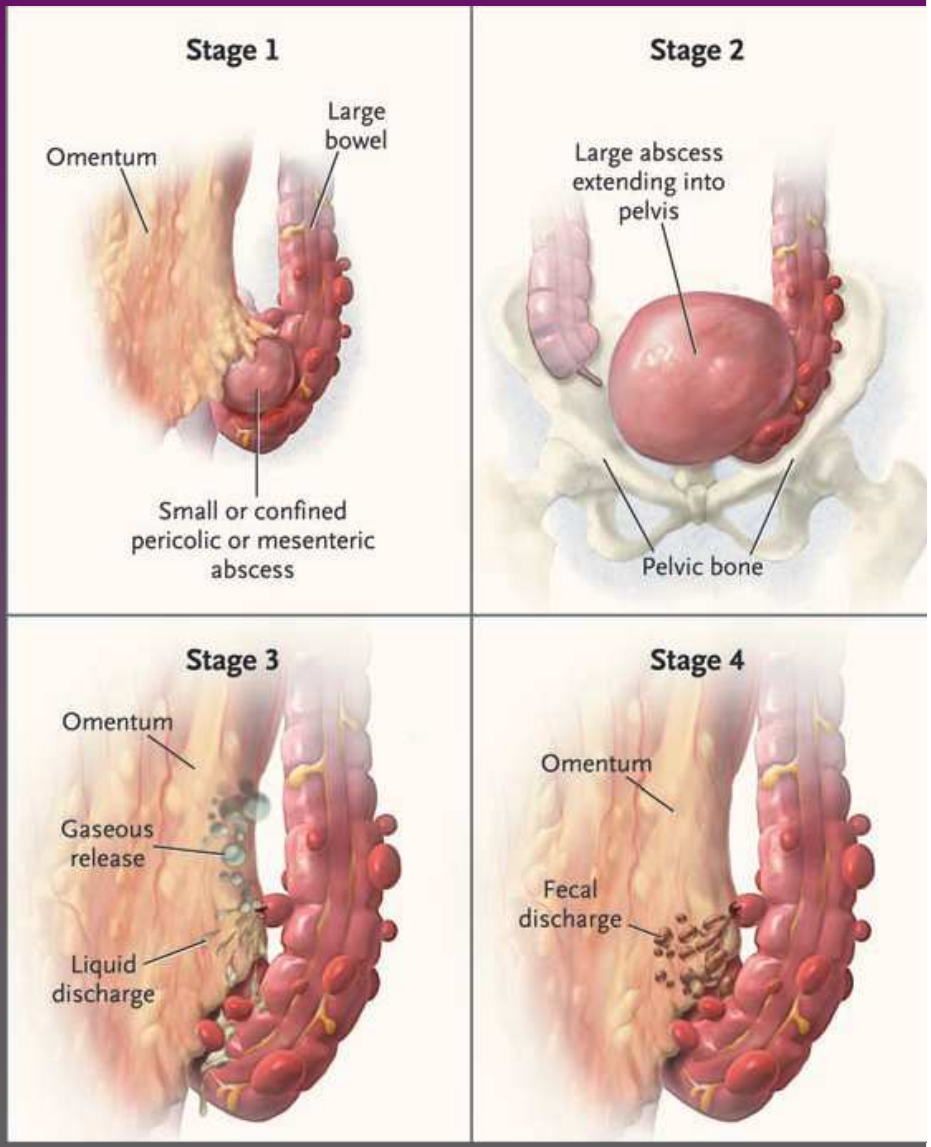
DIVERTICULITIS: THE MOST COMMON COLON EMERGENCY FOR THE ACUTE CARE SURGEON

Scandinavian Journal of Surgery 99: 86–89, 2010

D. E. Lopez, C. V. R. Brown

Staging

The severity of diverticulitis is often graded with the use of Hinchey's criteria



Diverticulitis

Danny O. Jacobs, M.D., M.P.H.

N ENGL J MED 2007; 357:2057-2066

Ambrosetti's CT scan classification for diverticulitis.

Mild diverticulitis	Severe diverticulitis
Localized sigmoid wall thickening (<5 mm)	Abscess
Inflammation of pericolic fat	Extraluminal air Extraluminal contrast

DIVERTICULITIS: THE MOST COMMON COLON EMERGENCY FOR THE ACUTE CARE SURGEON

Scandinavian Journal of Surgery 99: 86–89, 2010

D. E. Lopez, C. V. R. Brown

CT findings may be used to direct clinical management. Some authors have associated CT findings with the Hinchey classification and modified Hinchey classification , showing how CT can effectively guide medical or surgical treatment

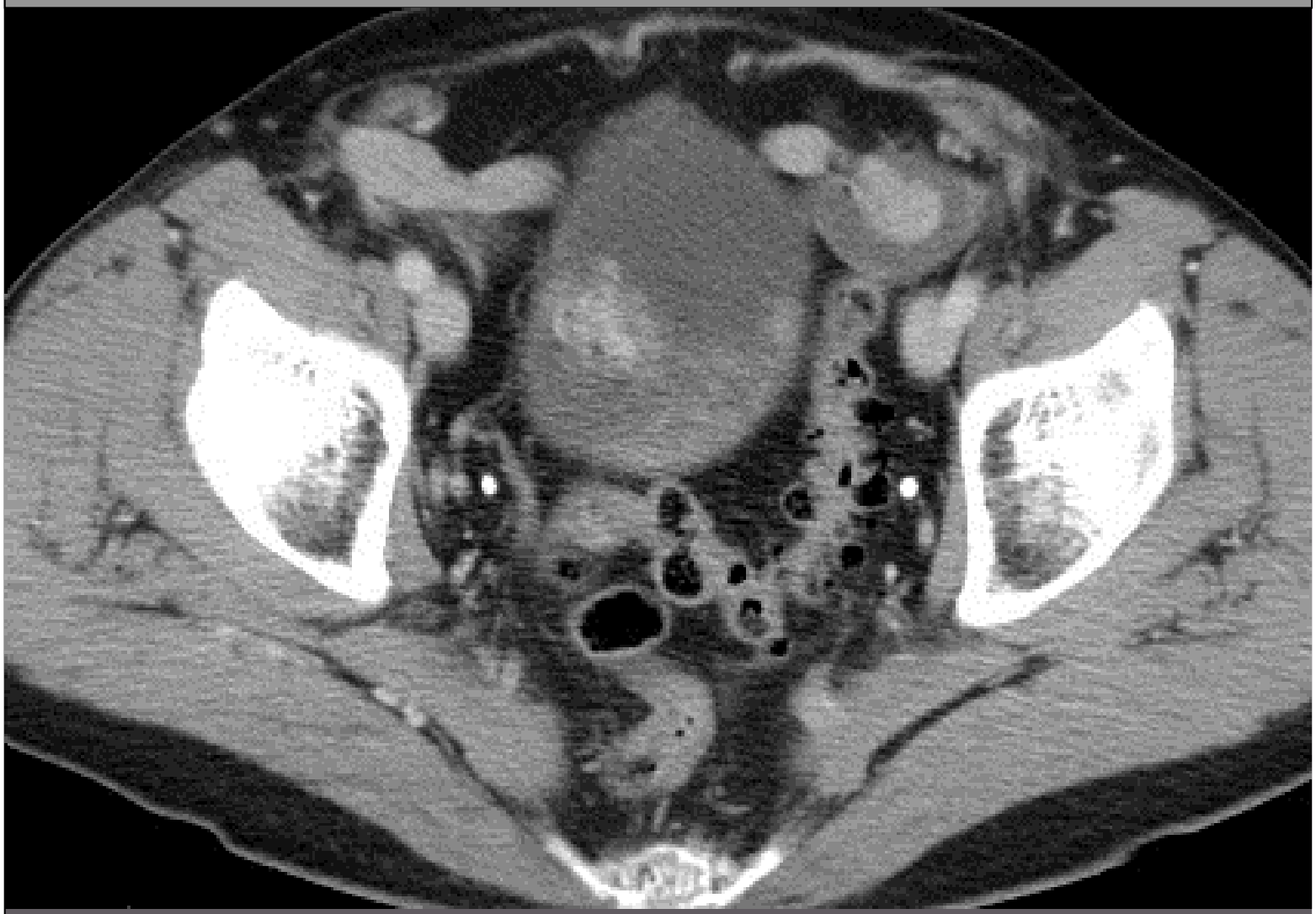
Imaging Update: Acute Colonic Diverticulitis
Kristen K. DeStigter, M.D.1 and David P. Keating, M.D.1
***Clin Colon Rectal Surg.* 2009 August; 22(3): 147–155.**

The two most common CT findings in uncomplicated diverticulitis are colonic wall thickening (wall thickness is greater than 3 mm on the short axis of the lumen) and pericolic fat stranding

Imaging Update: Acute Colonic Diverticulitis
Kristen K. DeStigter, M.D.1 and David P. Keating, M.D.1
***Clin Colon Rectal Surg.* 2009 August; 22(3): 147–155.**

PM. Cervi - FE

Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

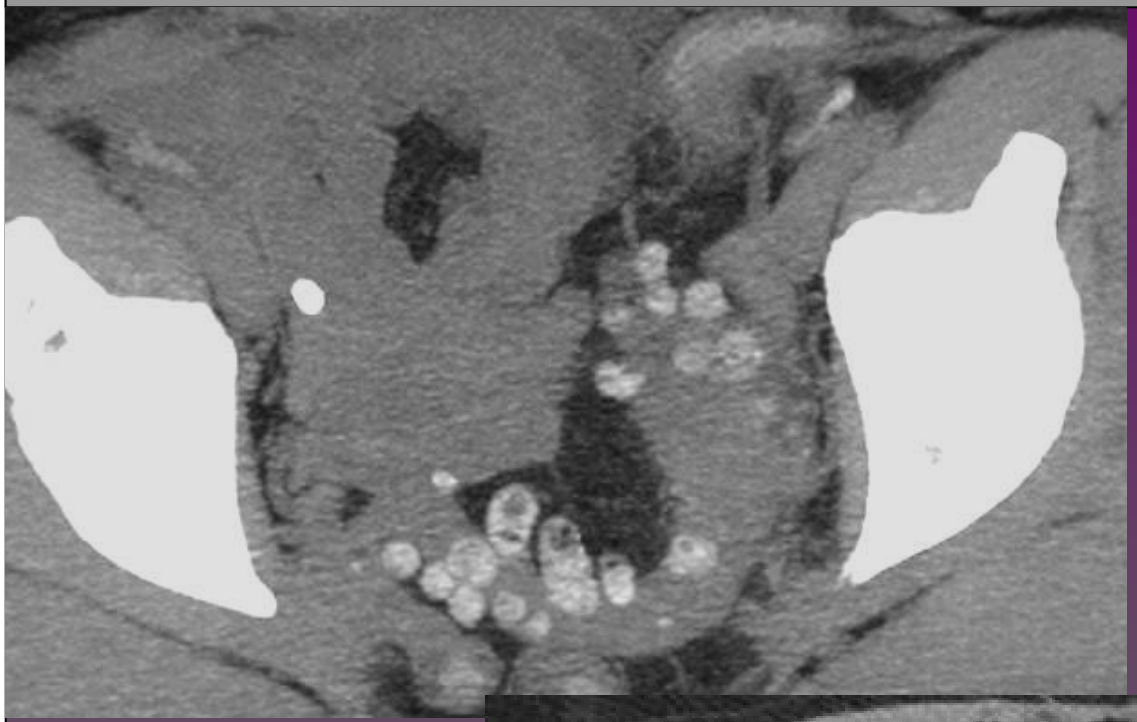
PM. Cervi - FE

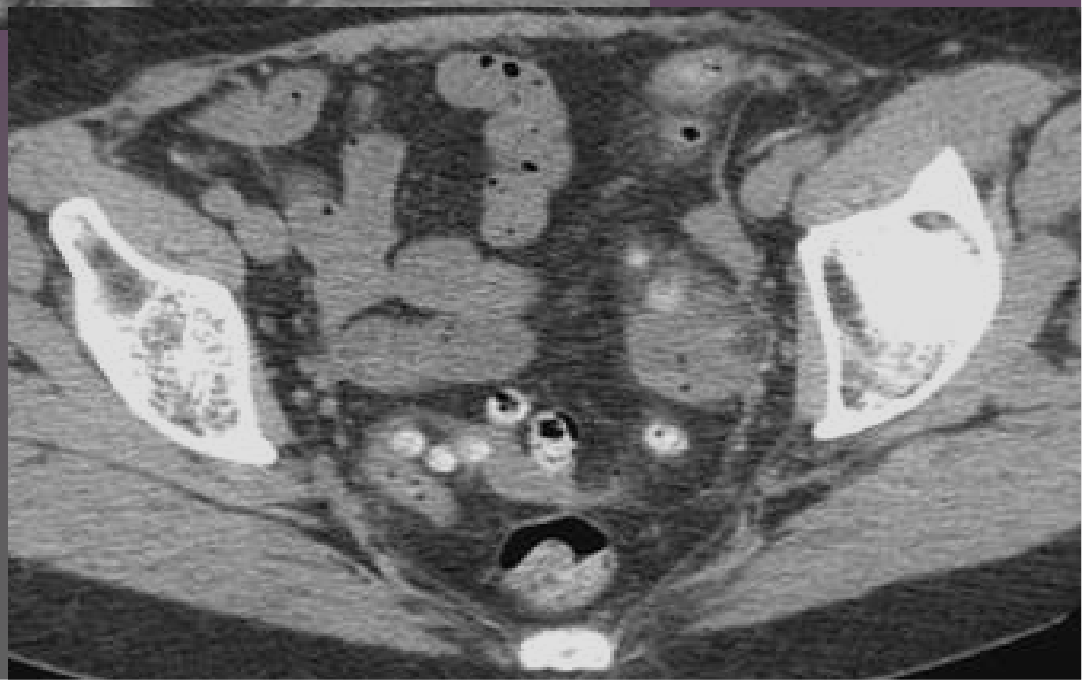
Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon





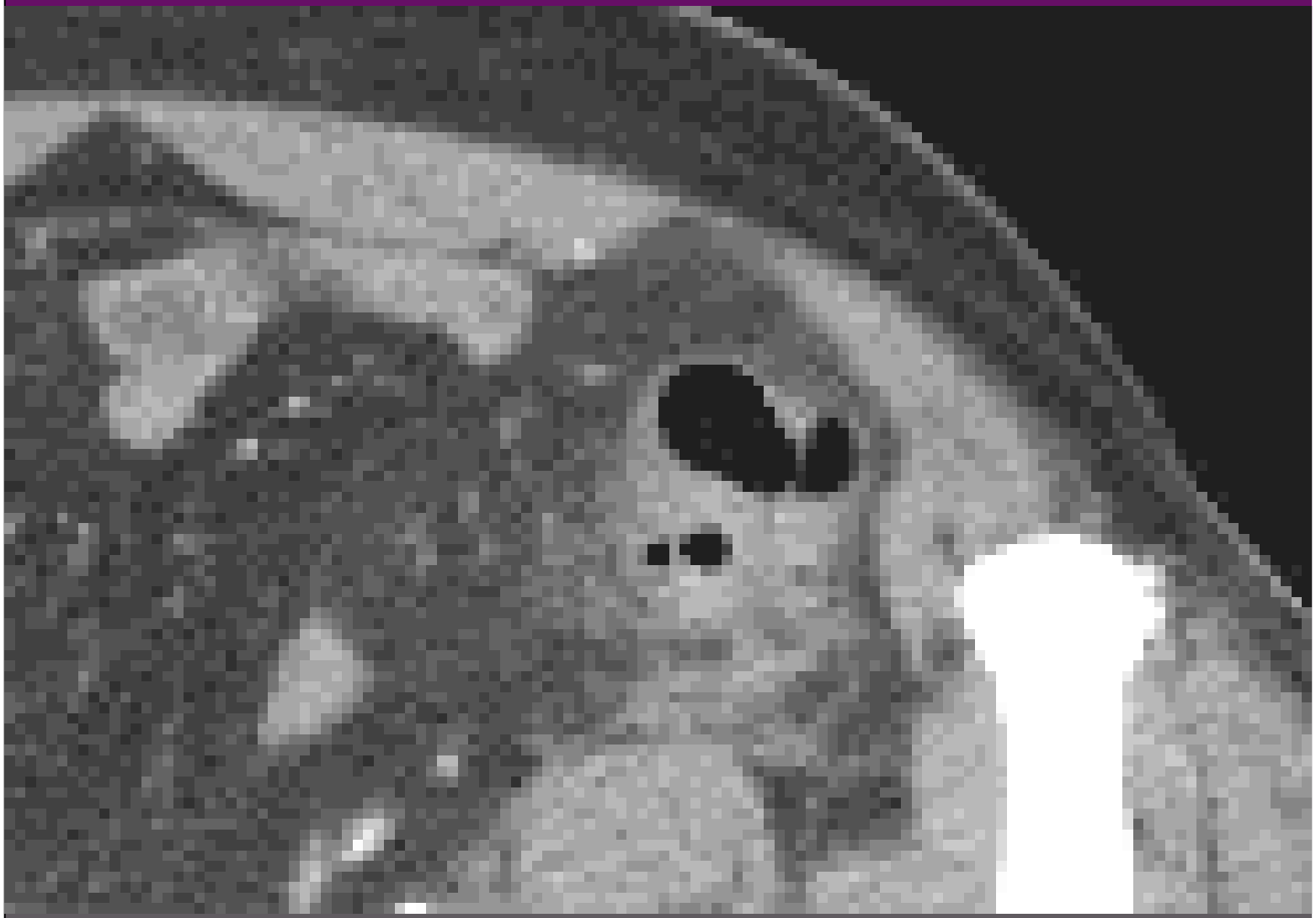
Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

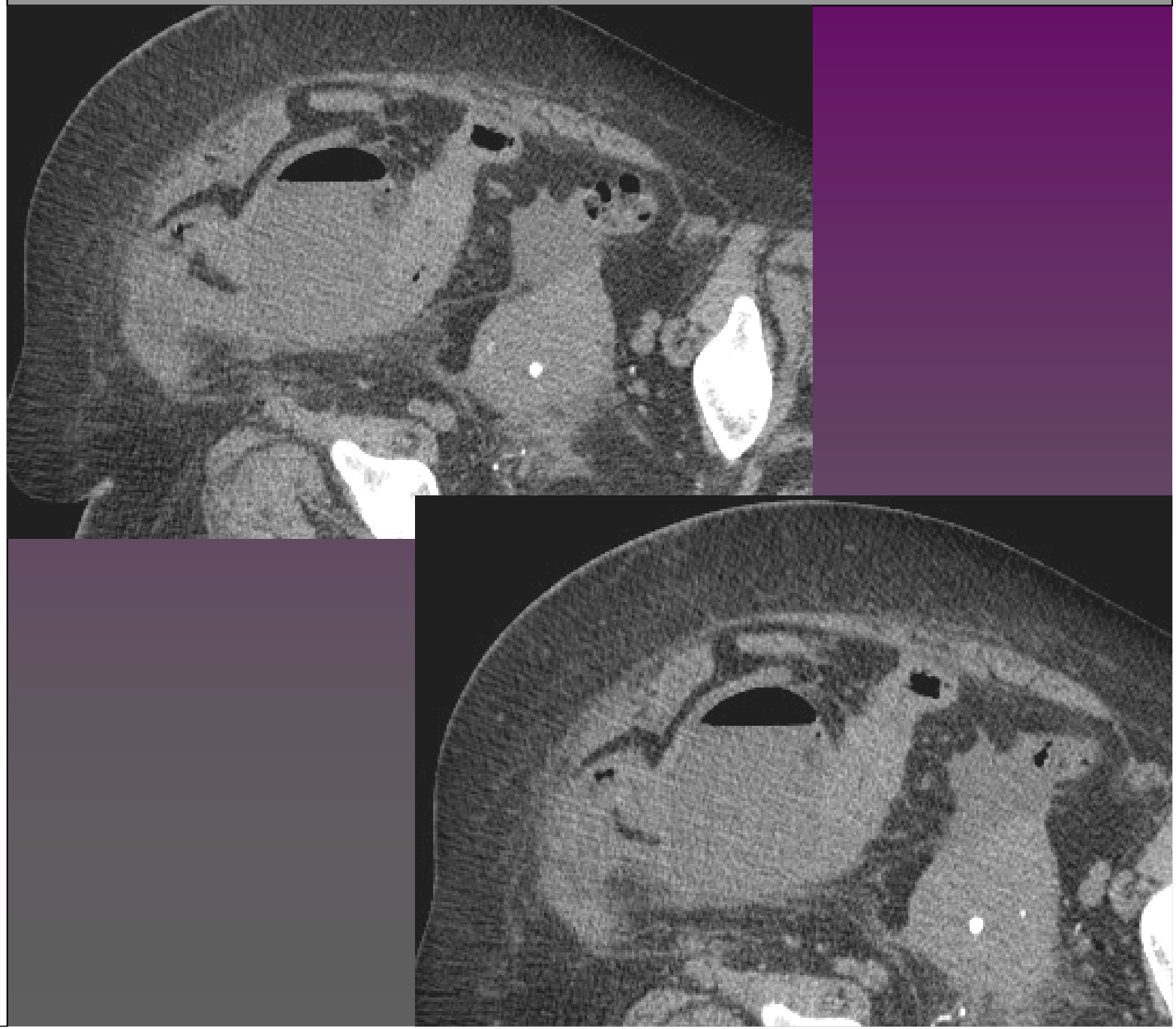
PM. Cervi - FE



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

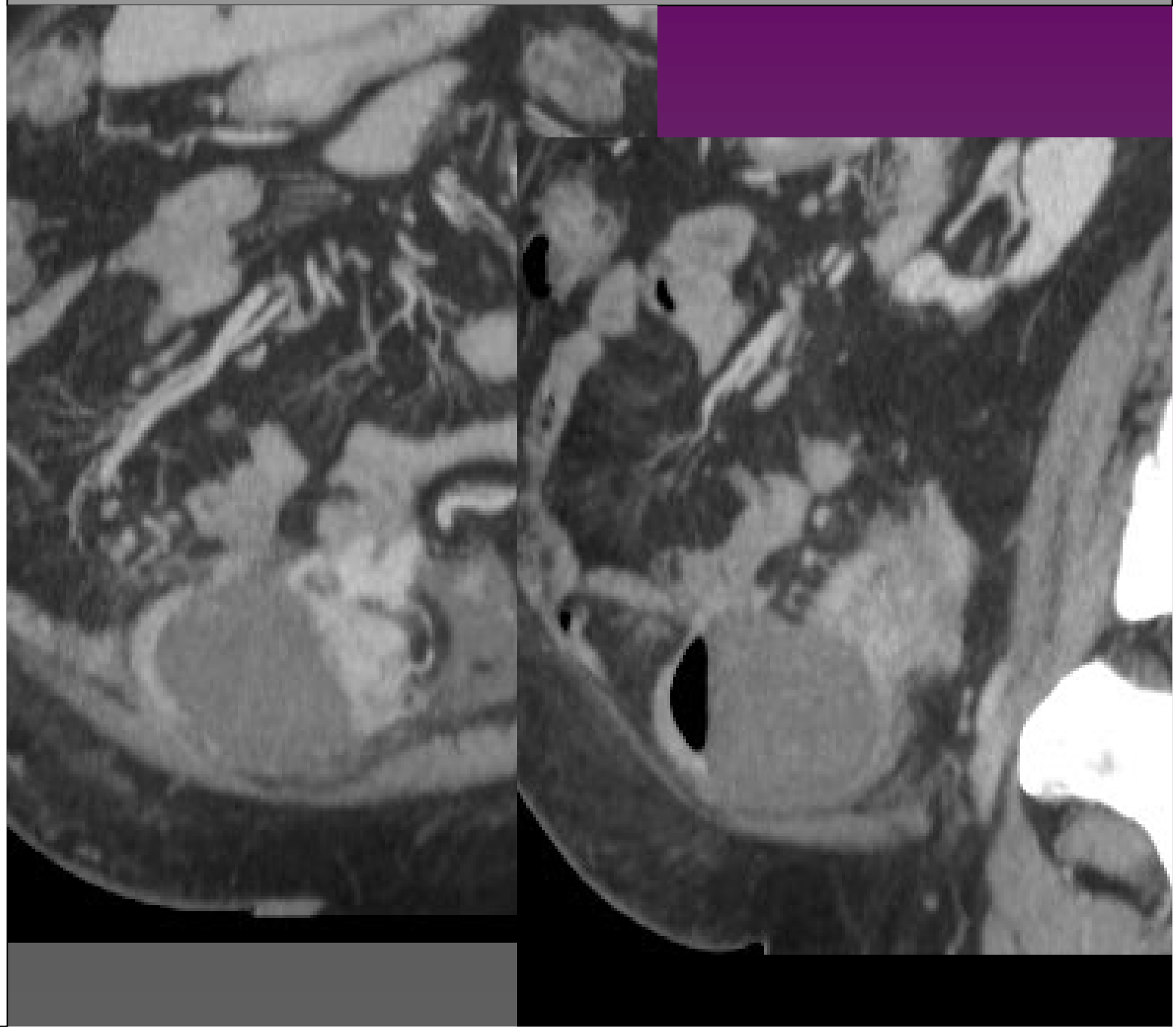
Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

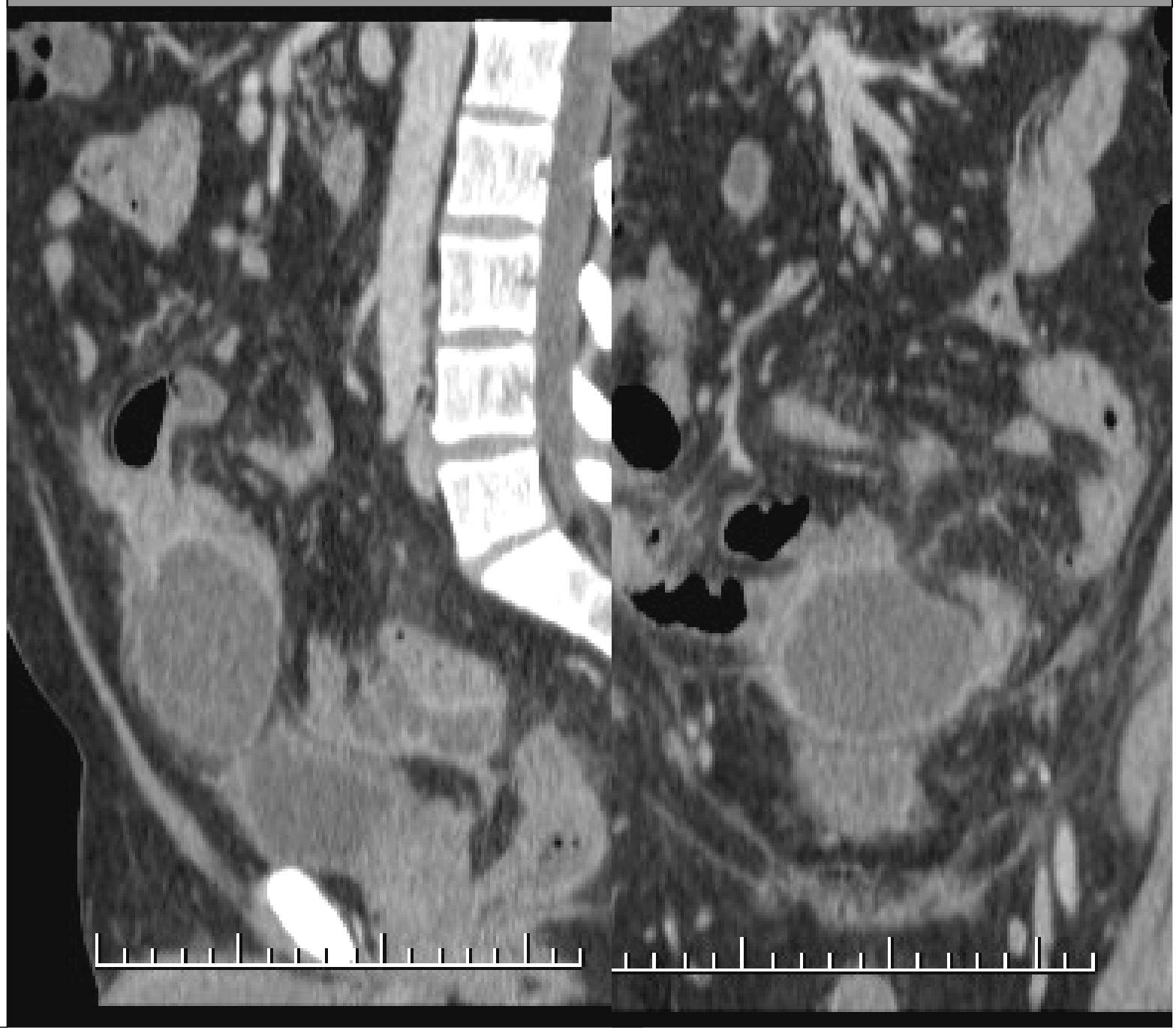
PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

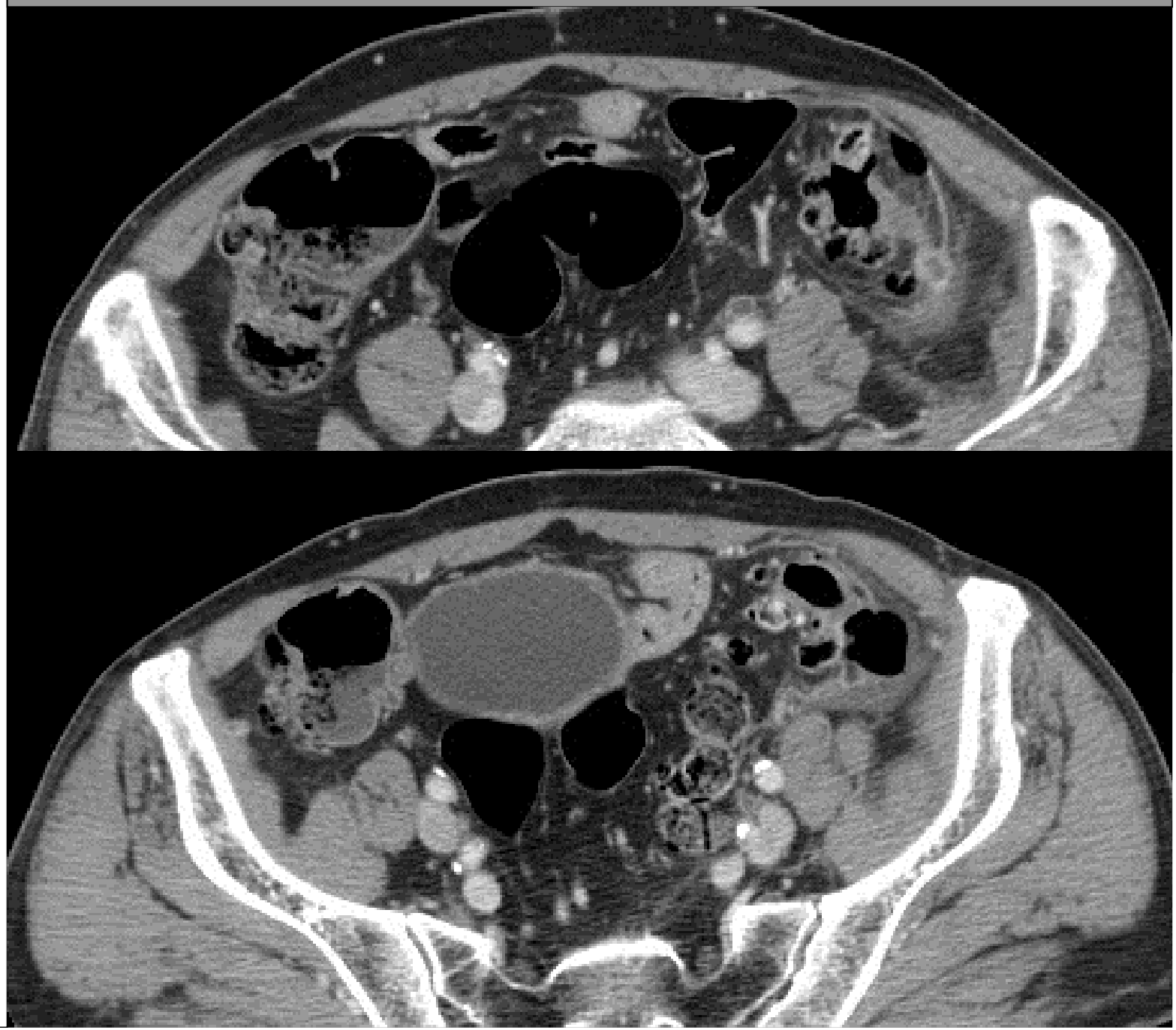
Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

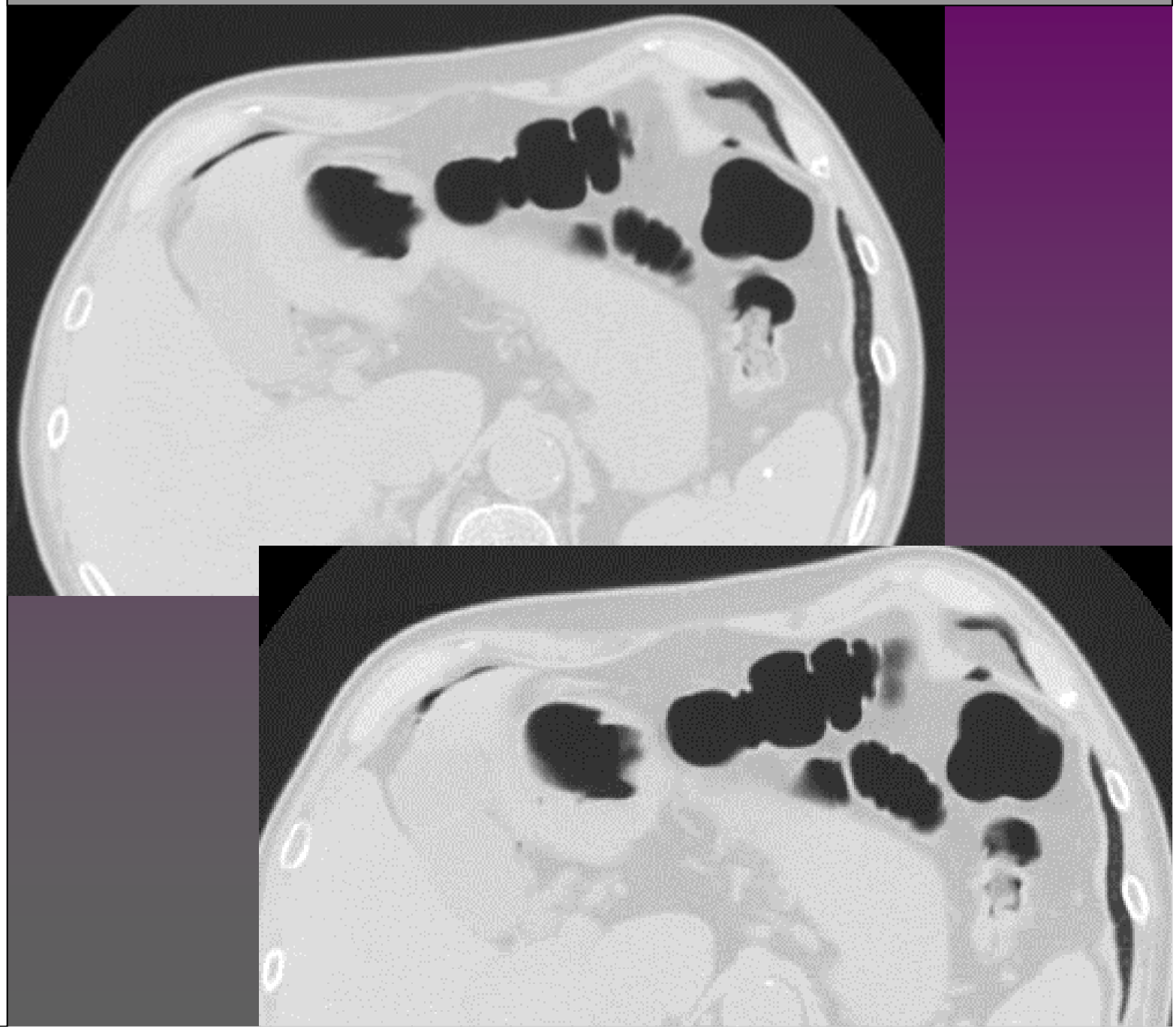
Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

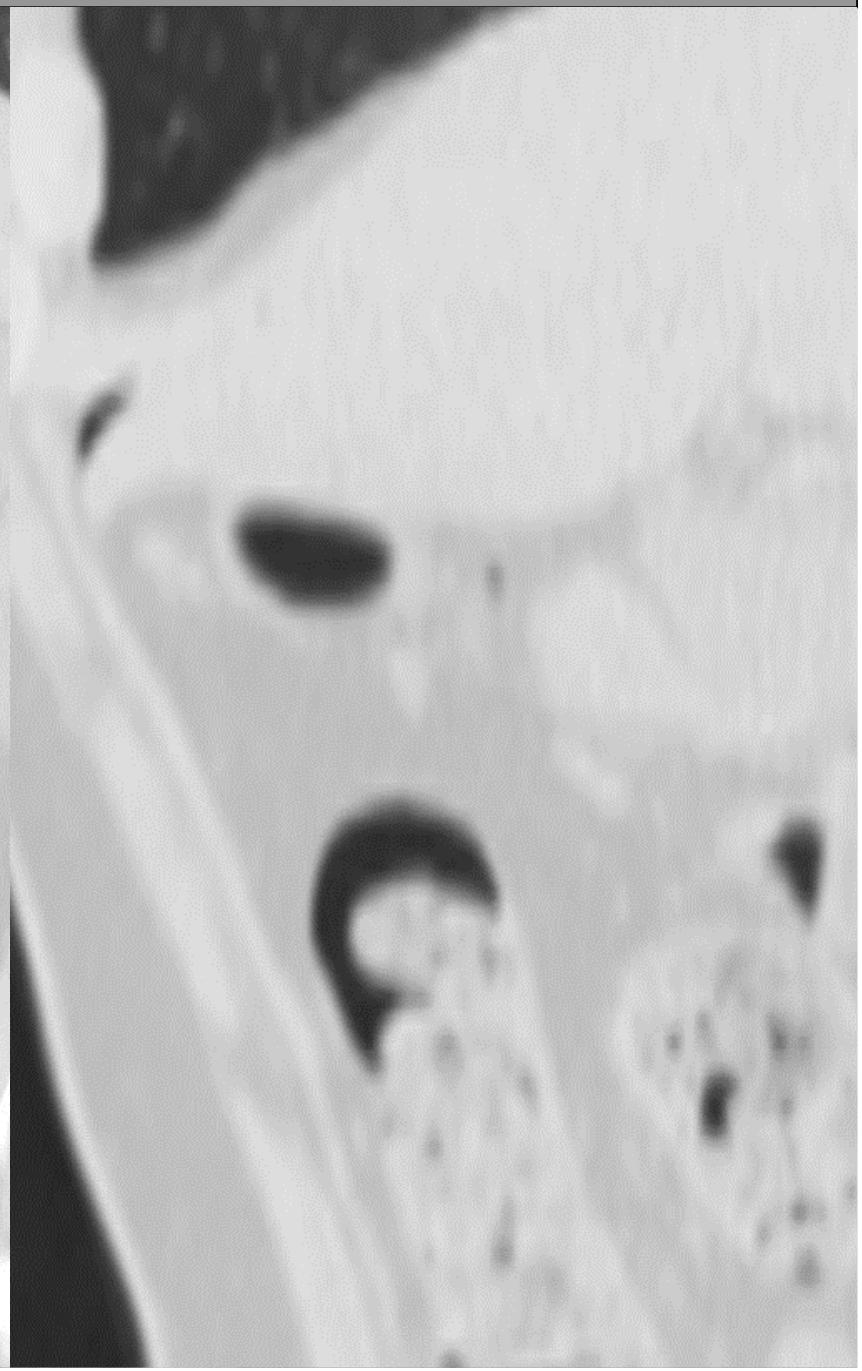
Malattia diverticolare del colon



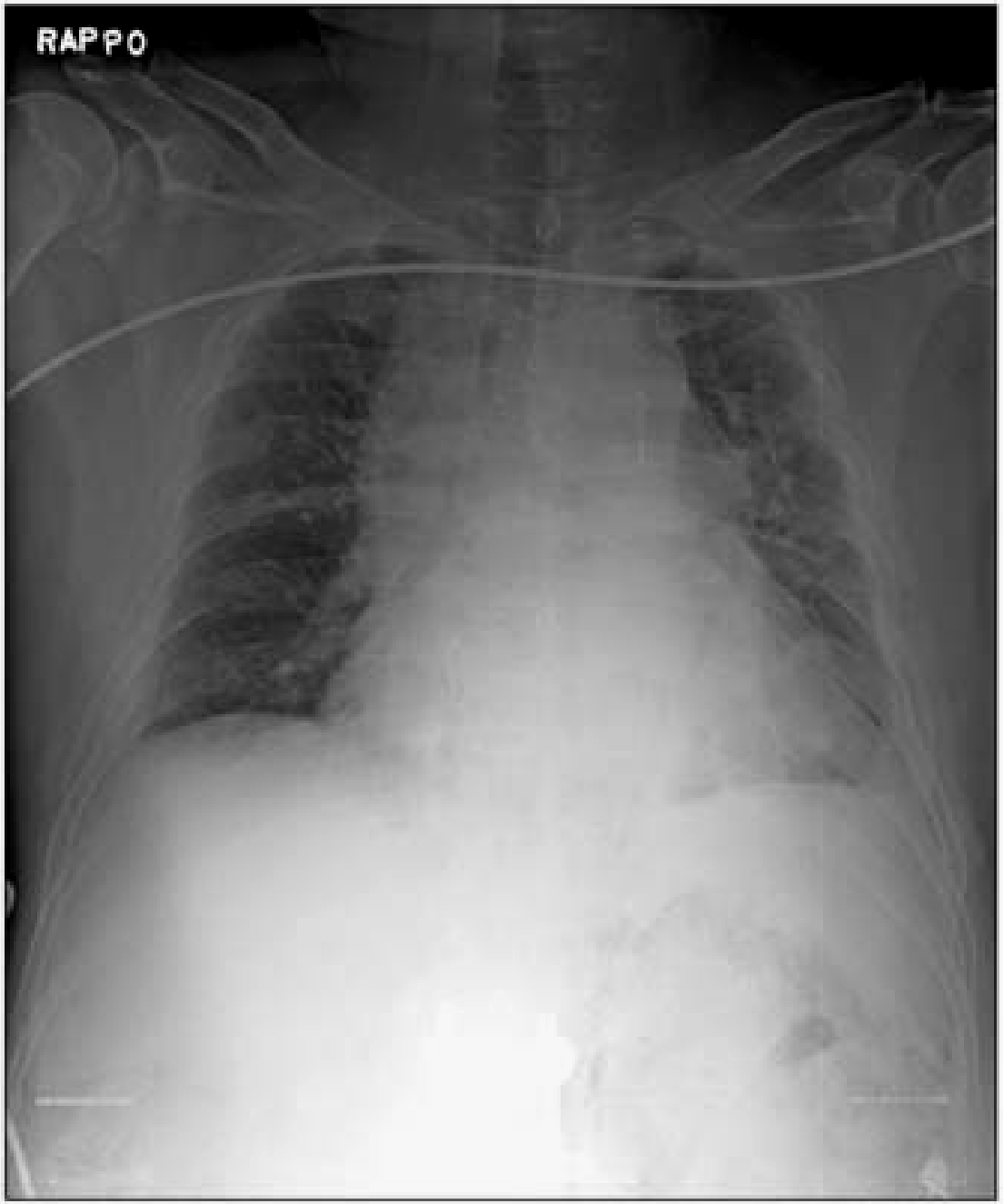
Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon

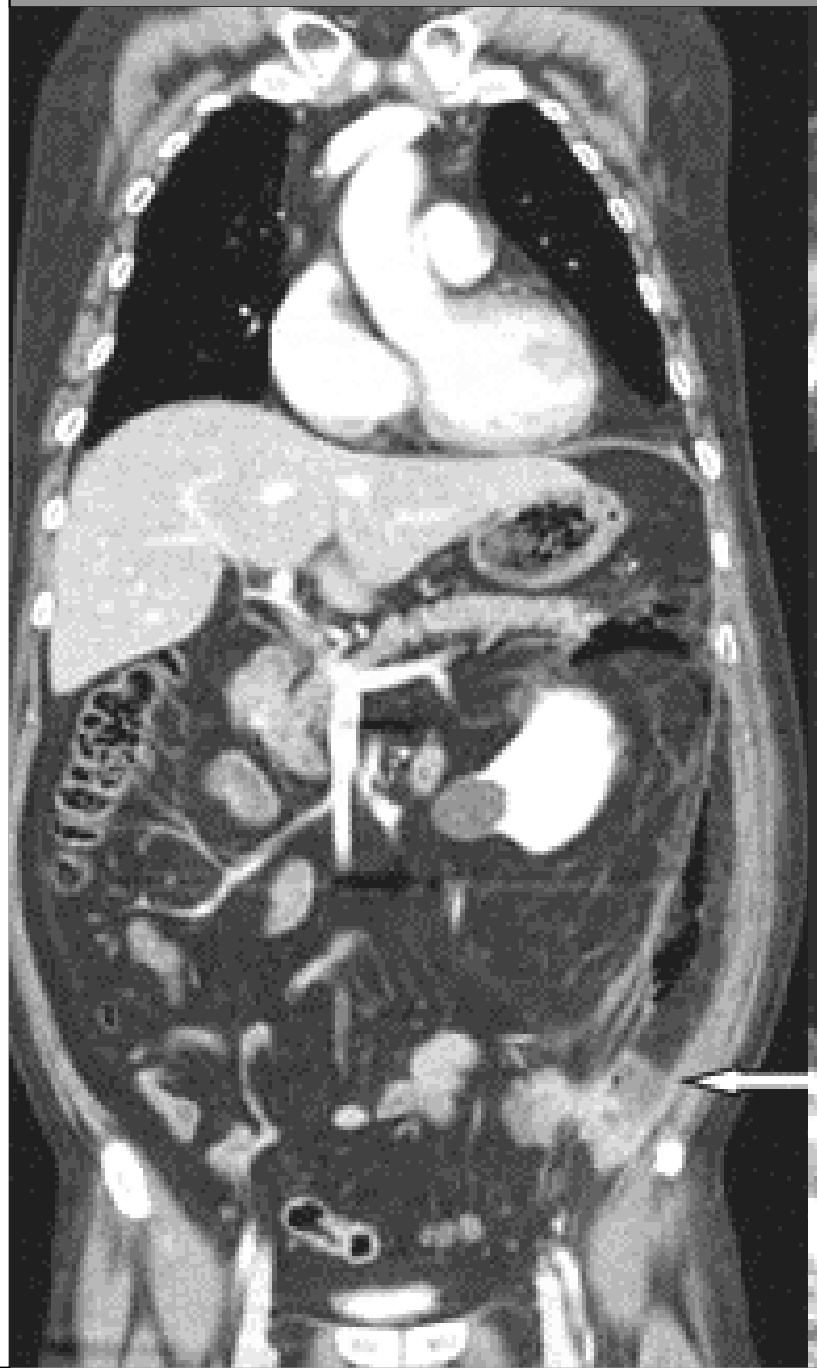


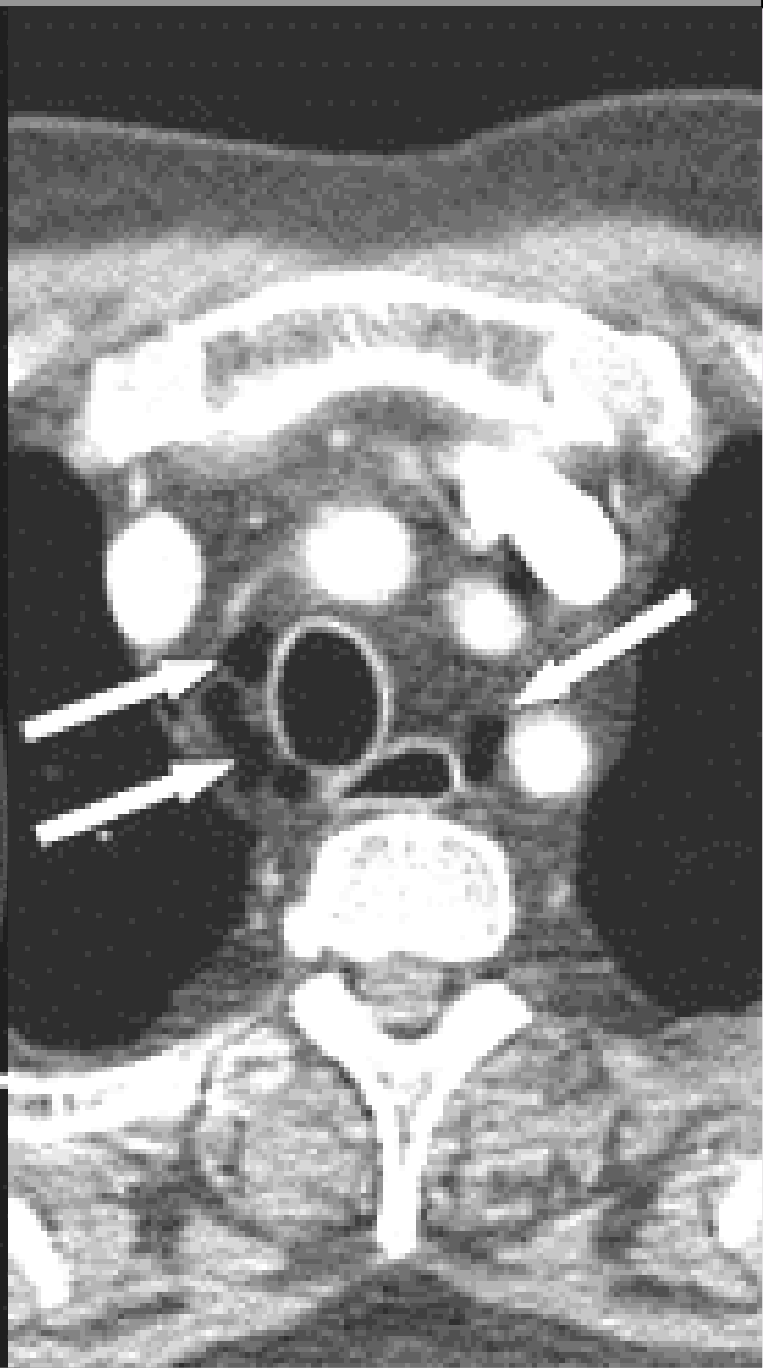
Società Medico Chirurgica di Ferrara


RAPPO

PM. Cervi - FE

Malattia diverticolare del colon





Società Medico Chirurgica di Ferrara

Interestingly, there is a unique predilection for diverticular disease of the colon in Western and Asian populations, and is predominant in the left colon in Caucasians, while much more common in the right colon in Asians

Image-guided conservative management of right colonic diverticulitis

Sun Jin Park, Sung Il Choi, Suk Hwan Lee, and Kil Yeon Lee

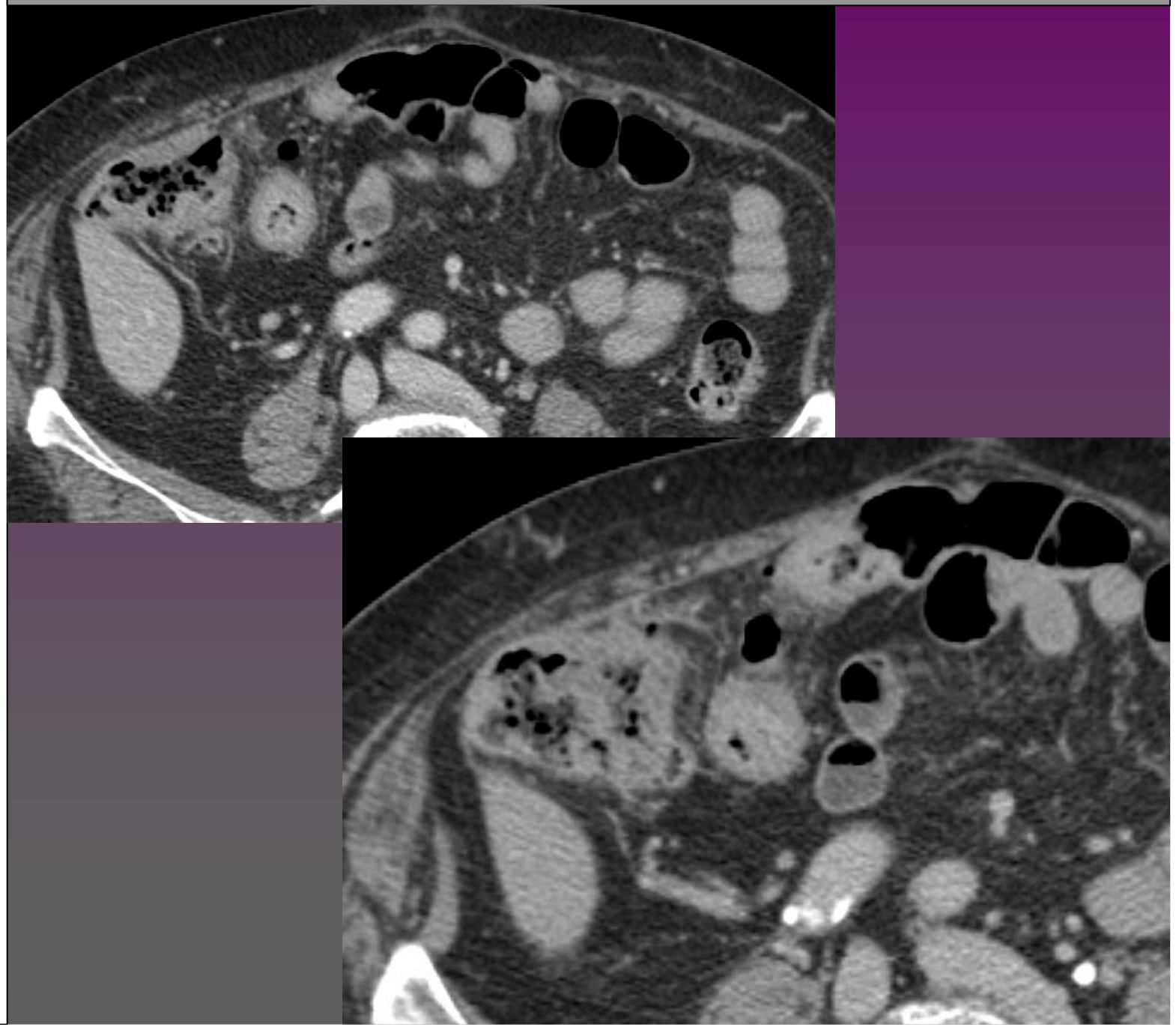
World J Gastroenterol. **2009 December 14; 15(46): 5838–5842**

CT findings in right colonic diverticulitis are similar to other areas of the colon , with colon wall thickening and pericolonic fat stranding seen in all patients on one prospective study

Imaging Update: Acute Colonic Diverticulitis
Kristen K. DeStigter, David P. Keating
***Clin Colon Rectal Surg.* 2009 August; 22(3): 147–155**

PM. Cervi - FE

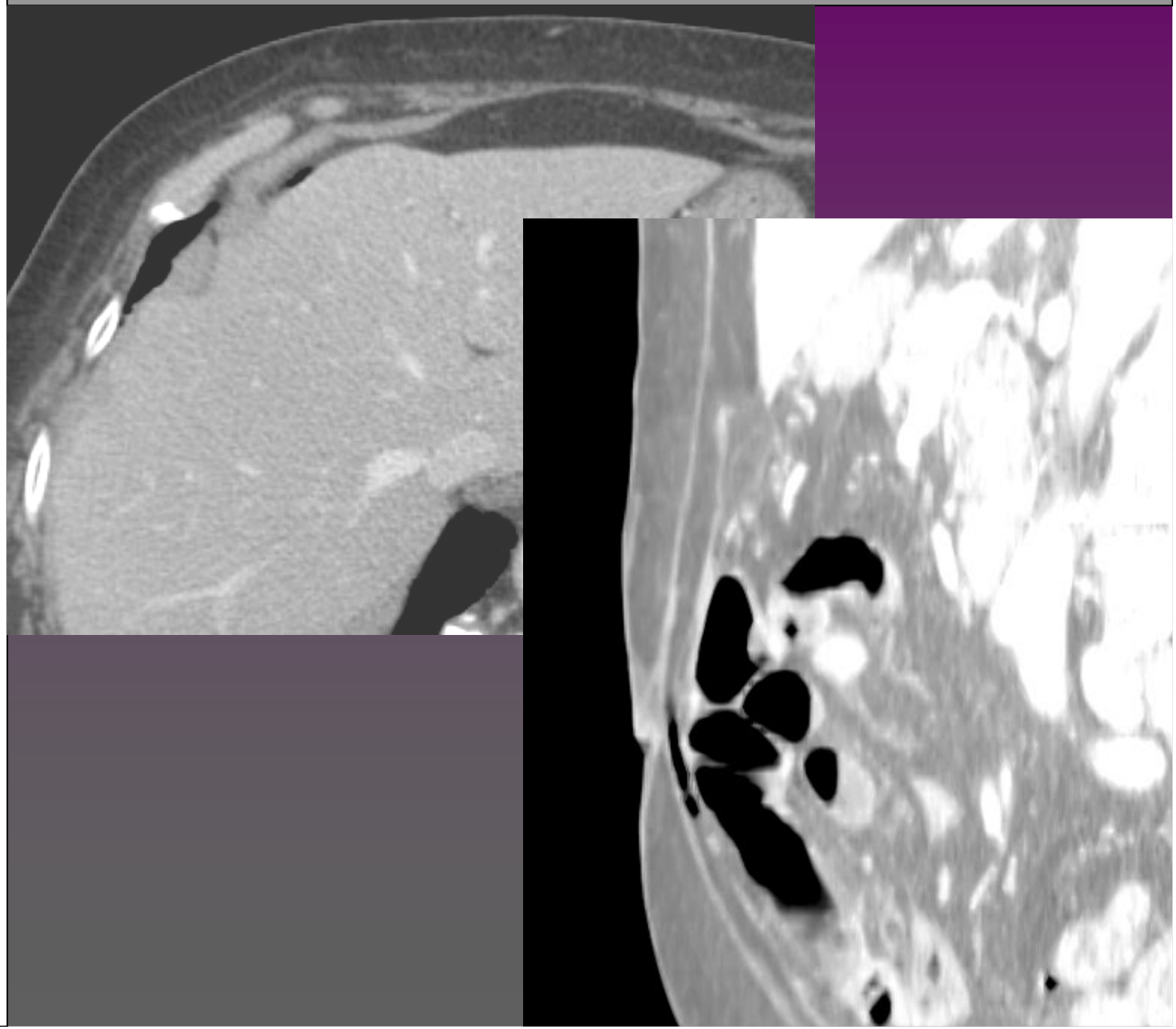
Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon



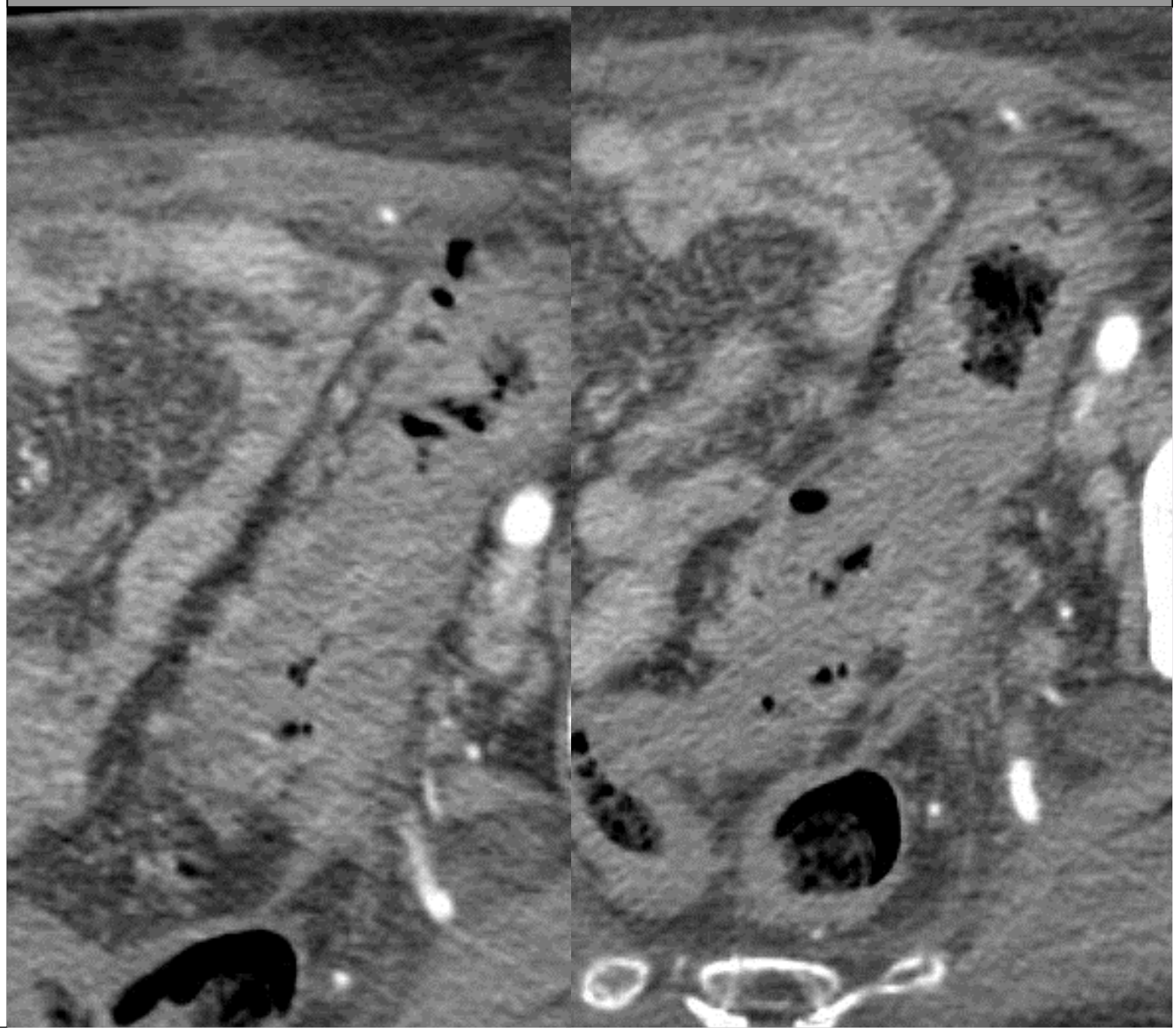
Società Medico Chirurgica di Ferrara

OTHER COMPLICATIONS

- Bowel obstruction
- Acute bleeding
- Hepatic abscess
- Fistula

PM. Cervi - FE

Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

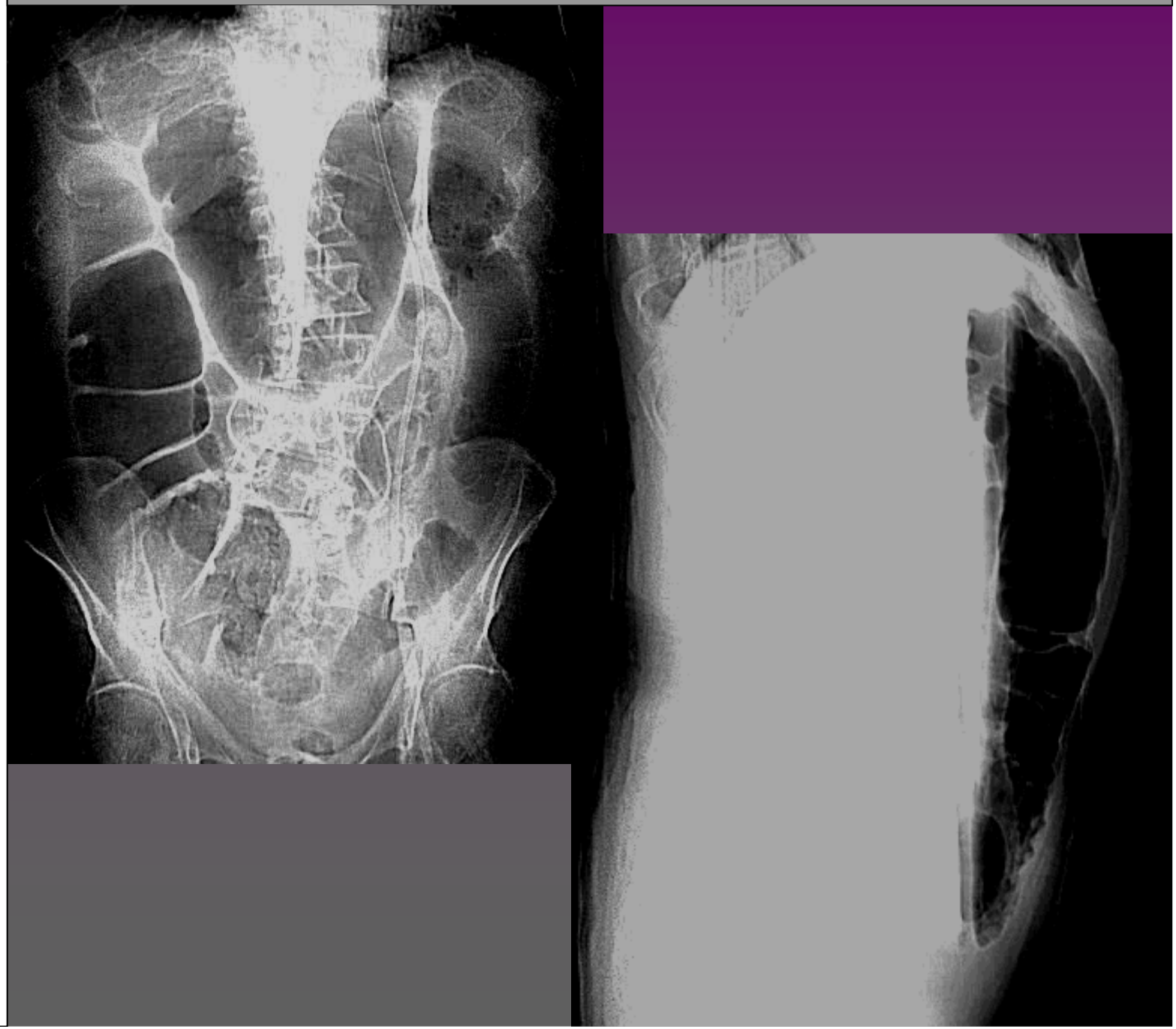
PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

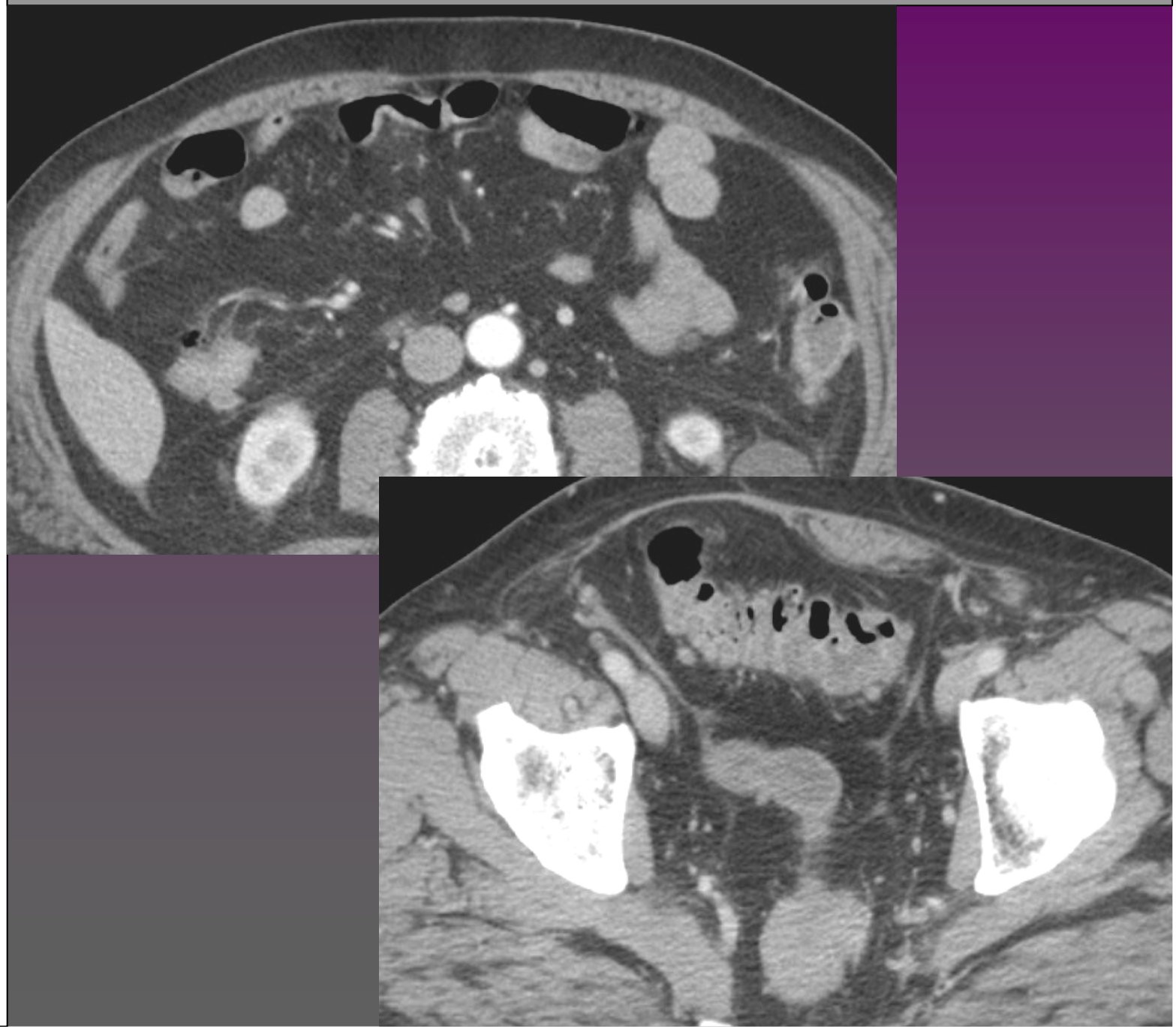
PM. Cervi - FE

Malattia diverticolare del colon

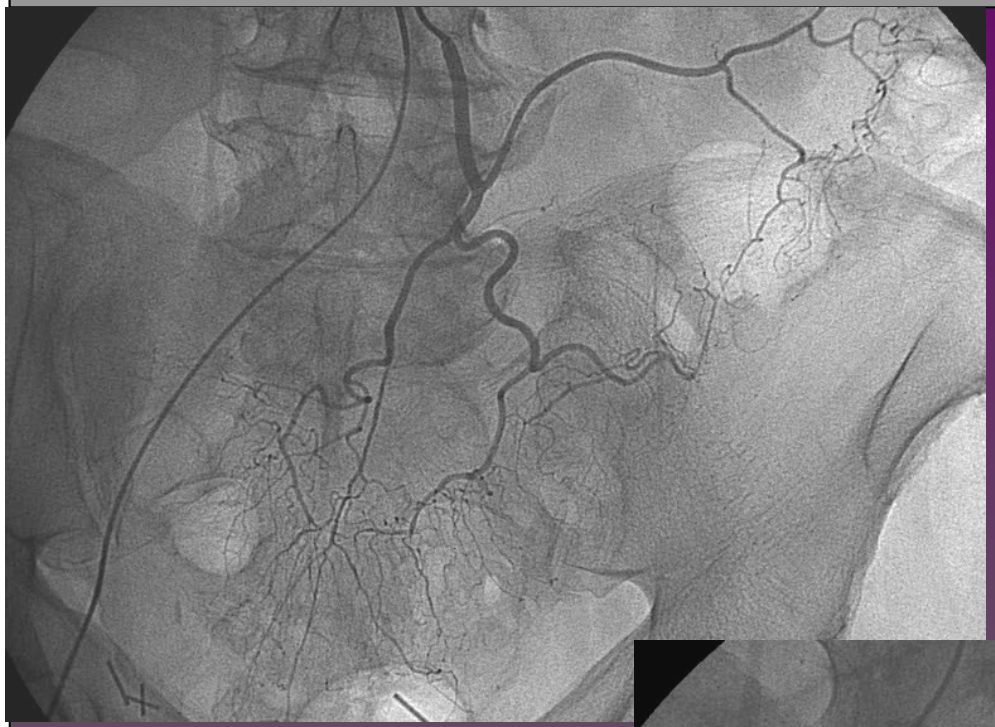
Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon



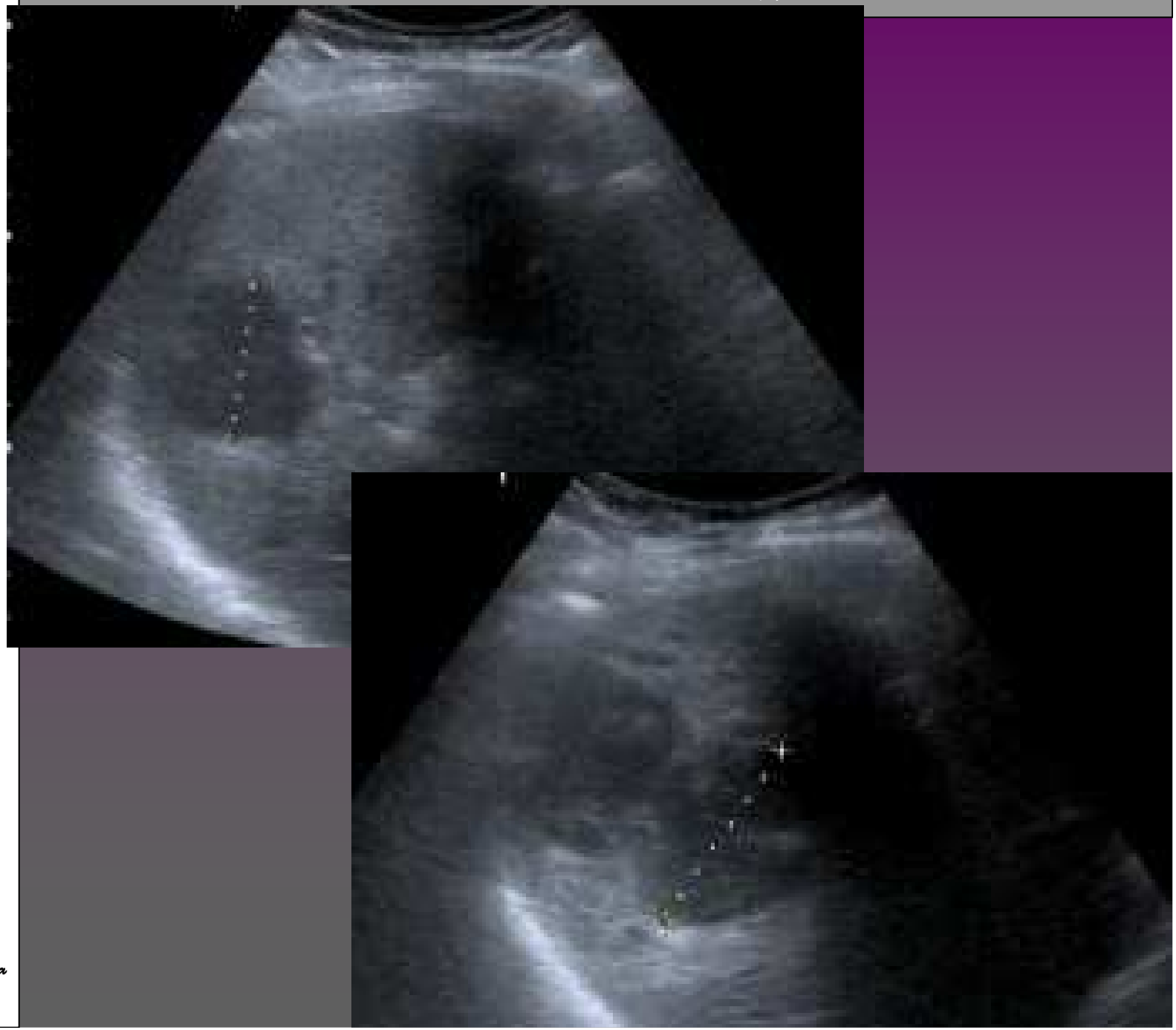
Società Medico Chirurgica di Ferrara



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

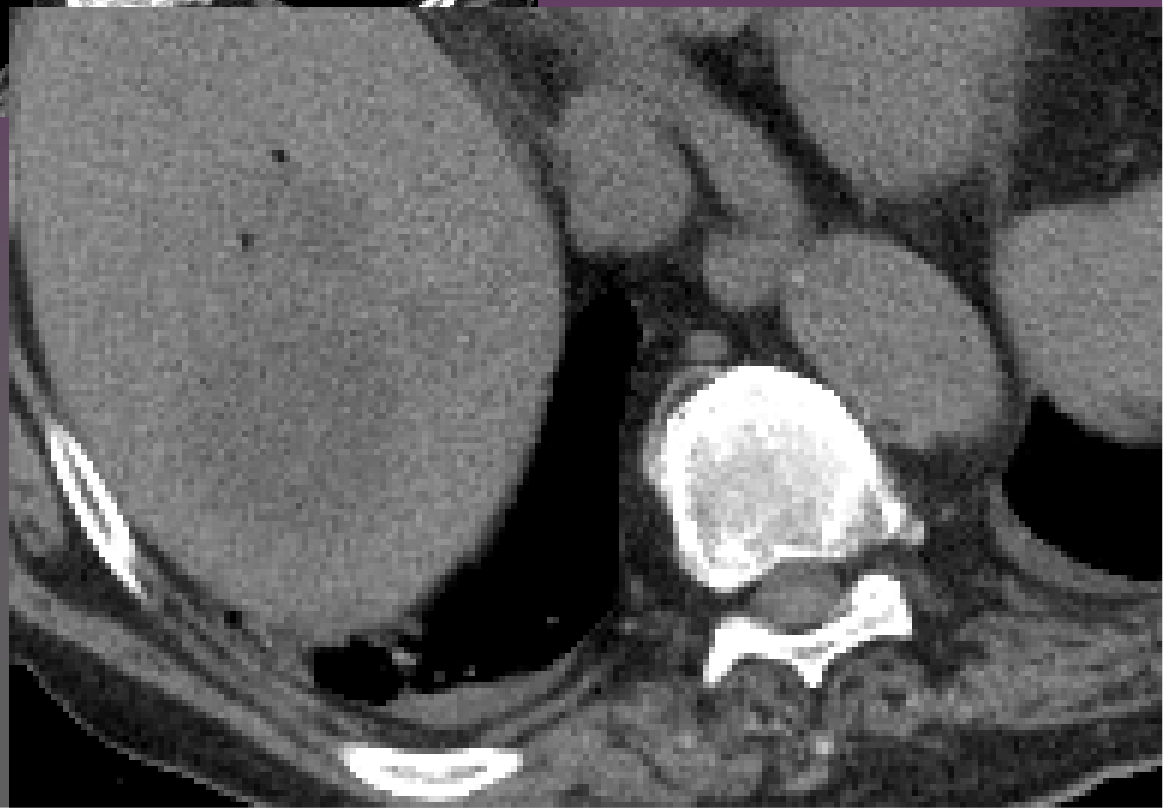
Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

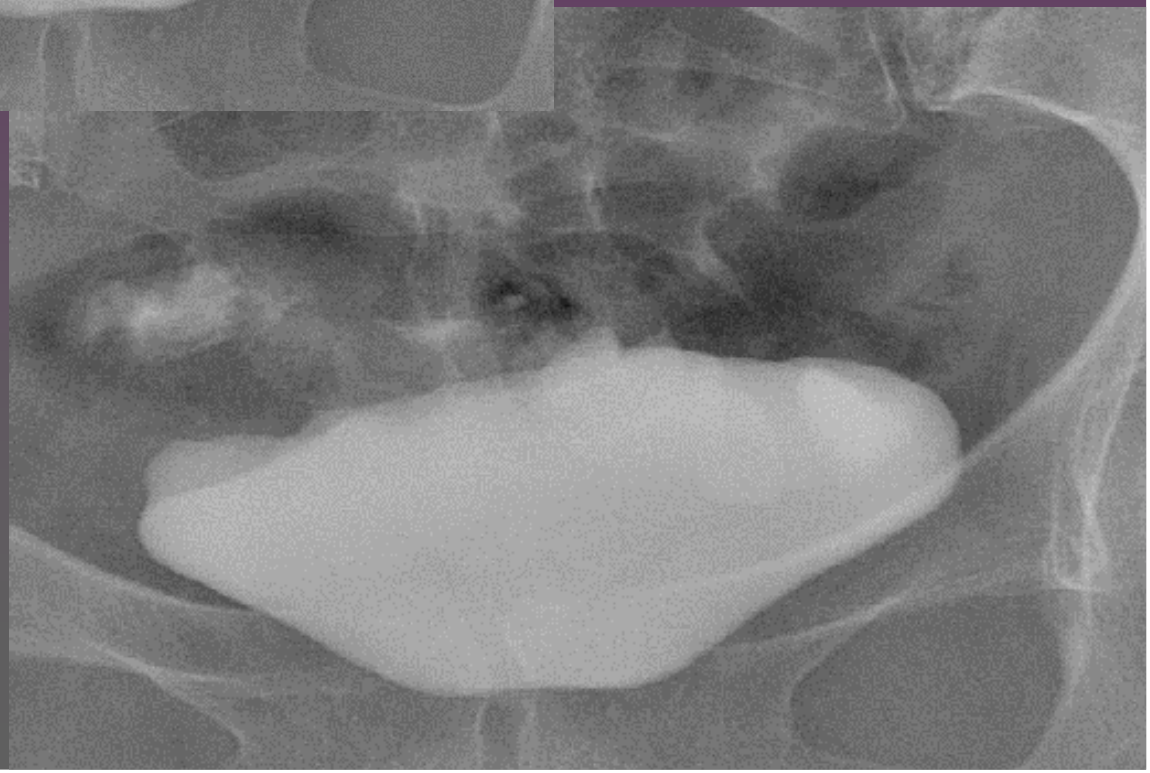
Malattia diverticolare del colon



Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon



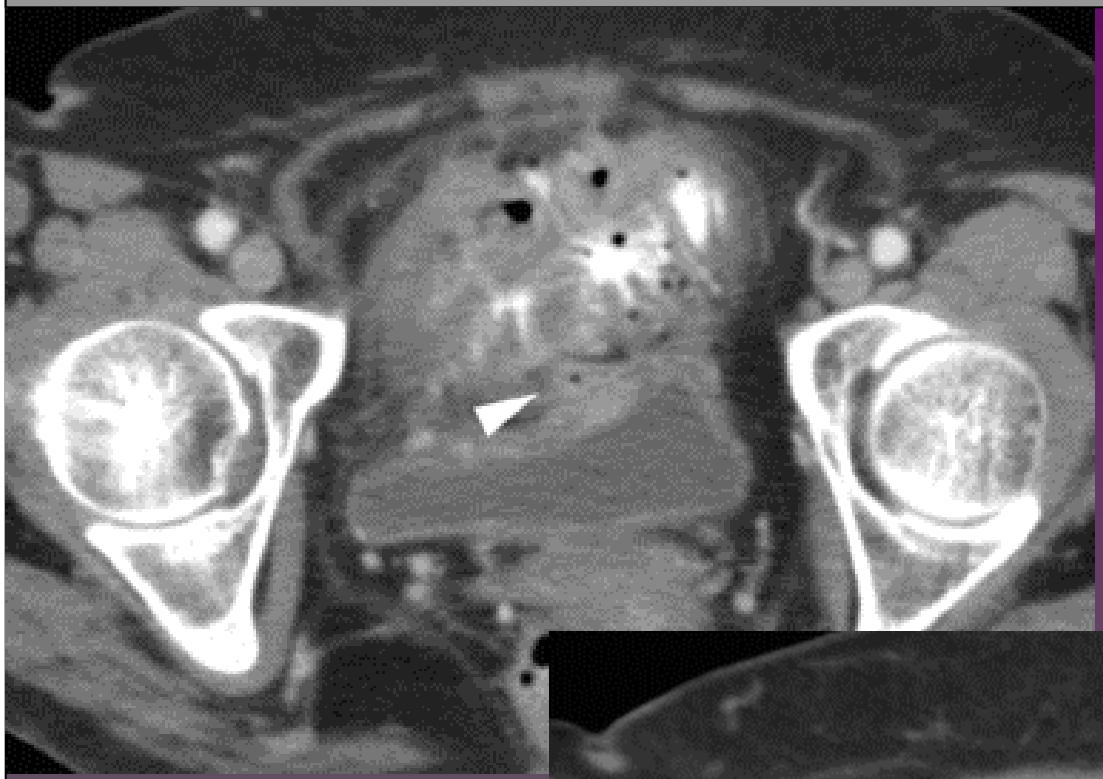
Società Medico Chirurgica di Ferrara

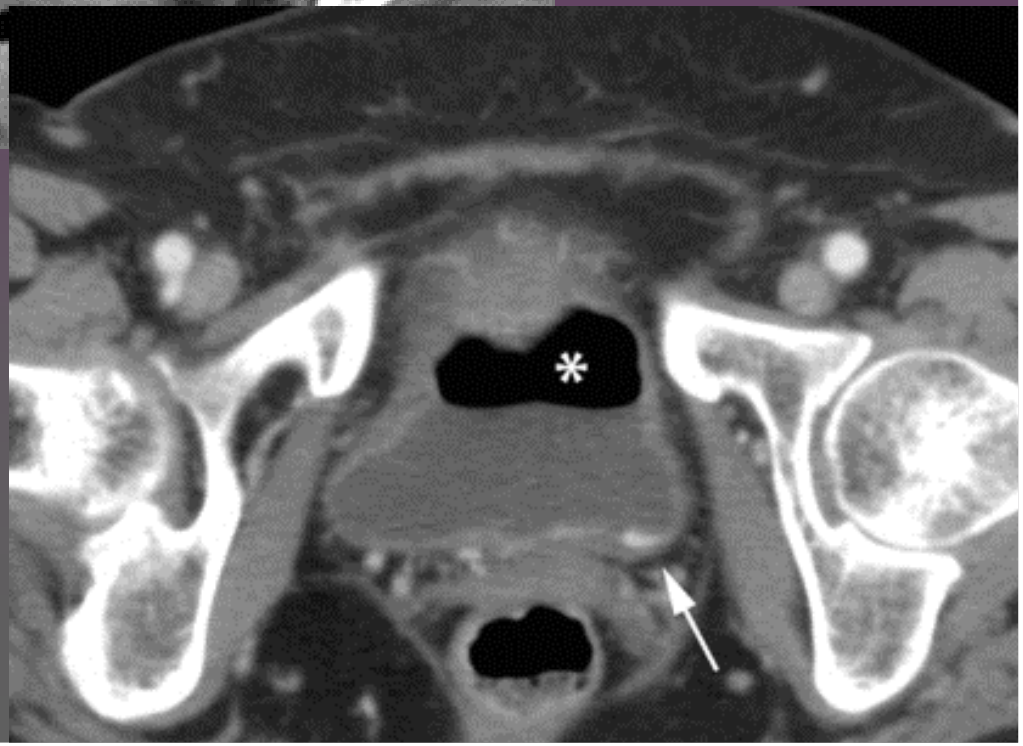
PM. Cervi - FE

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon





Società Medico Chirurgica di Ferrara

Computed tomography (CT) is recommended as the initial radiologic examination
It has high sensitivity (93-97%) and specificity approaching 100% for the diagnosis and it allows delineation of the extent of the disease process

Diverticulitis
Danny O. Jacobs, M.D., M.P.H.
N ENGL J MED 2007; 357:2057-2066

What is the question ?

Ionizing radiation exposure

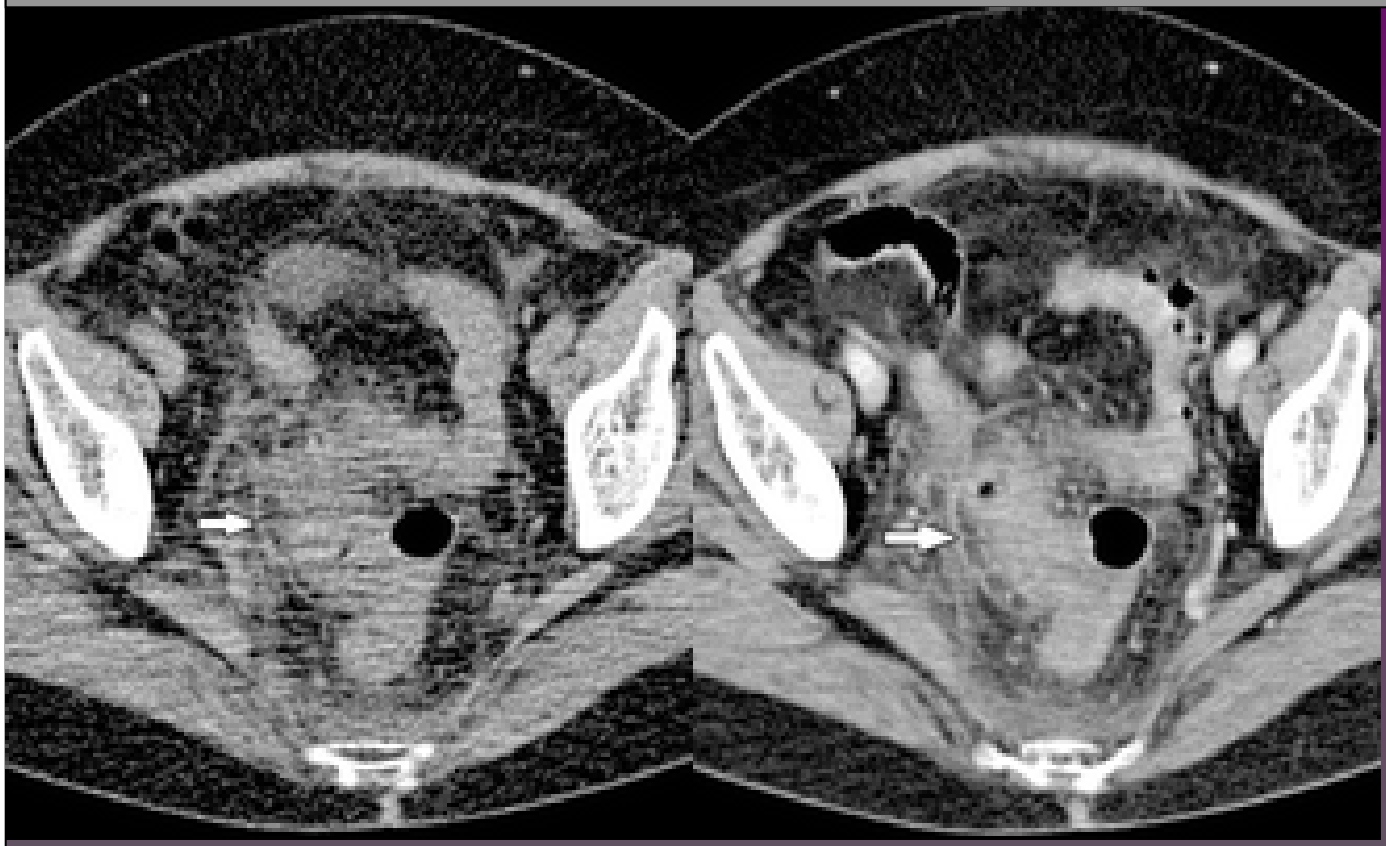
RESULTS: No significant difference was observed in sensitivity or in specificity for any sign or overall diagnosis between radiation doses by all readers, except wall thickening, which for one reader had a higher specificity at low dose than at standard dose

Suspected Acute Colon Diverticulitis: Imaging with Low-Dose Unenhanced Multi–Detector Row CT
Denis Tack, MD, et al
October 2005 Radiology, 237, 189-196.

CONCLUSION: Low-dose unenhanced multi–detector row CT has a diagnostic performance similar to that of contrast-enhanced standard-dose multi–detector row CT in patients suspected of having acute diverticulitis

Suspected Acute Colon Diverticulitis: Imaging with Low-Dose Unenhanced Multi–Detector Row CT
Denis Tack, MD, et al
October 2005 Radiology, 237, 189-196.

Società Medico Chirurgica di Ferrara



(a) Unenhanced low-dose scan acquired at 30 mAs preset and (b) contrast-enhanced standard-dose scan acquired at 120 mAs preset show fat stranding (arrow) around the colon.

Suspected Acute Colon Diverticulitis: Imaging with Low-Dose Unenhanced Multi–Detector Row CT

Denis Tack, MD, et al

October 2005 Radiology, 237, 189-196.

Società Medico Chirurgica di Ferrara

CONCLUSIONS

What Imaging in Patients with Acute Left Lower-Quadrant Abdominal Pain ?

Patient age : < 50 years

Clinically : Acute left lower quadrant abdominal pain without sign of generalized peritonitis

Ultrasonography: Focal diverticulitis without or with local abscess (< 3 cm)

PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

PM. Cervi - FE

Malattia diverticolare del colon

Società Medico Chirurgica di Ferrara

Patient age : < 50 years

Clinically : Acute left lower quadrant abdominal pain without sign of generalized peritonitis

Ultrasonography: Focal diverticulitis without or with local abscess (< 3 cm)

MEDICAL MANAGEMENT

IN OTHER PATIENTS

LOW DOSE UNEHNANCED CT AND EVENTUALLY CONTRAST-ENHANCED STANDARD-DOSE CT

Effective dose in millisievert (mSv) for different radiograms reported to Swedish Radiation Protection Authority.

Radiograms	Effective dose (mSv)
Abdominal plain film	1.3
Standard dose CT abdomen	7.3
Low dose CT abdomen	4.2

Can low-dose abdominal CT replace abdominal plain film in evaluation of acute abdominal pain?
Olle Haller, Lars Karlsson, and Rickard Nyman
Ups J Med Sci. 2010 May; 115(2): 113–120.

	A: Diagnostic report	B: Report valuable but not diagnostic
APF	20% (17)	10% (9)
CT	50% (68)	18% (24)

Can low-dose abdominal CT replace abdominal plain film in evaluation of acute abdominal pain?
Olle Haller, Lars Karlsson, and Rickard Nyman
Ups J Med Sci. 2010 May; 115(2): 113–120.

Average calculated dose in millisievert (mSv) with original radiograms excluded and included (in parenthesis).

	A R 1 week	A R in admission	A R in 30 days	T A R in 30 days
APF	3.6 (4.9)	4.0 (5.4)	5.0 (6.3)	5.3 (6.7)
DCT	4.2 (8.5)	1.7 (9.0)	2.3 (9.5)	2.8 (10.1)
LDCT	1.2 (5.4)	1.3 (5.5)	1.9 (6.1)	2.0 (6.2)

Can low-dose abdominal CT replace abdominal plain film in evaluation of acute abdominal pain?
Olle Haller, Lars Karlsson, and Rickard Nyman
Ups J Med Sci. 2010 May; 115(2): 113–120.