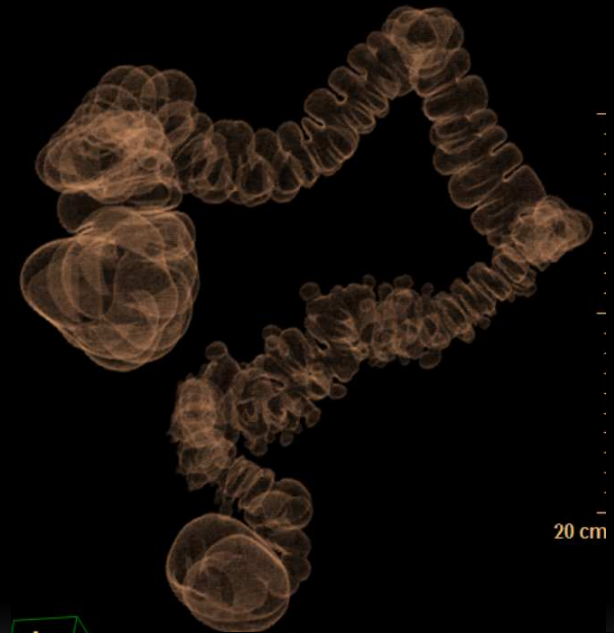
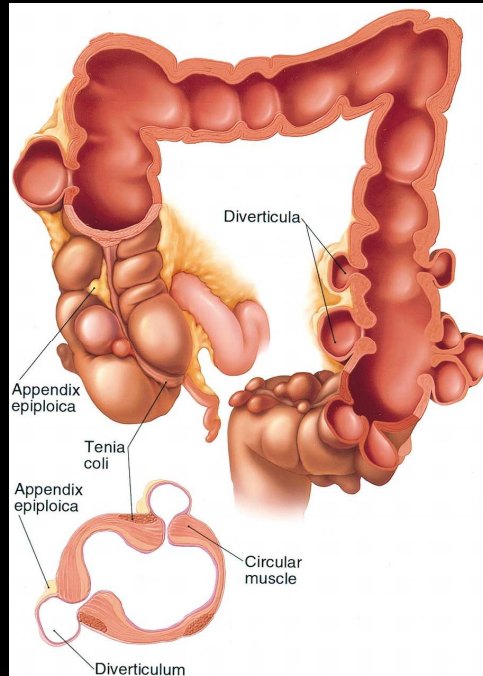
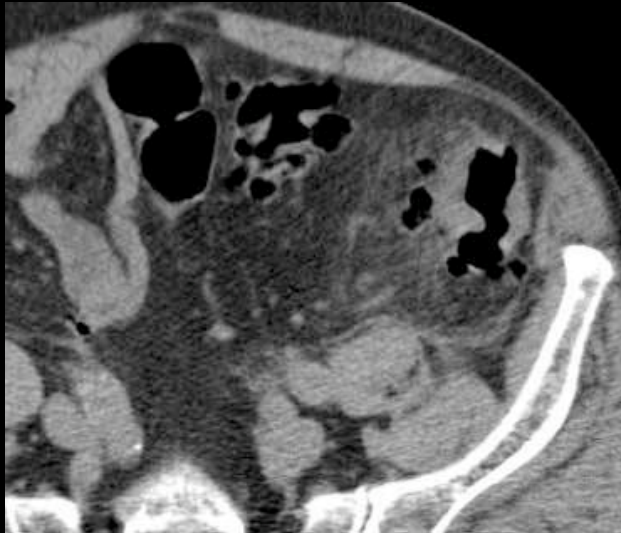
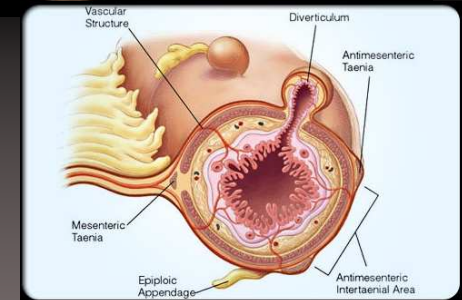


Colonscopia Virtuale e Malattia diverticolare



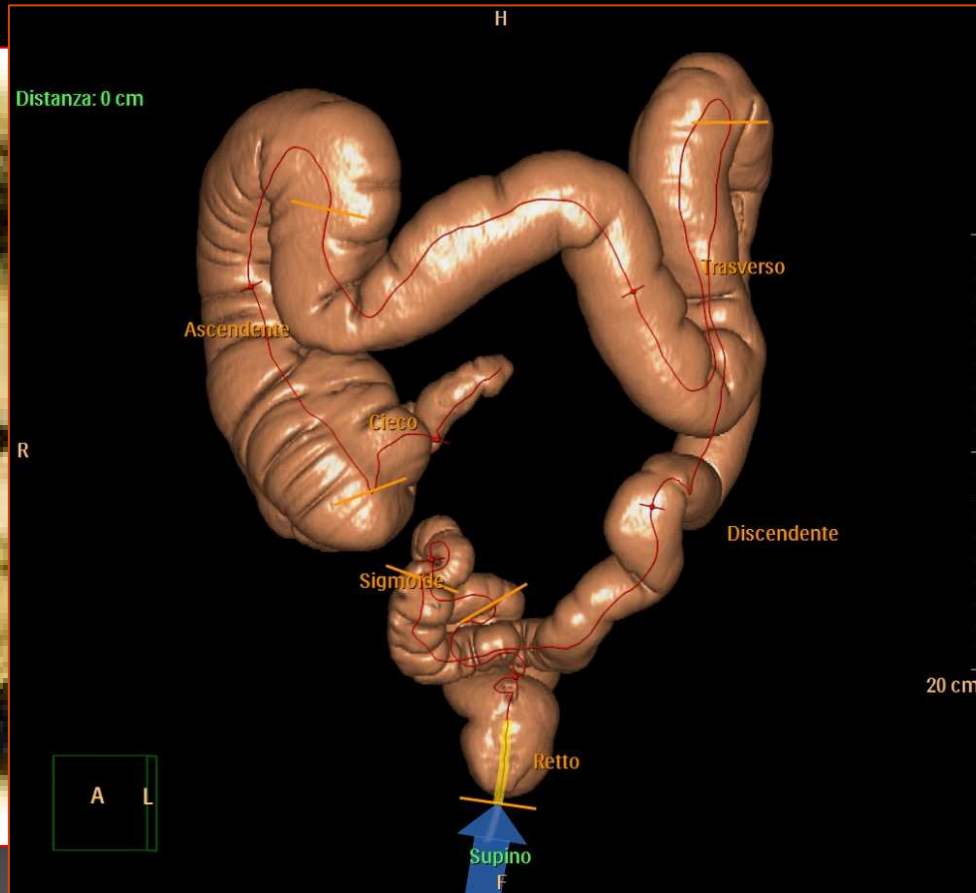
Roberto Rizzati



Dipartimento di Radiologia (Dir. Giorgio Benea)
Ospedale di Lagosanto (Fe) - Azienda USL Ferrara



Colonscopia Virtuale



- CV: introdotta nel 1994 da D. Vining
- TC volumetrica di un colon preparato e disteso da aria
- Ricostruzione dei dati con algoritmi dedicati 3D



Colonscopia virtuale

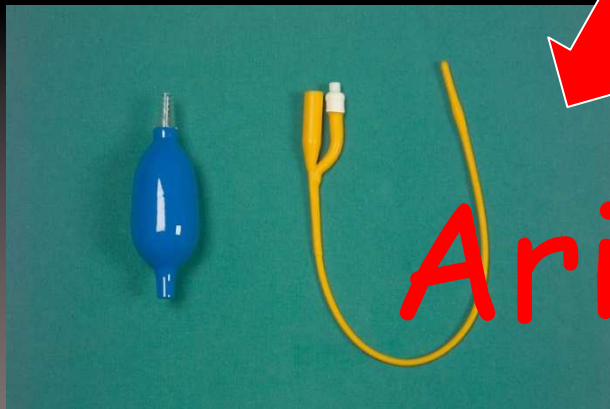
BEN TOLLERATA DAI PAZIENTI!

- NO purganti
- NO sedazione
- NO sonda endoscopica
- Veloce
- Basso numero di complicanze
- Accurata



Distensione intestinale

- Posizionamento paziente in decubito laterale sinistro a ginocchia flesse (posizione di Sims) su lettino TC
- Esplorazione rettale e successiva introduzione di sonda (Foley di piccole dimensioni)
- Distensione.....



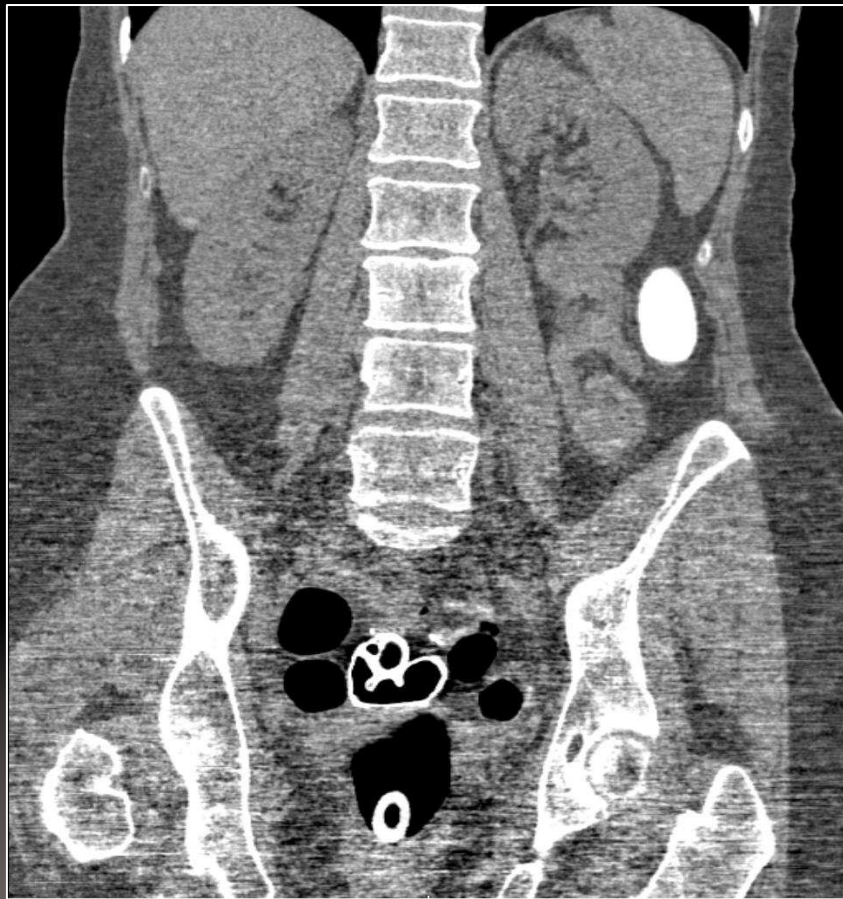
Aria



CO₂



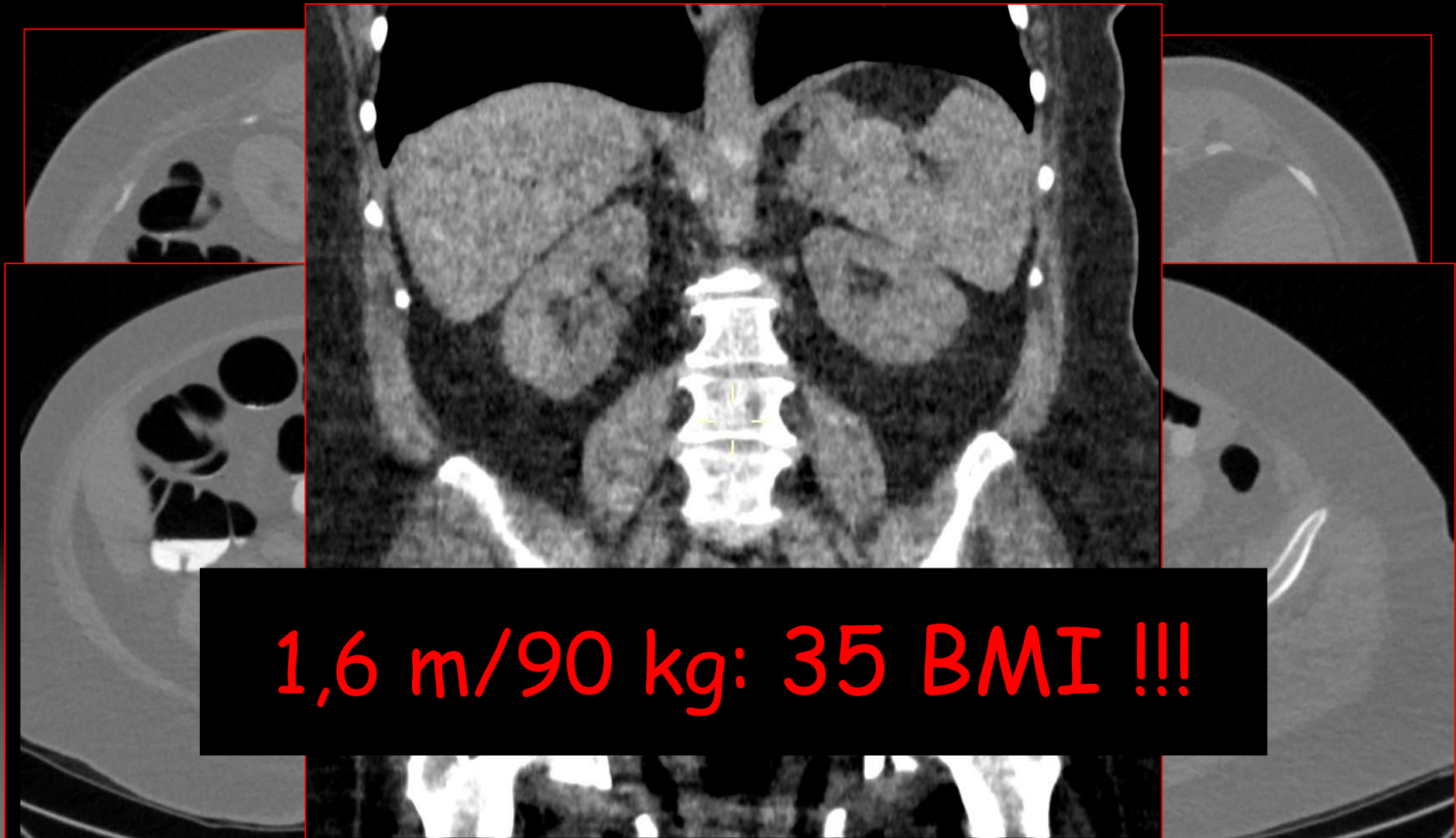
Evoluzione tecnologica: Dose



16 sl x 1,25 mm – 120 kV – 50 mAs



Evoluzione tecnologica e dose



Rx Addome diretto

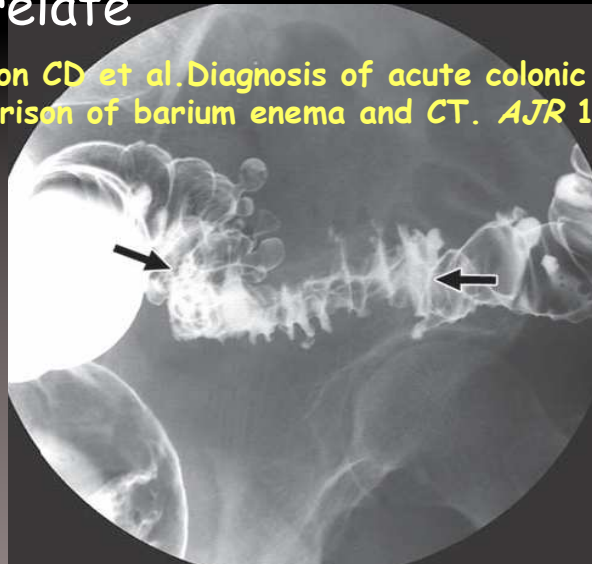
Utilità molto limitata

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

Clisma Opaco

- Sensibilità 59%-90% nella diagnosi di diverticolite del sigma.
- 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.
- US transrettale e transvaginale, specie nel sesso femminile
- Limite 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.

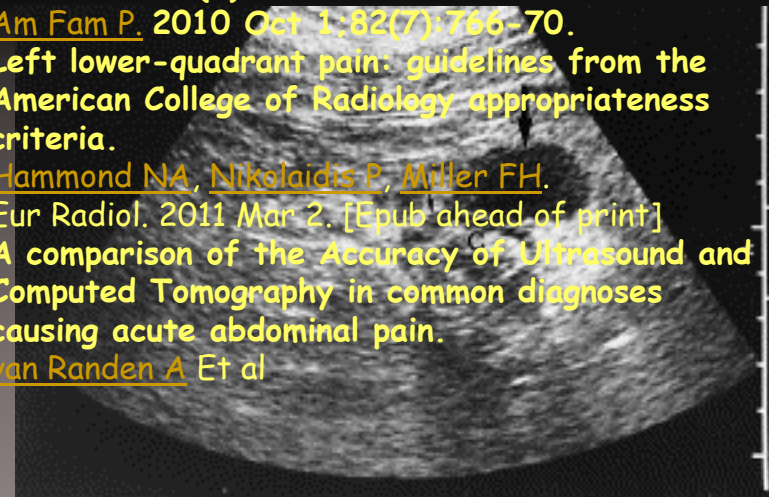
Left lower-quadrant pain: guidelines from the American College of Radiology appropriateness criteria.

[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](#)



TC Addome

Gold Standard nella diverticolite

- ❖ Sensibilità 79%-99%
- ❖ Bilancio di estensione malattia agli organi circostanti
- ❖ Indirizza il trattamento idoneo
- ❖ Guida per drenaggio percutaneo eventuali raccolte
- ❖ Pone D.D. 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

TC versus Clisma Opaco

Ambrosetti et al 2000

*TC versus Clisma opaco con mdc idrosolubile
420 pazienti con diverticolite complicata*

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



TC versus Clisma Opaco

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

[Rollandi GA](#), [Biscaldi E](#), [Decicco E](#).

[Eur J Radiol](#), 2006

“..the main limit of DCBE is that it considers the pathology 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.”

TC Colonscopia Virtuale (CT-Colonoscopy)

VC excels at diverticulosis staging

By [Eric Barnes](#)

AuntMinnie.com staff writer

By [Eric Barnes](#)

AuntMinnie.com staff writer

September 22, 2009

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.



PubMed

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



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 χ^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.

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NON in URGENZA

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

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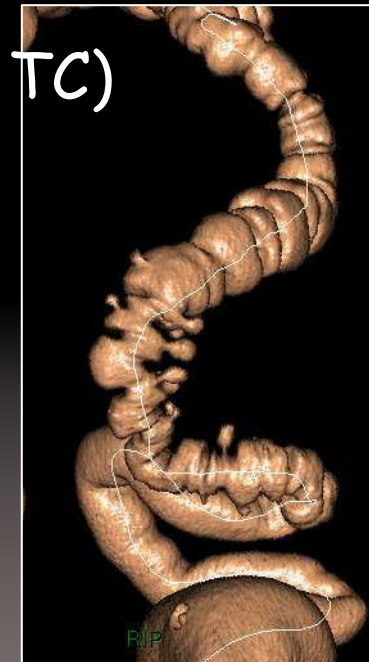
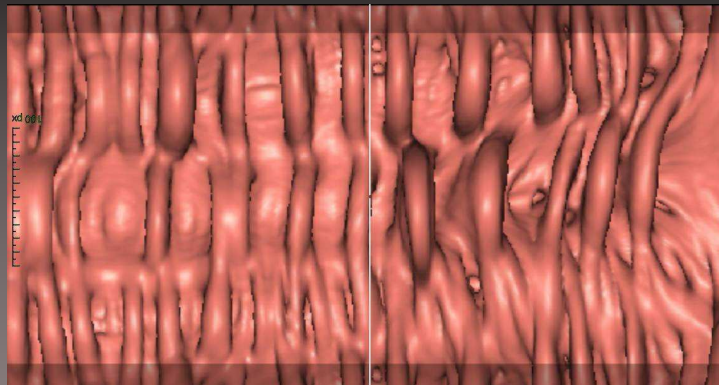
Flor N et al. Eur J Radiol 2011 in press

CV ALMENO 6 SETTIMANE DOPO L'EVENTO ACUTO !



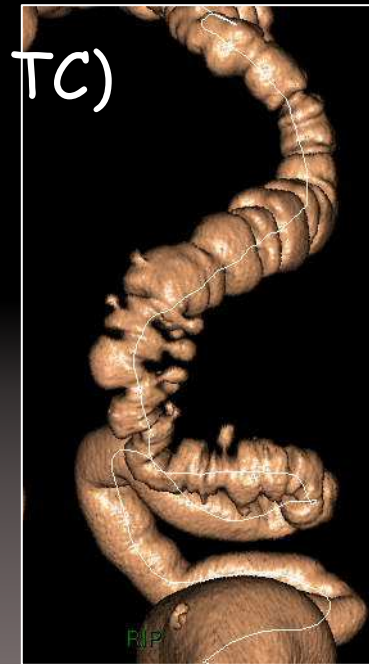
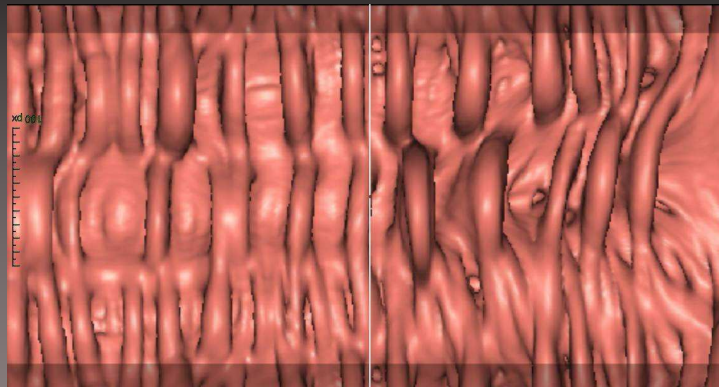
Vantaggi Colonscopia Virtuale vs TC/CO

1. Estensione diverticolosi e valutazione anatomica colon
2. Completamento diagnostico in caso di CO incompleta
3. Morfologia e grado di ispessimento parietale
4. Interessamento extracolico (versamento, perforazione coperta, ecc)
5. D.D. con CRC ????
6. Follow up diverticolite (dose minore rispetto a TC)
7. Planning pre-operatorio

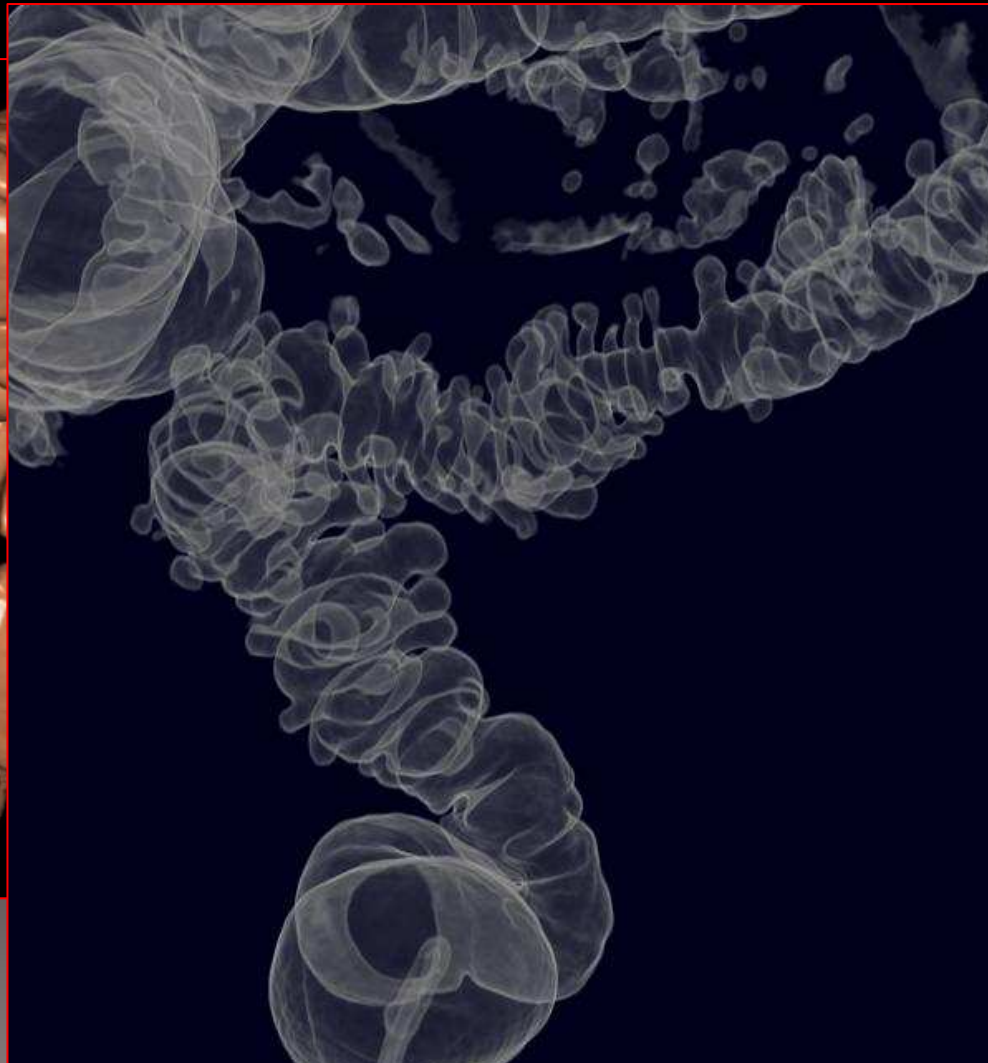
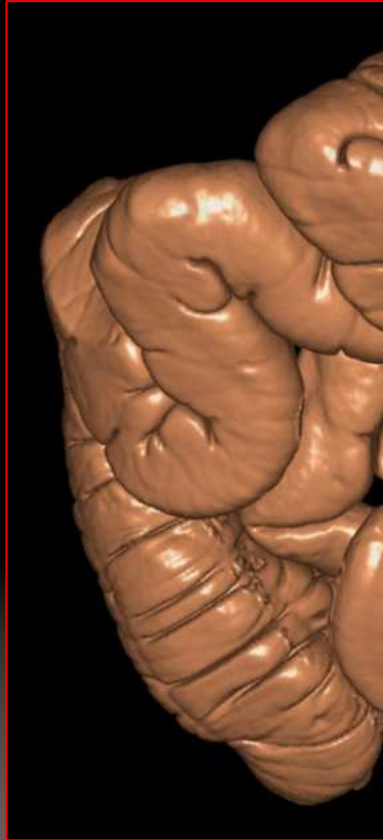


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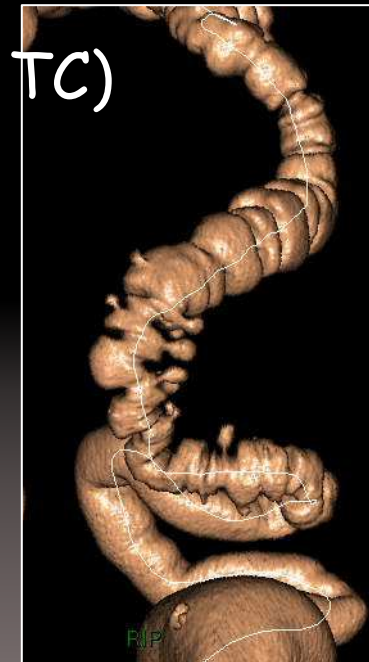
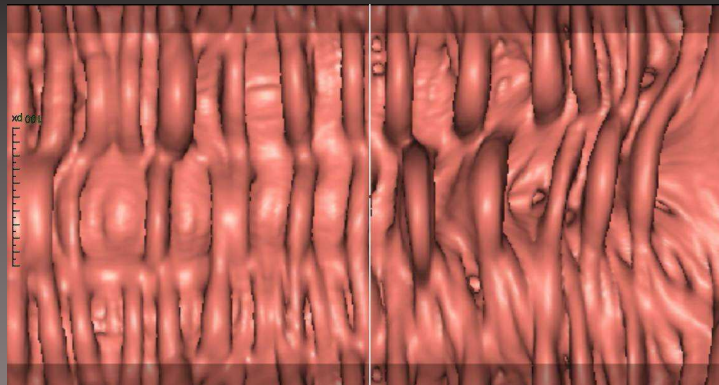


Estensione diverticolosi e valutazione anatomica colon



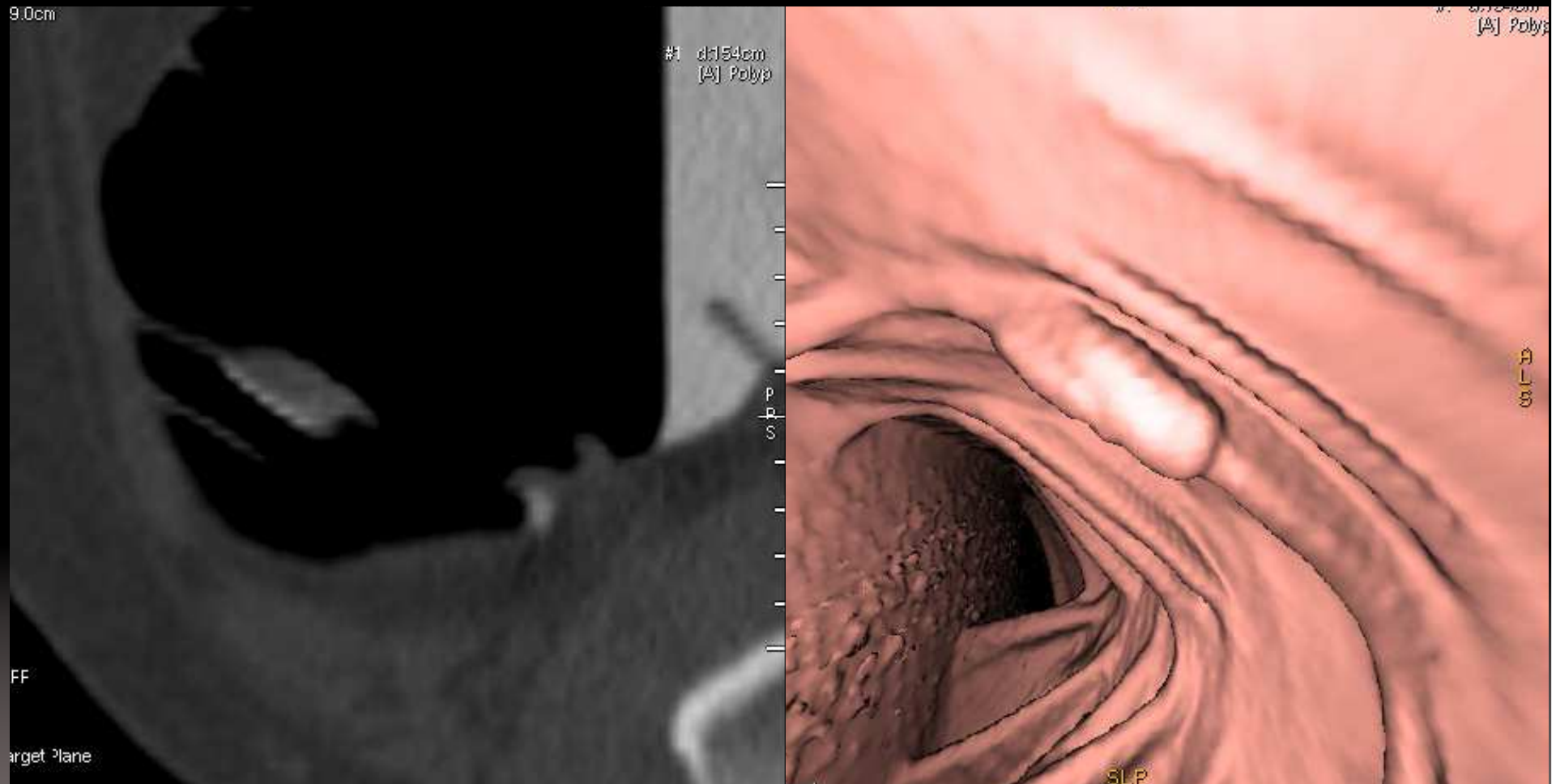
Vantaggi Colonscopia Virtuale vs TC/CO

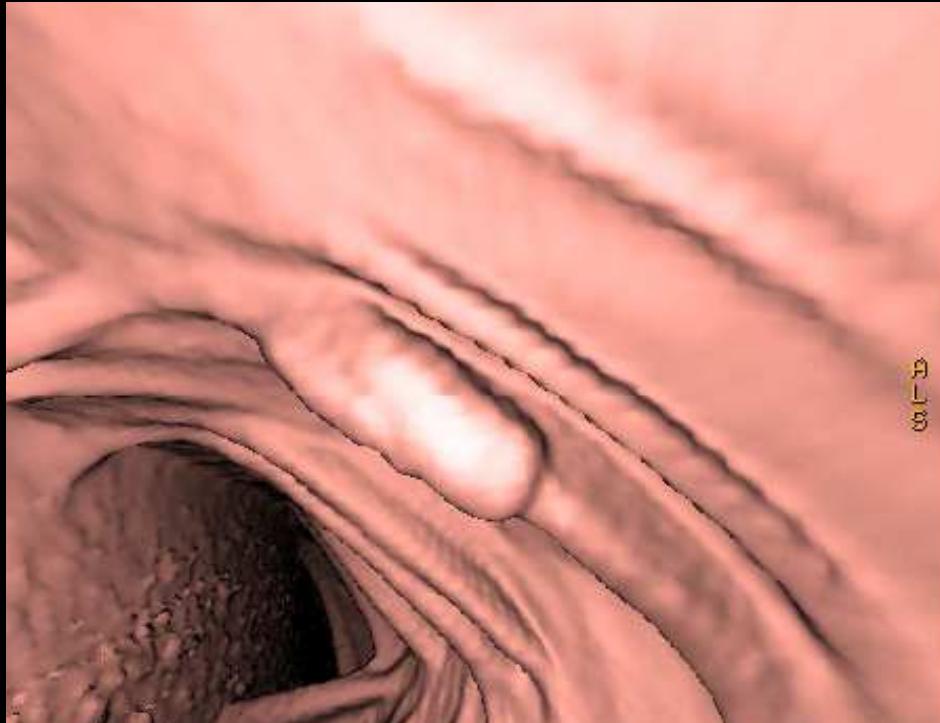
1. Estensione diverticolosi e valutazione anatomica colon
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7. Planning pre-operatorio



DONNA DI 56 ANNI

Colonscopia convenzionale interrotta al sigma per malattia diverticolare

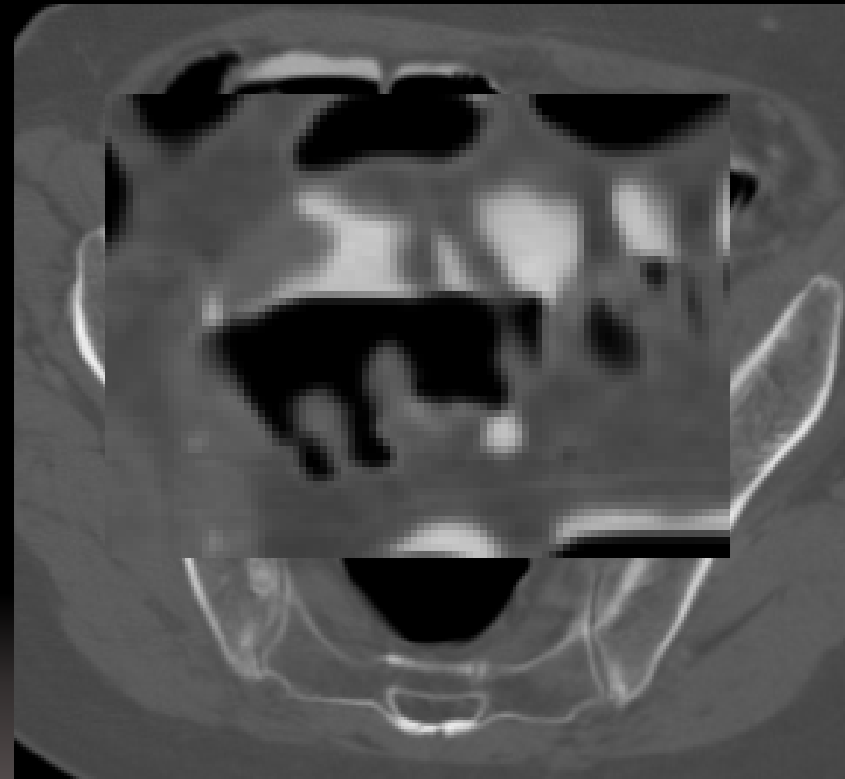
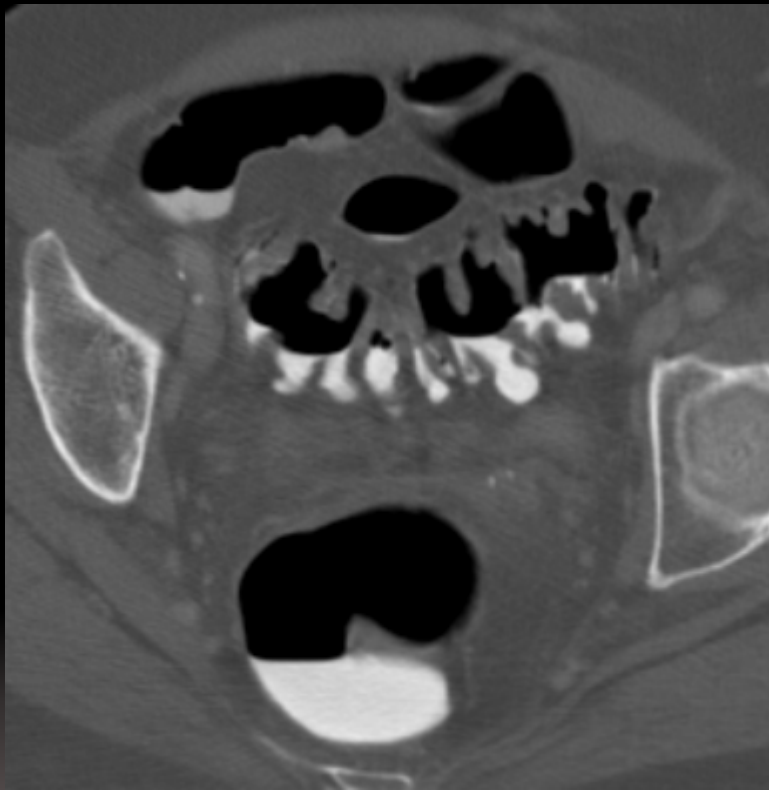


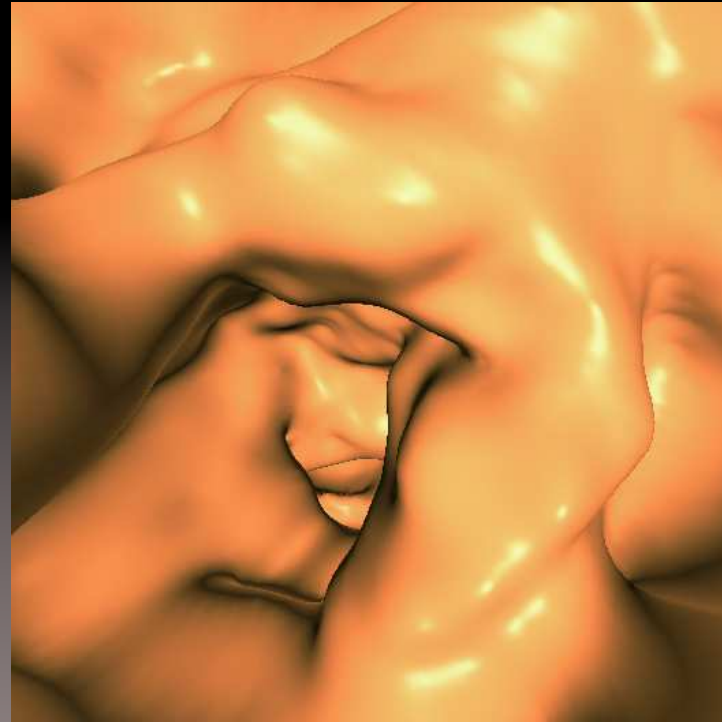
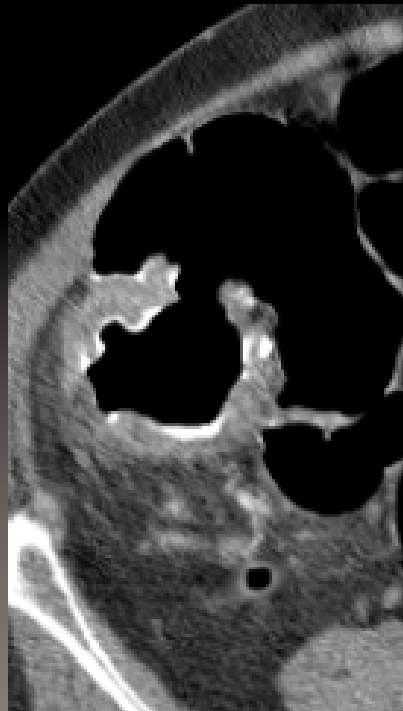
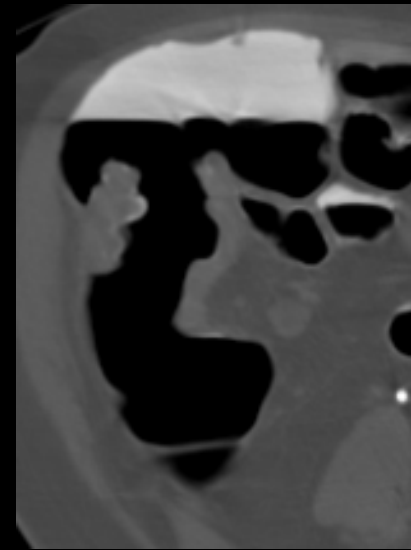
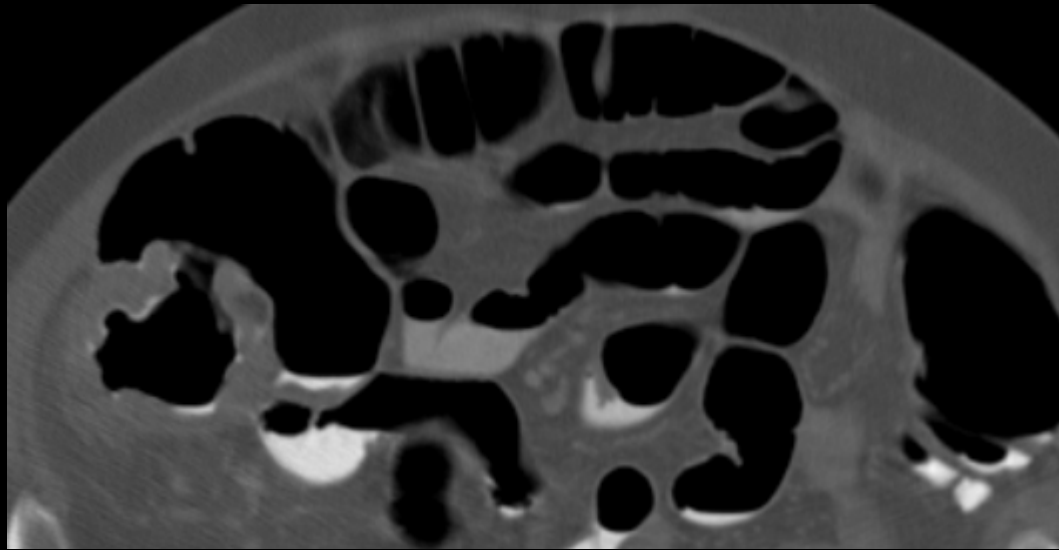


**NUOVA COLONSCOPIA OTTICA, POST CV, CON MUCOSECTOMIA
ADENOMA TUBULARE SERRATO DISPLASIA BASSO GRADO**



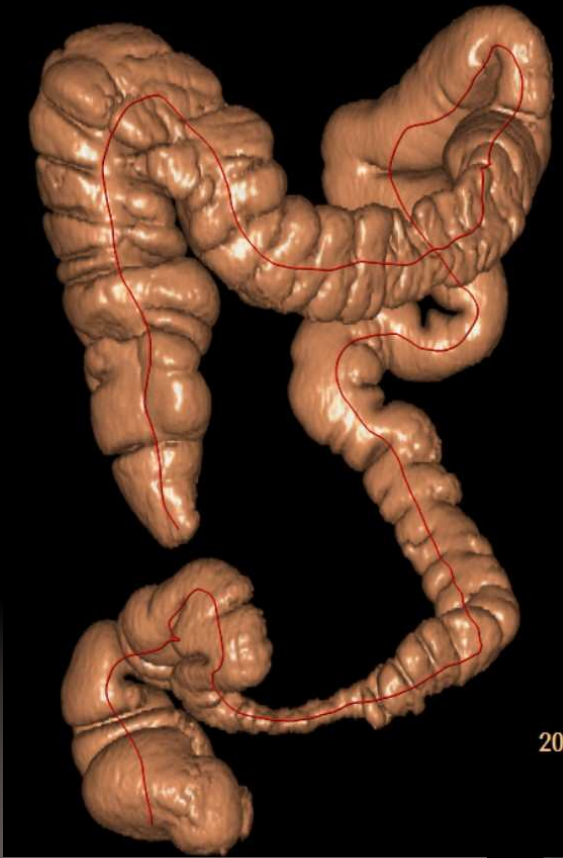
DONNA DI 72 ANNI
FOBT +
CO interrotta al sigma per malattia diverticolare



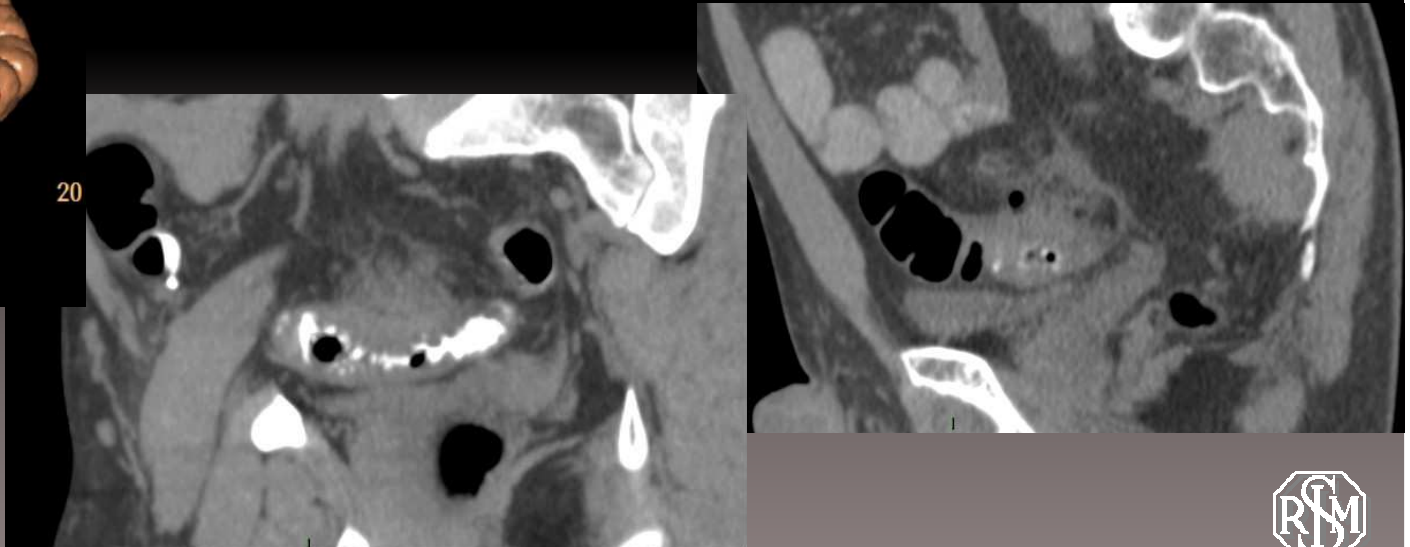


Maschio di 43 aa. Episodio forti dolori addominali con febbre circa 2 mesi prima
CO incompleta esame eseguito a completamento

39722
V TC ENDOSCOPIA VIRTUALE
2ME SMDC
1 SMDC >

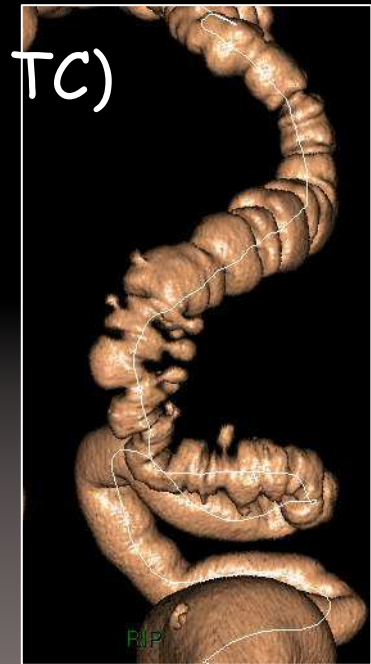
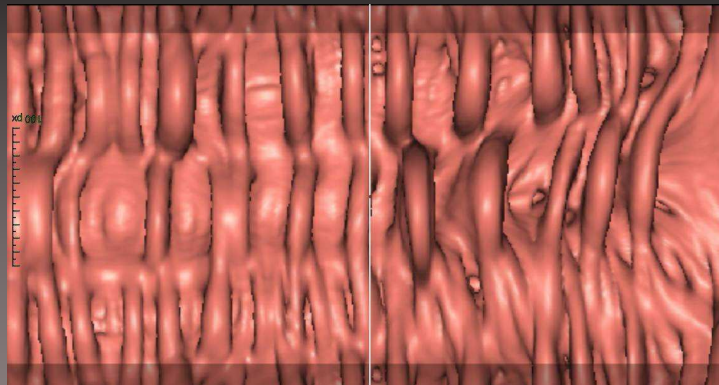


20



Vantaggi Colonscopia Virtuale vs TC/CO

1. Estensione diverticolosi e valutazione anatomica colon
2. Completamento diagnostico in caso di CO incompleta
3. **Morfologia e grado di ispessimento parietale**
4. Interessamento extracolico (versamento, perforazione coperta, ecc)
5. D.D. con CRC ????
6. Follow up diverticolite (dose minore rispetto a TC)
7. Planning pre-operatorio





COLON TC per studio malattia diverticolare

Pre insufflazione



Dopo insufflazione con CO2

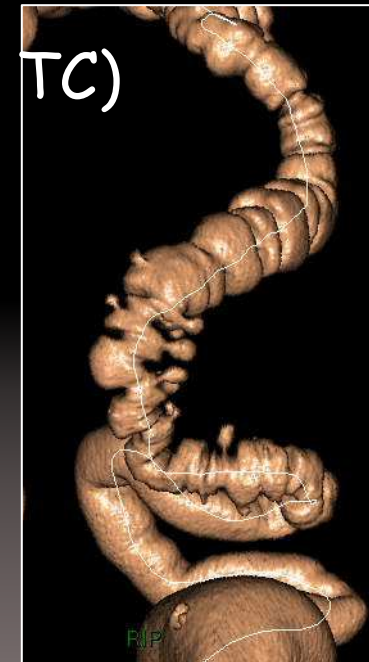
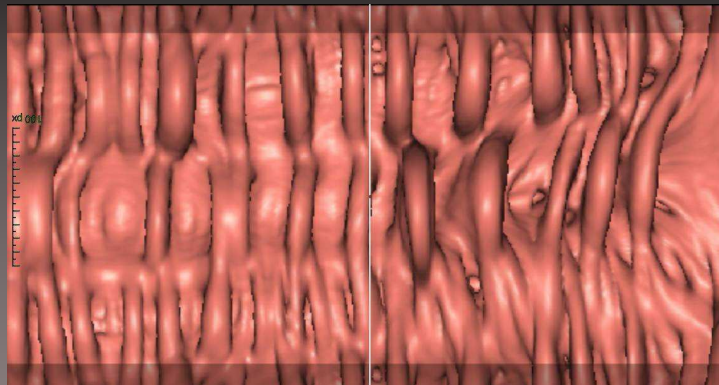


- Morfologia
- Grado di ispessimento parietale
- Presenza e numero di formazioni diverticolari
- Rapporto con organi vicini

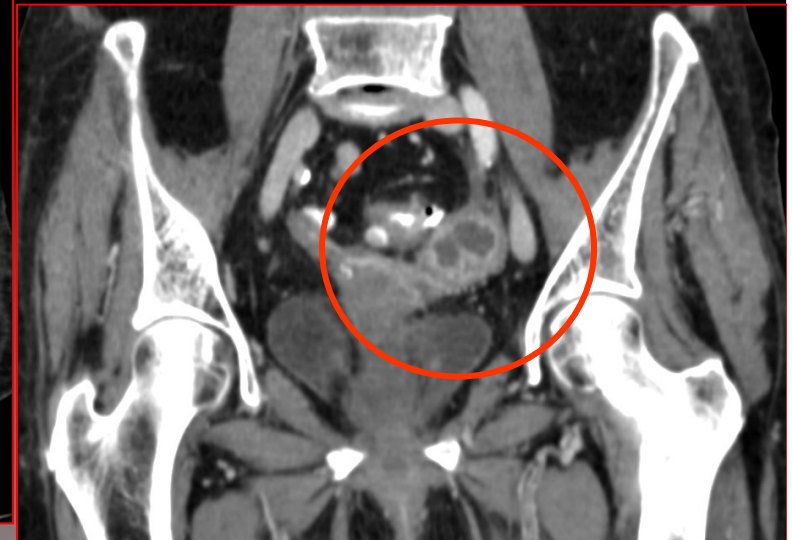
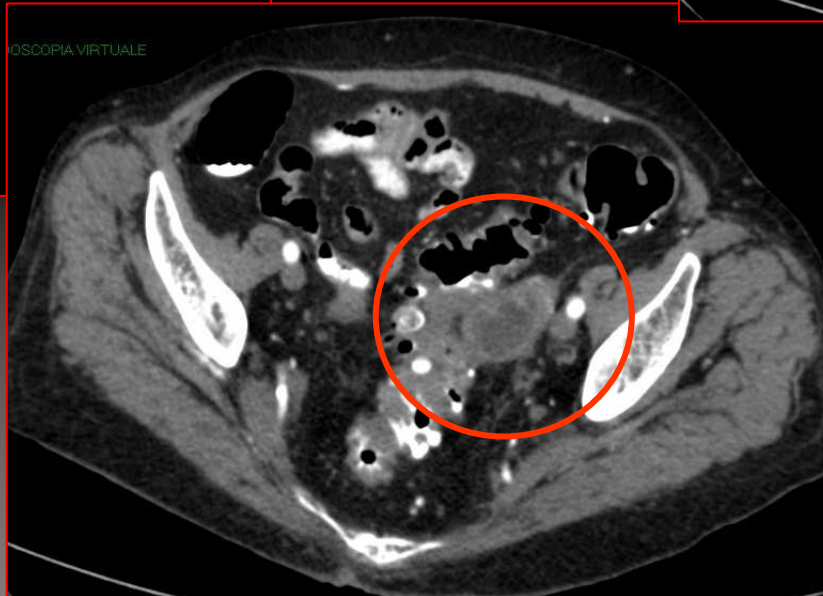
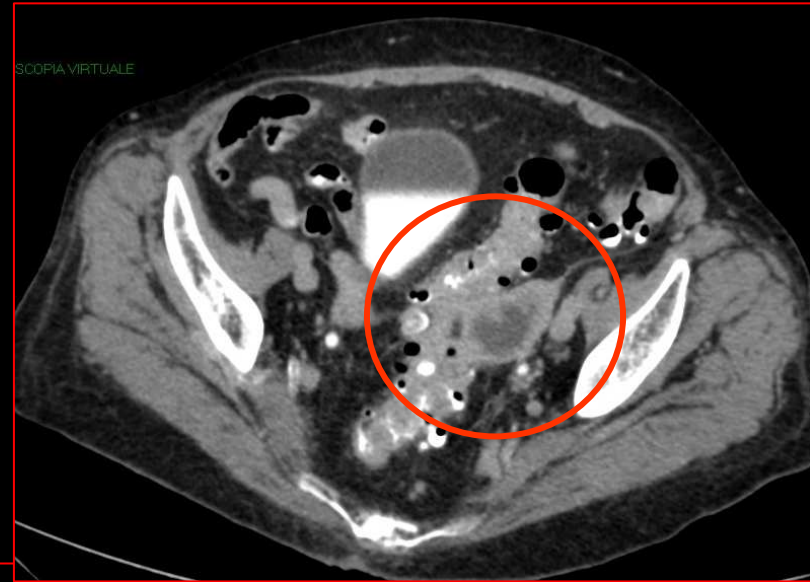


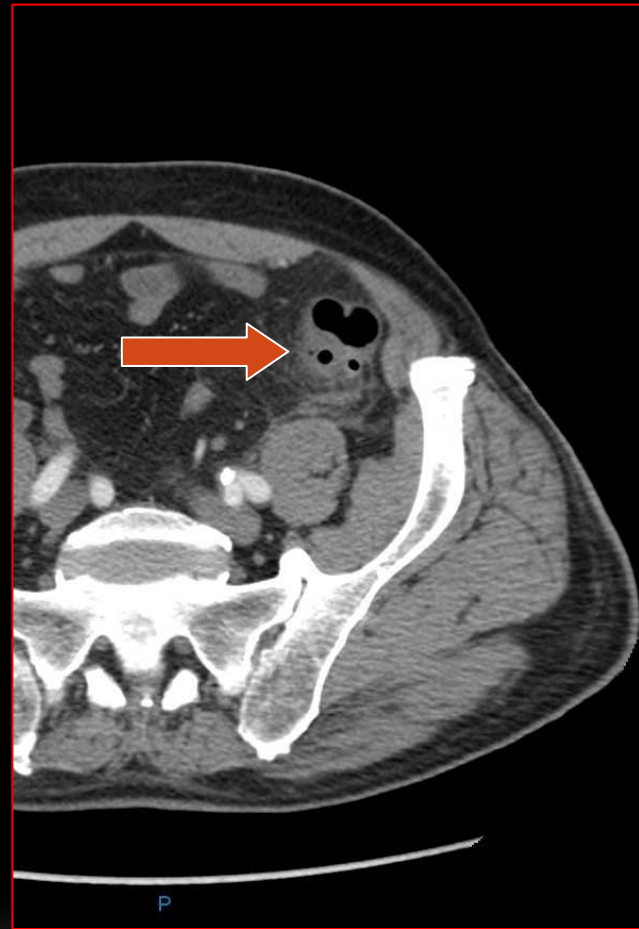
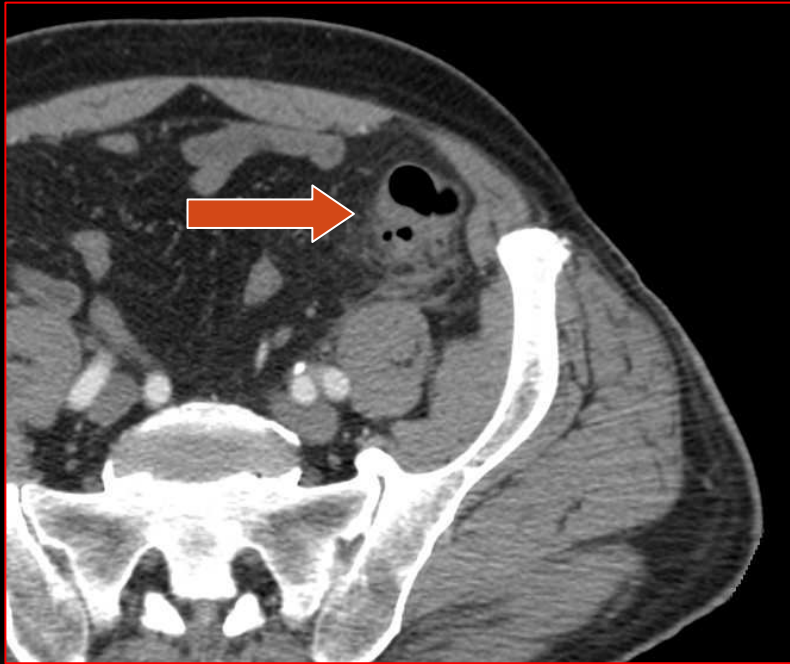
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7. Planning pre-operatorio



Femmina di 75 aa, sospetta diverticolite acuta. Colon-TC 2 mesi dopo l'episodio acuto; risoluzione della sintomatologia

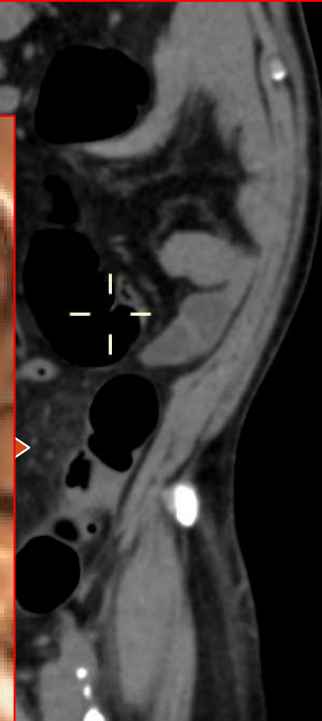
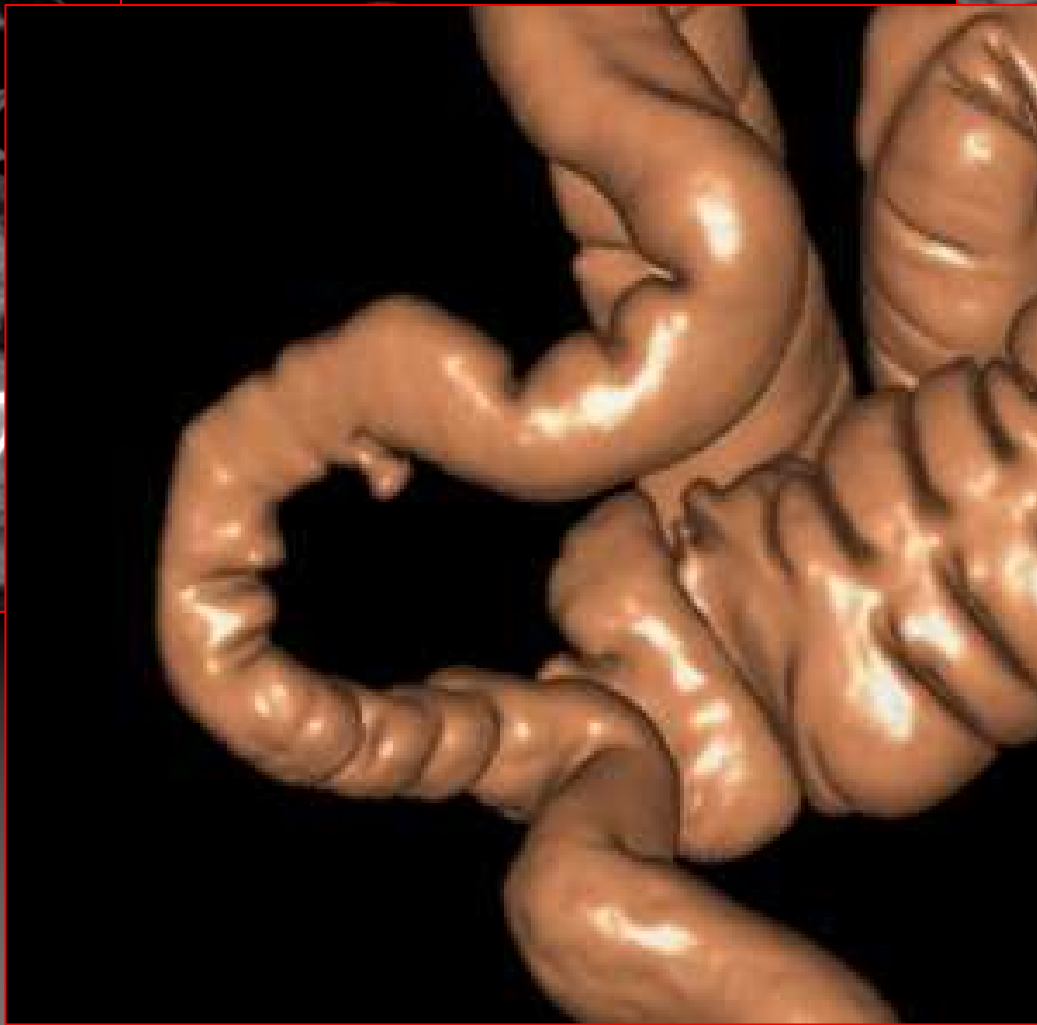
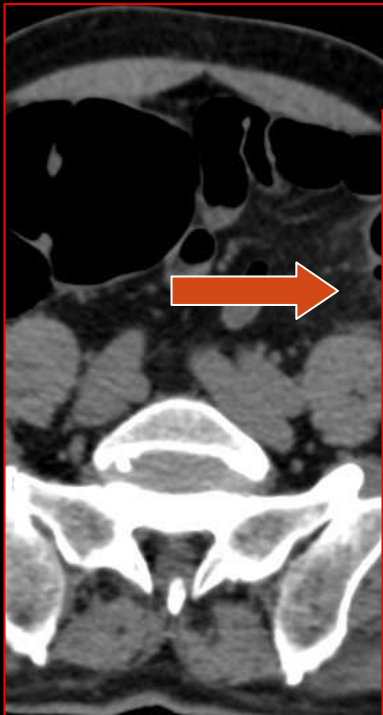




Dolore addominale acuto 69 aa Tc
con mdc eseguita in urgenza da PS



Follow up dopo 6 settimane con CTC



Stadi avanzati - Forme Complicate

- Flemmoni e/o Ascessi (21-47%)
- Fistole pericoliche (14%) (colo-enteriche, -vesicali, -vaginali, -cutanee)
- Segni di peritonite diffusa (16%)
- Altre: perforazione (1.5%), trombosi v. mesenterici (1.5%), occlusione (1.5%)

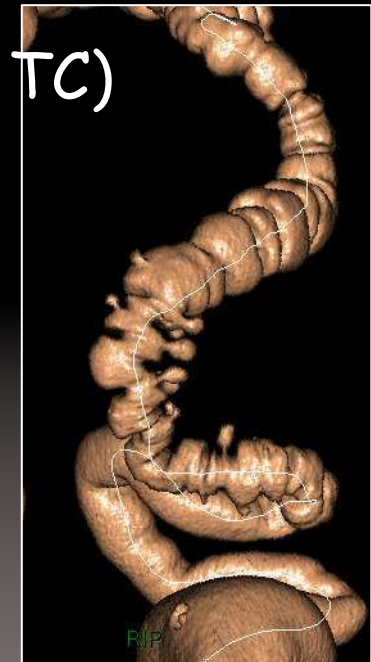
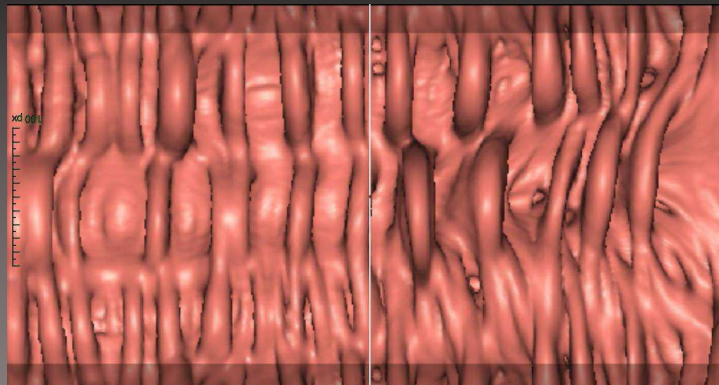
CTC con mdc?????

Rao PM et al. AJR 1998
Balthazar EJ et al. AJR 1990

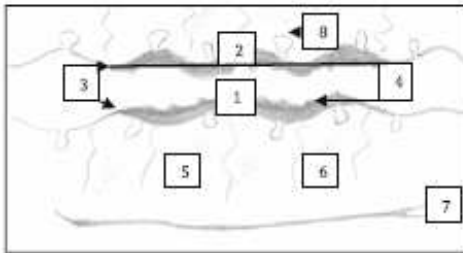


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6. Follow up diverticolite (dose minore rispetto a TC)
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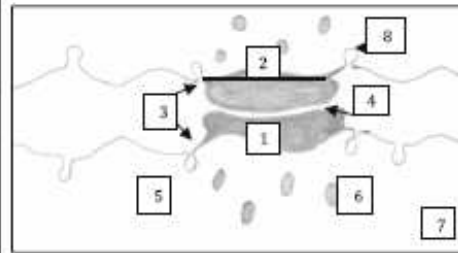


**Findings suggestive of chronic
diverticulitis.**



1. Wall thickening (milder).
2. Long segment (≥ 10 cm).
3. Tapered margins.
4. Distorted but preserved folds.
5. Pericolic infiltration.
6. No pericolic adenopathies.
7. Thick fascia sign .
8. Diverticula adjacent to and in the affected segment.

Findings suggestive of malignant tumor.



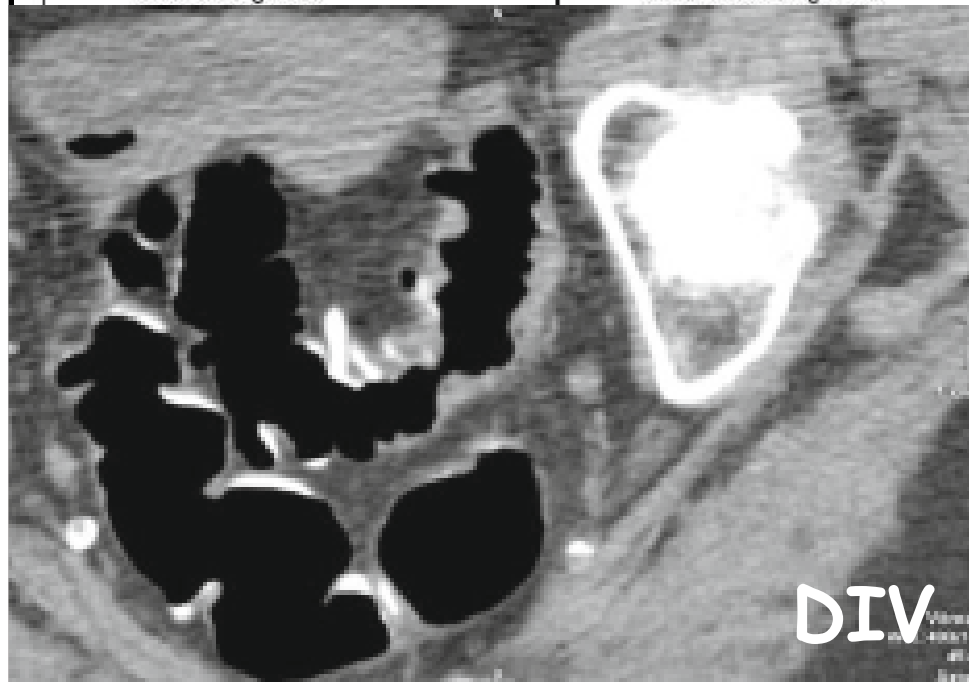
1. Wall thickening ++ (≥ 2 cm).
2. Short segment .
3. Shoulder forming.
4. Distorted folds.
5. No pericolic infiltration.
6. Pericolic adenopathies.
7. No thick fascia sign .
8. Diverticula adjacent to but NOT IN the affected segment.

**Chronic diverticulitis vs. colorectal cancer:
findings on CT colonography**

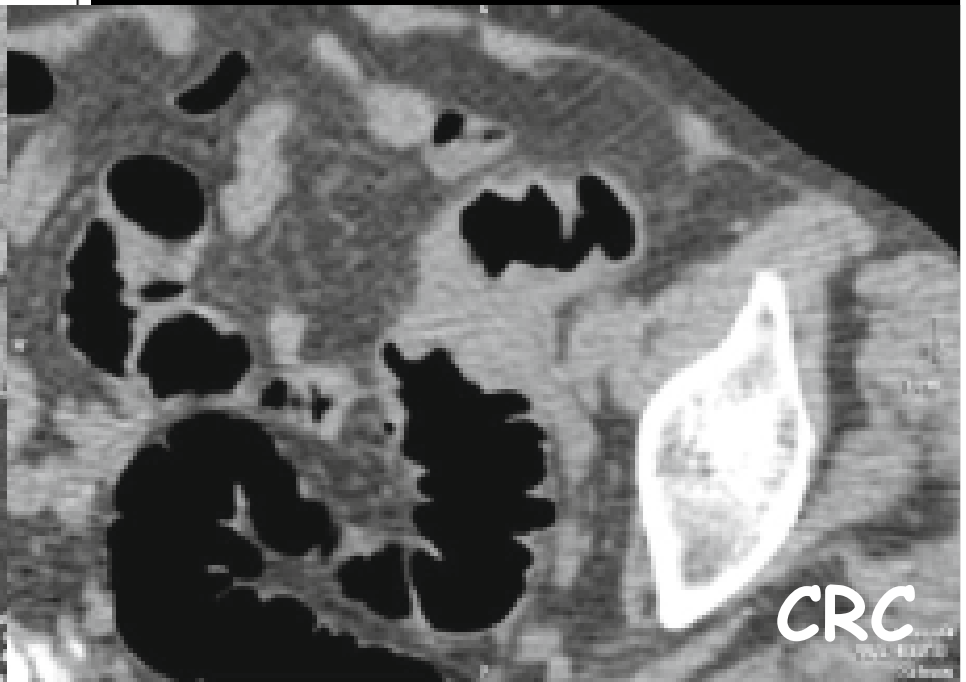
Stefaan Gryspeerdt, Philippe Lefere

Virtual Colonoscopy Teaching Centre, Akkerstraat 52 c, 8830 Hooglede, Belgium

DD diverticolite e CRC



DIV

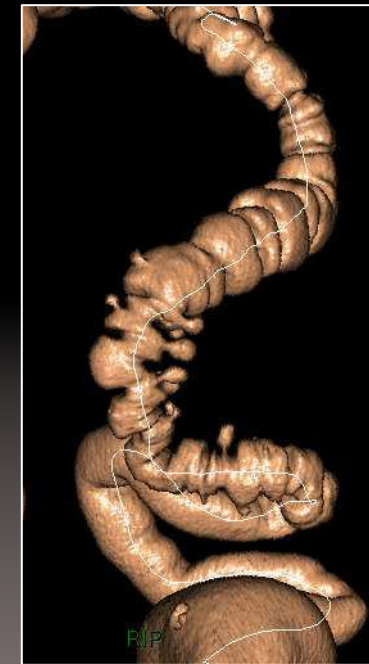
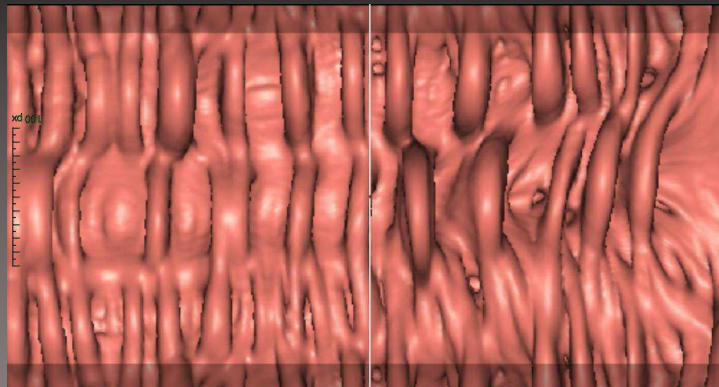


CRC



Vantaggi Colonscopia Virtuale vs TC/CO

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4. Interessamento extracolico (versamento, perforazione coperta, ecc)
5. D.D. con CRC
6. **Follow up diverticolite (dose)**
7. Planning pre-operatorio



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

F. Hjerm^{a,*}, E. Jonas^a, B. Holmström^a, T. Josephson^b, A. Mellgren^{a,c}, C. Johansson^a

Divisions of ^aSurgery, and ^bRadiology, Department of Clinical Sciences, Danderyd Hospital, Karolinska Institutet, Stockholm, Sweden, and ^cDivision of Colon and Rectal Surgery, University of Minnesota, Minneapolis, Minnesota, USA

CONCLUSION: CTC appears to have a better diagnostic potential for imaging of diverticular disease-specific findings, when compared with colonoscopy. Also, CTC was less uncomfortable and was preferred by a majority of patients. CTC seems to be a reasonable alternative in follow-up of patients with symptomatic diverticular disease.

Vantaggi CTC nel follow-up

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

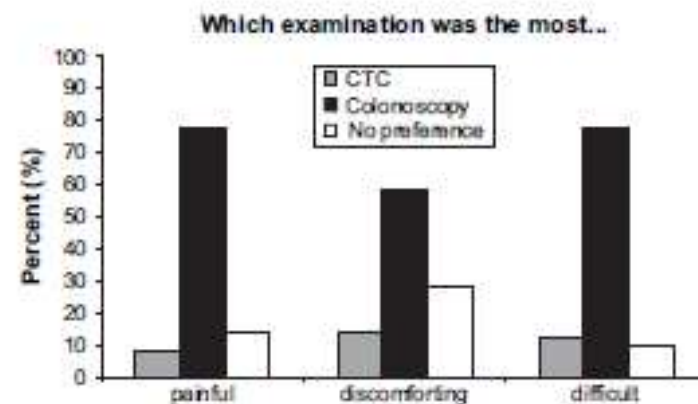


Figure 3 Patient preference (CTC vs. colonoscopy). Patients rated colonoscopy more painful ($p < 0.001$), discomforting ($p < 0.001$) and difficult ($P < 0.001$) than CTC.



Uomo, 43 aa

PS

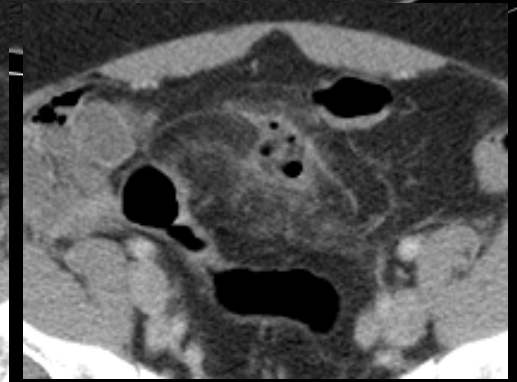
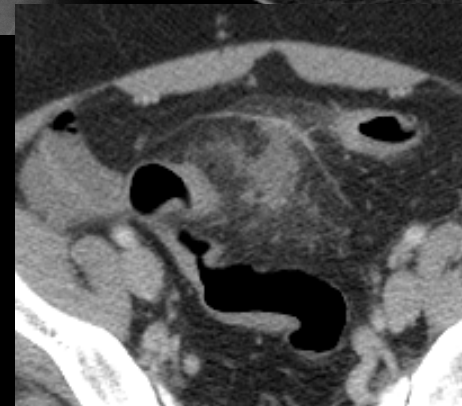
Dolori QIS, febbre,
leucocitosi

TC in Urgenza

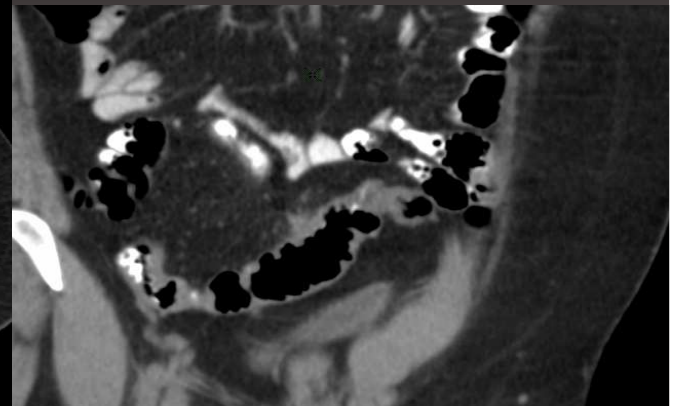
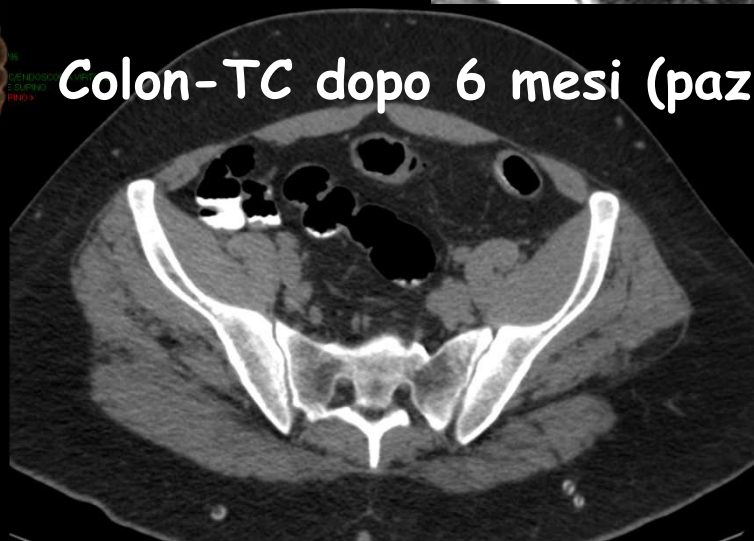
CTC dopo 6 Settimane



Maschio, 35 aa; dolore addominale, febbre, leucocitosi



Colon-TC dopo 6 mesi (paz in benessere)



Uomo, 58 aa addome acuto forti dolori addominali, febbre, leucocitosi si decide, in accordo per esecuzione diretta di esame TC da PS.

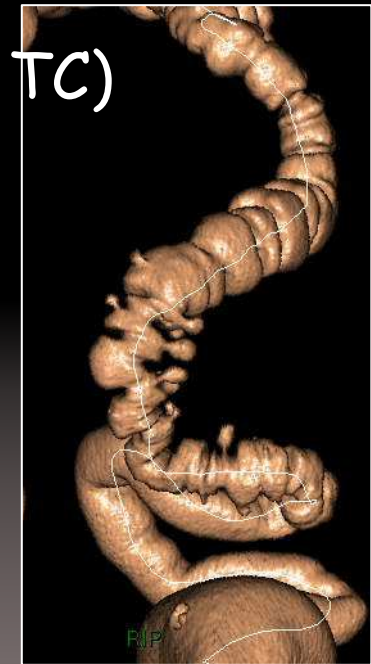
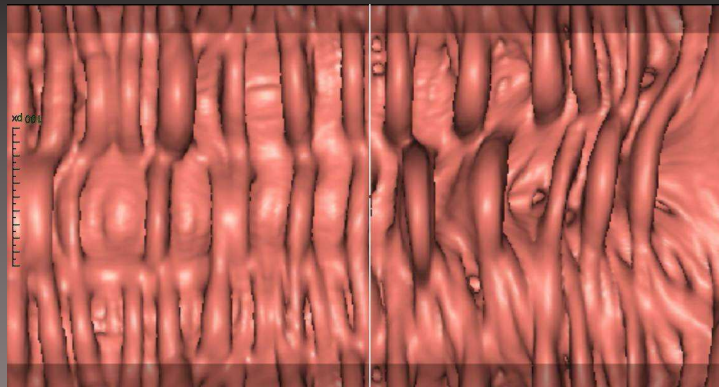


PAZIENTE "RAFFREDDATO" CON TERAPIA MEDICA CV 8
SETTIMANE DOPO EVENTO ACUTO !



Vantaggi Colonscopia Virtuale vs TC/CO

1. Estensione diverticolosi e valutazione anatomica colon
2. Completamento diagnostico in caso di CO incompleta
3. Morfologia e grado di ispessimento parietale
4. Interessamento extracolico (versamento, perforazione coperta, ecc)
5. D.D. con CRC ????
6. Follow up diverticolite (dose minore rispetto a TC)
7. **Planning pre-operatorio**



Planning preoperatorio: chirurgia laparoscopica/open?

Obiettivi studio preoperatorio:

- Identificazione estensione malattia, caratteristiche e varianti anatomiche (dolicocolon, rotazioni ecc..).
- Eventuale interessamento extraparietale, linfadenomegalie locoregionali ecc.
- Complicanze locali (perforazioni coperte, ascessi, fistole)
- Reperti accessori anche eventualmente controindicanti l'intervento (es aneurisma aorta addominale)

COLONSCOPIA VIRTUALE



Planning preoperatorio: chirurgia laparoscopica/open?

Fondamentale!!!

- Adeguata selezione del paziente
- Fine pianificazione dell'intervento



Results

Diverticular disease

→ **100%** agreement (49 patients) on location and extension of intestinal segment involved

10 (20.4%) cases no surgical treatment because of CTC

→ **98.8%** sensitivity of associated complications (2 cases undiagnosed pericholic adhesions)

14 cases (28.6%) of diverticular disease with pericholic adhesions between:

- intestinal loops (4)
- spleen (2)
- vesic sigmoid fistula (2)
- uterus appendages (6)

Value of CT colonography as preliminary study prior to laparoscopic surgery in patients with colon malignancies and complicated diverticular disease

R. Rizzati¹, S. Tartari¹, C. Cavallini¹, M. Princivalle¹, R. Righi¹, G. Anania², G. Benea¹; ¹Lagosanto Ferrara/IT, ²Ferrara/IT

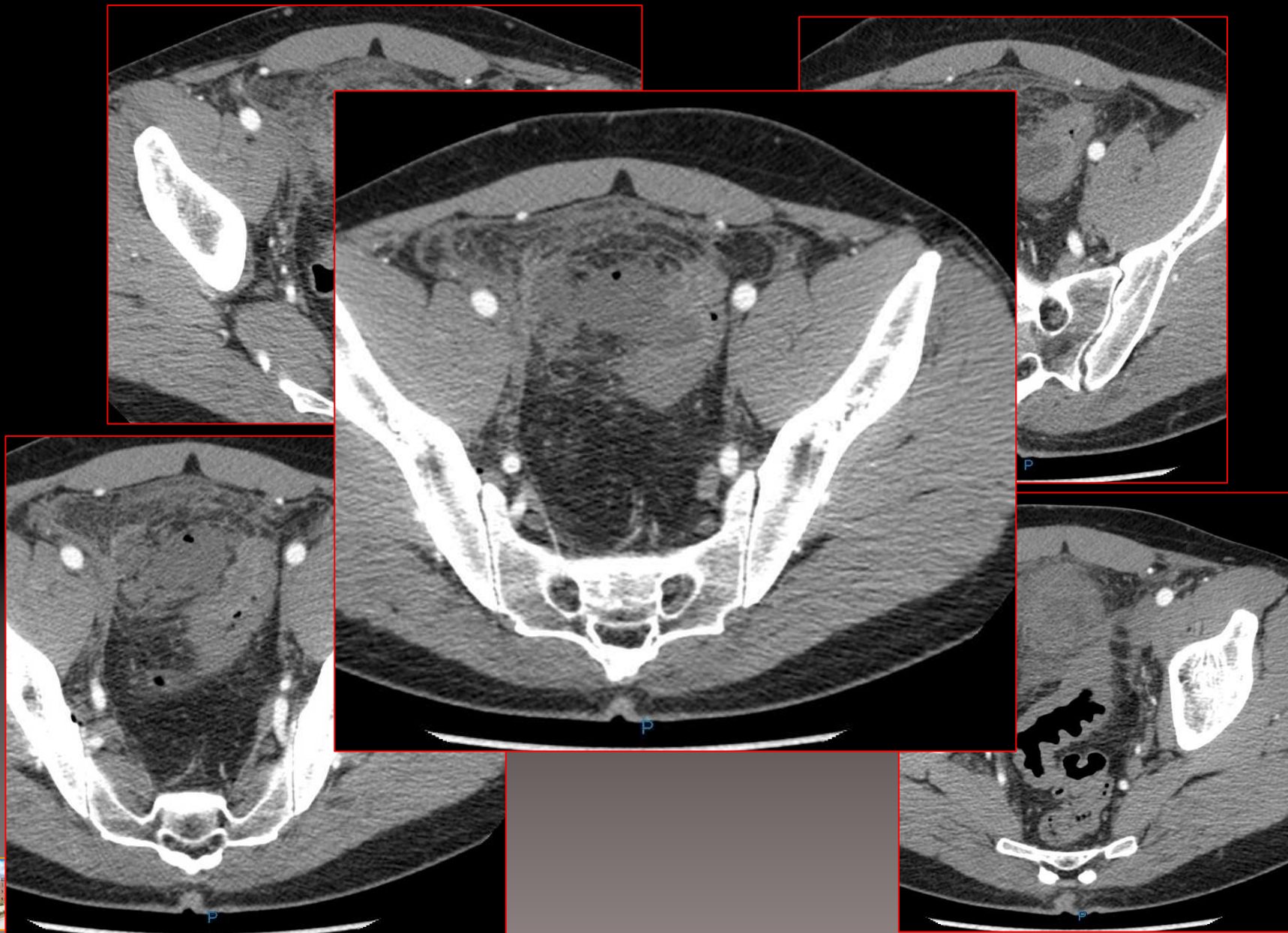


EGR
2012

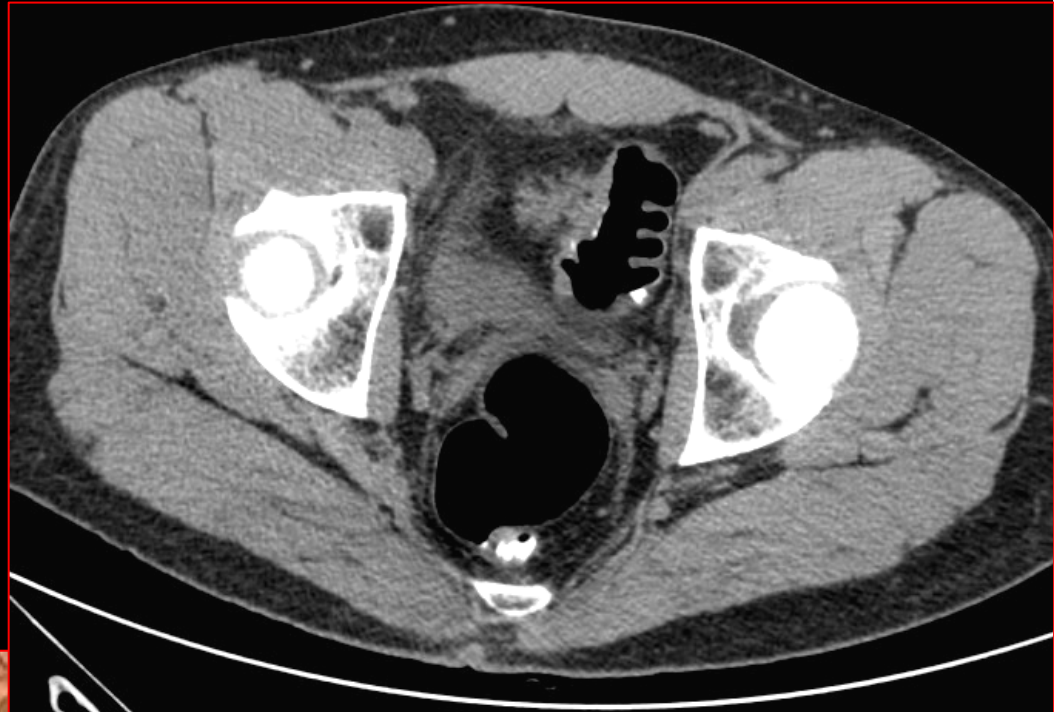
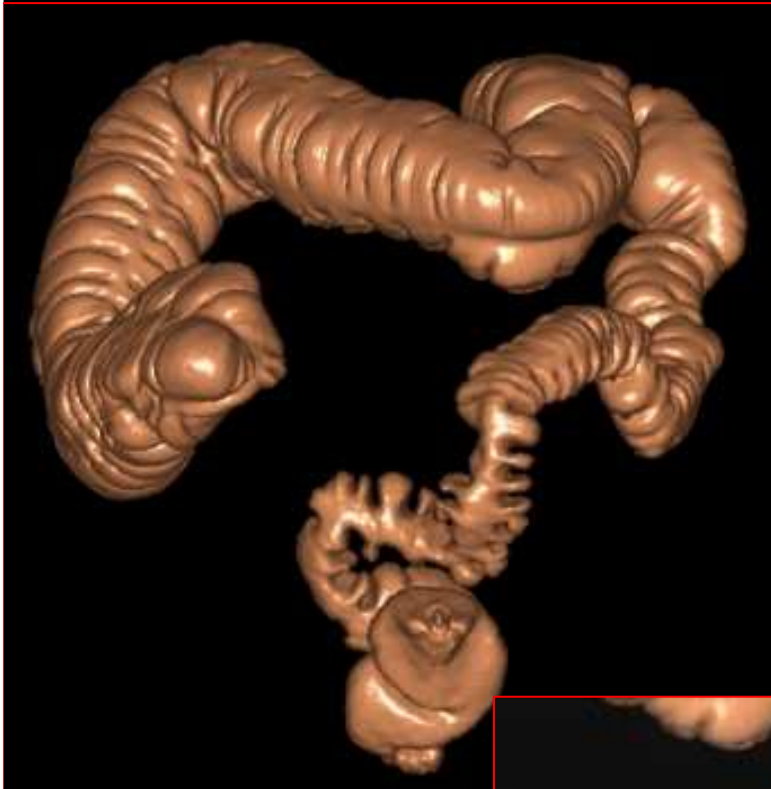


Vienna
March 1-5

Maschio di 36 aa. Episodio di dolore ipogastrico acuto
Tc in Urgenza possibile perforazione coperta.



Colonscopia incompleta 45 cm per dolore: possibile perforazione coperta: si esegue a completamento diagnostico CTC



Extracolonic findings

Extracolonic findings:

22 reports (13.6%) with **minor clinical evidence** (inguinal hernia, cholecystic calculosis, renal lithiasis, renal artery stenosis, ecc)

28 reports (17.3%) with **major clinical evidence** (liver metastasis, renal neoplasms, AAA, lung nodules).

Value of CT colonography as preliminary study prior to laparoscopic surgery in patients with colon malignancies and complicated diverticular disease

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EGR
2012

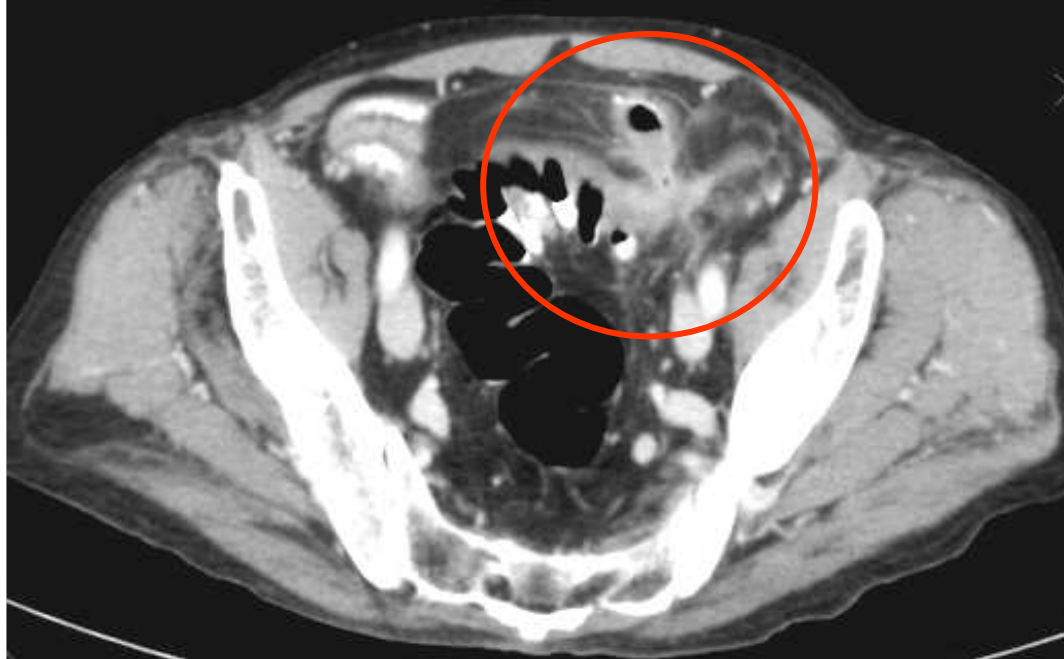
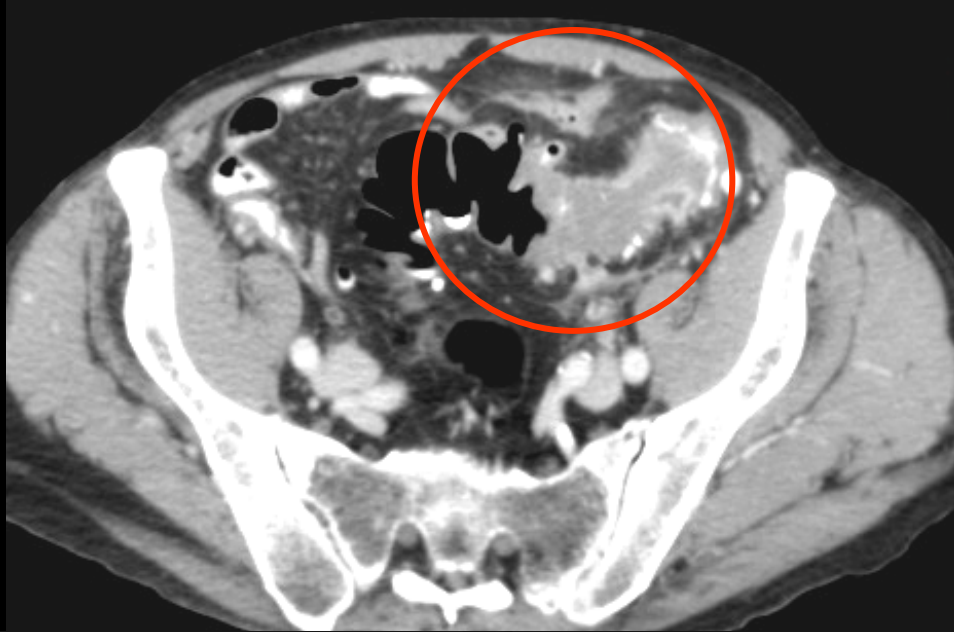


Vienna
March 1-5

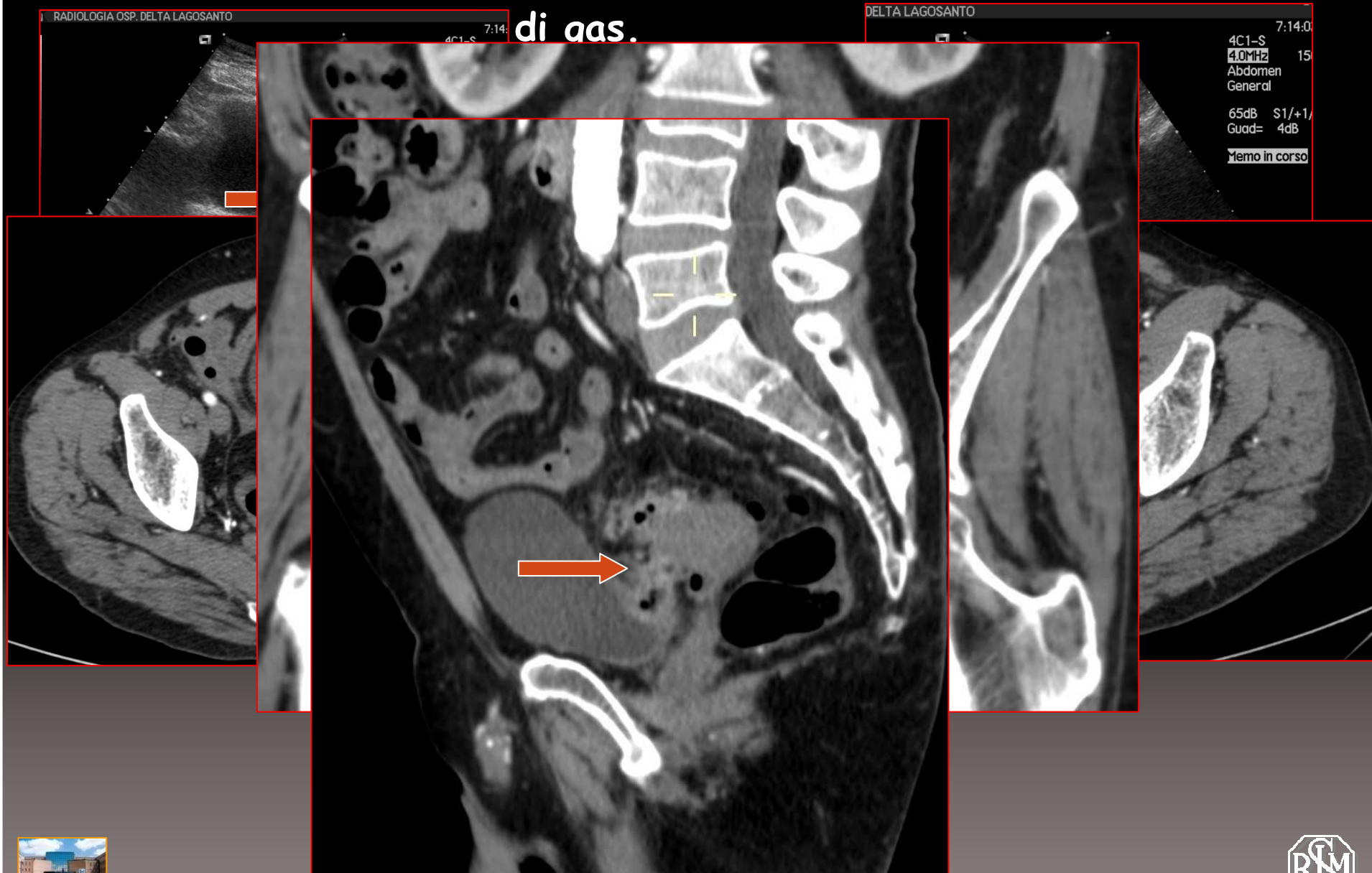
Limiti???????



Maschio di 70 aa con diverticolosi nota e pregressi episodi di dolori inoagstrici. Urina torbida con odore fecaloide.



Maschio di 70 aa diverticolosi non nota e pregressi episodi di forti dolori addominali. Urina torbida; durante la minzione di aas.



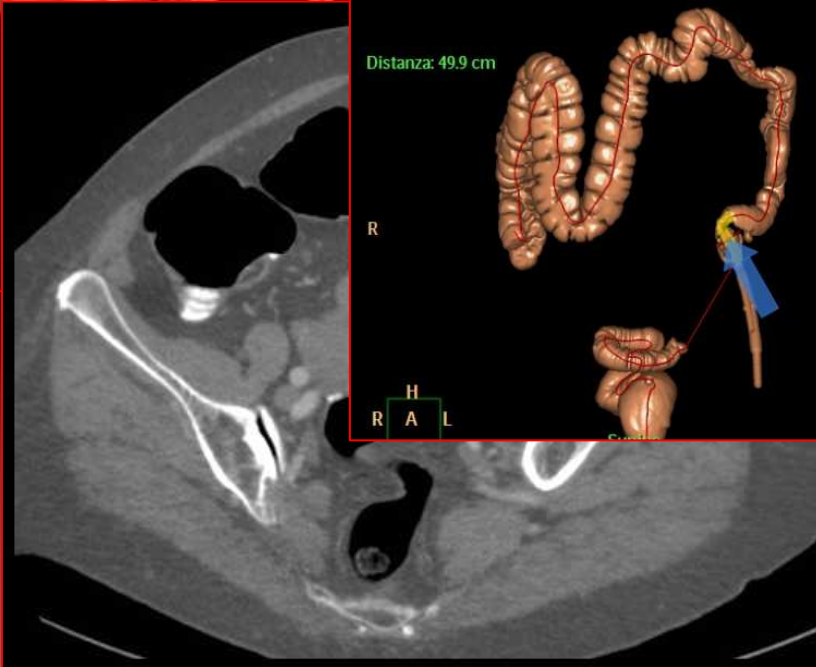
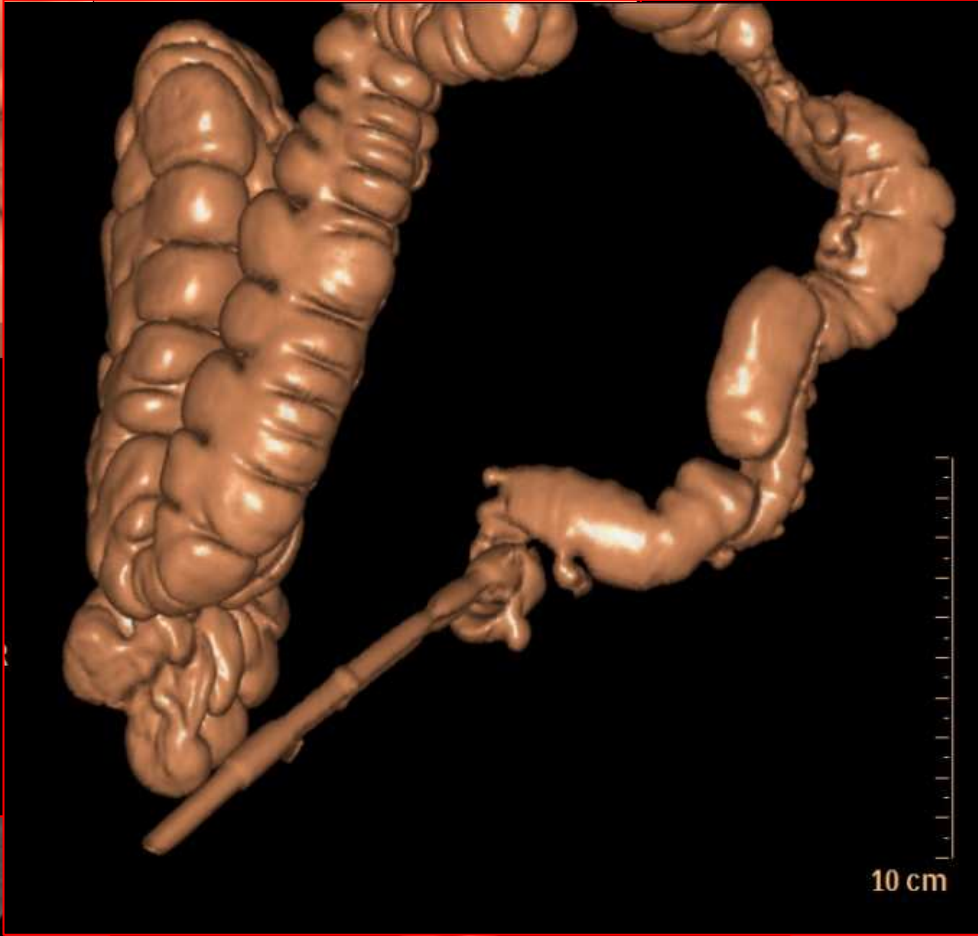
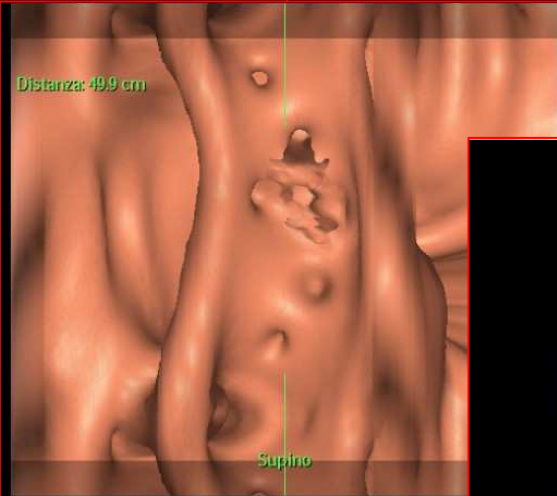
Possibili prospettive future

Studio preliminare ricanalizzazione Hartmann



- 1. Valutazione anatomia per corretta pianificazione preoperatoria*
- 2. Neoplasie: eventuali recidive sui monconi, linfonodi ecc.*
- 3. Diverticoliti: estensione ed eventuali attività di malattia nei segmenti da anastomizzare e nei restanti tratti.*
- 4. Persistenza o comparsa di complicanze (versamento, ascessi, fistole, aderenze) che potrebbero condizionare negativamente l'intervento*





The winner is.....

Take home message

- Follow up e planning pre-operatorio nella fase sub acuta
- Completamento diagnostico in caso di CO incompleta
- Morfologia e grado di ispessimento parietale

COLON TC

TC ADDOME

COLONSCOPIA OTTICA



Grazie per l'attenzione !

r.rizzati@ausl.fe.it

Marzo, 2010



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President Obama Gets Virtual Colonoscopy (CT Colonography) Coverage to Seniors

PR Newswire 2010-03-02

Medicare Should Cover Screening CT Colonography for Older Americans Who Want It WASHINGTON, March 2, 2010 /PRNewswire-USNewswire/ -- President Obama, in his first routine physical exam as commander in chief, received a CT colonography (CTC), commonly known as a virtual colonoscopy, to screen him for colorectal cancer. However, Obama Administration officials at the Centers for Medicare and Medicaid Services (CMS) previously denied coverage of the same exam for seniors enrolled in Medicare, cutting off access for many an exam proven to increase compliance with nationally accepted colon cancer...

