Incontro Congiunto Sezioni SIRM
Radiologia Pediatrica
Radiologia Addominale e Gastroenterologica

Imaging Gastro-intestinale: L'adulto e il Bambino
Aula Magna AOU di Ferrara
4-5 Febbraio 2016

Patologia infiammatoria acuta

Roberto Rizzati, Stefano Leprotti

Radiologia Interaziendale

Azienda Ospedaliero Universitaria - FE

Direttore Dott. Giorgio Benea

PATOLOGIA INFIAMMATORIA ACUTA

CAUSE:

- IBD (morbo di Crohn, RCU)
- Infettiva
- Vascolare
- Tiflite
- Diverticolite
- Appendagite epiploica
- Infarto omentale
- Appendicite
- Altre (attinica, graft versus host disease,…)

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EZIOLOGIA INFETTIVA

- **BATTERICA** (*Clostridium difficile*, *Shigella*, *Salmonella*, *Yersinia*, *Campylobacter*, *Staphylococcus*, *Chlamydia trachomatis*…)
- **VIRALE** (*HPV, CMV, rotavirus..)*
- **MICOTICA** (*istoplasmosi, mucormicosi, actinomicosi,...)*
- **DA PROTOZOI** (*amebiasi*, *Giardia intestinalis*, **…**)

COLITE PSEUDOMEMBRANOSA

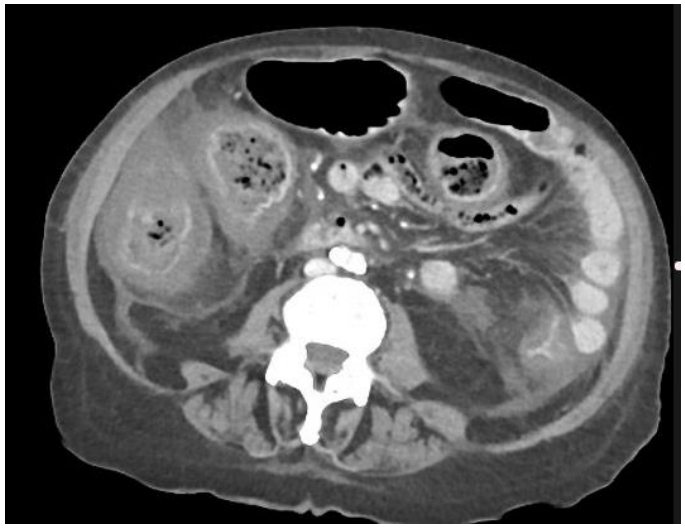
CAUSA:
Clostridium difficile (spesso in seguito a T. antibiotica)

CLINICA:
Dolore, febbre, diarrea acquosa, muco o pus nelle feci

IMAGING TC:

- Ispessimento parietale e dilatazione delle anse,
- generalmente coinvolto anche il retto.
- “Pseudomembrane”
- Possibile ascite

COLITE PSEUDOMEMBRANOSA



PATOLOGIA INFIAMMATORIA ACUTA

CAUSE:

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- Appendicite
- Appendagite epiploica
- Infarto omentale

TIFLITE

(Colite neutropenica)

- Condizione infiammatoria necrotizzante che coinvolge tipicamente il cieco

- Può estendersi al colon acendente o all'ileo terminale

TIFLITE

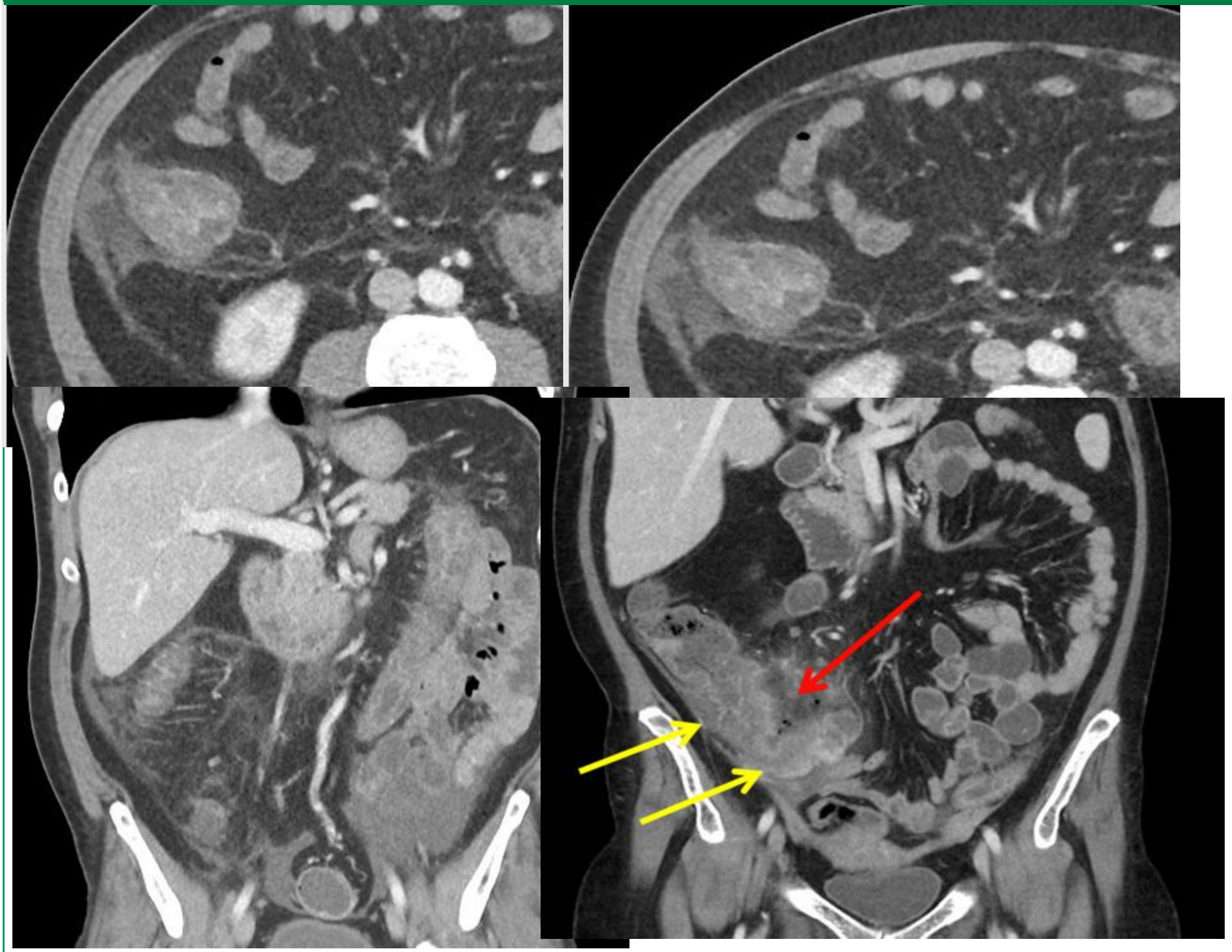
BACKGROUND:
Immunodepressione, chemioterapia, terapia steroidea.
Pz con leucemia, linfoma, anemia aplastica o AIDS

EZIOLOGIA:
Eziologia sconosciuta, probabilmente causata dalla combinazione di ischemia, infezione, emorragia mucosa

CLINICA:
Dolore e distensione addominale, febbre, nausea e diarrea

IMAGING:
Edema del cieco, ispessimento del grasso mesenteriale, pneumatosi intestinale; possibile occlusione del piccolo intestino

TIFLITE



PATOLOGIA INFIAMMATORIA ACUTA

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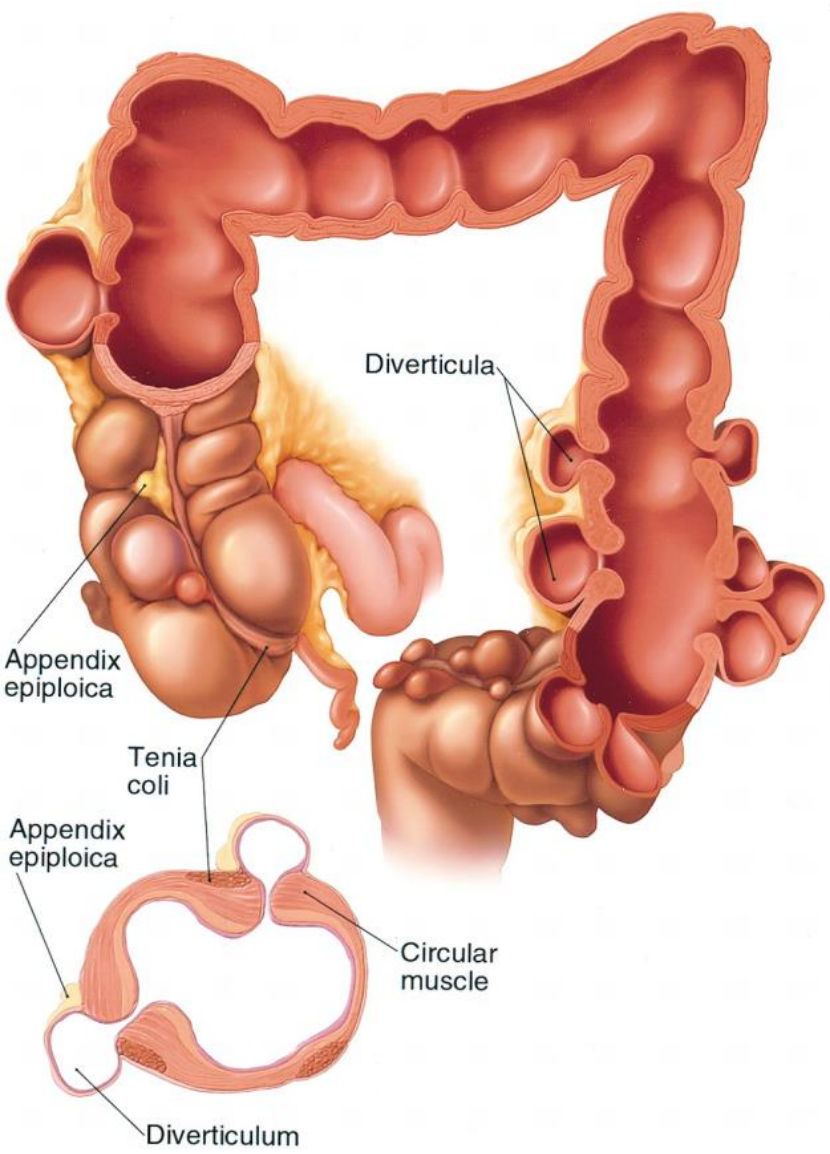
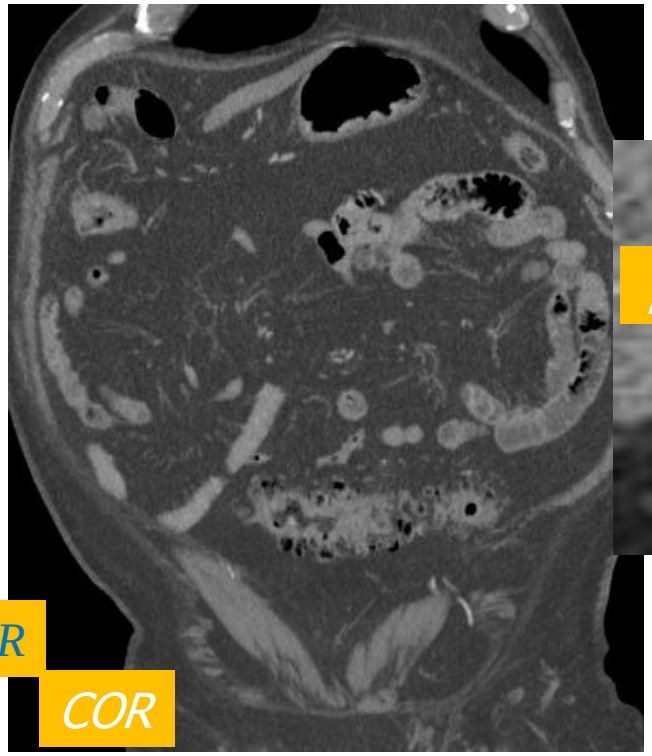
Diverticolite

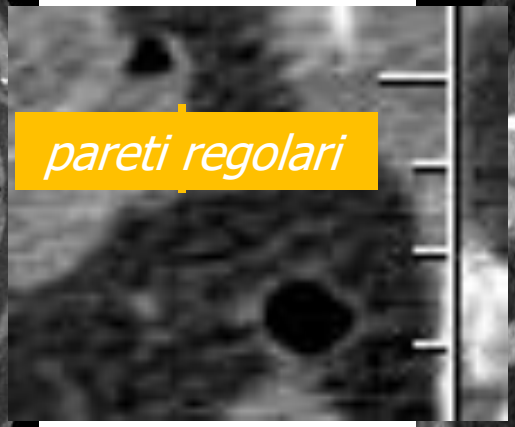
SEVERITY	COMMON CAUSE OF PERITONITIS	MORTALITY RATE
MILD	Appendicitis Perforated gastroduodenal ulcers Acute salpingitis	< 10%
MODERATE	Diverticulitis (localized perforations) Non-vascular small bowel perforation Gangrenous cholecystitis	< 20%
SEVERE	Large bowel perforation Ischemic small bowel injuries Postoperative complications	20-80%

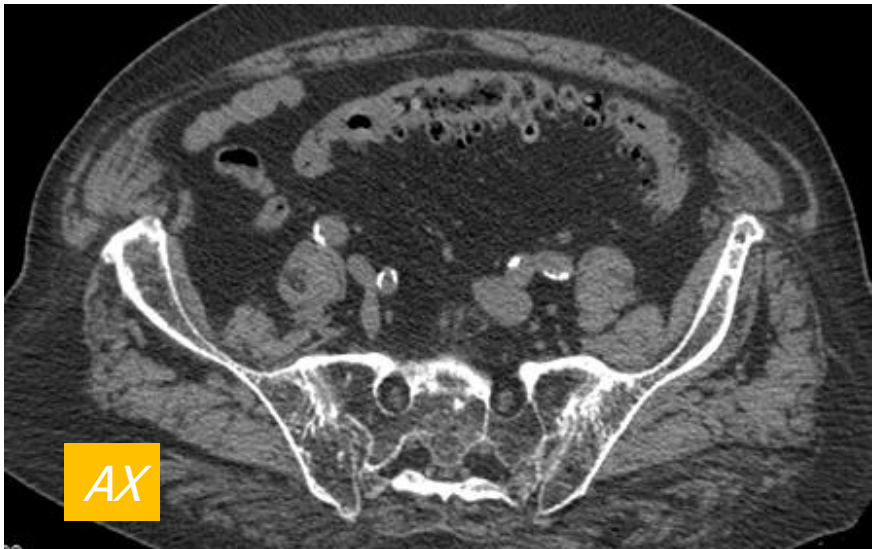
Diverticolosi



Diverticolosi







Diverticolite acuta

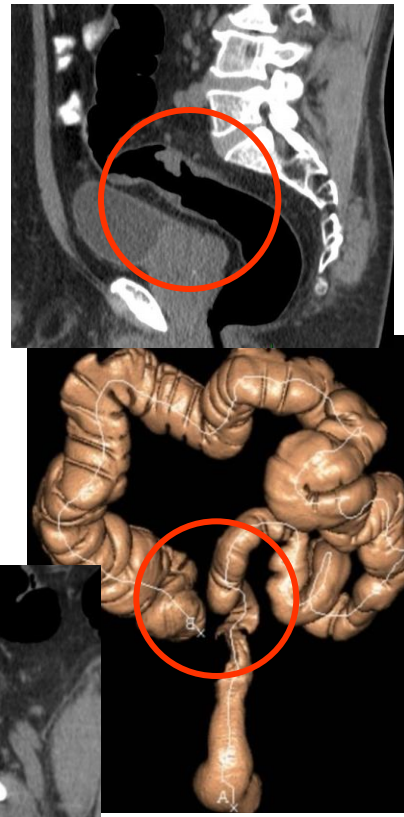
- Rx Addome
- Ecografia
- DCBE
- TC

Diagnostica per Immagini:

- ❖ confermare la diagnosi
- ❖ valutare l'estensione
- ❖ rilevare eventuali complicanze

D.D. of Acute Diverticulitis

- ❖ Irritable bowel syndrome
- ❖ Gastroenteritis
- ❖ Cholecystitis
- ❖ Bowel obstruction
- ❖ Appendicitis
- ❖ Ischemic colitis
- ❖ Colorectal cancer
- ❖ Urologic disorders
- ❖ Gynecologic disorders



Greenall MJ Gastrointest Radiol 1983

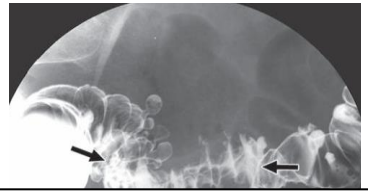
Rx Addome diretto

Utilità molto limitata

- sensibile per le complicanze (pneumoperitoneo, ostruzione) ma aspecifico

DCBE (Clisma)

- **Sensibilità** 59%-90% nella diagnosi di diverticolite del sigma. NON IN ACUTO
- Nessuna informazione su:
- Flogosi circostante, ascessi, patologie correlate



Johnson CD et al.Diagnosis of acute colonic diverticulitis: comparison of barium enema and CT. *AJR* 1987.

Ecografia

US con compressione graduata

- **Sensibilità** 77%-98% e specificità di 80%-99% nella diagnosi di diverticolite.
- Poco utilizzata e con scarsa diffusione in letteratura.
- Limitata in pz. obesi

Yacoe ME, Jeffrey RB, Jr. Sonography of appendicitis and diverticulitis. *Radiol Clin North Am* 1994; 32(5):899-912.
Am Fam P. **2010 Oct 1;82(7):766-70.**
Left lower-quadrant pain: guidelines from the American College of Radiology appropriateness criteria.
Hammond NA, Nikolaidis P, Miller FH.
Eur Radiol. 2011 Mar 2. [Epub ahead of print]
A comparison of the Accuracy of Ultrasound and Computed Tomography in common diagnoses causing acute abdominal pain.
van Randen A Et al

Double Contrast Barium Enema (DCBE)

Double contrast barium enema: Technique, indications, results and limitations of a conventional imaging methodology in the MDCT virtual endoscopy era.

Eur J Radiol. 2006

Rollandi GA, Biscaldi E, Decicco E.

"..the main limit of DCBE is that it considers the patology only from the mucosal surface..."

"..diagnostic result *cannot compete* with the new ct multislice techniques (CT enteroclysis and VC) which can examine both the lumen and the wall of the colon."

Sensitivity	DCBE	CT
Disease detection	92%	98% (p<0,01)
Abscesses	29%	100%

Ambrosetti et al 2000

Colonscopia Virtuale

(CT-Colonoscopy)

VC excels at diverticulosis staging

By Eric Barnes
AuntMinnie.com staff writer

Although virtual colonoscopy practice has always focused on adenoma detection and colon cancer prevention, the exam is proving to be formidable in the staging of diverticular disease, a scourge of fast-food Western nations that affects most of their citizens by age 60.

By Eric Barnes
AuntMinnie.com staff writer
September 22, 2009

RM ?

- Sensibilità **86-94%** Specificità **88-94%**
- Imaging simile a TC (complicanze e patologie associate)
- Risoluzione di contrasto superiore alla TC
- Assenza di Radiazioni
- Costi e tempi di esecuzione elevati
- No possibilità di posizionamento diretto di drenaggi

Heverhagen J et al. Pralospective evaluation of the value of magnetic resonance imaging in suspected acute sigmoid diverticulitis. Dis Colon Rectum. 2008

Ajaj et al magnetic resonance colonography in patients with suspected sigmoid diverticulitis: a feasibility study. Eur Radiol. 2005

Buckley O, et al. Pictorial review: magnetic resonance imaging of colonic diverticulitis. Eur Radiol. 2007

TC addome con mdc

Clinical Condition: Left Lower Quadrant Pain — Suspected Diverticulitis

Variant 1: Typical clinical presentation for diverticulitis, suspected complications or atypical presentations.

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis with contrast	9	For this procedure 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		O
MRI abdomen and pelvis without and with contrast	5	See statement regarding contrast in text under "Anticipated Exceptions."	O
X-ray contrast enema	4		☢☢☢
US abdomen transabdominal graded compression	4		O
X-ray abdomen and pelvis	4		☢☢☢
US pelvis transvaginal	2		O

Rating Scale: 1,2,3 Usually not appropriate; 4,5,6 May be appropriate; 7,8,9 Usually appropriate — *Relative Radiation Level

to
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these patients.

TC addome con mdc

Indagine di primo approccio nel sospetto di diverticolite

- Sensibilità **79-99%**
- Bilancio di estensione
- Indirizza il trattamento idoneo
- Guida per drenaggio percutaneo
- Diagnosi Differenziale con altre patologie

•Cho KC et al.Sigmoid diverticulitis: diagnostic role of CT--comparison with barium enema studies. *Radiology* 1990
•Kircher MF et al. Frequency, sensitivity, and specificity of individual signs of diverticulitis on thin-section helical CT with colonic contrast material: experience with 312 cases. AJR 2002
•Lohrmann C et al. CT in acute perforated sigmoid diverticulitis. Eur J Radiol 2005

Semeiotica TC

- **Pericolic fat-stranding (98%)**
- **Diverticula (84%)**
- **Wall thickening (70%)**
- **Abscess (47%)**
- **Free air (16%)**
- **Fistula (14%)**
- **Obstruction (12%)**
- **Ureteral obstruction (7%)**

Rogalla et al.

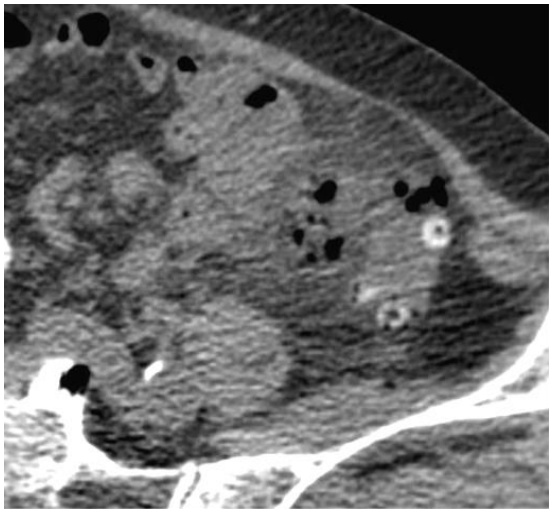


TABLE 1 Frequency, Sensitivity, and Specificity of Individual CT Signs of Diverticulitis

Presence of Sign	Bowel Wall Thickening	Fat Stranding	Diverticula	Fascial Thickening	Free Fluid	Inflamed Diverticulum
Sensitivity (%)	96	95	91	50	45	43
Specificity (%)	91	90	67	100	97	100
Positive predictive value (%)	86	85	62	100	89	100
Negative predictive value (%)	97	97	93	77	75	75

TABLE 2 Frequency, Sensitivity, and Specificity of Individual CT Signs of Diverticulitis

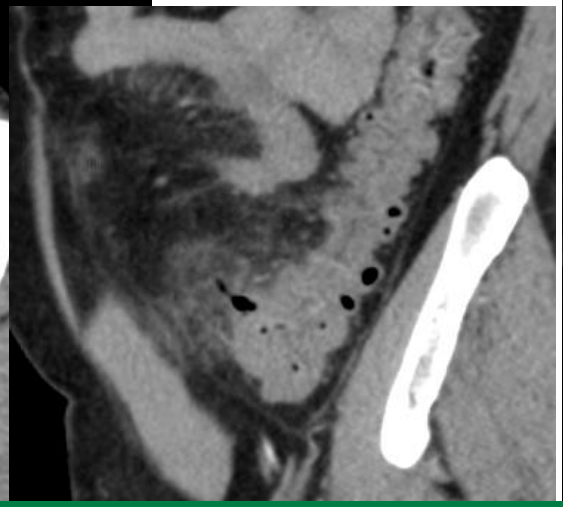
Presence of Sign	Free Air	Arrowhead Sign	Abscess	Phlegmon	Intramural Air	Intramural Sinus Tract	Overall Results
Sensitivity (%)	30	16	8	4	4	2	99
Specificity (%)	100	100	99	100	99	100	99
Positive predictive value (%)	100	100	90	100	83	100	99
Negative predictive value (%)	71	67	65	64	64	63	99

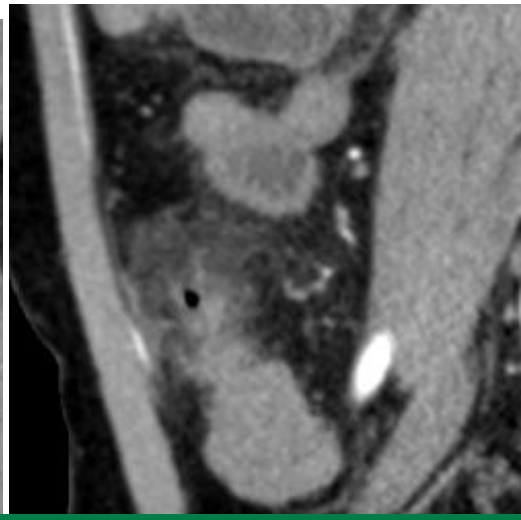
Frequency, Sensitivity, and Specificity of Individual Signs of Diverticulitis on Thin-Section Helical CT with Colonic Contrast Material: Experience with 312 Cases

Kircher et al.

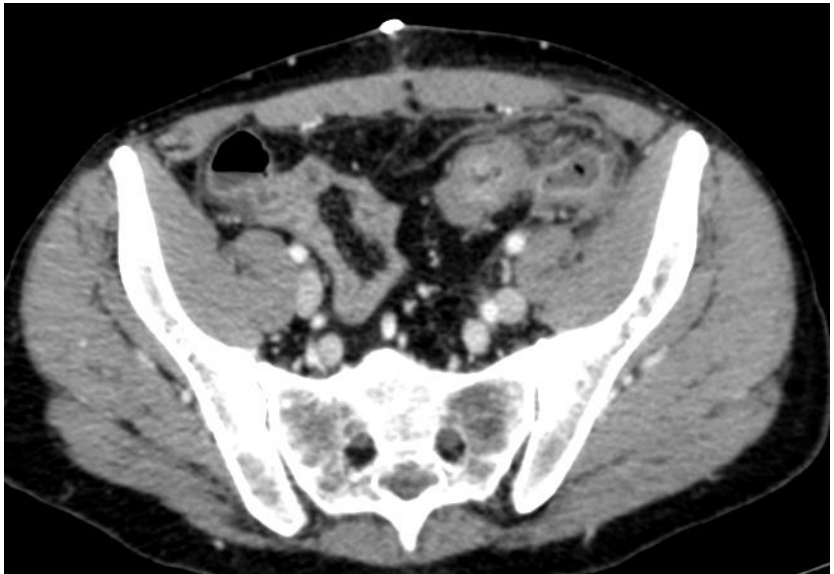
AJR:178, June 2002

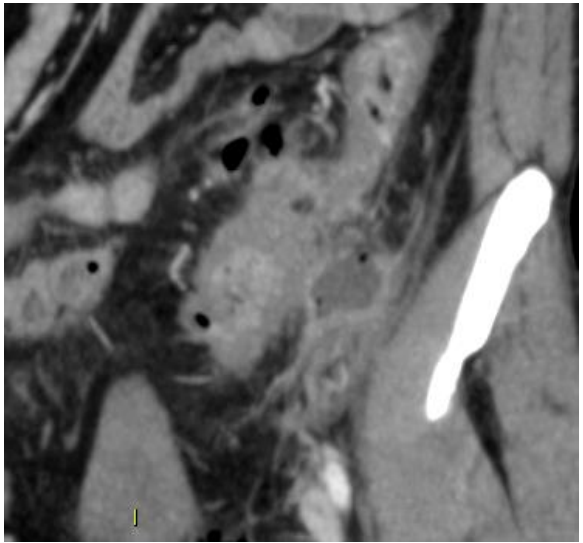
Maschio di 44 aa Blumberg ++ con dolore quadrante inferiore sn.

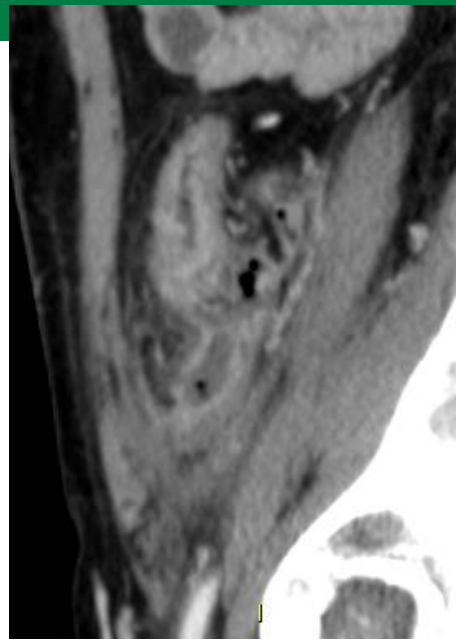




Febbricola persistente. Eco e TC a 10 giorni in corso di trattamento conservativo







Diverticolite acuta

Classification

Modified Hinchey Classification

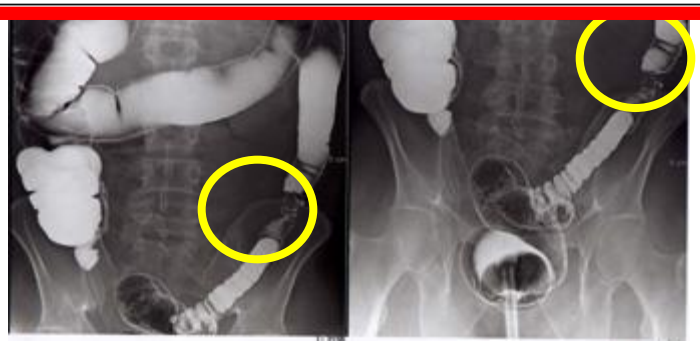
Current indications and role of surgery in the management of sigmoid diverticulitis.
Stocchi L.
World J Gastroenterol.

Table 1 Hinchey classification and its modifications

	Original Hinchey classification	Sher[10], Kohler modification[11]	Wasvary modification[33]	Kaiser modification[71]
Stage I	Pericolic abscess confined by the mesentery of the colon	Pericolic abscess	I a phlegmon	I a confined pericolic inflammation-phlegmon

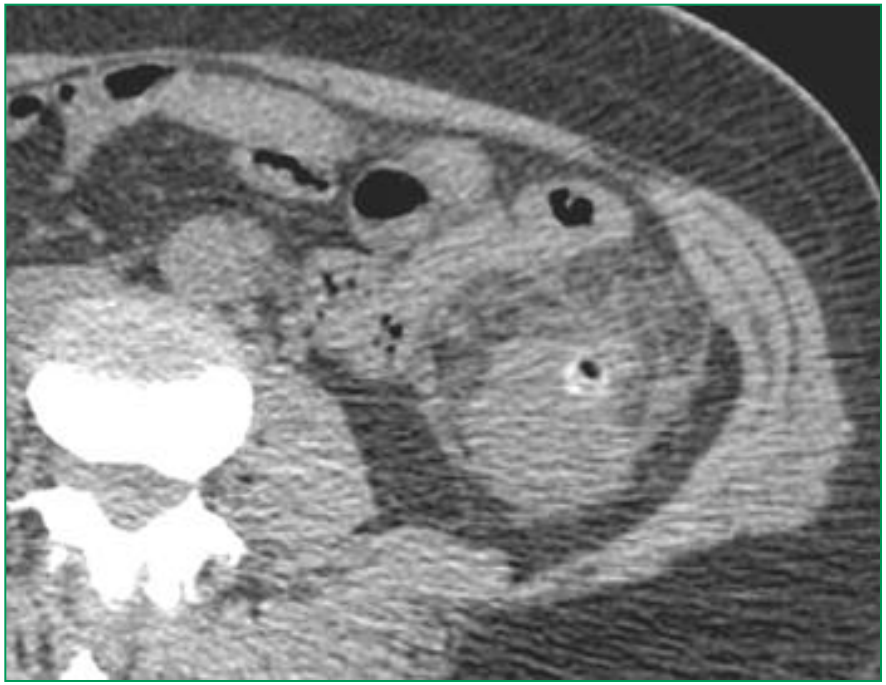
Modified Hinchey classification		Accompanying CT findings
Stage 0	clinically mild diverticulitis	diverticula with or without wall thickening of the colon
Stage Ia	confined pericolic inflammation and phlegmonous inflammation	colonic wall thickening with inflammatory reaction in pericolic fatty tissue
Stage Ib	abscess formation (<5 cm) in the proximity of the primary inflammatory process	alterations as stage Ia + pericolic or mesocolic abscess formation
Stage II	intra-abdominal abscess, pelvic or retroperitoneal abscess, abscess distant from the primary inflammatory process	alteration as stage Ia + distant abscess formation (mostly pelvic or interloop abscesses)
Stage III	generalized purulent peritonitis	free air with local or generalized free fluid and possible thickening of the peritoneum
Stage IV	fecal peritonitis	similar findings to stage III

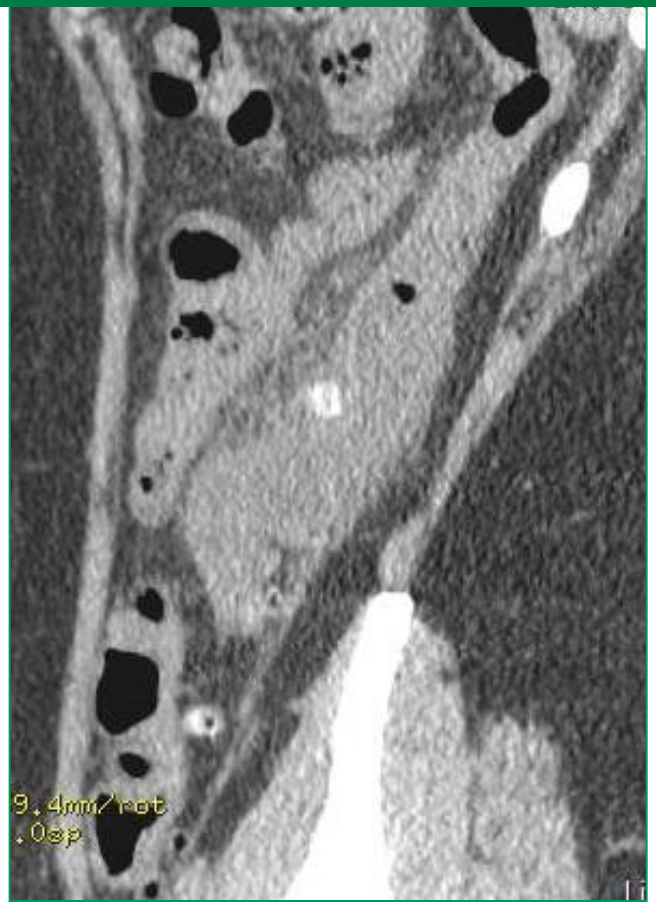
Localized sigmoid wall thickening (> 5 mm) Inflammation of pericolic fat	Same as mild diverticulitis plus one of the following: Abscess Extraluminal air Extraluminal contrast

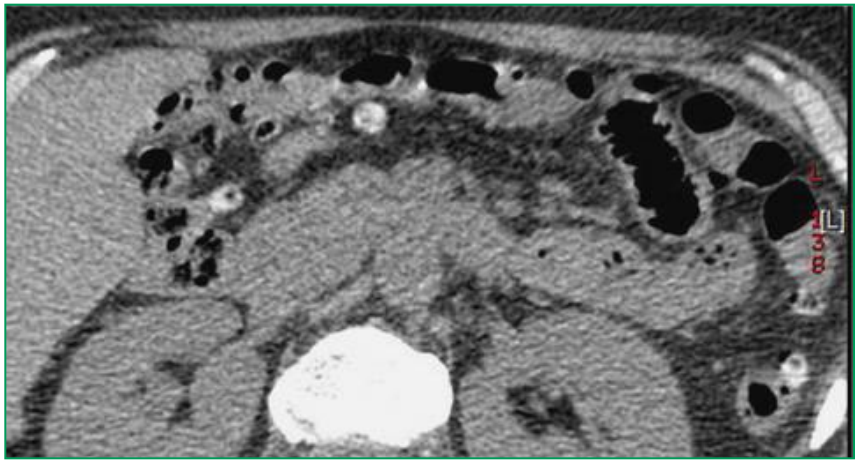


Ambrosetti P et al. *Br J Surg* 1997

Donna 48 aa, dolore acuto emiaddome sn in diverticolosi colon nota

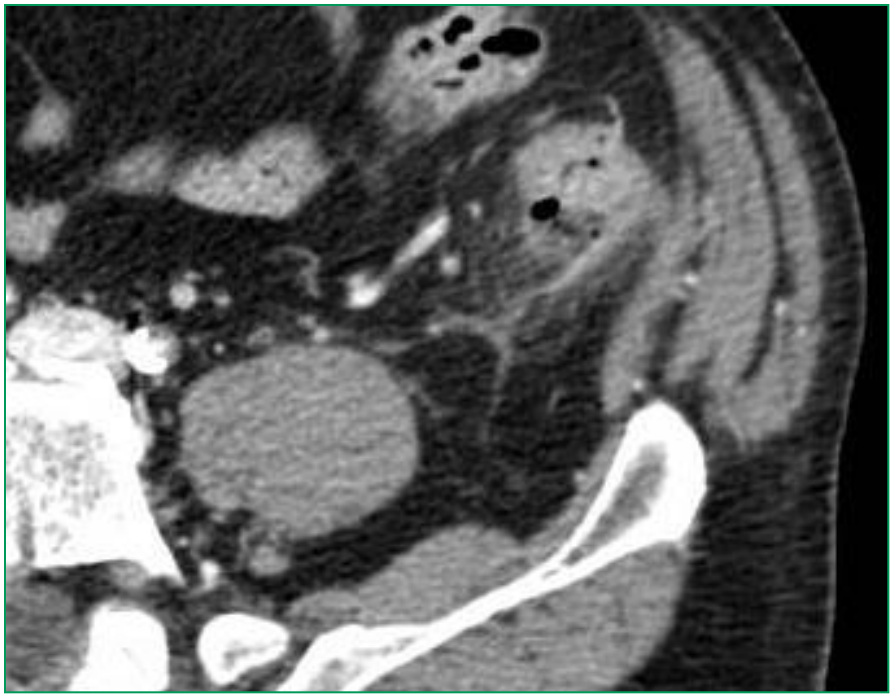


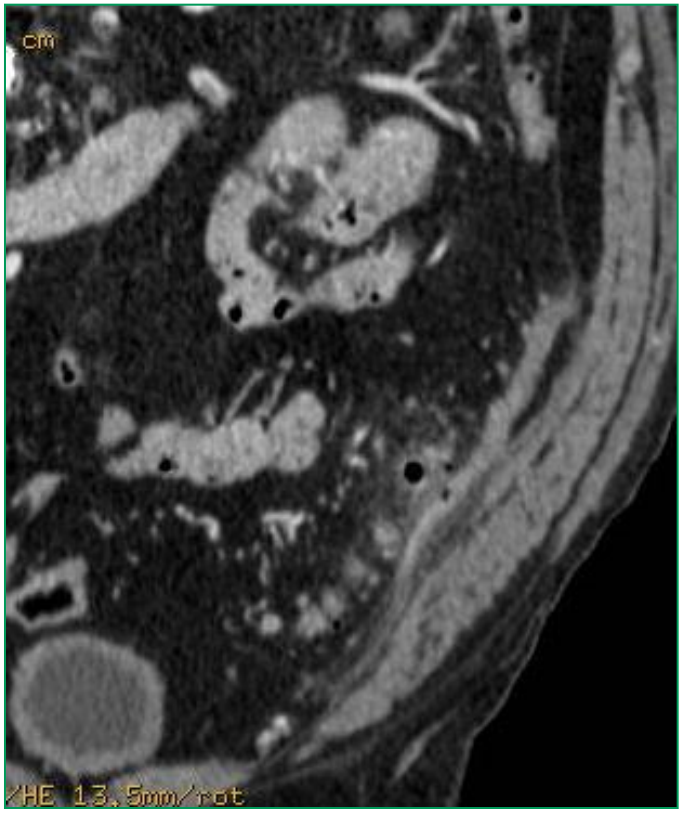




HINCHEY IA

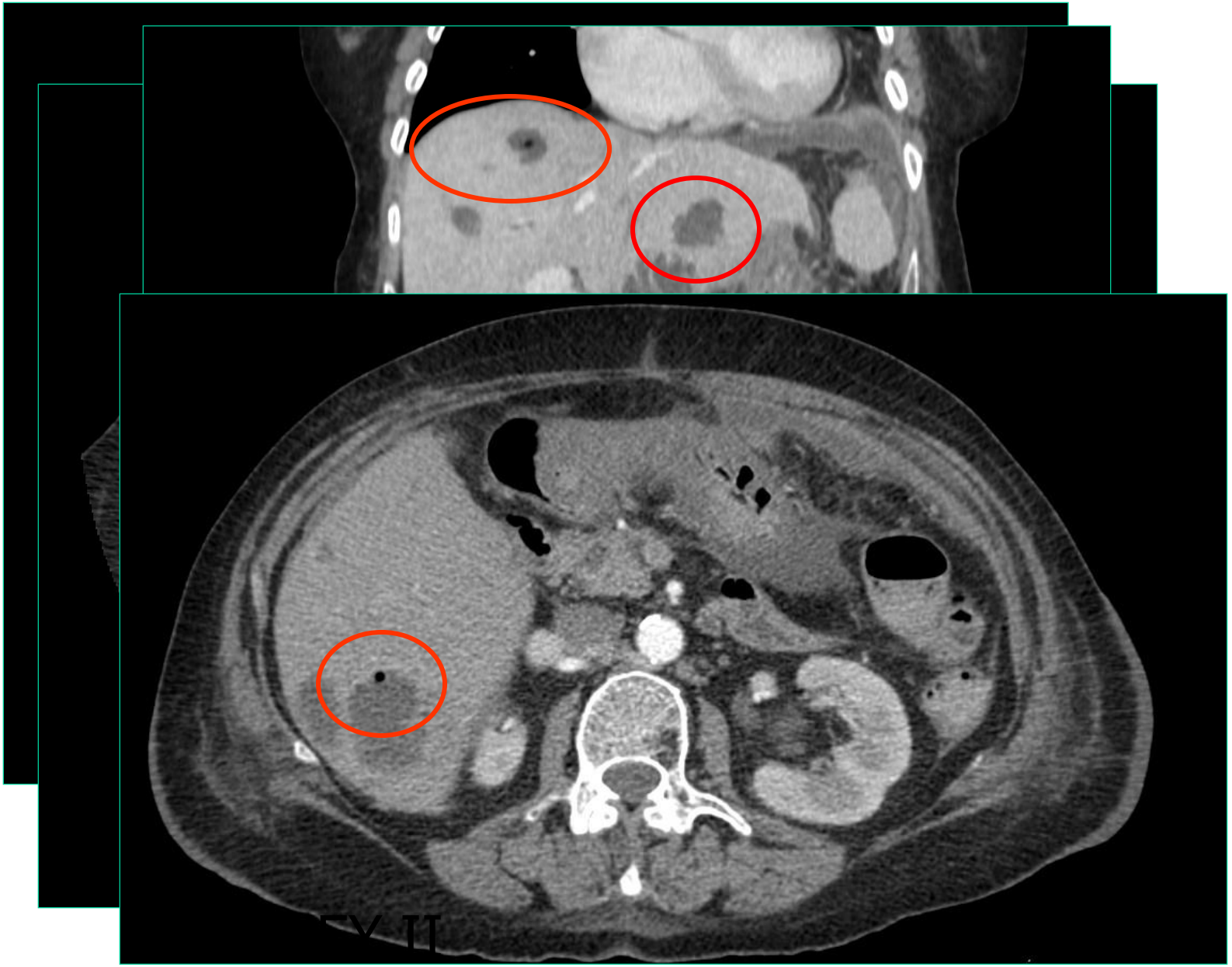
Uomo 66 aa, febbre , dolore fossa iliaca sn da 1 settimana



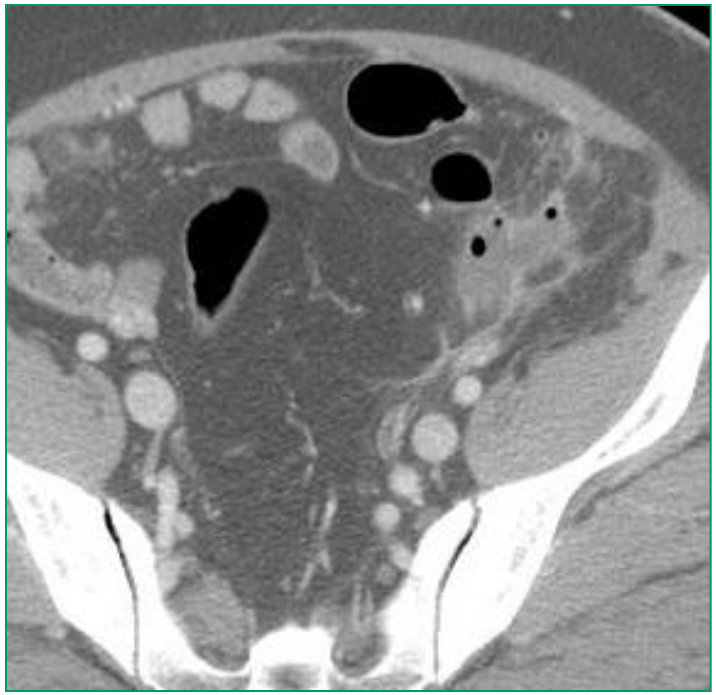


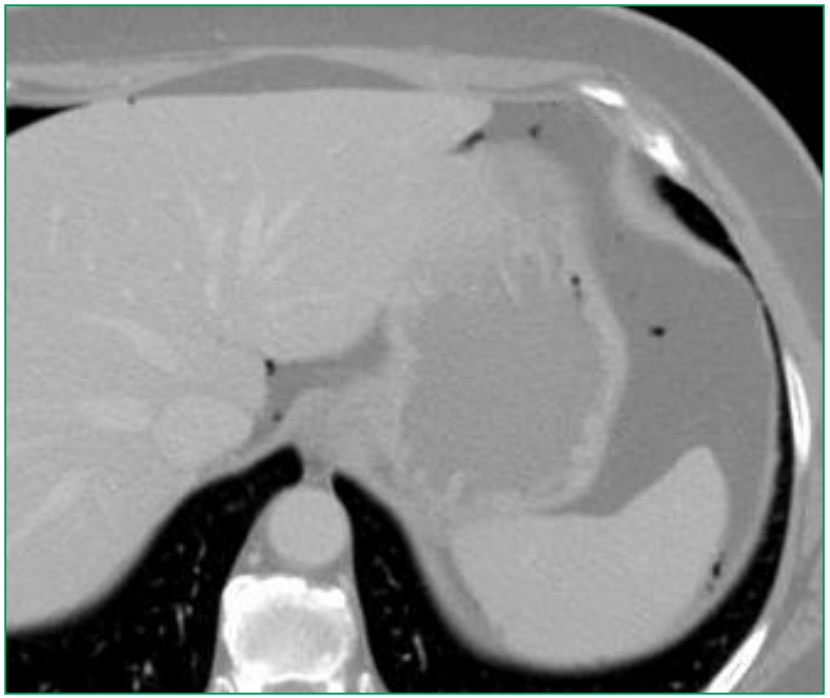
HINCHEY IB

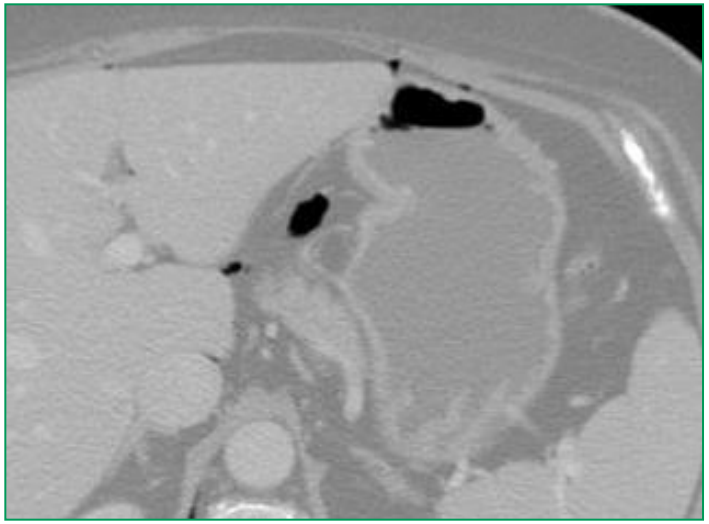
Femmina di 67 aa dolore in fossa iliaca sinistra e febbre 38° .



Donna 66 aa, ascesso pericolico, aria libera diffusa in addome sup

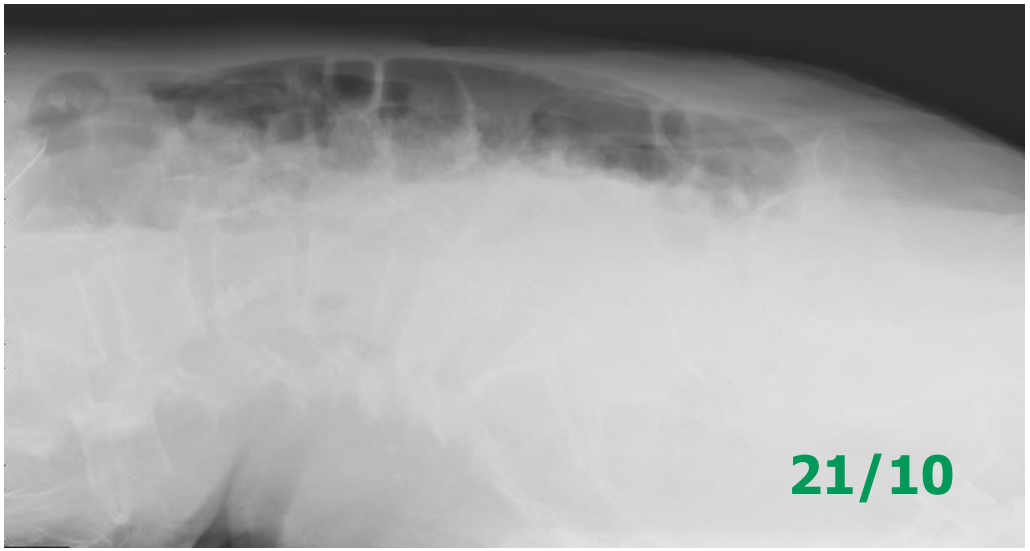


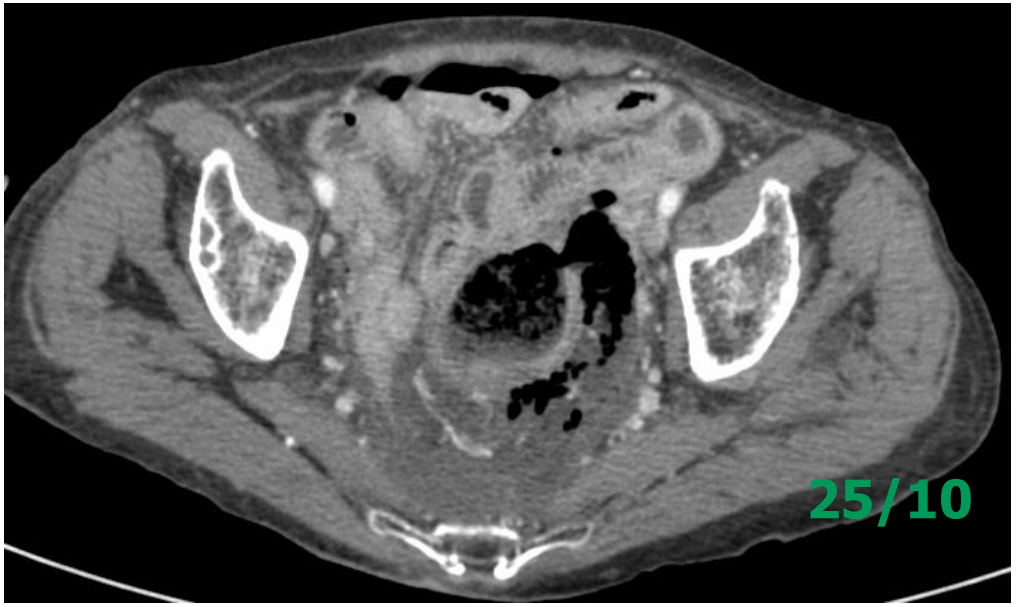




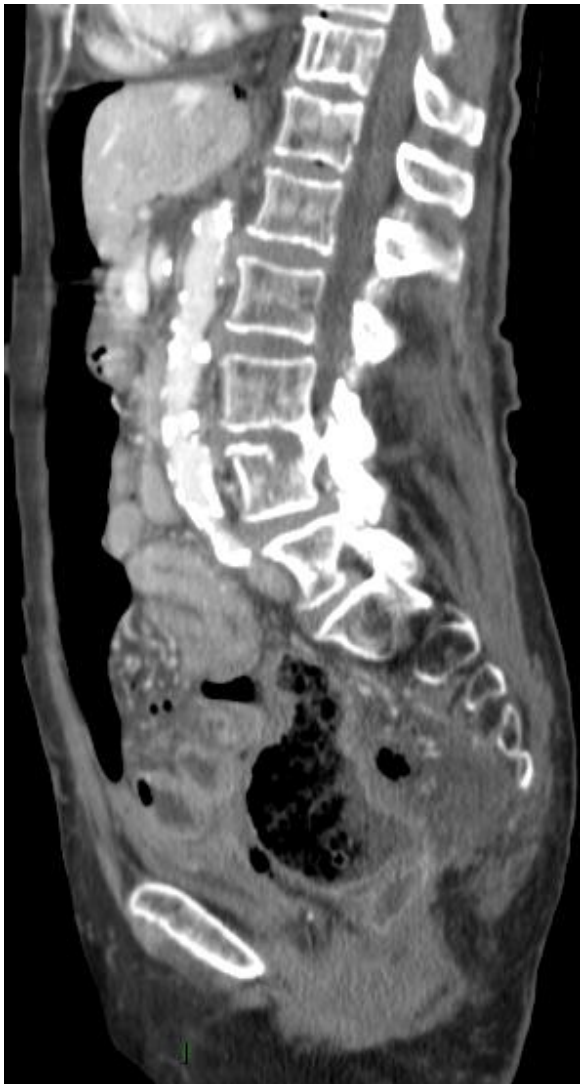
HINCHEY III

Femmina di 96 aa; dolori addominali da 5 giorni.
Quadro occclusivo ingravescente (TC in nona giornata dal ricovero).





HINCHEY IV



WSES Classification

The World Society of Emergency Surgery

WSES Classification

Stadio	Segni
Diverticolite non complicata	
0	Diverticoli, ispessimento parietale, incremento densitometrico del grasso pericolico
Diverticolite complicata	
1 A	Bolle aeree pericoliche o piccola falda fluida pericolica senza ascessi
1 B	Ascesso <4 cm
2 A	Ascesso >4 cm
2 B	Aria a distanza (>5cm dal segmento intestinale infiammato
3	Versamento diffuso senza aria a distanza (né perforazione colica)
4	Versamento diffuso con aria a distanza (perforazione colica persistente)

Workgroup for the Consensus Conference on Diverticulitis and Diverticular Disease

S.I.C.E.
Società Italiana di Chirurgia
Endoscopica e nuove tecnologie

acoi
Associazione Chirurghi
Ospedalieri Italiani

S.I.C.
Società Italiana
di Chirurgia

Società Italiana
di
Chirurgia Colo Rettale

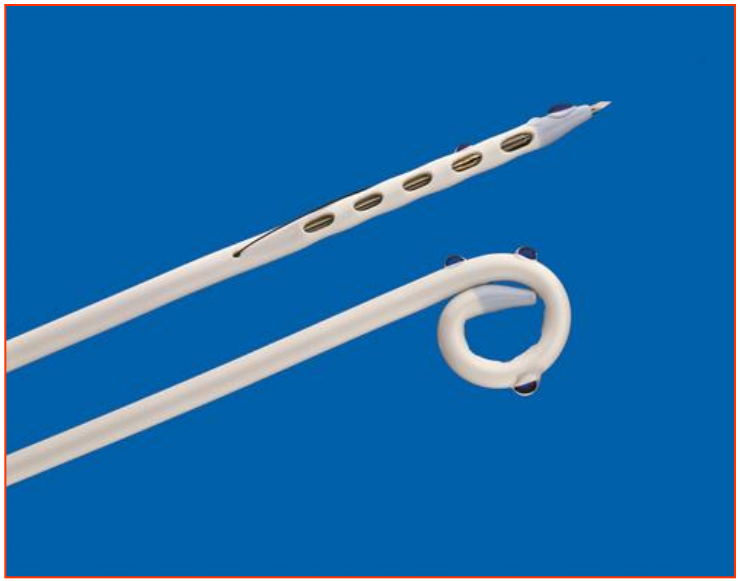
Società Italiana
di Chirurgia
nell'Ospedalità Privata

Società Italiana
di Radiologia Medica

Società Italiana Unitaria
di Colonproctologia

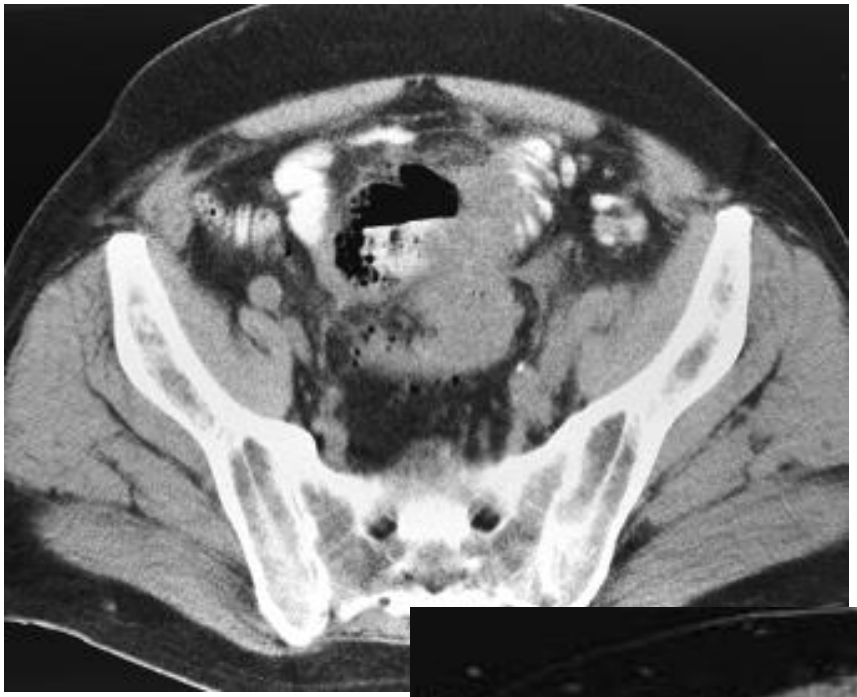
The World Society
of Emergency Surgery

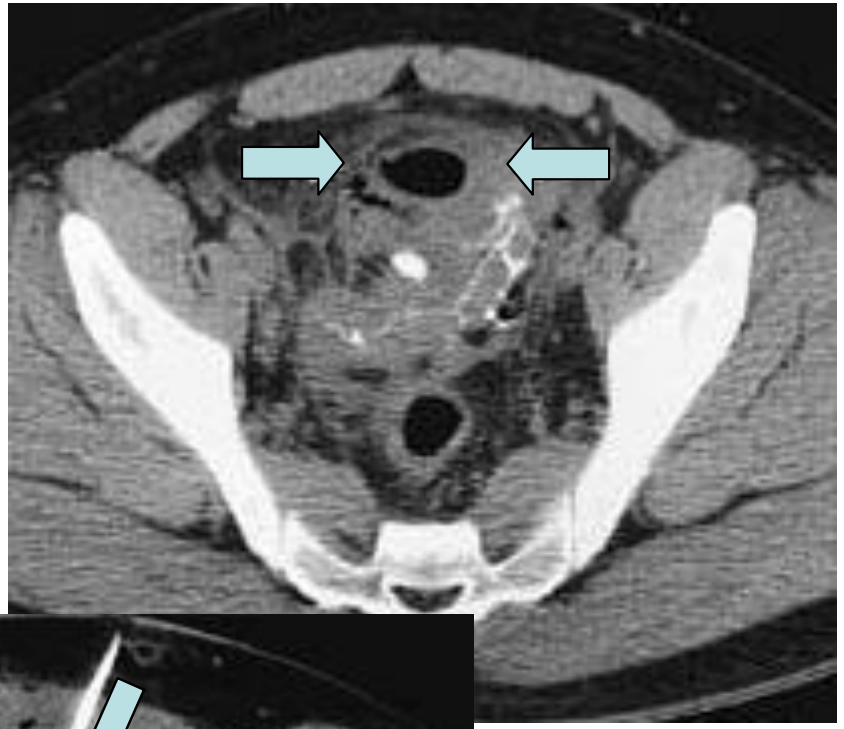
…E IL RADIOLOGO INTERVENTISTA?



- Propedeutico all'intervento chirurgico
- Riduce possibilità intervento in 2 tempi
- Successo tecnico terapeutico > 90%
- Accessibilità (sede, pz obeso etc)
- Dimensioni ascesso
- Timing

DRENAGGIO PERCUTANEO RACCOLTE FLUIDE





Role of Imaging

FOLLOW-UP: quando, come e perchè

- Forme non complicate (75%)
- **Forme complicate (25%) >> rischio CRC**
- Orientamento chirurgico conservativo
- Approccio laparoscopico (anche in fase sub-acuta)
- Controllo generalmente **4-6 settimane**
- Informazioni coliche ed extracoliche
- Con quale metodica radiologica?

Vantaggi Colonscopia Virtuale nel FU

Clinical Radiology (2007) 62, 645–650

CT colonography versus colonoscopy in the follow-up of patients after diverticulitis — A prospective, comparative study

F. Hjern[a,*], E. Jonas[a], B. Holmström[a], T. Josephson[b], A. Mellgren[a,c], C. Johansson[a]

Divisions of [a]Surgery, and [b]Radiology, Department of Clinical Sciences, Danderyd Hospital, Karolinska Institutet, Stockholm, Sweden, and [c]Division of Colon and Rectal Surgery, University of Minnesota, Minneapolis, Minnesota, USA

- Buon agreement con Colonscopia Ottica
- Diametro lume più accurato
- Dose minore rispetto a TC addome
- Ben tollerata dai pazienti

Vantaggi Colonscopia Virtuale nel FU

PubMed

U.S. National Library of Medicine
National Institutes of Health

ELSEVIER FULL-TEXT ARTICLE

Display Settings: Abstract

Eur J Radiol. 2011 Feb 25. [Epub ahead of print]

Technical quality of CT colonography in relation with diverticular disease.

Flor N, Rigamonti P, Di Leo G, Ceretti AP, Opocher E, Sardanelli F, Cornalba GP.

Dipartimento di Scienze Medico-Chirurgiche, Università degli Studi di Milano, Milan, Italy; Unità Operativa di Radiologia Diagnostica e Interventistica, Azienda Ospedaliera San Paolo, Milan, Italy.

Abstract

OBJECTIVE: The aim of the study is to explore how the technical quality of the examination was affected by diverticular disease.

MATERIALS AND METHODS: We retrospectively evaluated a consecutive series of 78 subjects who underwent CTC for screening (n=58) or staging (n=20) colorectal cancer, 38 of them (49%) after an incomplete optical colonoscopy. Patients were administered a mild laxative and a iodinated contrast material for fecal tagging. We scored both the bowel preparation and the overall colon distension as poor, good, or optimal and measured the mean sigmoid colon diameter. We counted the number of diverticula and classified patients as having or not a severe diverticular disease (SDD). The number of the prompts of computer aided diagnosis (CAD) per patient was also considered. Mann-Whitney U and $\chi(2)$ tests were performed.

RESULTS: No CTC complications occurred. The bowel cleansing was poor in 8 (10%) patients, good in 29 (37%) and optimal in 41 (53%); colon distension was poor in 7 (9%) patients, good in 38 (49%), and optimal in 33 (42%). Fifty-four (69%) showed diverticula and 30 (38%) had an SDD. Bowel cleansing and distension were not significantly impaired by neither diverticula ($p>0.590$) nor the SDD ($p>0.110$). Mean sigmoid colon diameter was reduced in presence of diverticula (28mm versus 23mm, $p=0.009$) or SDD (26mm versus 22mm, $p=0.016$). The mean number of CAD prompts per patient was not significantly increased by the presence of SDD ($p=0.829$).

CONCLUSIONS: Bowel cleansing and distension at CTC were not influenced by the presence of diverticular disease.

CONCLUSIONS: Bowel cleansing and distension at CTC were not influenced by the presence of diverticular disease.

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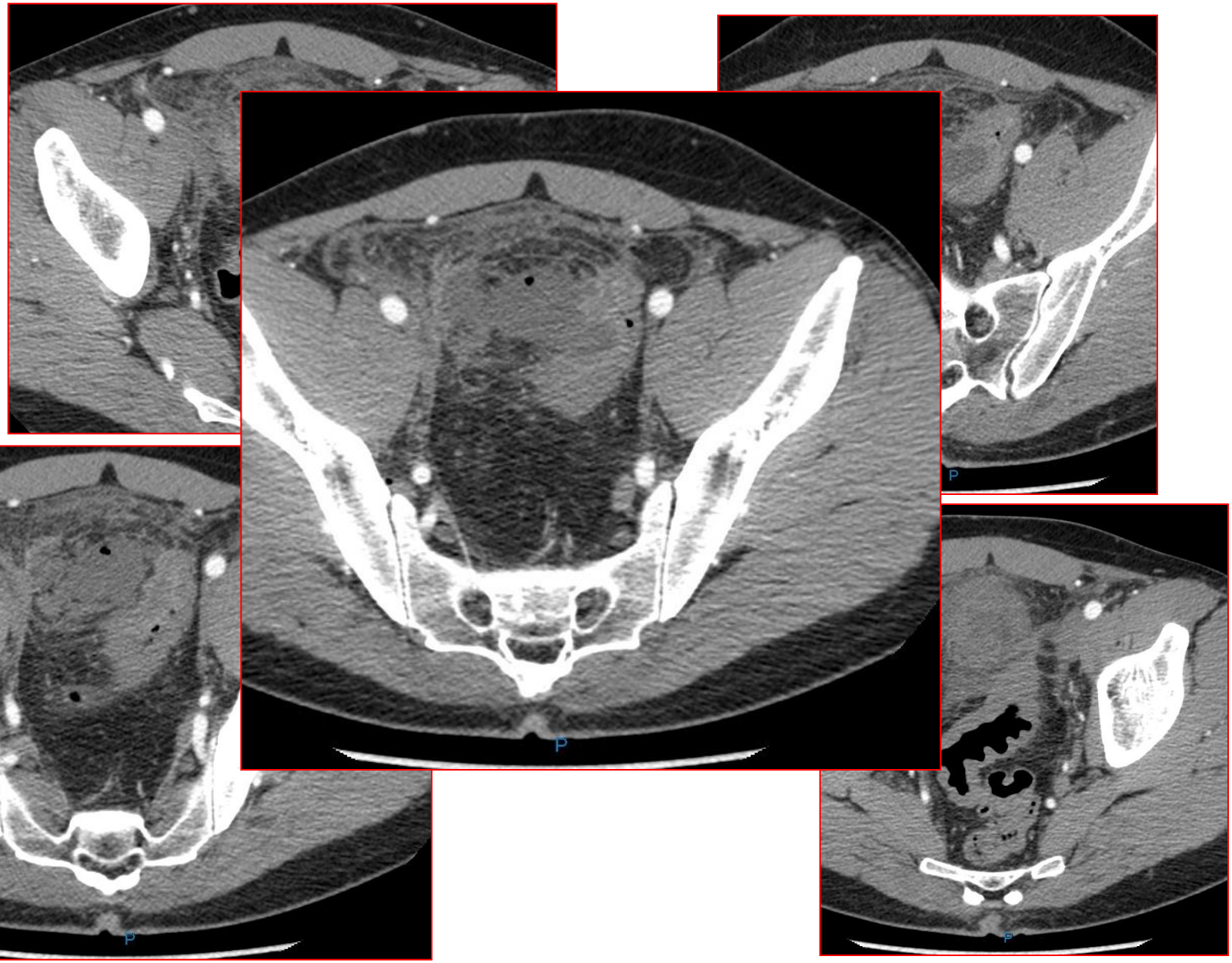
CV ALMENO 4-6 SETTIMANE

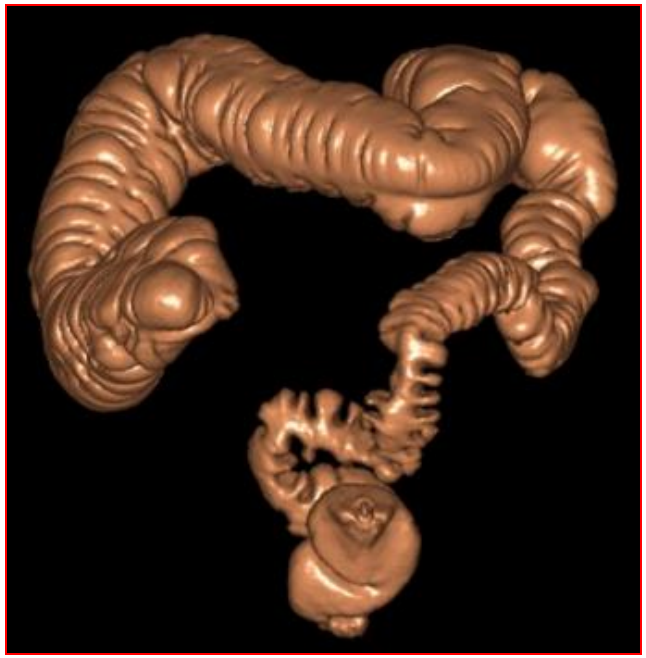
DOPO L'EVENTO ACUTO

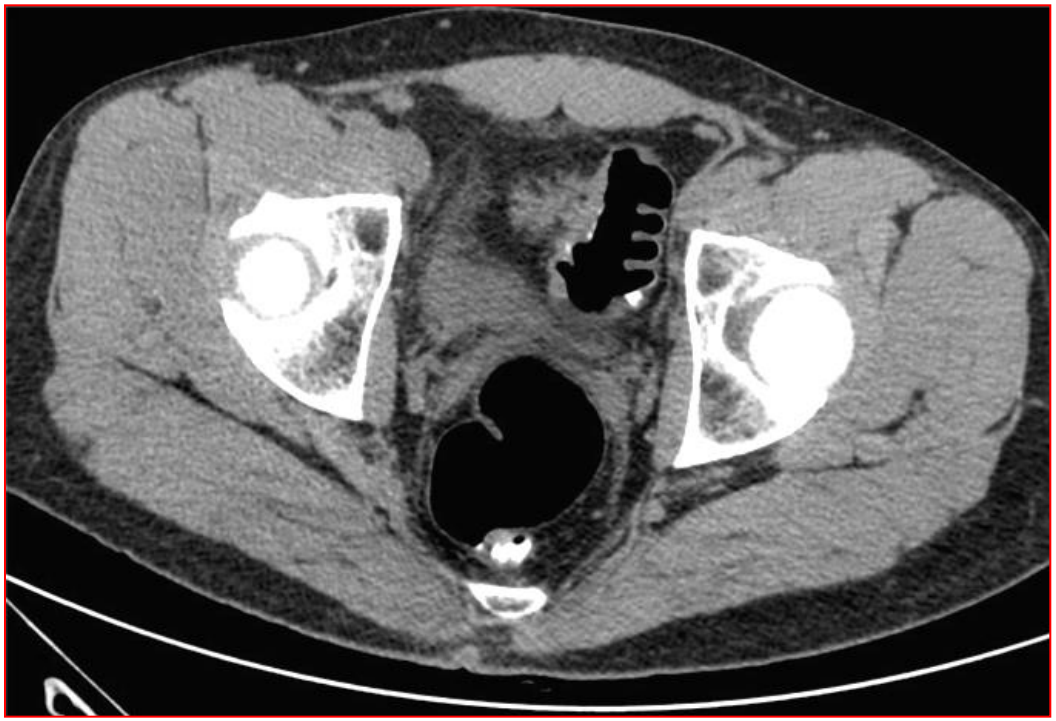
Flor N et al. Eur J Radiol 2011 in press

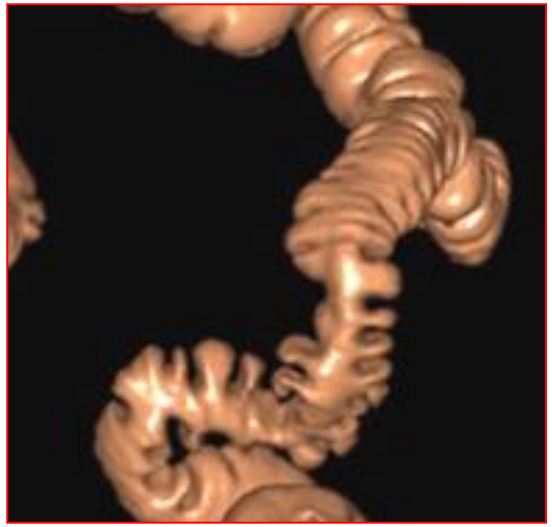
Maschio 36 aa, sospetto di diverticolite acuta: dolore addominale, febbre e diarrea



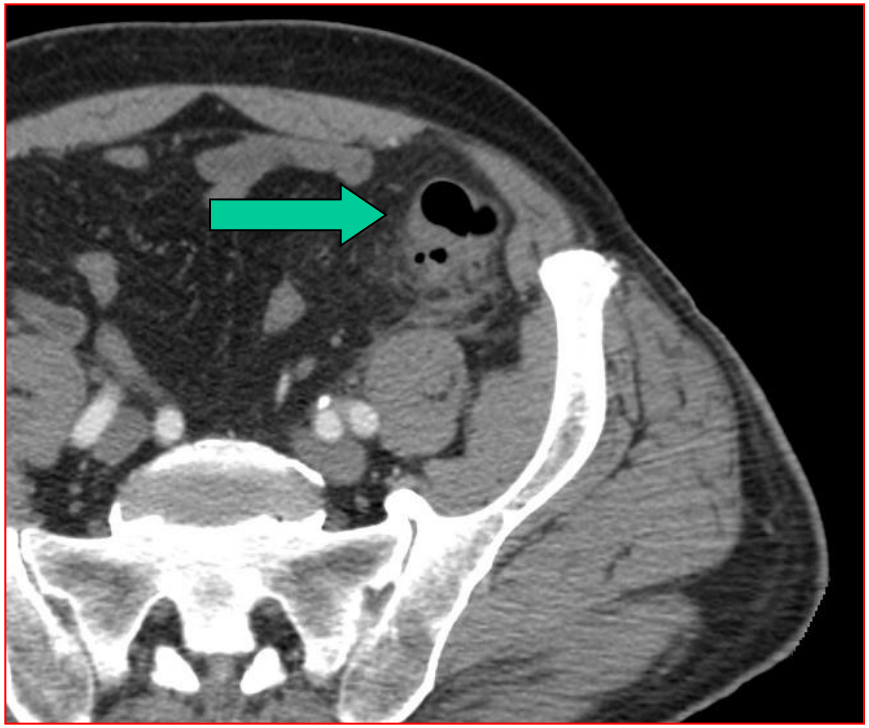
Colonscopia Virtuale a 2 mesi dall'episodio acuto su CO incompleta

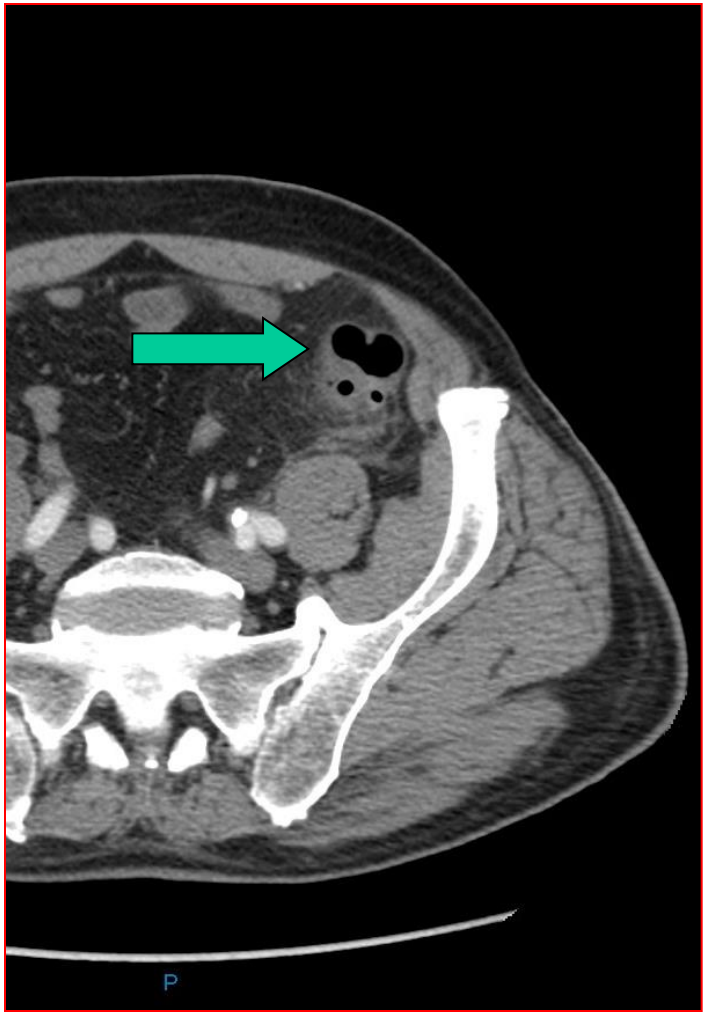




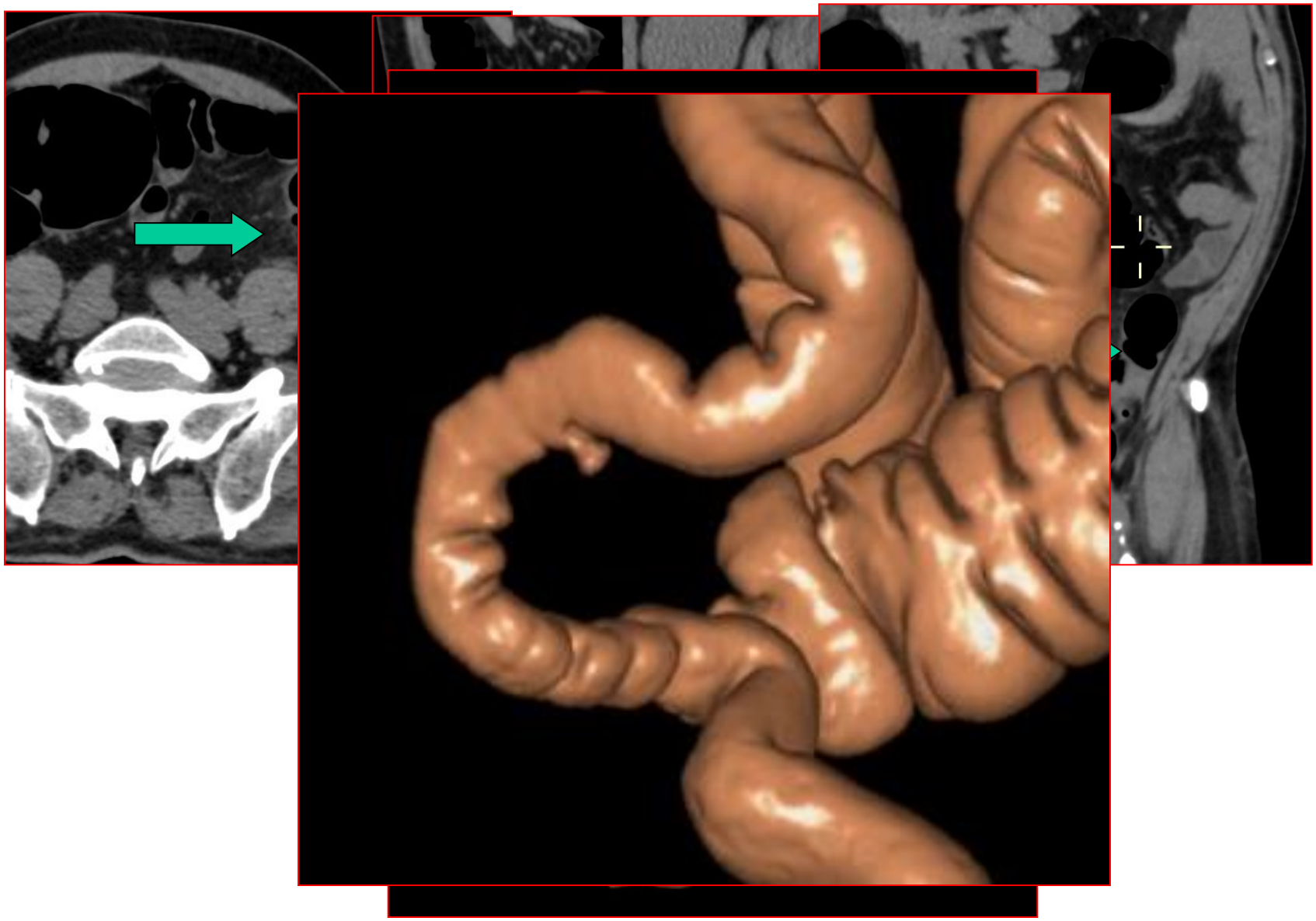


69 aa con febbre, leucocitosi, dolore addominale acuto. TC con mdc eseguita in urgenza da PS

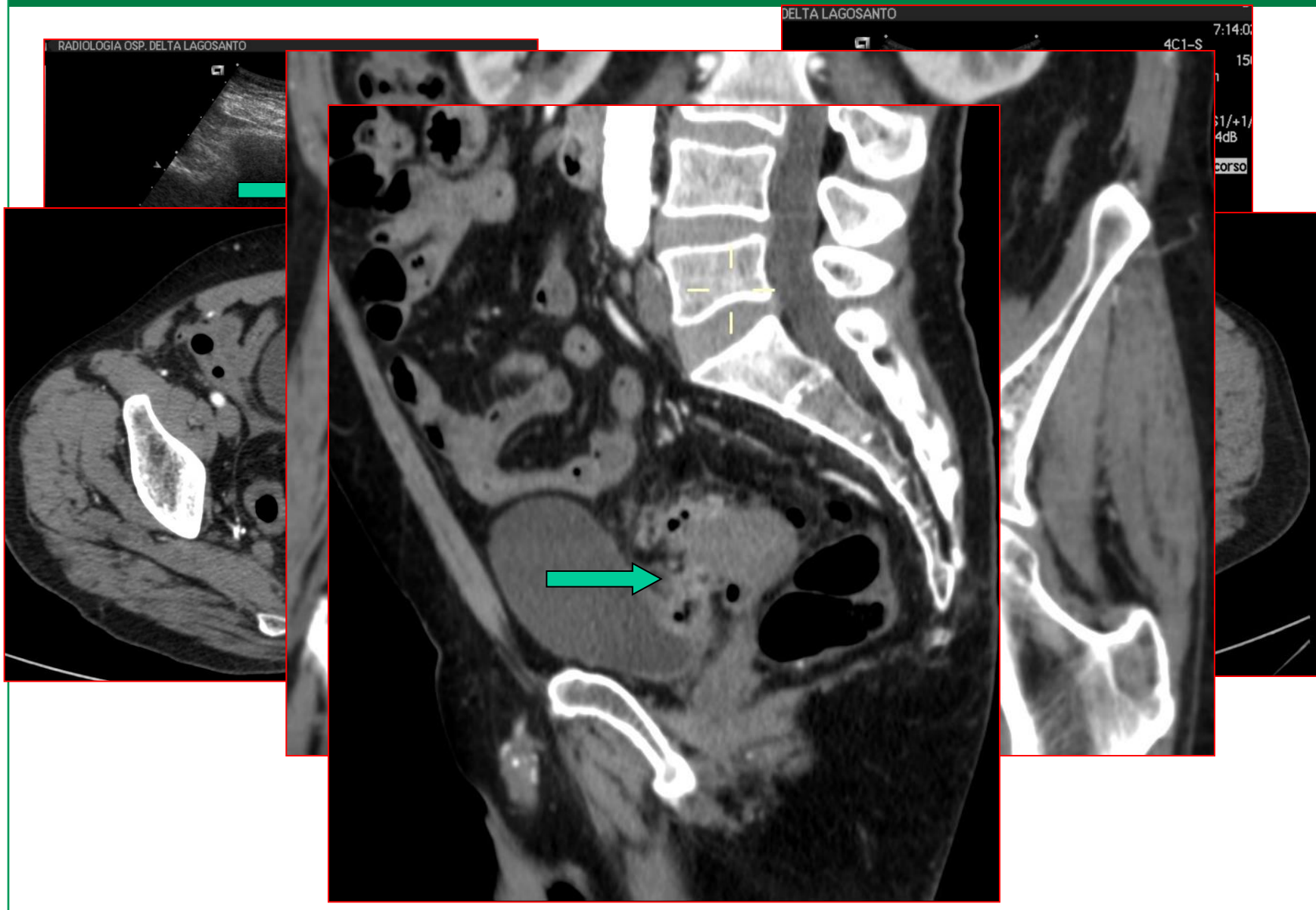




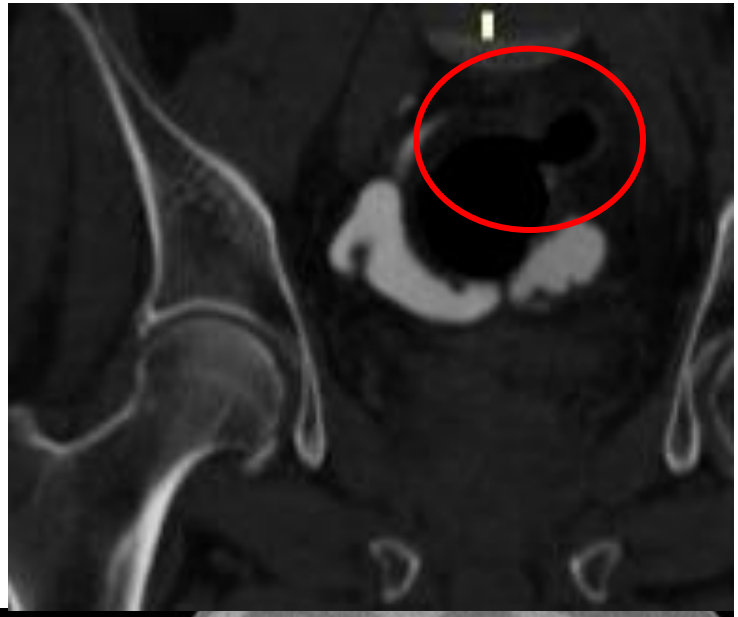
Follow-up dopo 6 settimane con CTC

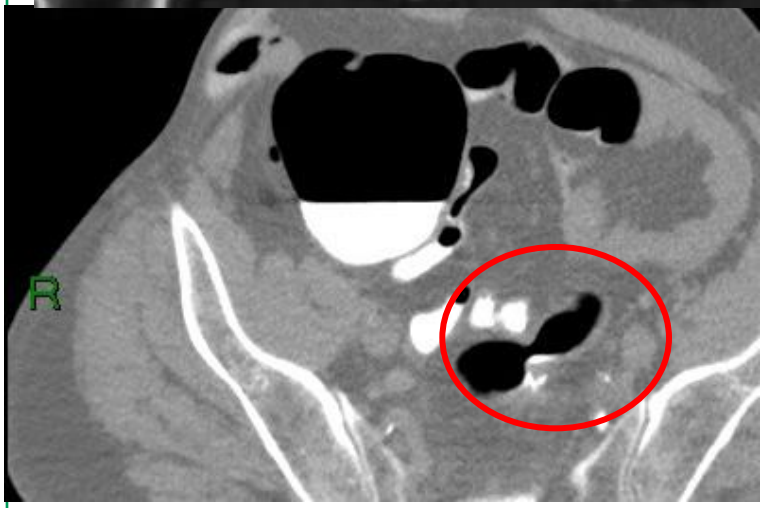


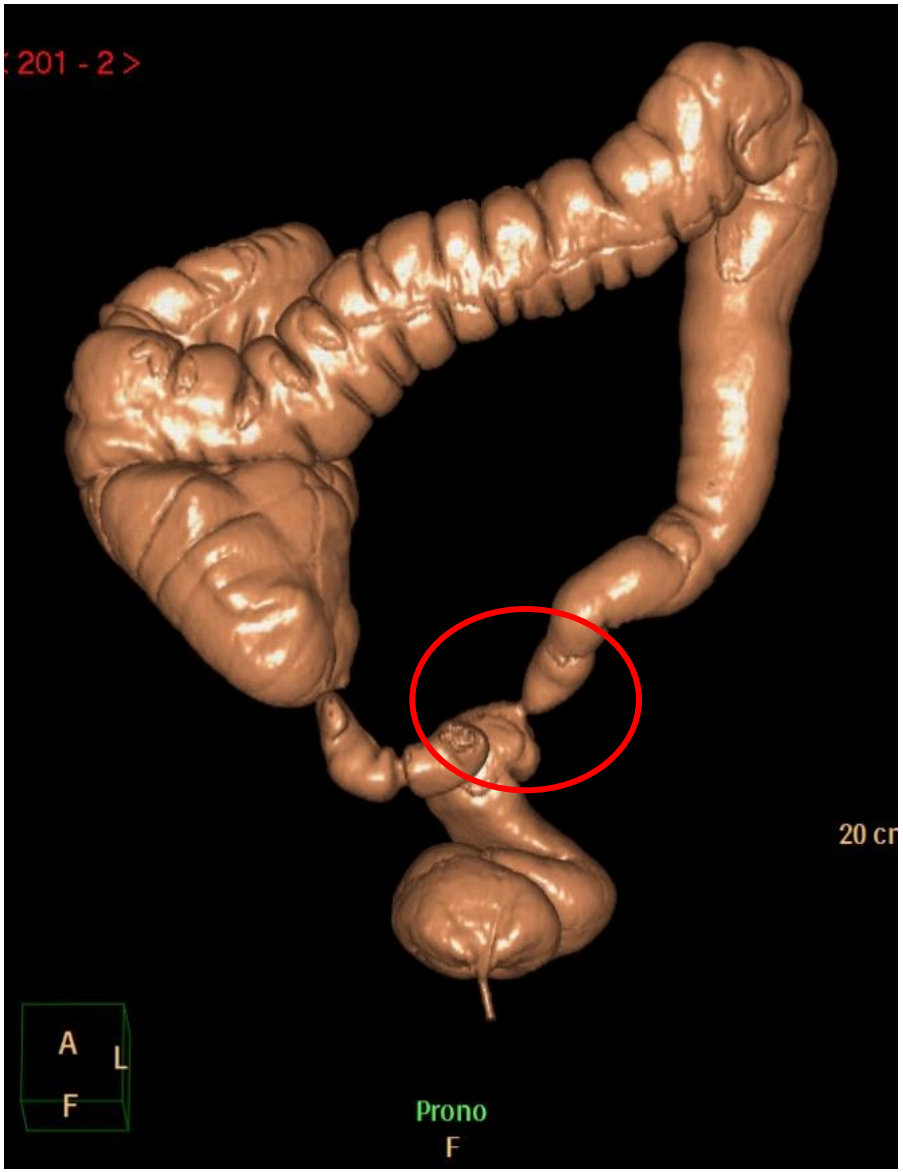
Maschio di 70 aa diverticolosi non nota. Pregressi episodi di forti dolori addominali. Durante la minzione emissione di gas.



Controllo post-operatorio con CV







...non dimentichiamo che....

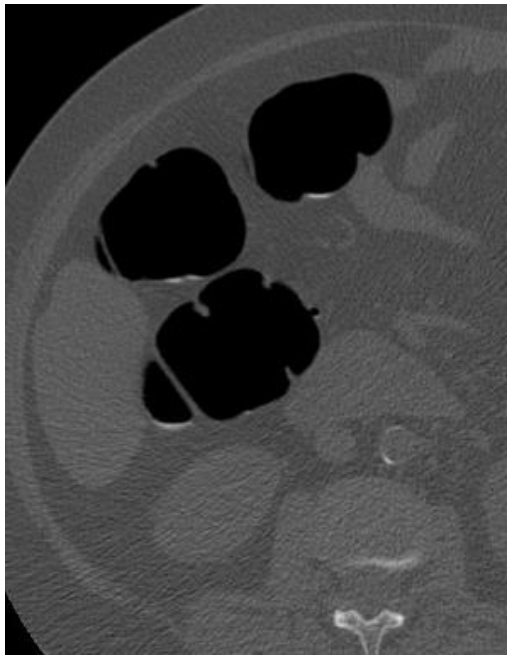
- Esistono diverticoli anche in altri distretti del colon

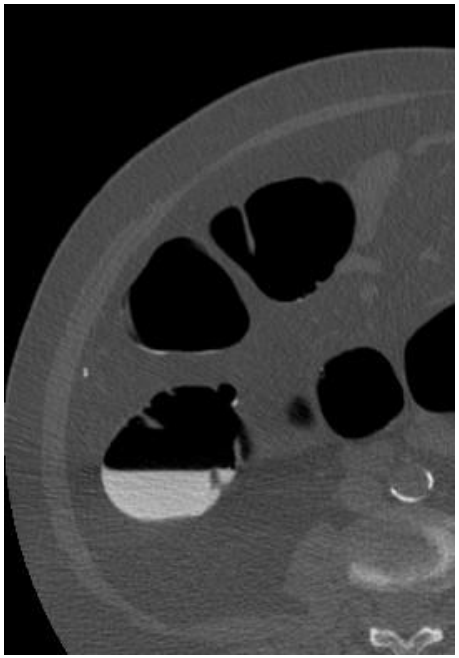
- Esistono diverticoli del piccolo intestino
  - Duodeno **00,2 – 6%**
  - Digiuno-ileo **00,7-1**%
  - Digiuno fino a 7 VOLTE > Ileo

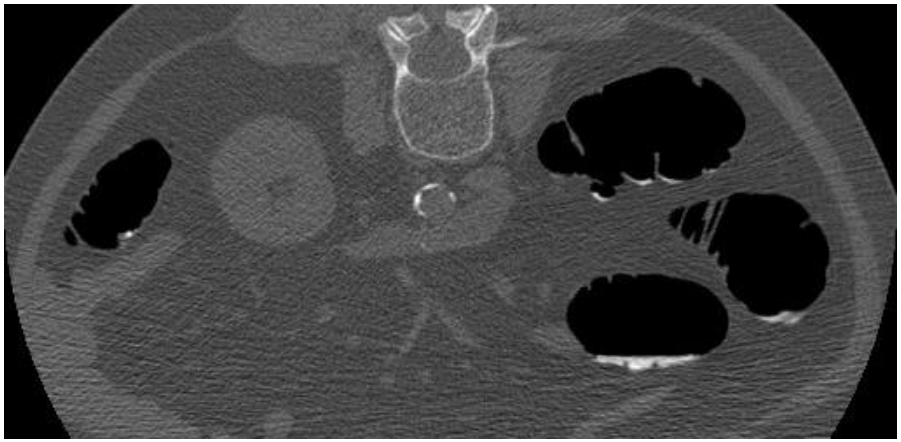
Cunningham SC, Gannon CJ, Napolitano LM (2005) Small-bowel diverticulosis. Am Surg 190:37–38

ENTRAMBE LE CATEGORIE POSSONO ANDARE INCONTRO A DIVERTICOLITE

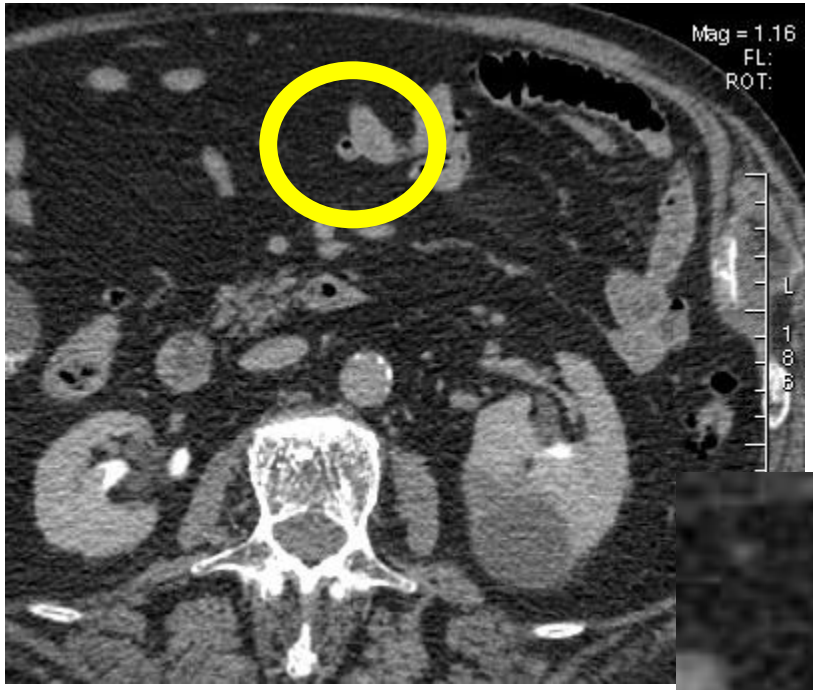
N.L .Laez, J.V.Zurlo: Small bowel diverticulitis: an often overlooked cause of acute abdomen;
Emerg Radiol (2010) 17:497–501

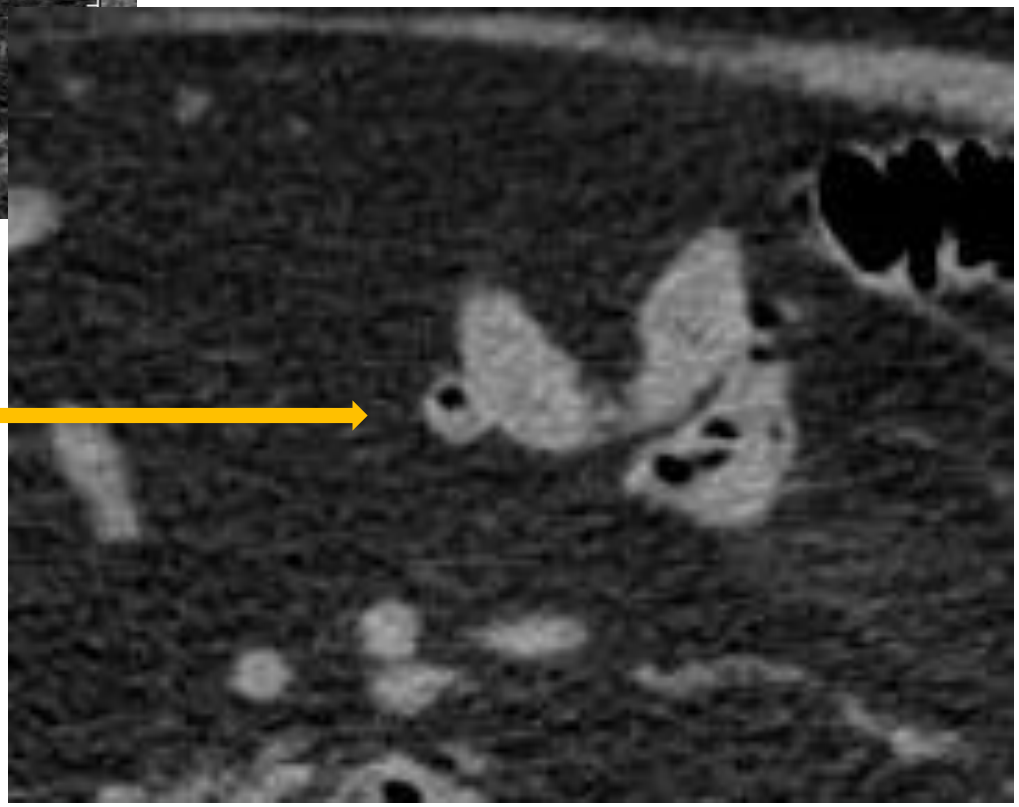




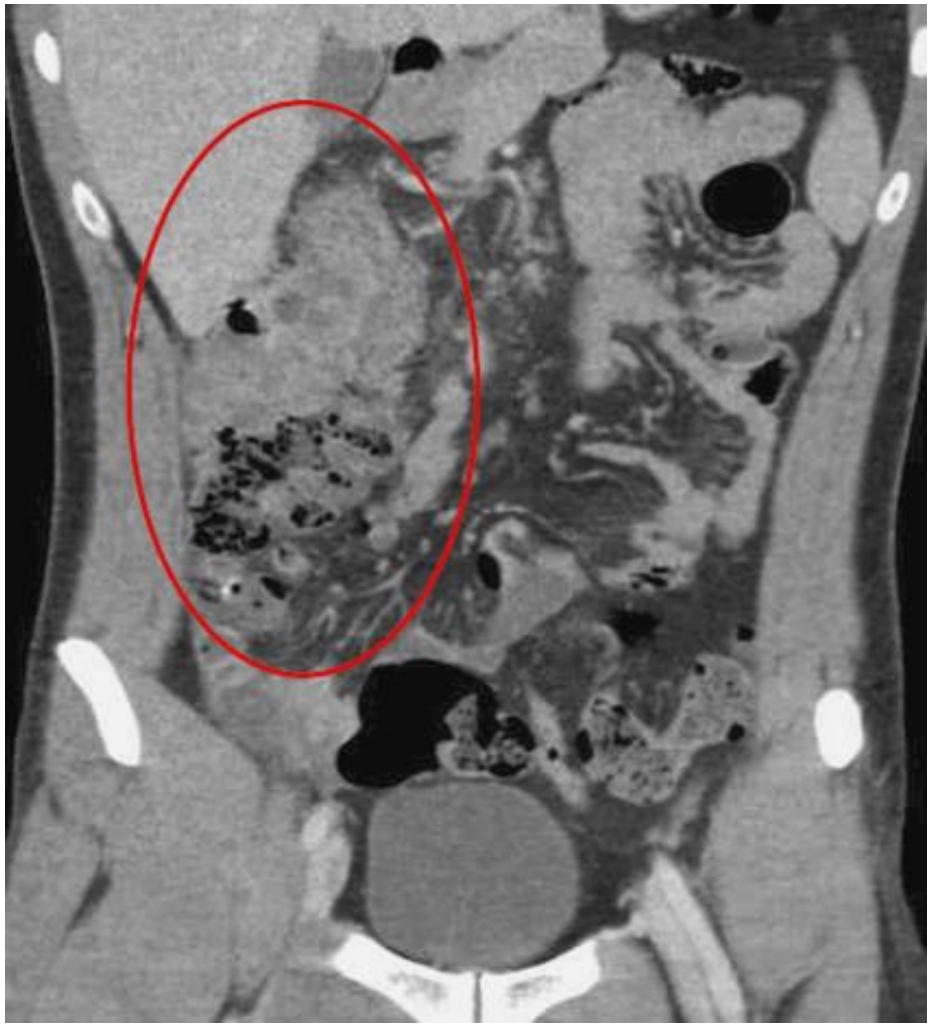


Diverticolosi del ceco/asc in malattia diverticolare diffusa (COLON-TC)





diverticolo digiunale



Substenosi infiammatoria in diverticolite flessura dx del colon

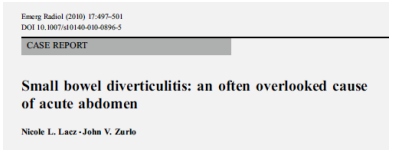
P. Tarchi, M. Kosuta, U. Ginanneschi, A. Adami , A. Balani, N. de Manzini
Chirurgia Generale, Ospedale di Cattinara, Trieste

DIVERTICOLITE DEL PICCOLO INTESTINO

Presentazione clinica come addome acuto
(DD colecistite, appendicite, litiasi renale, pancreatite)

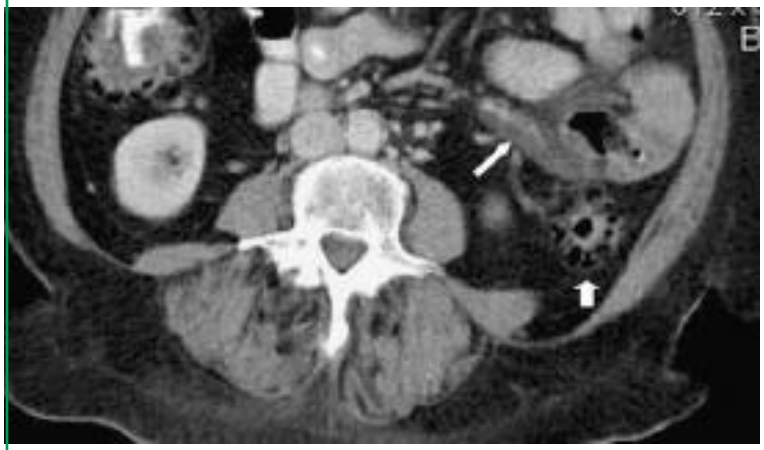
Patologia rara: spesso diagnosi di esclusione

Paz quasi esclusivamente *> 40 aa*

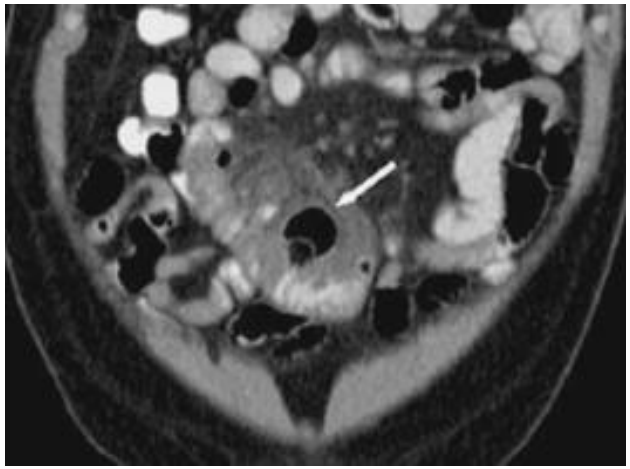

Emerg Radiol (2010) 17:497-501
DOI 10.1007/s10140-010-0896-5
CASE REPORT

Small bowel diverticulitis: an often overlooked cause of acute abdomen

Nicole L. Lacz · John V. Zarlo



Digiuno



Ileo distale

DIVERTICOLITE DEL DIGIUNO

EUR RAD, Radiological Cases Database 2014

PATOLOGIA INFIAMMATORIA ACUTA

CAUSE:

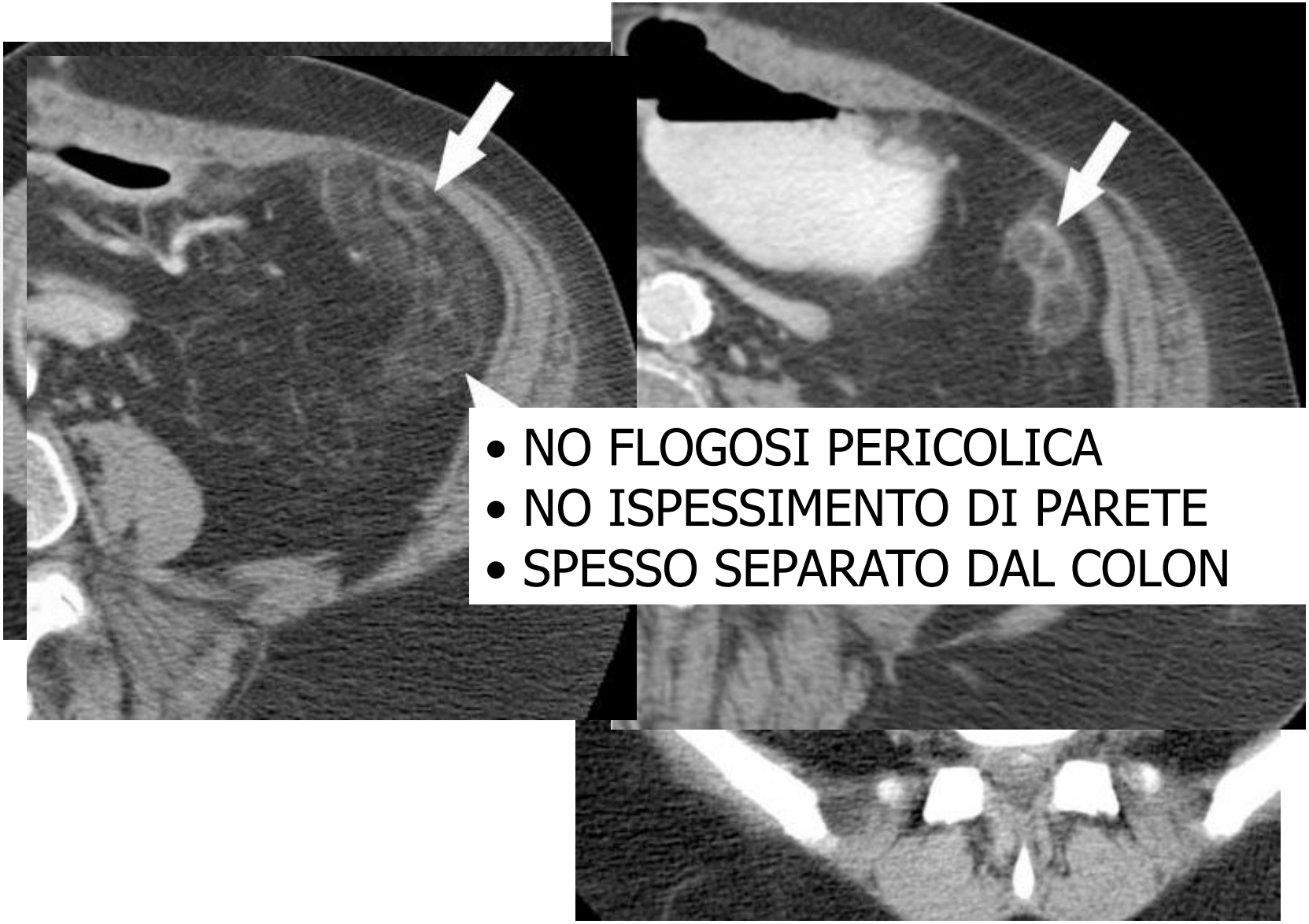
- Infettiva
- Tiflite
- Diverticolite
- Appendagite epiploica
- Infarto omentale
- Appendicite

APPENDAGITE EPIPLOICA

- FOCALITA' OVALARE DI GRASSO
- SOTTILE RIMA DI ENHANCEMENT
- **FLOGOSI DEL GRASSO ADIACENTE**
- **IPERDENSITA' CENTRALE** PER TROMBOSI VENOSA
- RARI GLI ASCESSI
- SCOMPAIONO NEL FOLLOW UP A 4-6 MESI
- SPESSO ESITANO CON DEPOSITO CALCIFICO X NECROSI

EUR RAD, Radiological Cases Database 2014

INFARTO OMENTALE



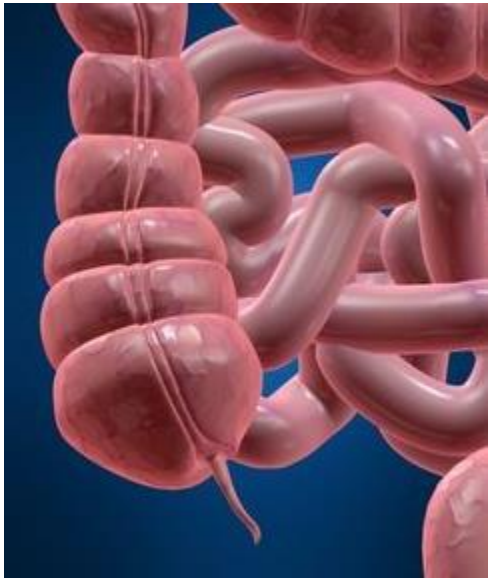
- NO FLOGOSI PERICOLICA
- NO ISPESSIMENTO DI PARETE
- SPESSO SEPARATO DAL COLON

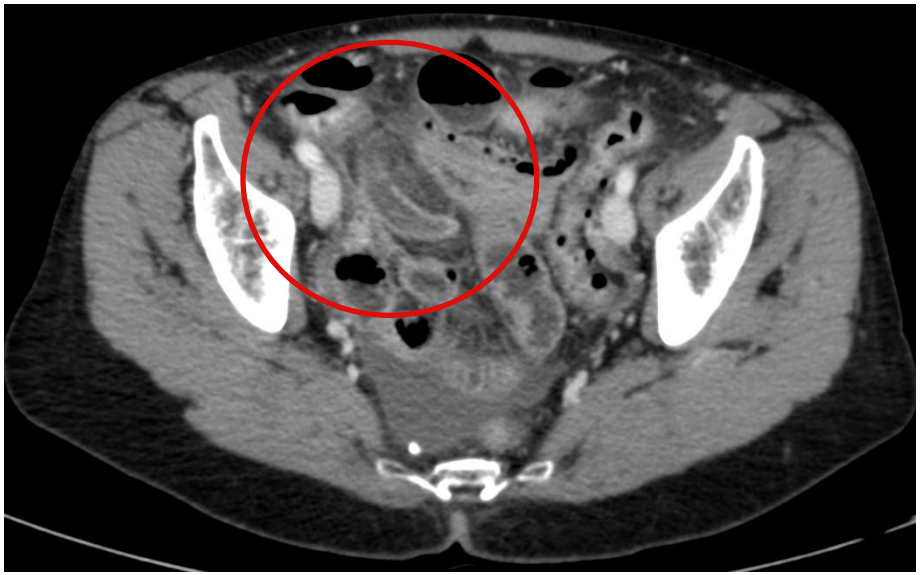
PATOLOGIA INFIAMMATORIA ACUTA

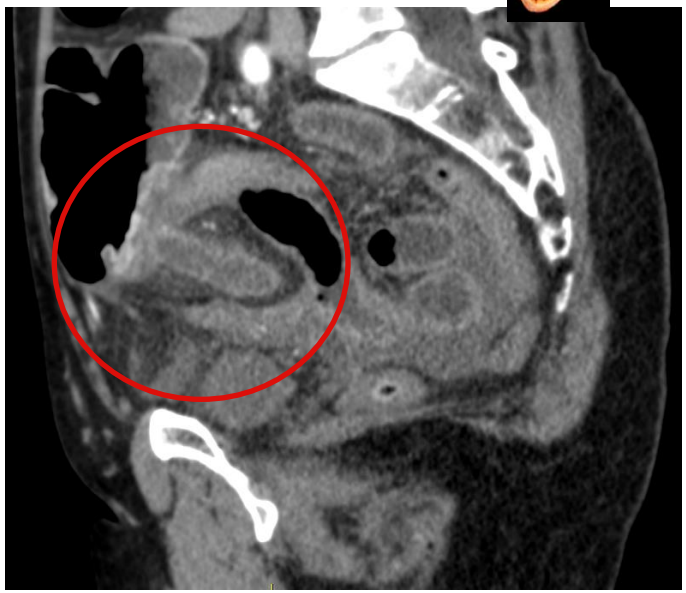
CAUSE:

- Infettiva
- Tiflite
- Diverticolite
- Appendagite epiploica
- Infarto omentale
- Appendicite

Appendicite

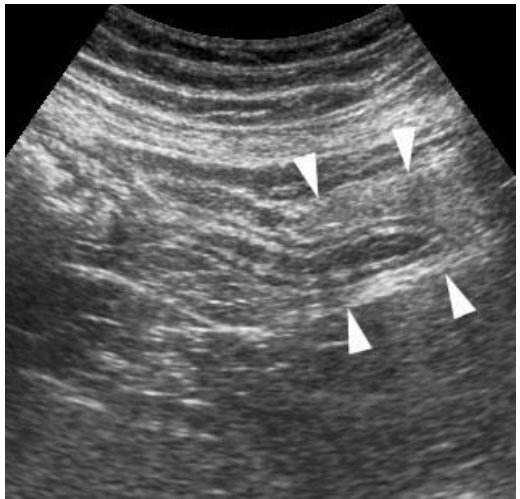




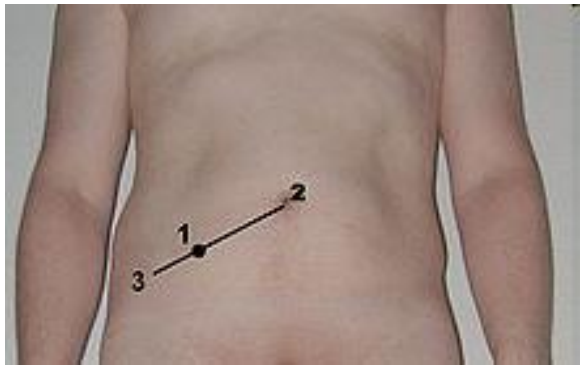


Appendicite

- Causa più comune di chirurgia addominale in urgenza
- Dolore periombelicale/fossa iliaca dx e Leucocitosi
- Life time risk 7%
- Picco di incidenza intorno all'adolescenza
- Mortalità per forme non gangrenose <0.1%
- Mortalità 5% se appendicite perforata



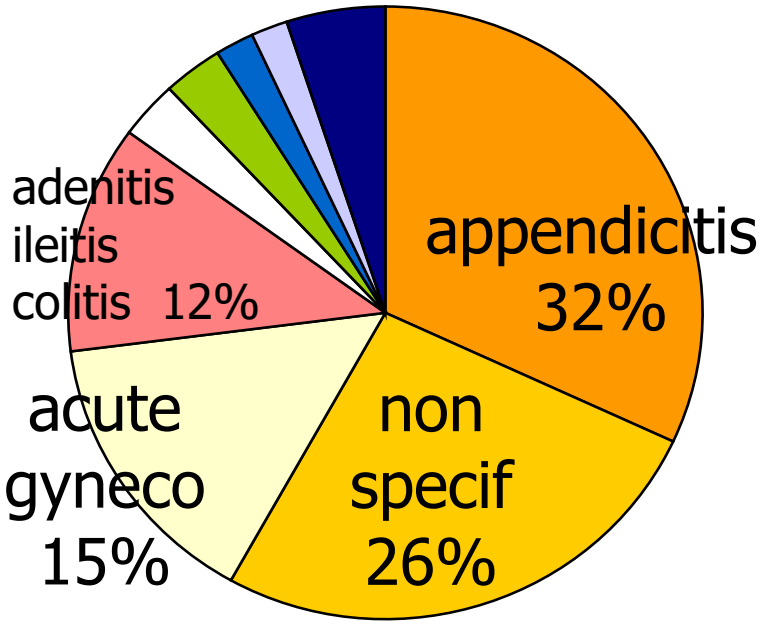
Appendicite



Diagnosi clinica più difficile:

- Bambini (valutazione clinica difficile)
- Anziani (forme fruste)
- Donne giovani (D.D. patologia utero-annessiale)

D.D. Right lower quadrant pain in women



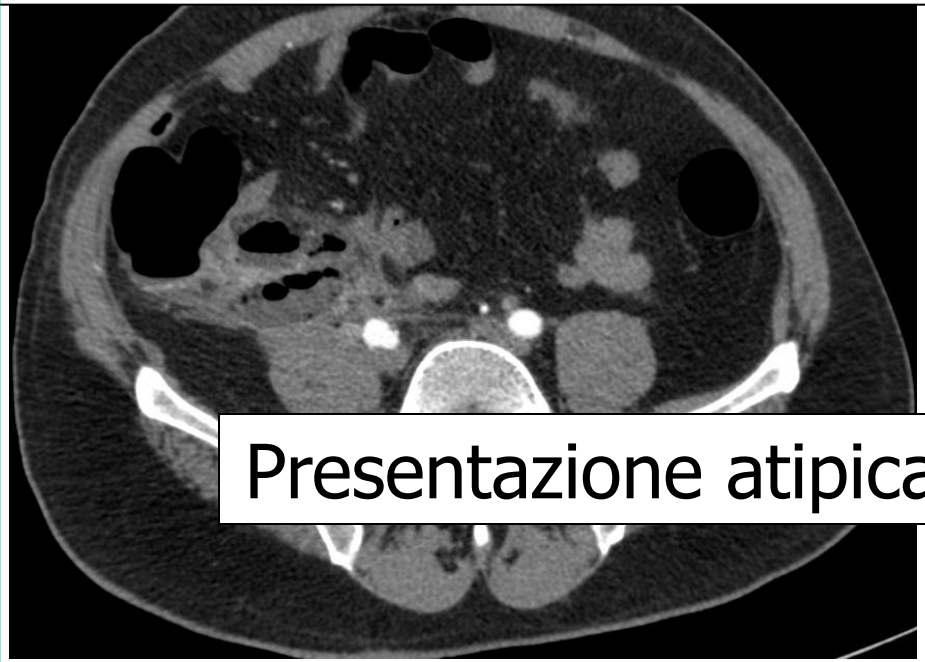
Gynecological findings:

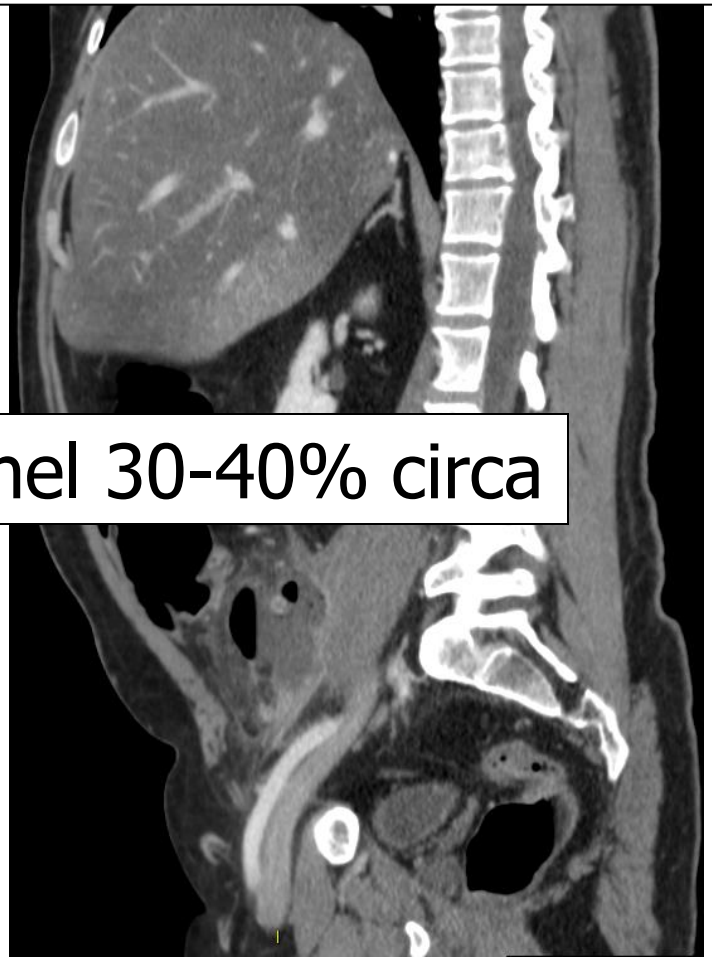
- Cyst rupture 53%
- Inflammation 20%
- Ovarian torsion 13%
- Ovarian teratoma 7%
- Other 7%

Appendicite

Nei pazienti con segni clinici tipici di appendicite acuta imaging generalmente non necessario

Maschio 49 anni. Dolore fianco dx da 6-7 giorni, febbre da 3 giorni. Blumberg positivo. Murphy e Giordano neg. Diagnosi operatoria: appendicite acuta con ascesso peritoneale





Presentazione atipica nel 30-40% circa

- **Rx Diretta Addome**
- **Ecografia**
- **TC**

Appendicite: Imaging

Rx Addome diretto

Sensibilità 0%

Ahn et al; Radiology 2002

Appendicolita (<10% dei pazienti con appendicite*) è l'unico segno di appendicite

** Lee PW Br J Surg 1976; (63) 763-766*

Ecografia

Sensibilità 44%-98%

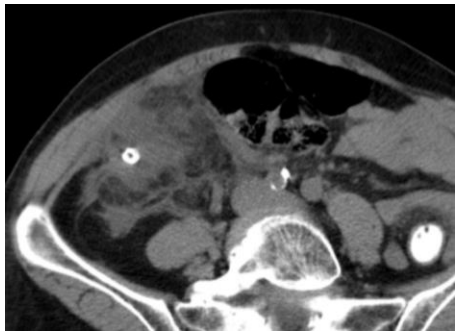
Specificità 47%-95%

* *Hernanz-Schulman M Radiology 2010*

TC

Sensibilità 87%-100%

Specificità 89%-99%



Ecografia

Segni diretti

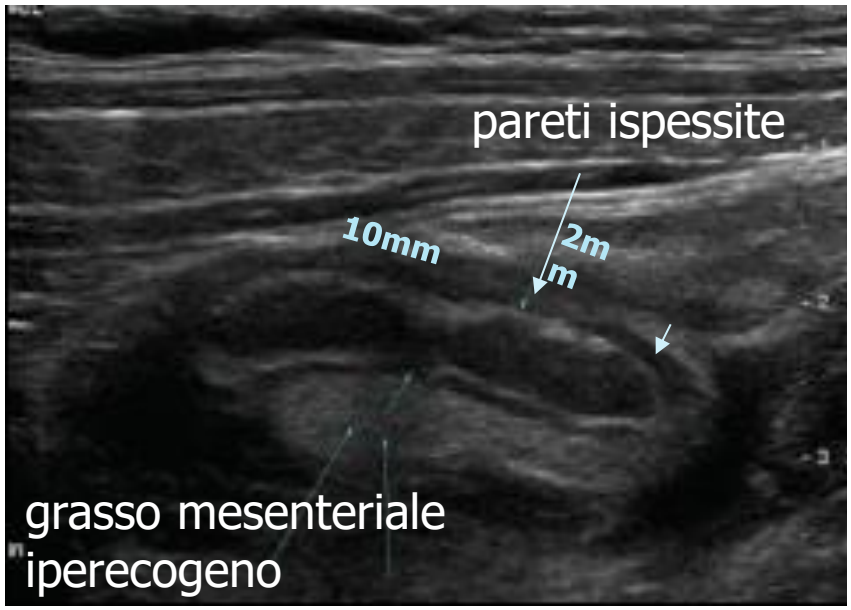
- **Diametro ≥ 6 mm***

  normale fino 9 mm

- **Spessore parete >2mm**
- **PPV ≥ 95 %**

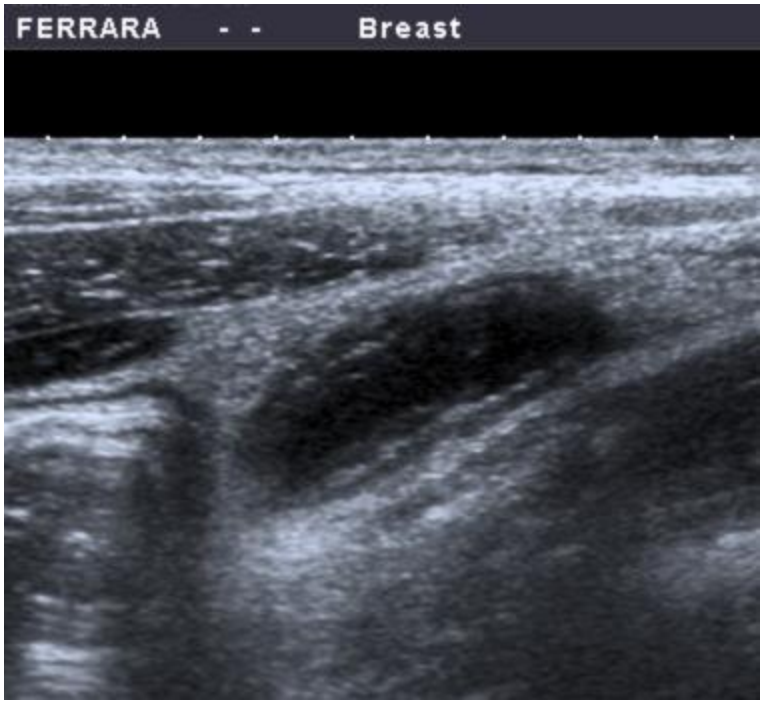
Segni indiretti

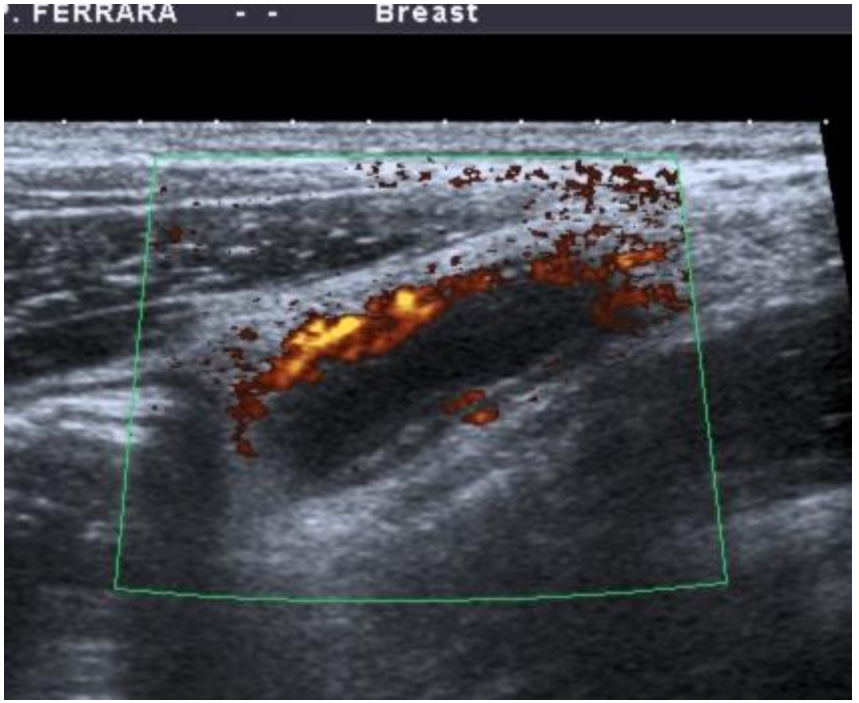
- **Iperecogenicità e non- compressibilità del grasso circostante**
- **Versamento libero**



**Kessler Radiology 2004*

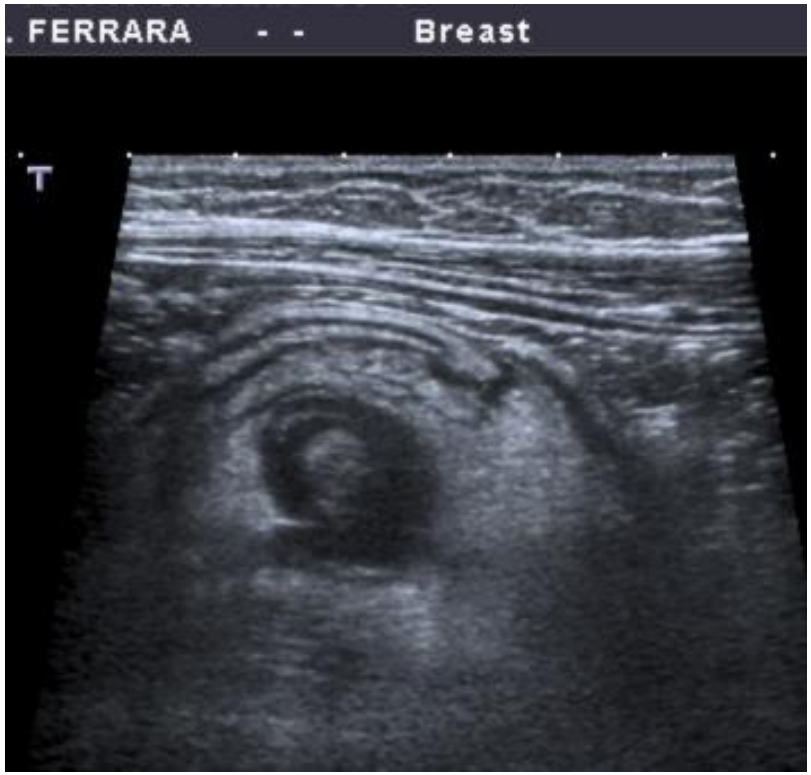
Ecografia

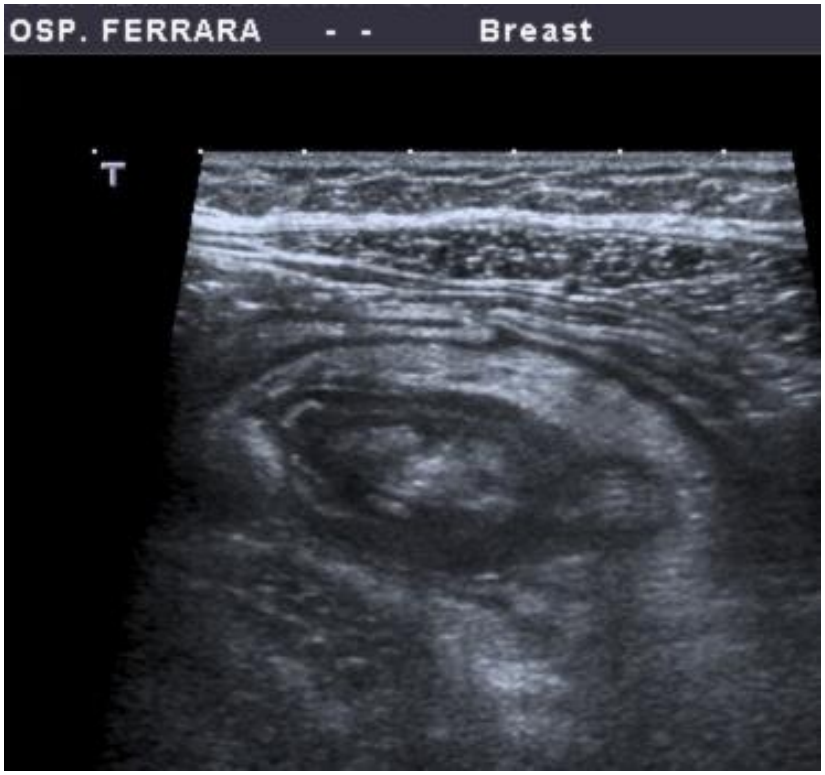




Ipervascolarizzazione parietale

Ecografia





Alterazione del grasso periviscerale

TC

Segni diretti

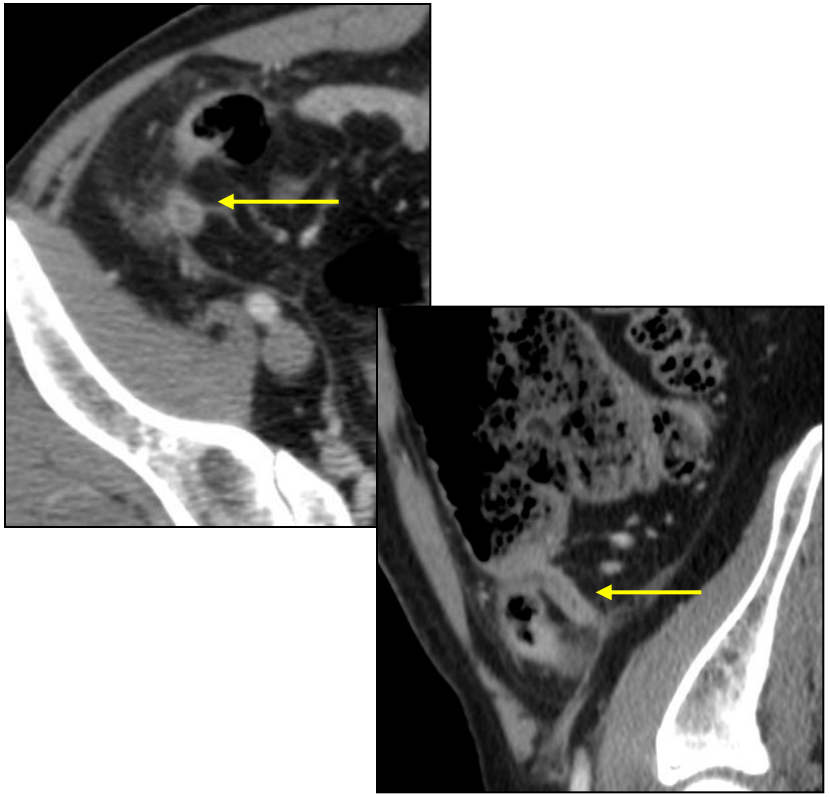
- Aumento dimensionale
- Ispessimento e/o enhancement parietale

Maschio 34 anni; dolore ingravescente da 2 giorni.

Segni indiretti

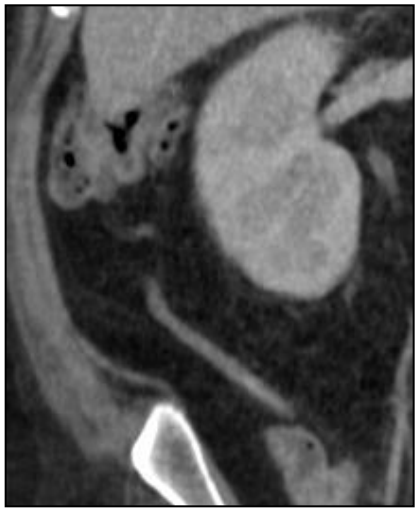
- Fat stranding
- Versamento

Maschio di 59 anni; dolore dal giorno precedente, apiretico



L'appendice normale

La TC è in grado quasi sempre di visualizzare una appendice normale



Garcia Pena et al, 1999: Appendice normale identificata con US nel 2.4% e con TC nel 84% (139 pazienti pediatrici)

Un alto VPN si traduce in un minor numero di laparotomie negative*

***TC: 0-2%, Ecografia: 8-18%** *(Applegate KE 2001, Lowe LH 2001)*

**Appendicectomie non necessarie negli USA: 15.3% del totale, Flum DR 2002*

MRI in gravidanza

Radiology

Pregnant Patients Suspected of Having Acute Appendicitis: Effect of MR Imaging on Negative Laparotomy Rate and Appendiceal Perforation Rate[1]

Ivan Pedrosa, MD

Results

- **14/148 (100% AA)**
- **9 FP**

Diagnostic Accuracy of US and MR Imaging

Findings	Patients with AA ($n = 14$)*	Patients without AA ($n = 134$)*	Sensitivity†	Specificity†	PPV†	NPV†
US			36 (5/14)	99 (125/126)	83 (5/6)	93 (126/135)
Positive for AA	5	1	. . .	. . .	. . .	. . .
Negative for AA	9	125	. . .	. . .	. . .	. . .
MR			100 (14/14)	93 (125/134)	61 (14/23)	100 (125/125)
Positive for AA	14	9	. . .	. . .	. . .	. . .
Negative for AA	0	125	. . .	. . .	. . .	. . .

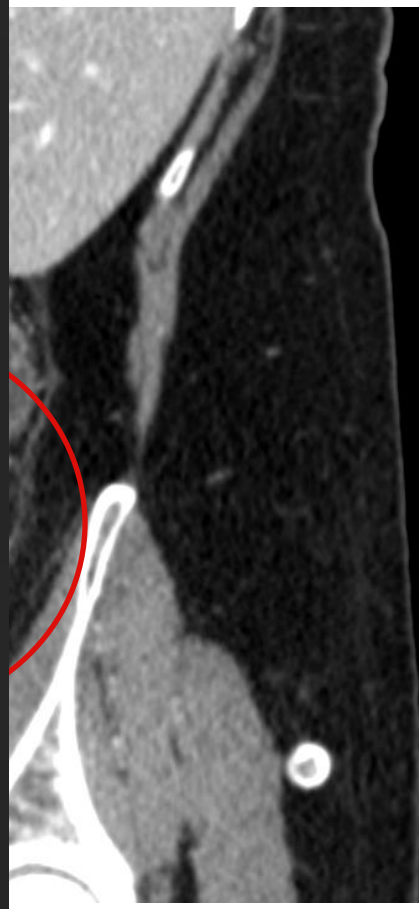
Note.—US was performed in 140 patients, and MR imaging was performed in all 148 patients. NPV = negative predictive value, PPV = positive predictive value.

* Data are numbers of patients.

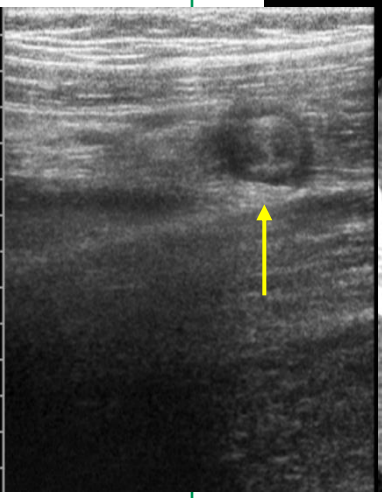
† Data are percentages. The numbers used to calculate the percentages are in parentheses.

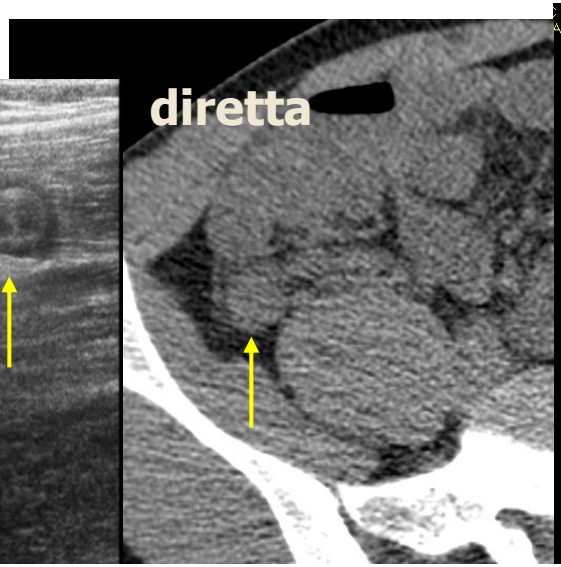
For pregnant patients clinically suspected of having AA, use of MR imaging yields favorable combinations of NLR and PR compared with previously reported values. The radiation exposure associated with CT examination can be avoided in most cases.

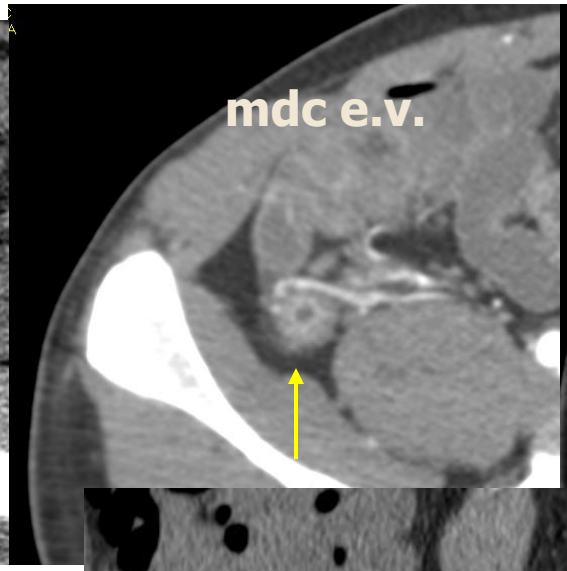
Femmina 65 anni, con nausea, vomito, algie addominali, iperpiressia. Eco/Rx negativa

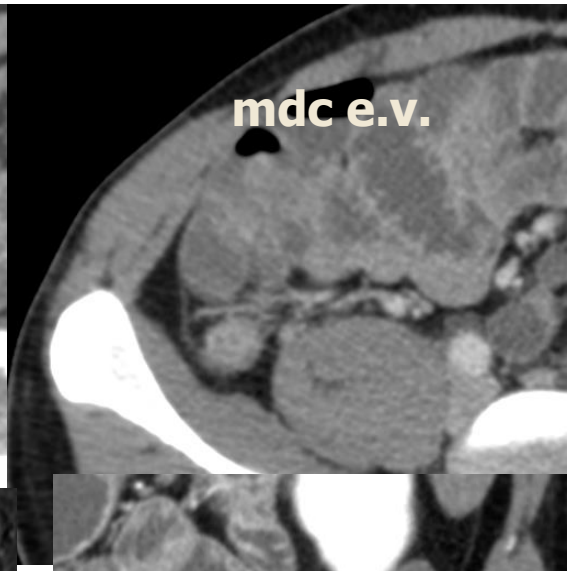


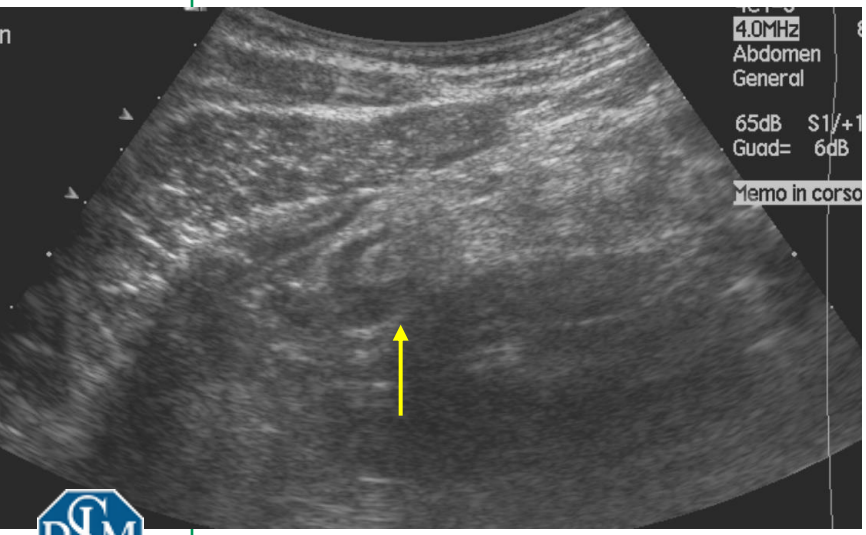
Maschio 35 anni, con algie addominali di ndd: sospetta patologia del tenue.

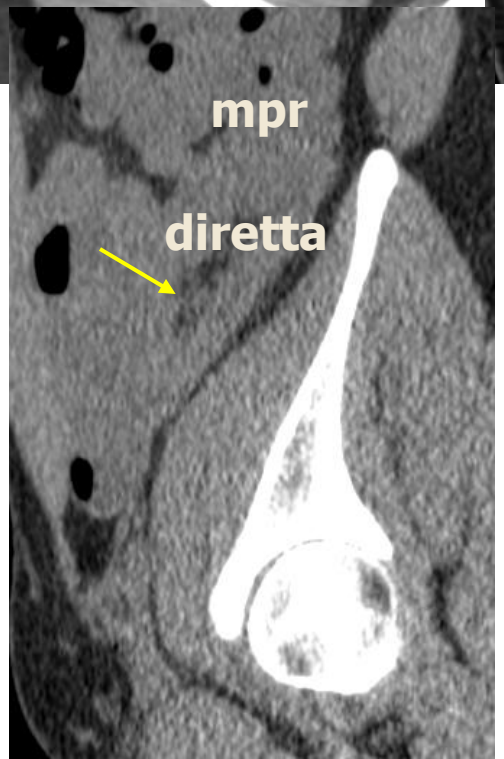


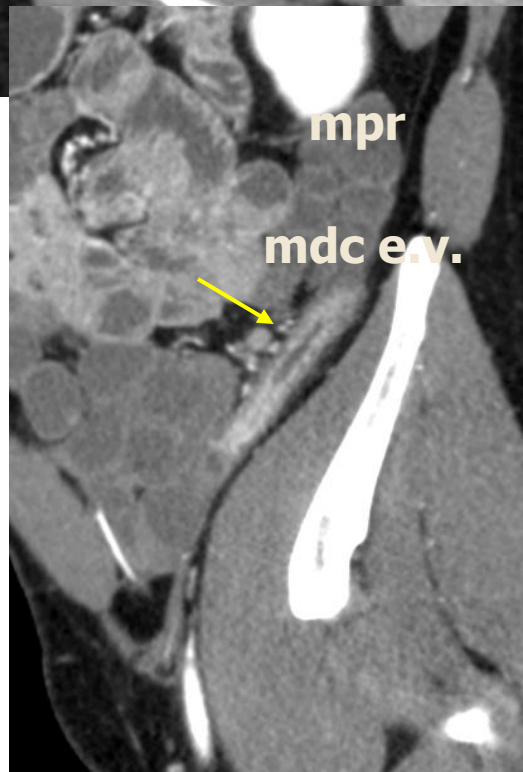








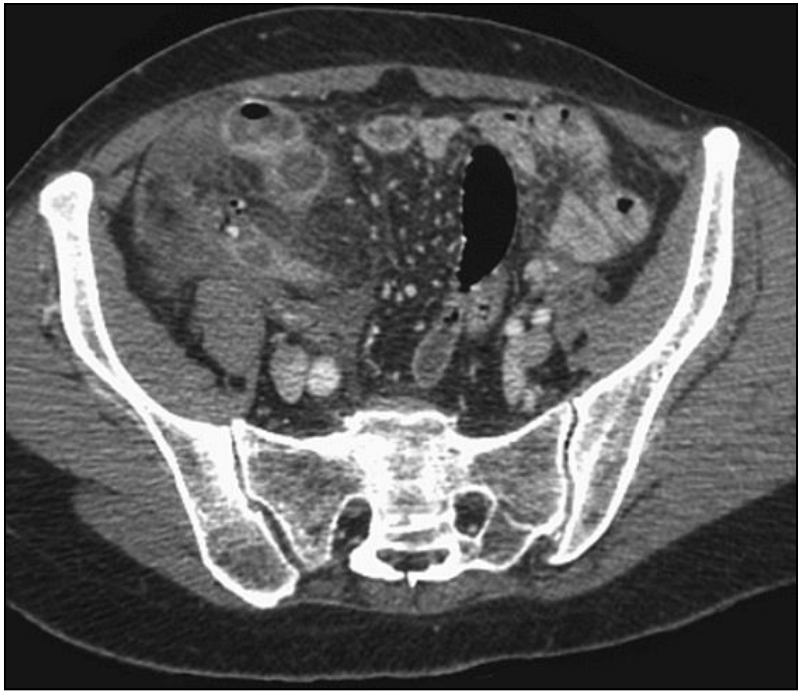




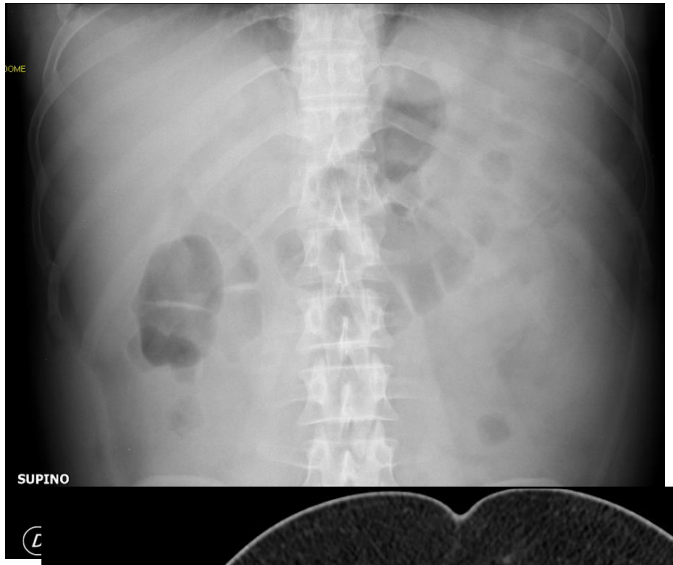
Forme Complicate

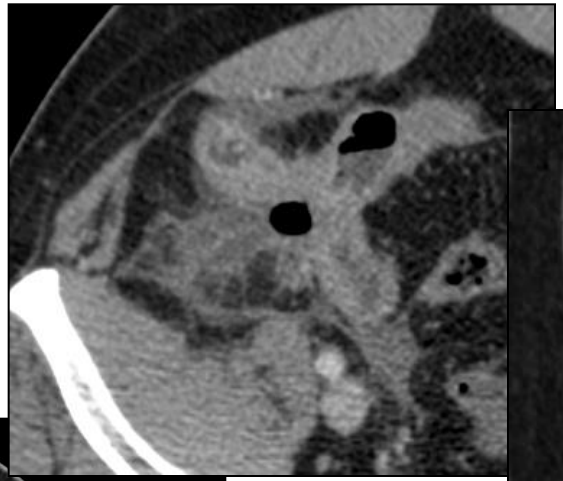
Flemmone

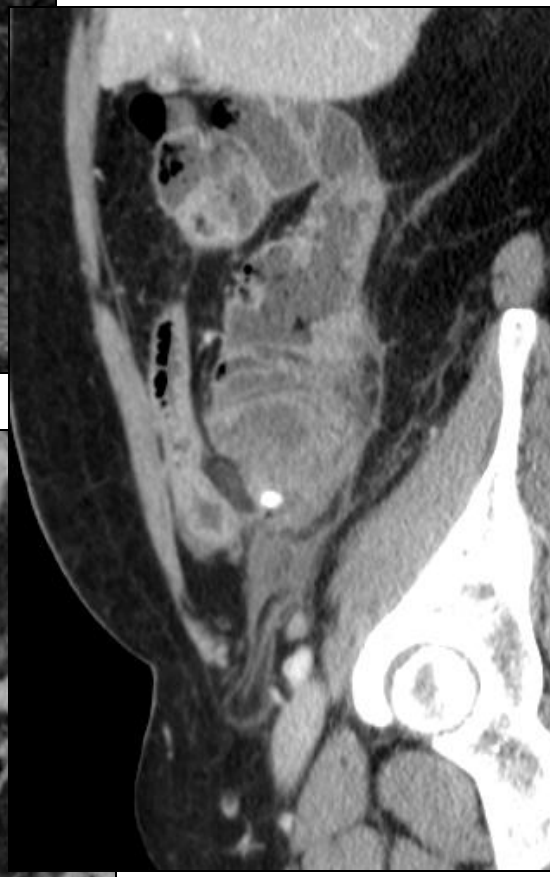
- Massa di tessuto flogistico con disomogeneo contrast enhancement
- L'appendice può non essere direttamente riconoscibile

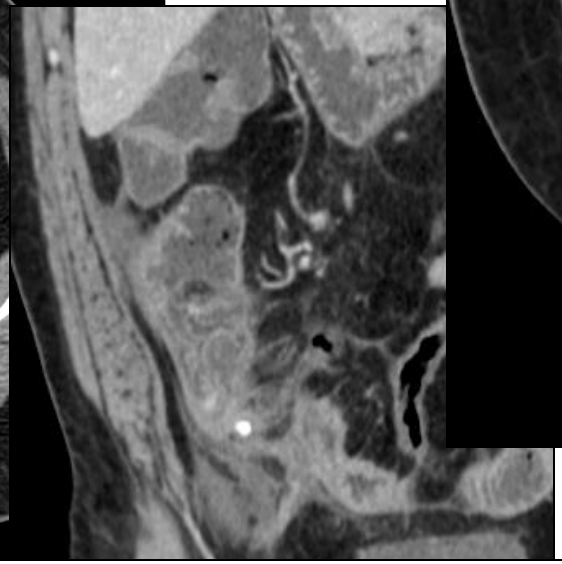


Maschio 48 aa. Vomito e alvo diarroico da 2 gg, dolore ai quadranti addominali inferiori.







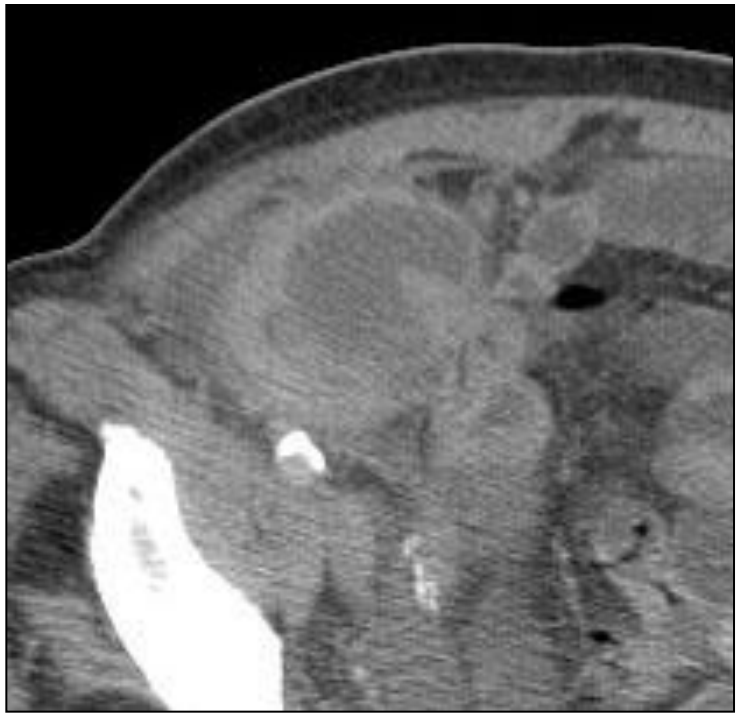


Diagnosi operatoria: appendicite necrotica gangrenosa (flemmone)

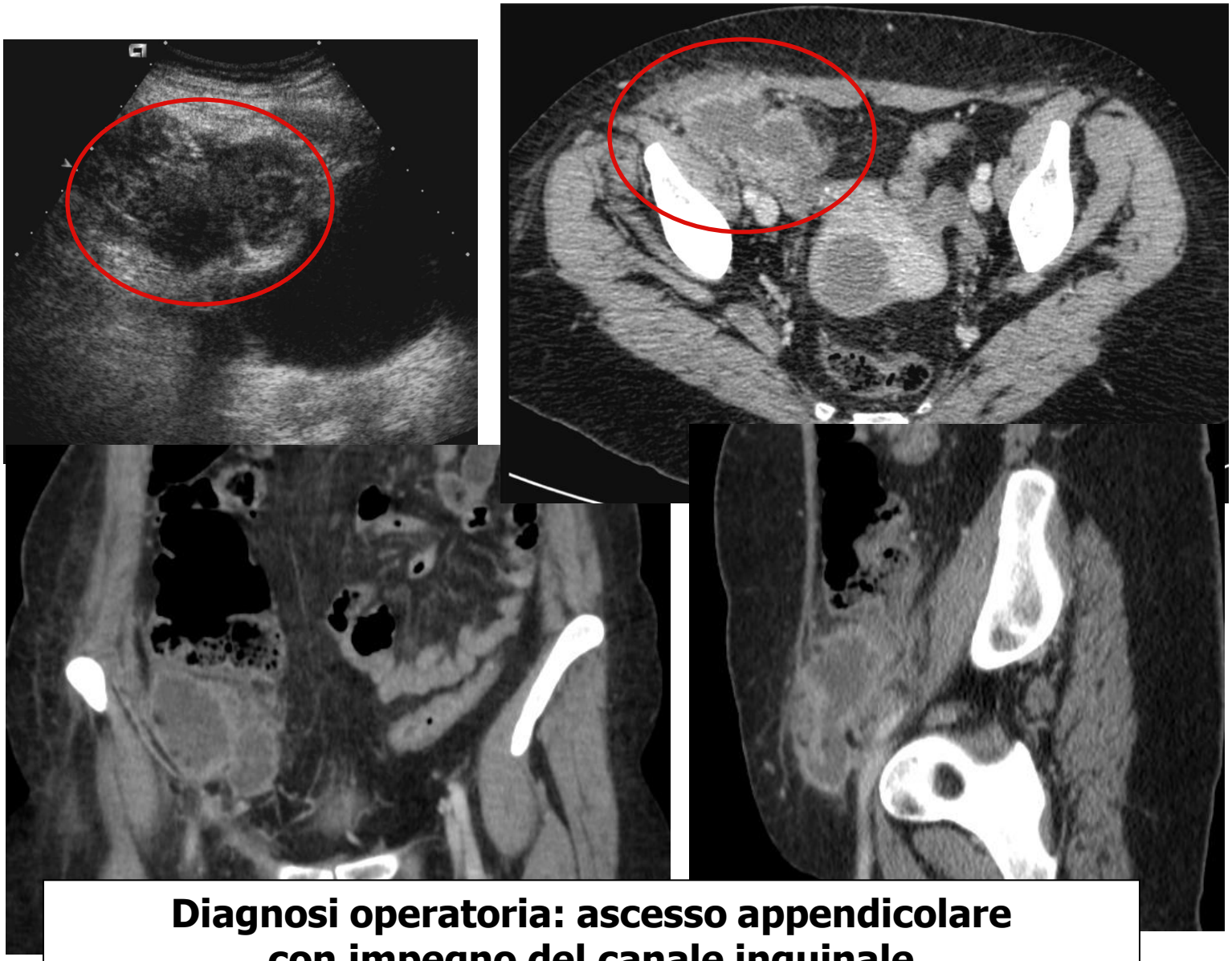
Forme Complicate

Ascesso

- Sede paracecale o a distanza
- Raccolta ipoecogena/ipodensa di materiale purulento
- Circondata da pseudocapsula irregolare vascolarizzata
- 15% dei casi: presenza di bolle di gas o livelli idroaerei



Femmina 59 aa. Dolore sede inguinale dx, stipsi ostinata, poliuria, lieve iperpiressia (t=37.5°)



Diagnosi operatoria: ascesso appendicolare con impegno del canale inguinale

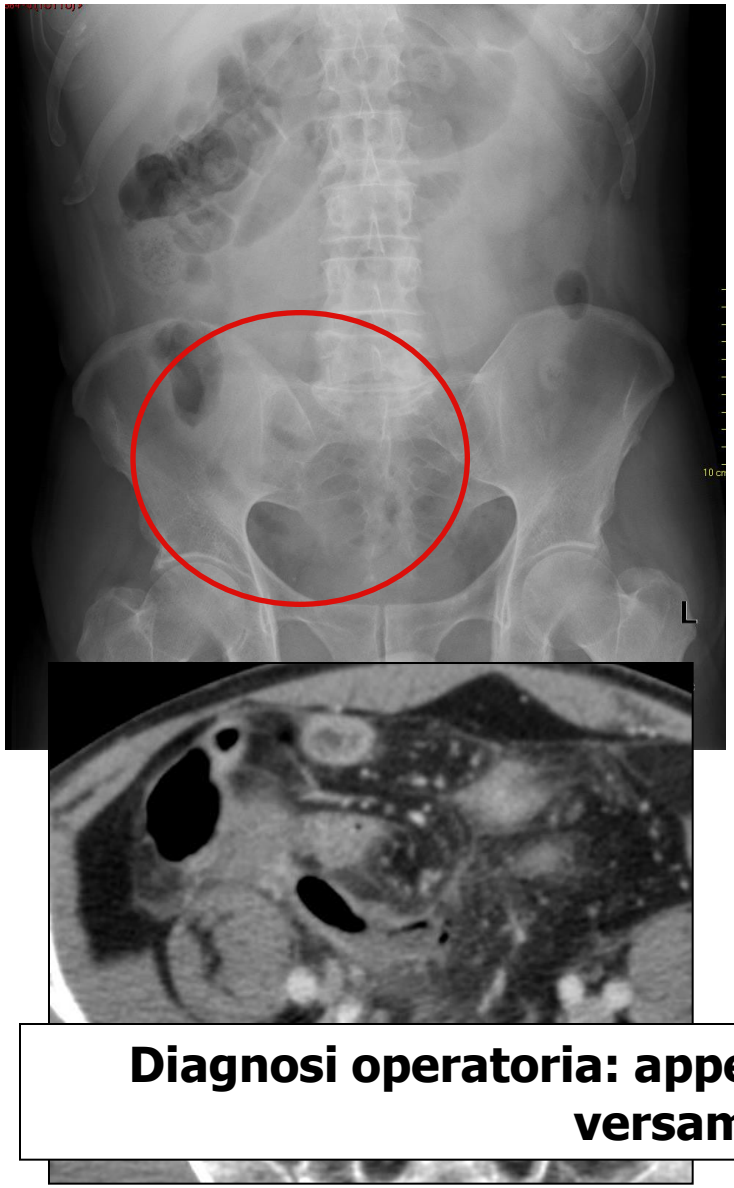
Forme Complicate

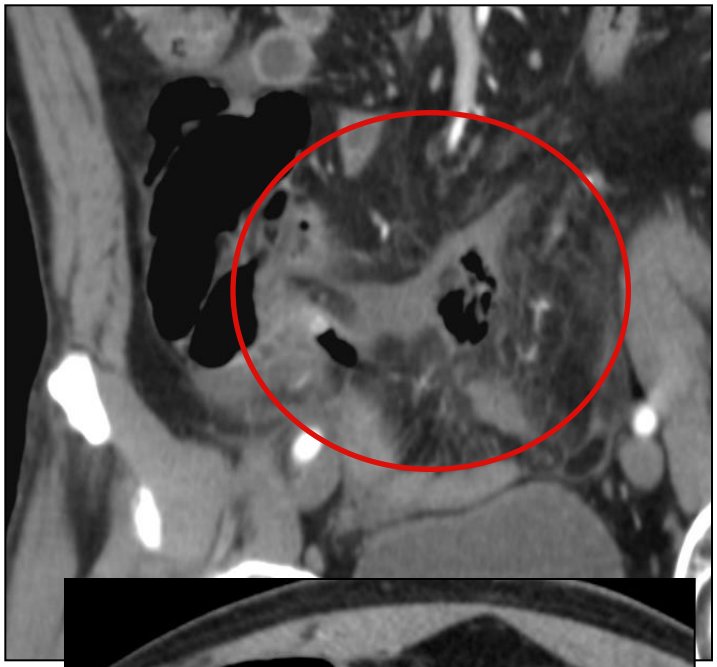
Perforazione – Fistole (Enterica, Vescicale, Vaginale, Cutanea)

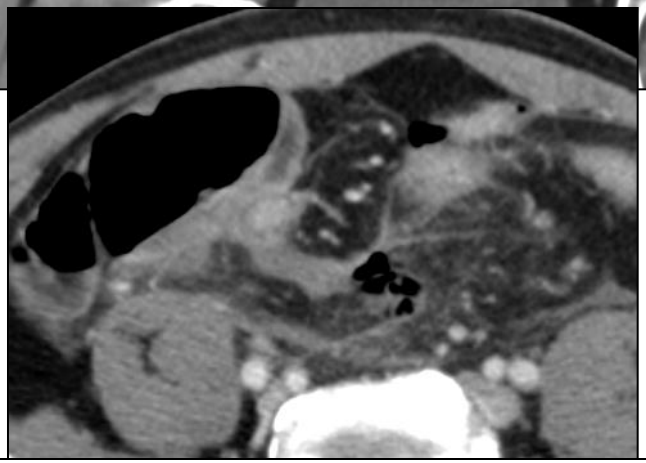
Femmina di 62 aa. Vomito, dolore quadranti di dx, Murphy +, Blumberg +, sospetta colecistite acuta (RX ed Eco negativi)

Diagnosi operatoria: appendicite perforata con raccolta

Maschio di 59 aa. Alvo chiuso, febbricola, dolore addominale diffuso







Diagnosi operatoria: appendicite gangrenosa perforata con versamento purulento

Appendicite Acuta

Quale protocollo d'indagine?

American College of Radiology
ACR Appropriateness Criteria®

Date of origin: 1996
Last review date: 2007

Clinical Condition: Right Lower Quadrant Pain

Variant 1: Fever, leukocytosis, and classic presentation clinically for appendicitis in adults.

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis with contrast	8	Use of oral or rectal contrast depends on institutional preference.	High
CT abdomen and pelvis without contrast	7	Use of oral or rectal contrast depends on institutional preference.	High
US abdomen RLQ	6	With graded compression.	None
US pelvis	5		None
X-ray abdomen	5		Med
MRI abdomen and pelvis with or without contrast	4	See statement regarding contrast in text under "Anticipated Exceptions."	None
X-ray contrast enema	3		Med
Tc-99m WBC scan abdomen and pelvis	3		Med

Rating Scale: 1=Least appropriate, 9=Most appropriate *Relative Radiation Level

Variant 2: Fever, leukocytosis; possible appendicitis, atypical presentation, adults and adolescents.

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis with contrast	8	Use of oral or rectal contrast depends on institutional preference.	High
X-ray abdomen	6		Med
US abdomen RLQ	6	With graded compression.	None
US pelvis	6		None
CT abdomen and pelvis without contrast	6	Use of oral or rectal contrast depends on institutional preference.	High
MRI abdomen and pelvis with or without contrast	5	See statement regarding contrast in text under "Anticipated Exceptions."	None
X-ray contrast enema	3		Med
Tc-99m WBC scan abdomen and pelvis	3		Med

Rating Scale: 1=Least appropriate, 9=Most appropriate *Relative Radiation Level

«**US** is recommended as the initial imaging study in children, young women, and during pregnancy»

Birnbaum BA, Wilson S. Appendicitis at the millenium, Radiology 2000

«Woman in whom acute gynecologic conditions are diagnosed versus appendicitis should have initial **US** evaluation»

Rao PM, Obst Gyn, 1999

CT:

1) all other patients
2) when US is normal or nondiagnostic

2014

Clinical Condition: Right Lower Quadrant Pain—Suspected Appendicitis

Variant 1: Fever, leukocytosis, and classic clinical presentation for appendicitis in adults.

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis with contrast	8	Oral or rectal contrast may not be needed depending on institutional preference.	☢☢☢☢

TIPICA NEGLI ADULTI

Variant 2: Fever, leukocytosis; possible appendicitis, atypical presentation, adults and adolescents.

Radiologic Procedure	Rating	Comments	RRL*
CT abdomen and pelvis with contrast	8	Oral or rectal contrast may not be needed depending on institutional preference.	☢☢☢☢
X-ray abdomen	6	This procedure may be useful in excluding free air or obstruction.	☢☢
US abdomen	6	Perform this procedure with graded compression.	O
US pelvis	6	This procedure is appropriate for women with pelvic pain.	O

ATIPICA IN ADULTI E ADOLESCENTI

Clinical Condition: Right Lower Quadrant Pain—Suspected Appendicitis

Variant 3: Fever, leukocytosis, pregnant woman.

Radiologic Procedure	Rating	Comments	RRL*
US abdomen	8	Perform this procedure with graded compression. This procedure is better in the first and early second trimester.	O
MRI abdomen and pelvis without contrast	7	This procedure may be useful following negative or equivocal US.	O
US pelvis	6		O
[illegible]	[illegible]	This procedure may be useful following negative or equivocal US and MRI. Oral	[illegible]

GRAVIDE

Variant 4: Fever, leukocytosis, possible appendicitis, atypical presentation in children (younger than age 14).

Radiologic Procedure	Rating	Comments	RRL*
US abdomen	8	Perform this procedure with graded compression.	O
CT abdomen and pelvis with contrast	7	This procedure may be useful following negative or equivocal US. Oral or rectal contrast may not be needed depending on institutional preference.	☢☢☢☢

PEDIATRICI

GASTROINTESTINAL

Eur Radiol (2010) 20: 1657–1666
DOI 10.1007/s00330-009-1706-x

Profiles of US and CT imaging features with a high probability of appendicitis

A. van Randen
W. Laméris
H. W. van Es
W. ten Hove
W. H. Bouma
M. S. van Leeuwen
E. M. van Keulen
V. P. M. van der Hulst
O. D. Henneman
P. M. Bossuyt
M. A. Boermeester
J. Stoker

European Radiology

Fig. 2 Flowchart for US

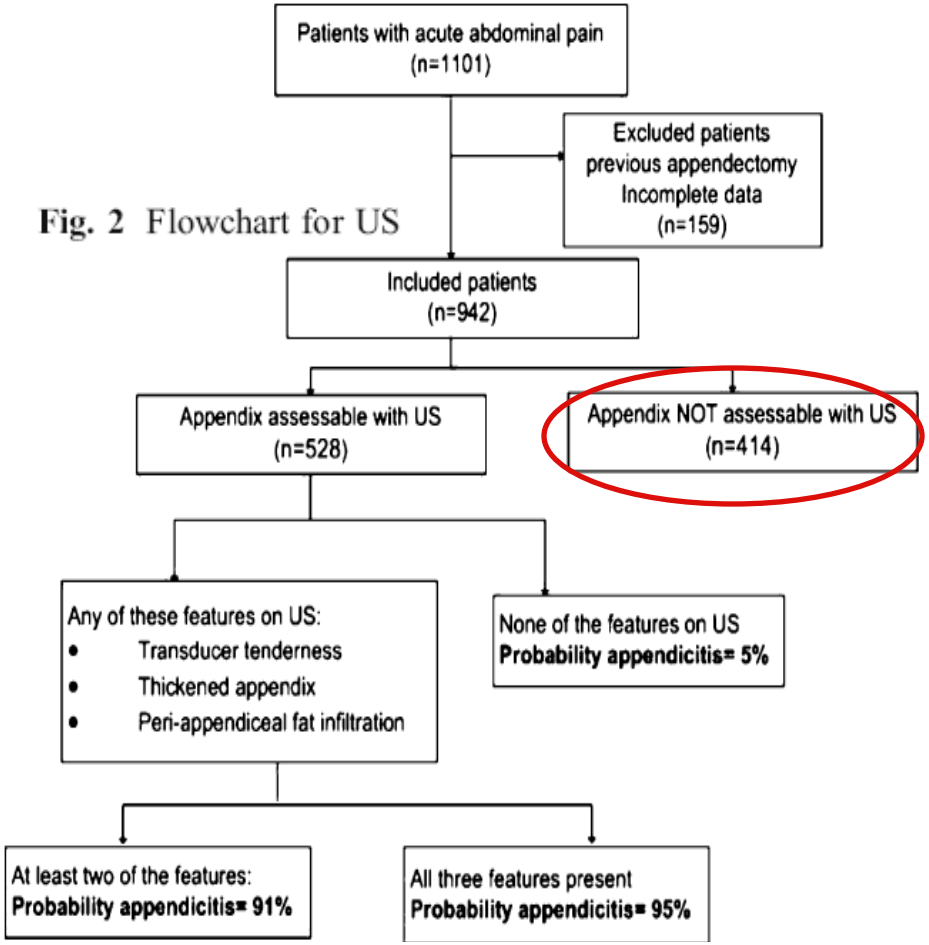
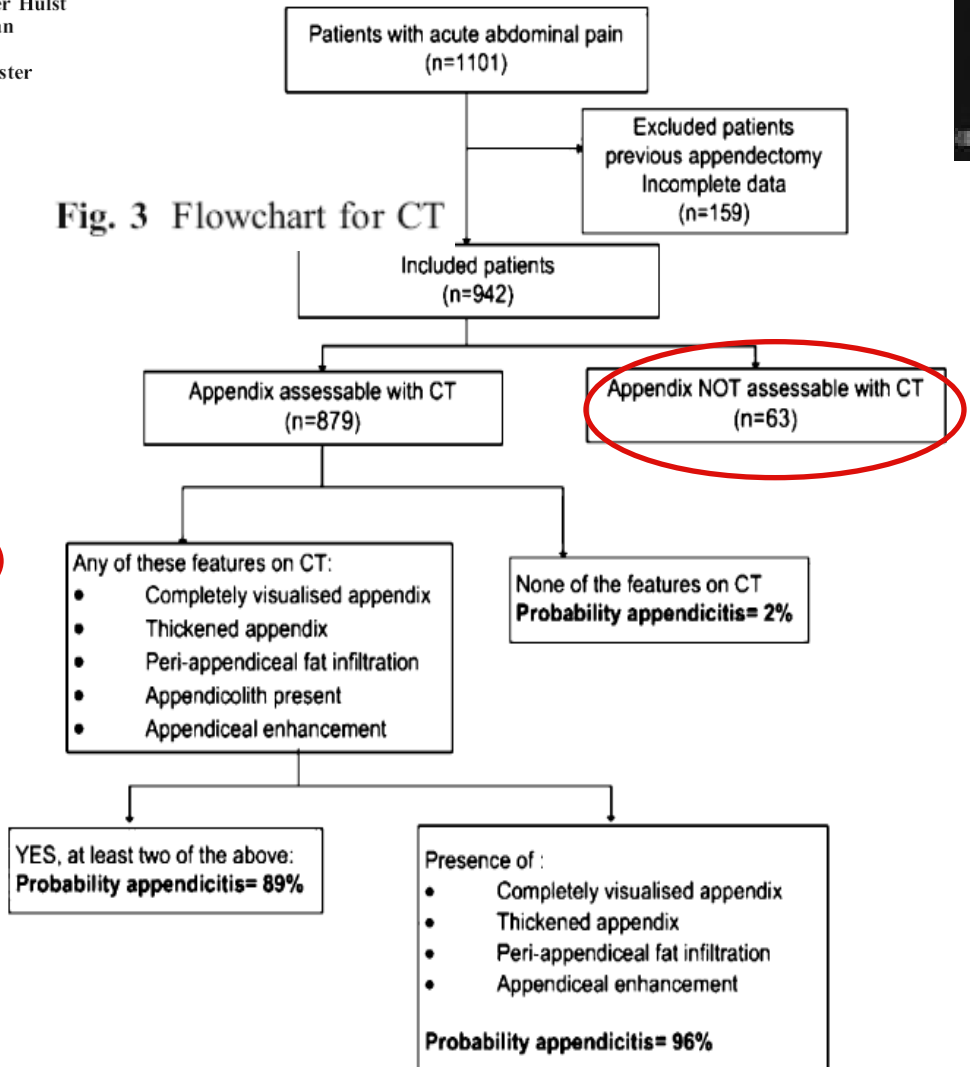


Fig. 3 Flowchart for CT



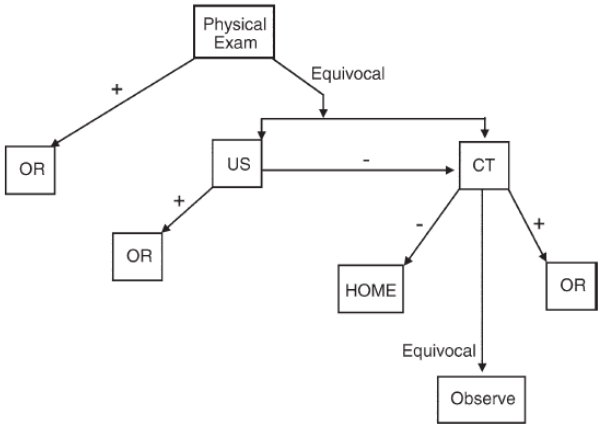
US (two or more features):
sensitivity 92% (95% CI 89–96%)
specificity 83% (95% CI 79–88%)

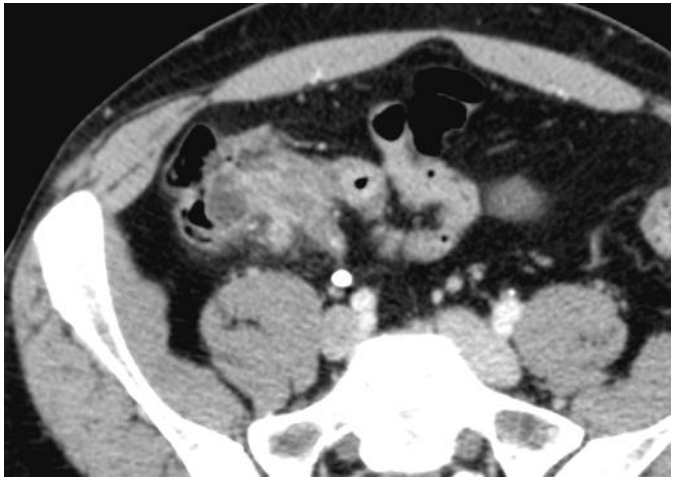
CT (two or more imaging features present):
sensitivity of 96% (95% CI 93–98%)
specificity of 95% (95% CI 93–96%)

Ecografia Vs TC

Radiology

CT and US in the Diagnosis of Appendicitis: An Argument for CT[1]



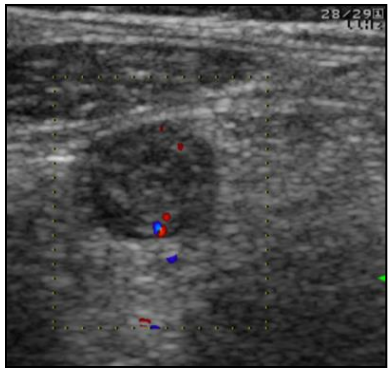


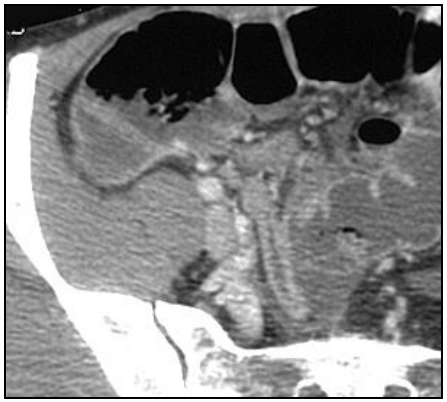
- ***Initial examination as US or CT would be determined on the basis of clinical concerns, patient size and suspicion of perforation***

- ***US may be used first in patients who are suspected of having appendicitis, but a US examination with negative findings should not lead to a dismissal of the diagnosis***

Marta Hernanz-Schulman, MD

Eco o TC?





US first line

- paziente magro
- bambino, donna giovane
- sintomi clinici tipici, recenti

CT first line

- paziente sovrapp./obeso
- forme complicate (peritonismo); dolore diffuso
- US inconclusiva/neg

Grazie per l'attenzione!

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