

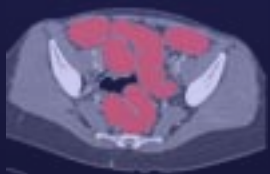
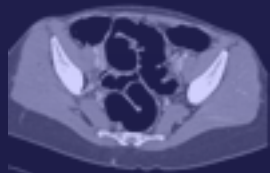
Multi Slice-CT des Gastrointestinaltraktes: Untersuchungs- und Nachverarbeitungsmöglichkeiten

Michael Krupa

MTRA

Institut für Diagnostische Radiologie

Universitätsspital Zürich



Vorteile des Multi Slice CT:

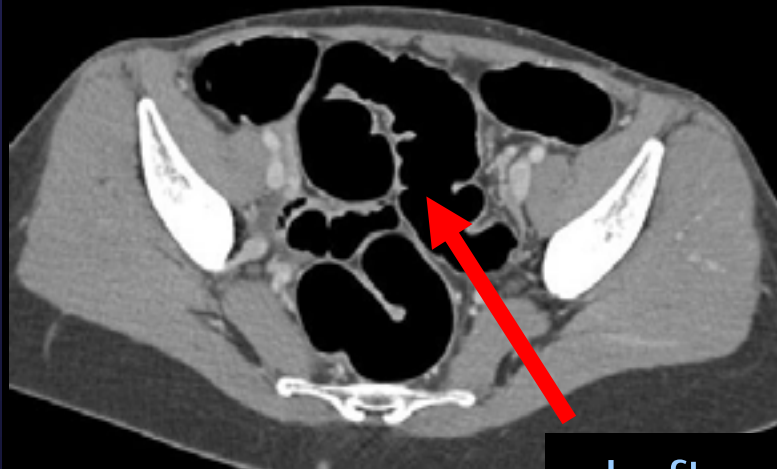
- hohe zeitliche Auflösung:
 - grosses Datenvolumen in kurzer Zeit erfassbar
- hohe räumliche Auflösung:
 - dünne Schichten (isotrope Voxel)

Nachverarbeitungs Hard- und Software:

- Verarbeitung grosser Datenmengen
- spezielle Programme zur Nachverarbeitung

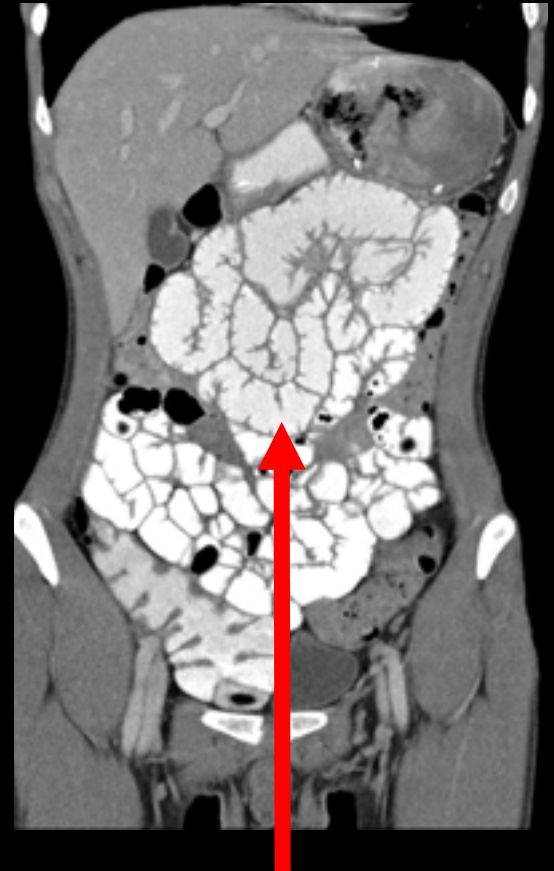
Enterale Kontrastmittel

negative Kontrastmittel

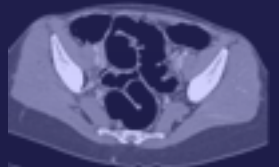


Luft

positive Kontrastmittel

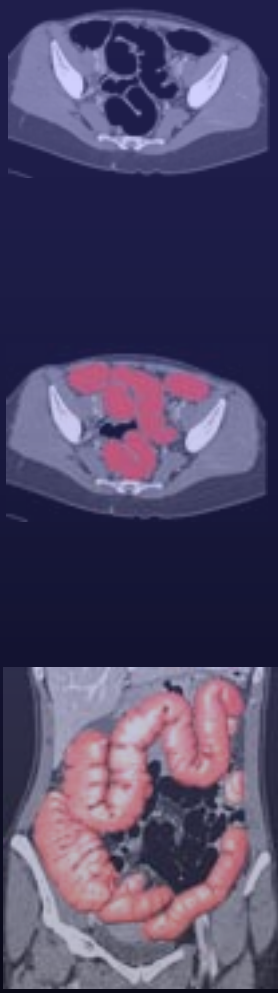


Jodhaltiges
Kontrastmittel



Wasser

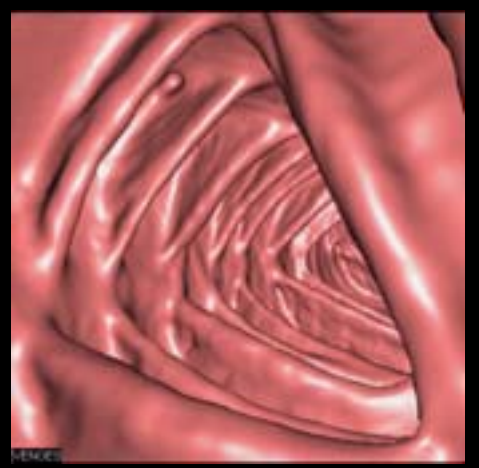
CT-Enteroclyse

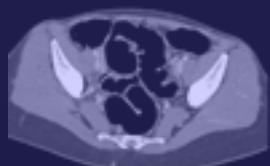


„Konventionelles“
Abdomen-CT



CT-Kolonographie





➤ **Entzündungen:**

- Pankreatitis, Appendizitis, Enteritis, Divertikulitis,...

➤ **Tumore:**

- Diagnostik, Staging, Therapieverlauf

➤ **Gefässpathologien:**

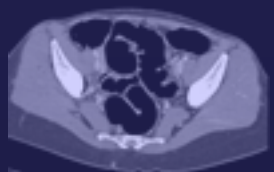
- Ischämie / Verschlüsse, Aneurysma, Malformationen,...

➤ **Trauma:**

- Perforationen, Blutungen, Organverletzungen

➤ **Sonstige:**

- Obstruktionen, Missbildungen, Hernien, unklares Abdomen



Klinik:

- männlicher Patient, 30 Jahre
- unklares Abdomen mit Abdominalschmerz seit 2 Tagen
- steigende Entzündungsparameter
- US unauffällig

Fragestellung:

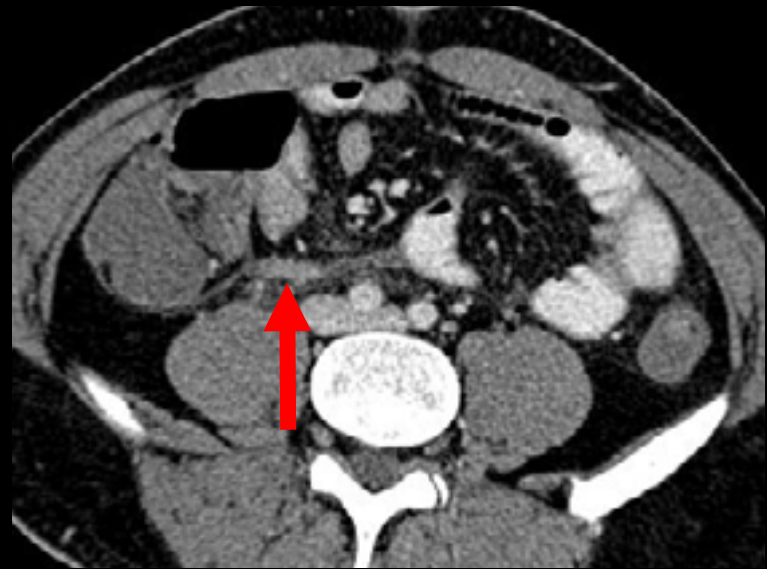
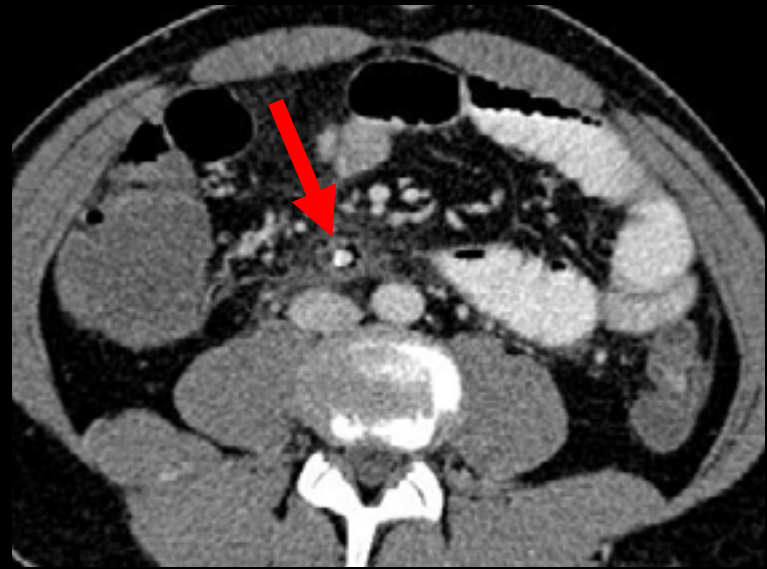
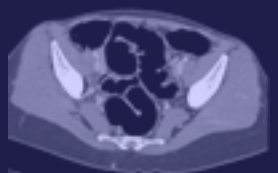
Appendizitis?, M. Crohn?

CT:

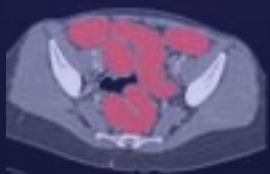
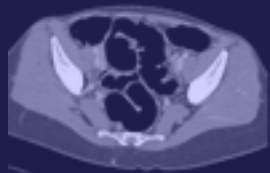
- KM oral
- Abdomen venös ⇒ Kollimation: 16x1.5, Rekonstruktion: 2/1



Fallbeispiel I



Appendizitis mit Appendikolith
und Verdacht auf gedeckte
Perforation



Klinik:

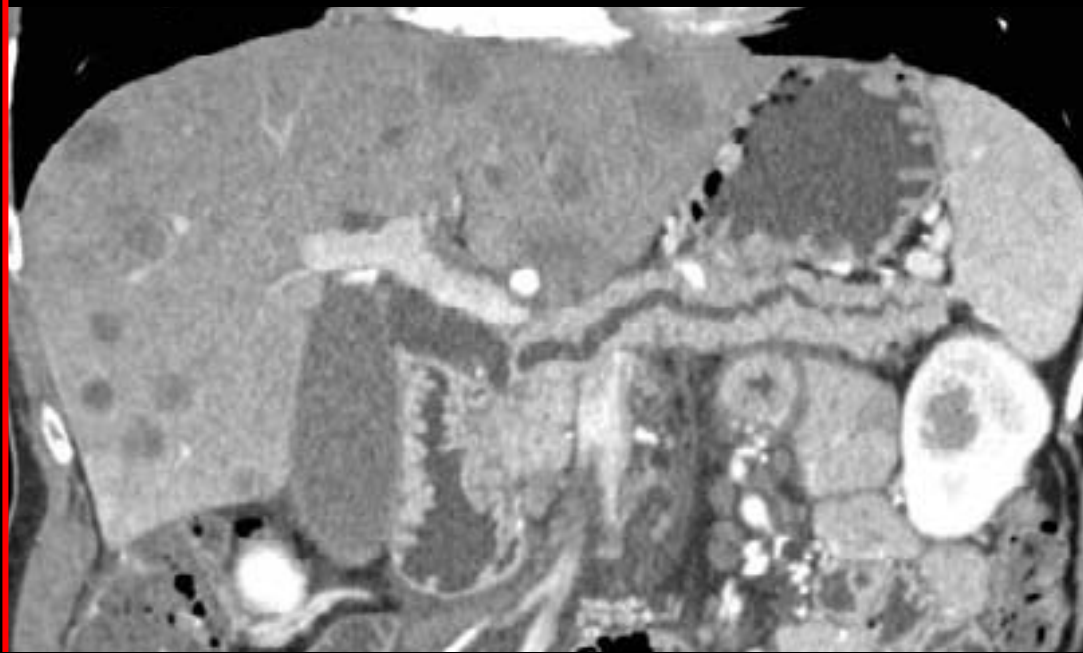
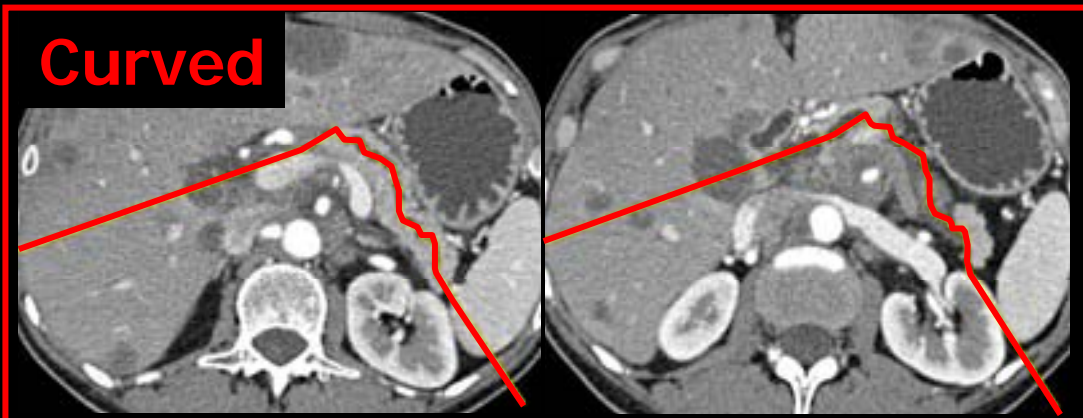
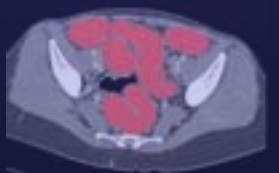
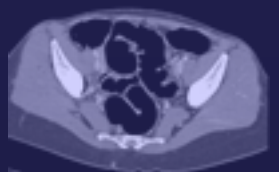
- 51 jährige Frau mit Verdacht auf Verschluss-Ikterus und begleitender Pankreatitis
- im US hypodense Läsionen in der Leber, Pankreas schlecht abgrenzbar

Fragestellung:

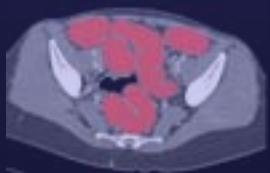
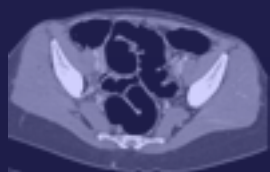
Verschluss-Ikterus? Pankreatitis? Leberläsionen?

CT:

- Wasser oral
- Pankreas nativ ⇒ Kollimation: 16x1.5, Rekonstruktion: 2/1
- Pankreas arteriell ⇒ Kollimation: 16x0.75, Rekonstruktion: 1/0.6
- Abdomen venös ⇒ Kollimation: 16x1.5, Rekonstruktion: 2/1



Duktales Adenokarzinom des
Pankreaskopfes, mit gestautem
Pankreas- und Gallengang



Klinik:

- 59 jähriger männlicher Patient
- bekanntes Vorderwandaneurysma
- vor 1 Jahr Mediainfarkt
- jetzt akut auftretende Bauchschmerzen

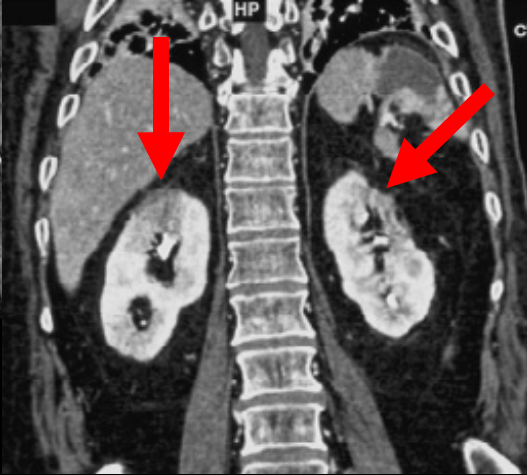
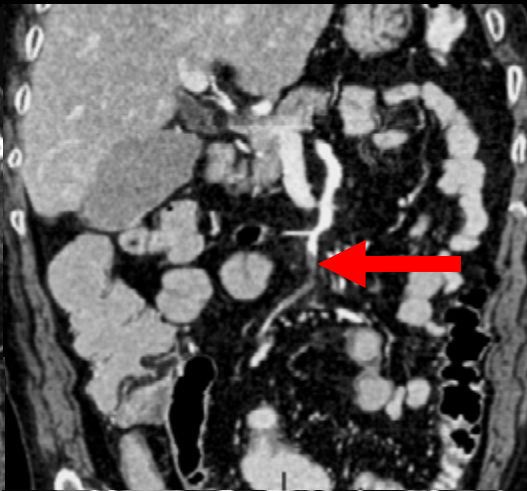
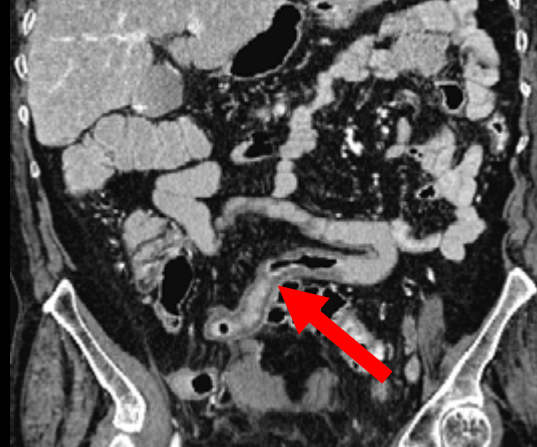
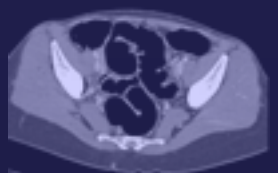
Fragestellung:

Unklares Abdomen? Bauchaortenaneurysma?

CT:

- kein orales KM
- Abdomen arteriell ⇒ Kollimation: 16x0,75, Rekonstr.: 1/0.6
- Abdomen venös ⇒ Kollimation: 16x1.5, Rekonstr.: 2/1

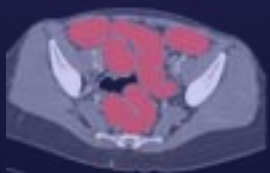
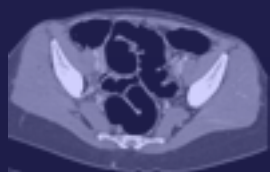
Fallbeispiel III

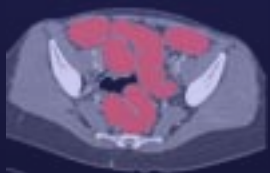
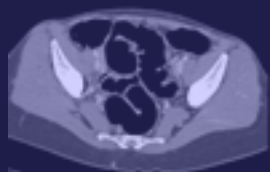


Segmentale Ileumischämie, Embolus in der A. ileocolica,
Thrombus im linken Ventrikel, Milz- und Niereninfarkt,
Verschluss der linken A. iliaca communis

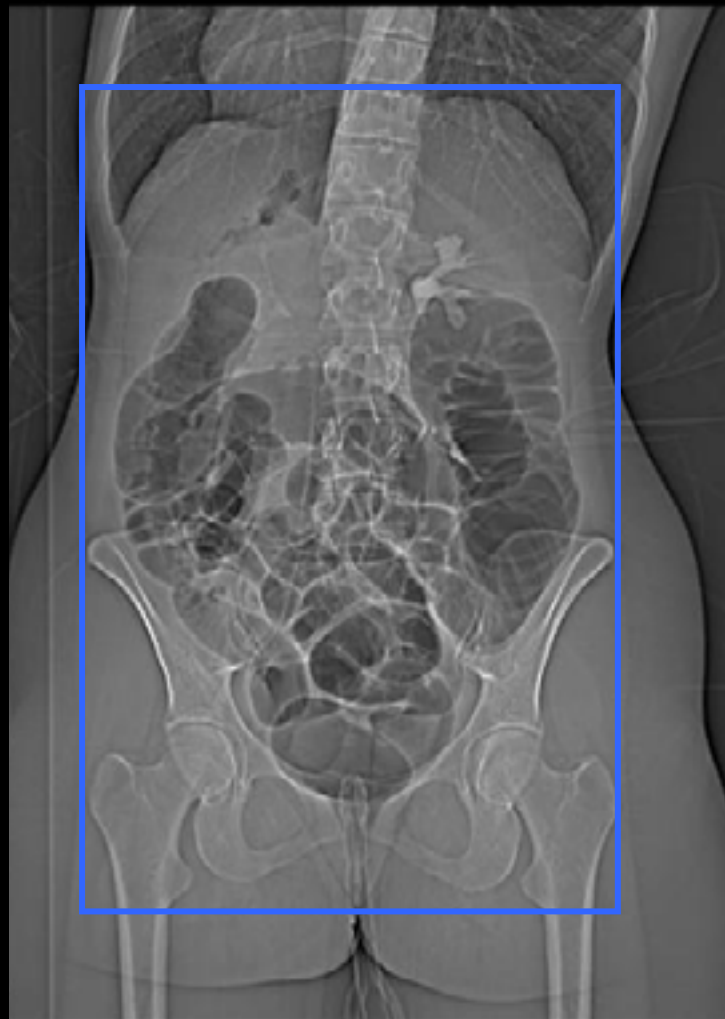
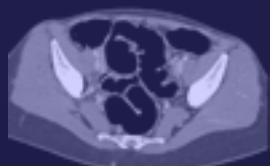
Kolonographie unter
Durchleuchtung

CT-Kolonographie

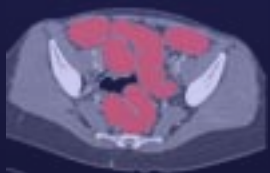
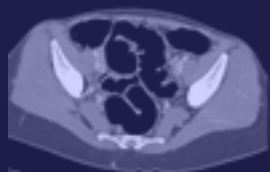




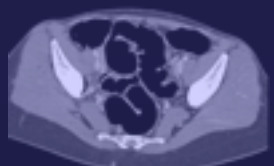
- Unvollständige Endoskopie
- Screening
- Polypen, Divertikel
- Tumore des Dickdarms
- Colitis Ulcerosa
- Morbus Crohn



	4-Zeiler	16-Zeiler
Kollimation	4 x 1,0 mm	16 x 0,75 mm
Tischvorschub	6 mm / U	12 mm / U
Schichtdicke	1,25 mm	1,0 mm
Schichtabstand	0,8 mm	0,6 mm
Kontrastmittel	120 ml	120 ml
Flow	3 ml /sec	3 ml/sec
Delay	80 sec	80 sec

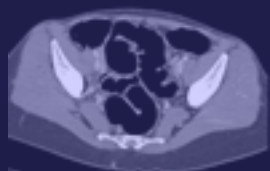


Segmentierung des Kolons



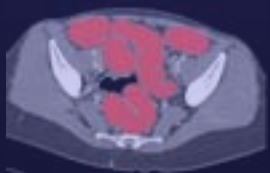
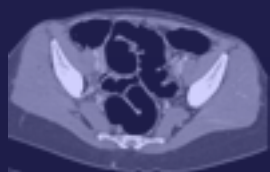


Automatische Pfadfindung

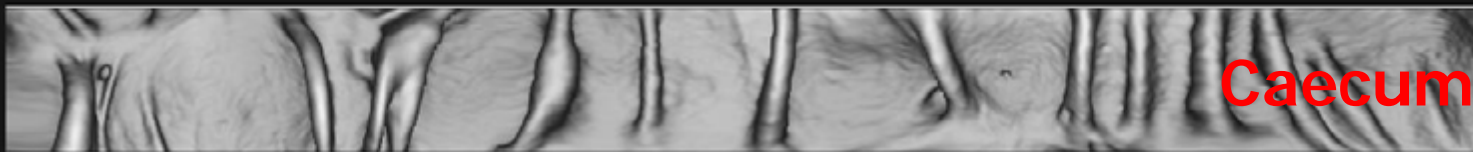
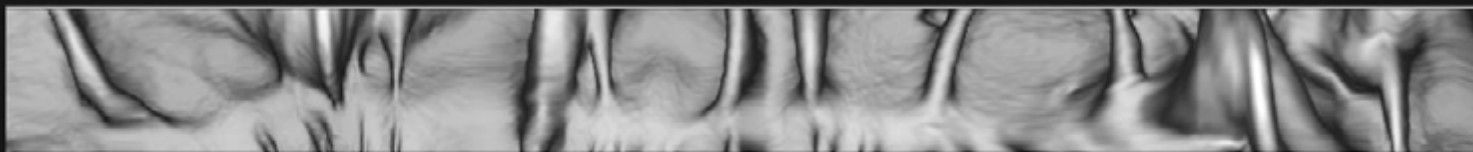
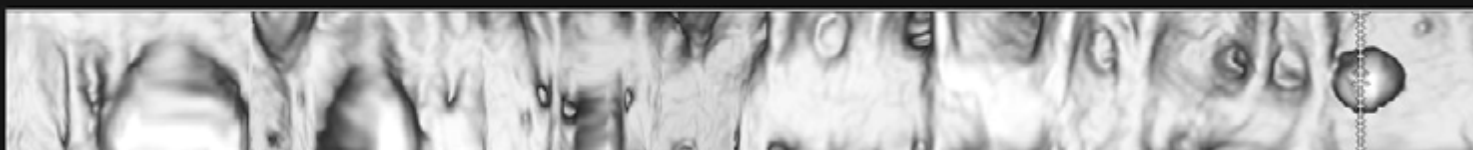




Virtuelle Pathologie (Lumendarstellung)

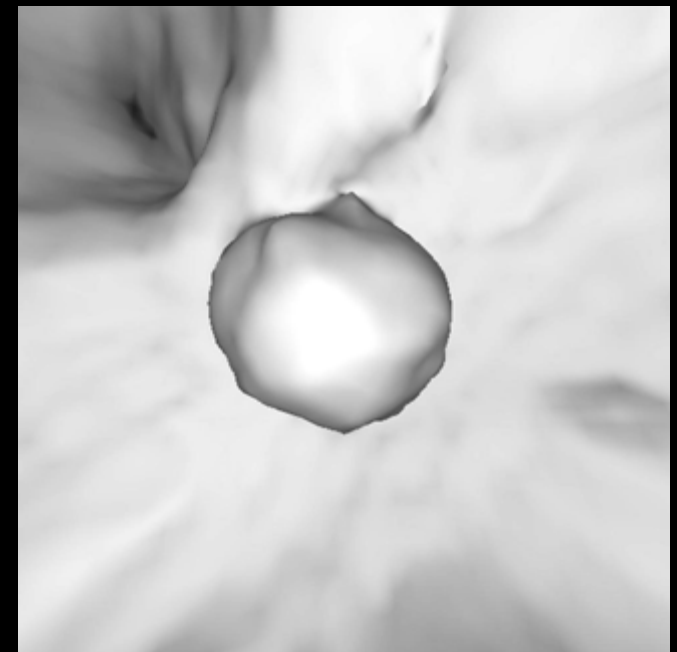
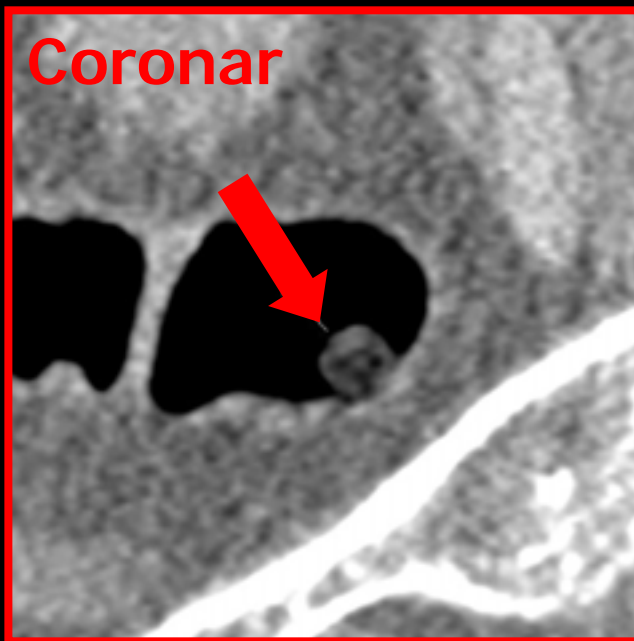
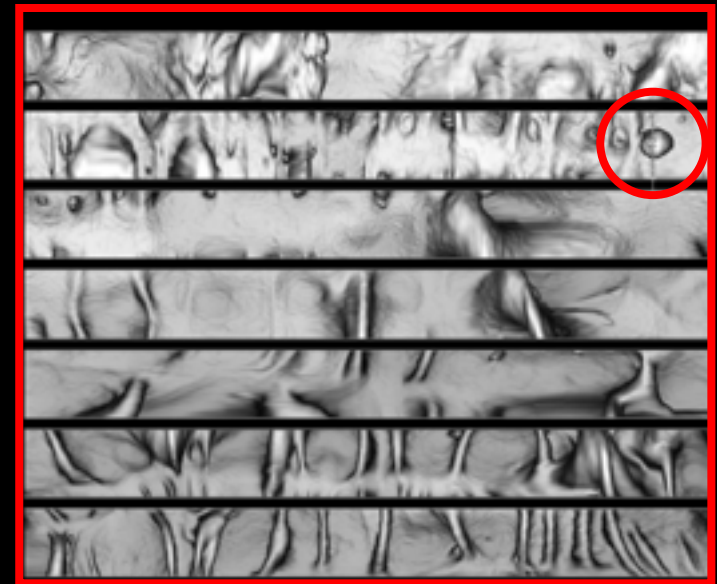
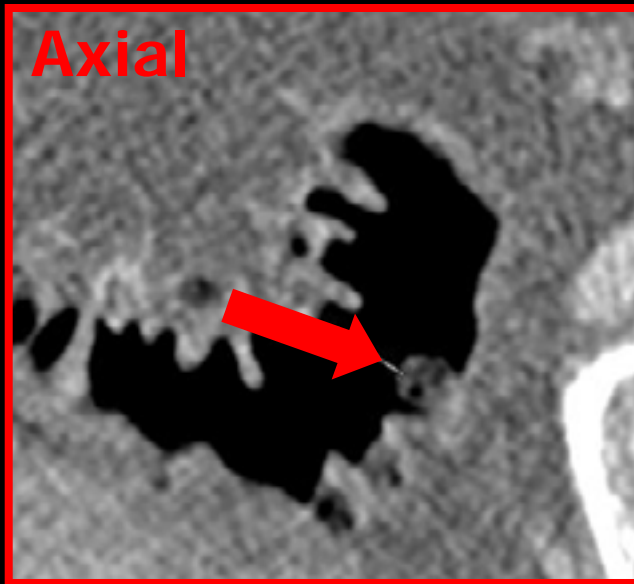
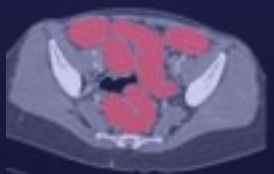
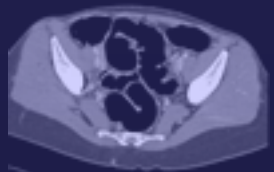


Rektum



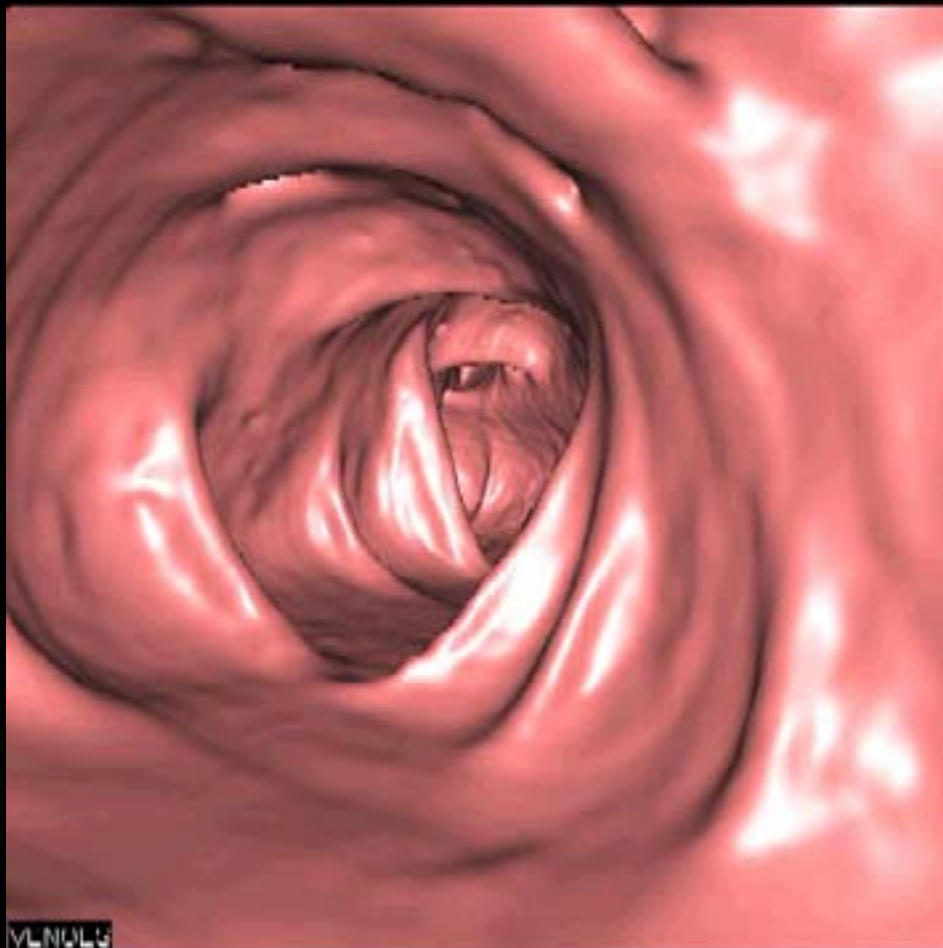
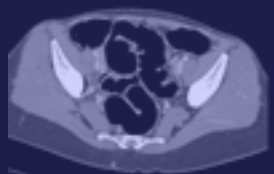
Caecum

Lokalisation - Referenzbilder





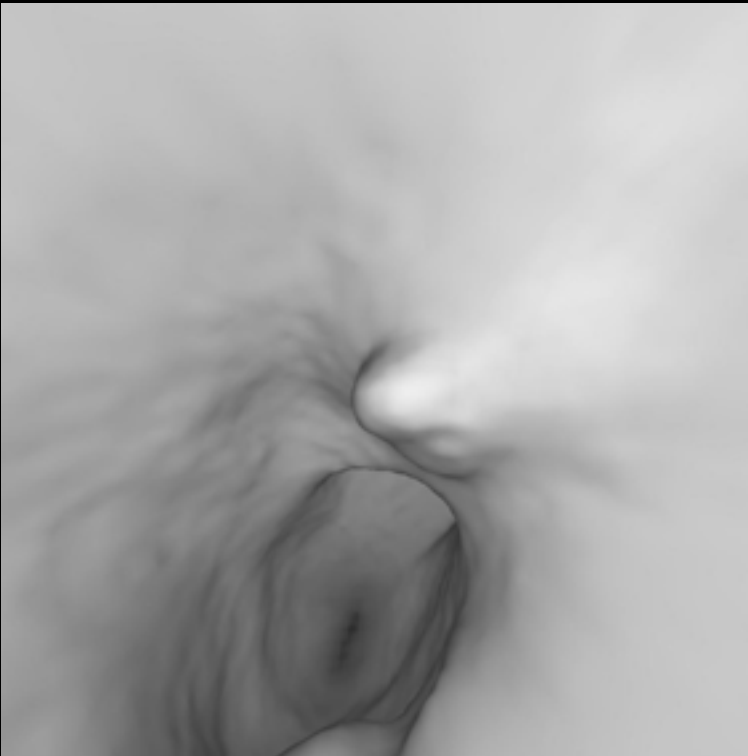
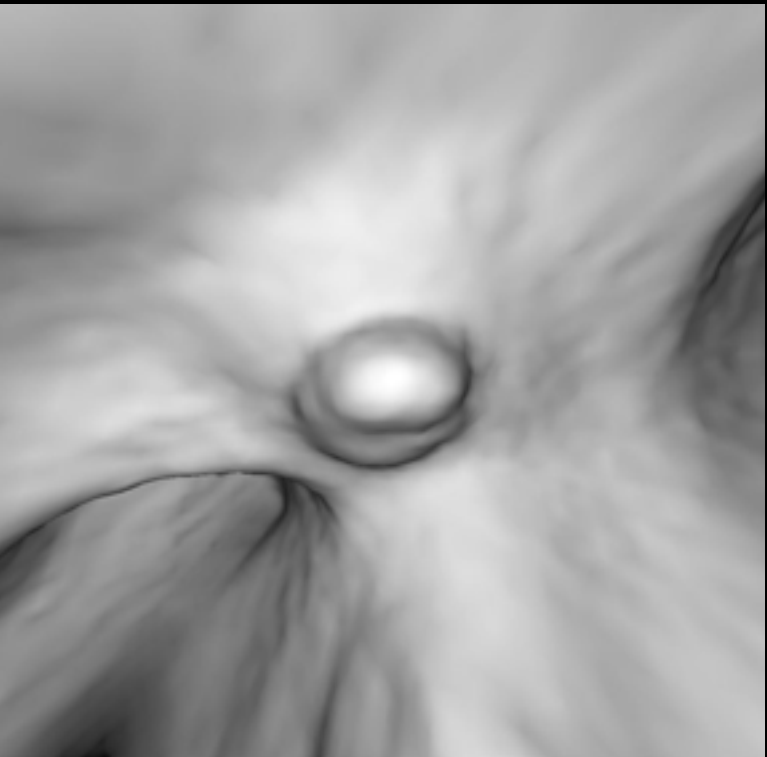
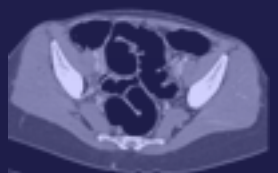
Virtuelle Endoskopie



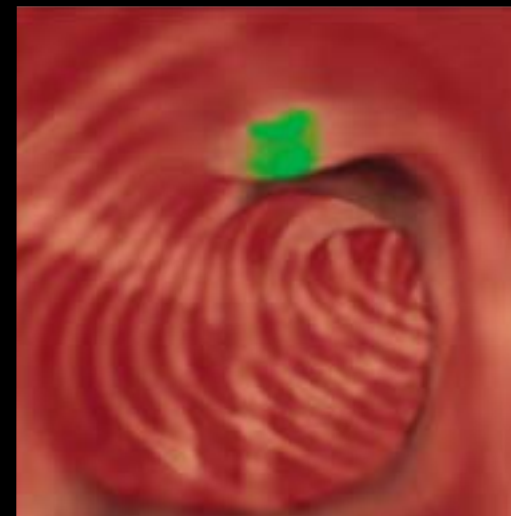
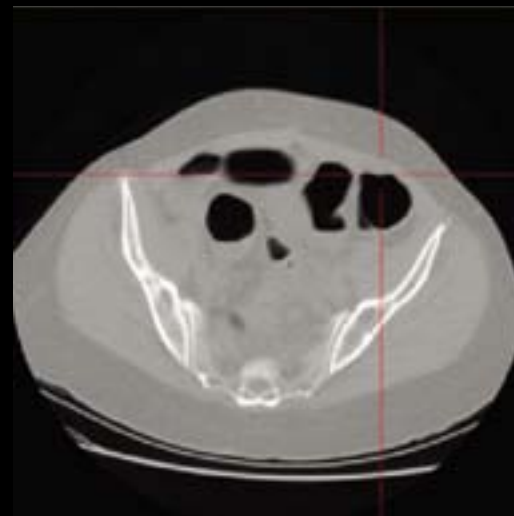
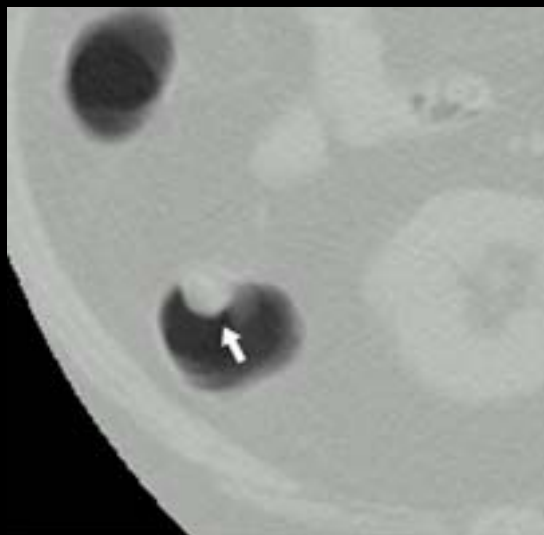
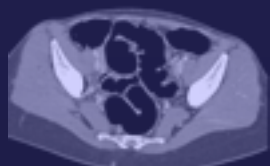
VLN0L6



Virtuelle Endoskopie – Polypen?

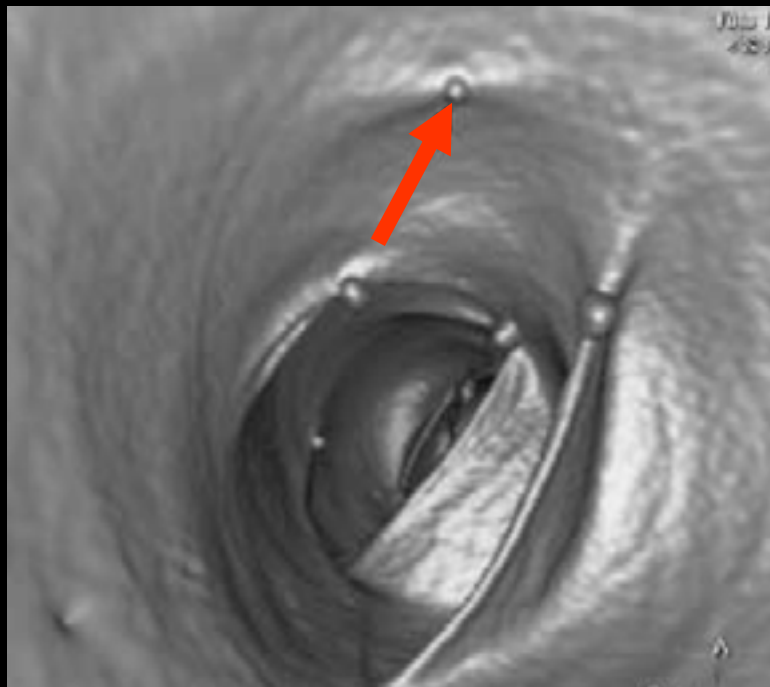
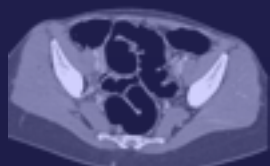


Computer Aided Diagnosis (CAD)

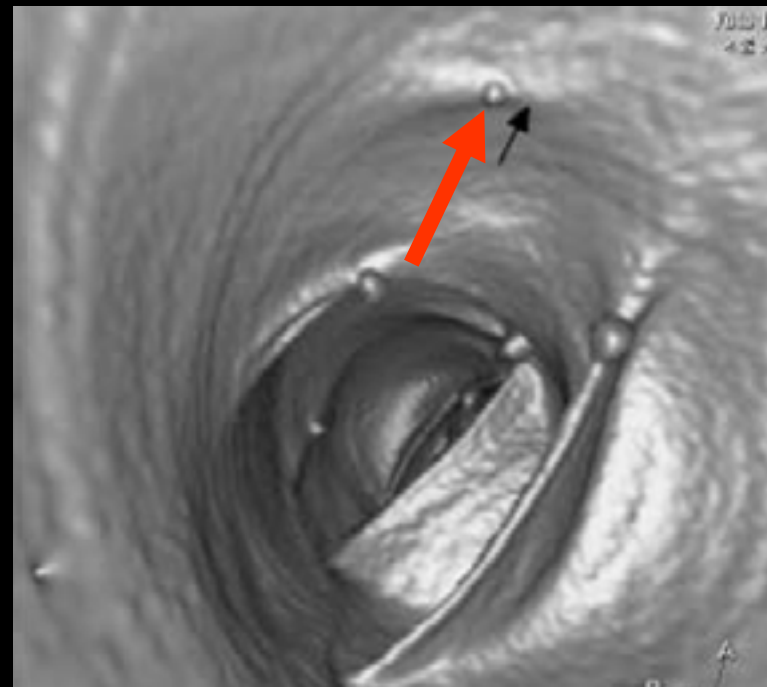


Polypendetektion CT-Dosisreduktion

- endoluminale Darstellung (VRT) eines Darmphantoms (Schwein)
- künstlich implantierte Polypen - 16-Zeilen-Technik



100 mAs



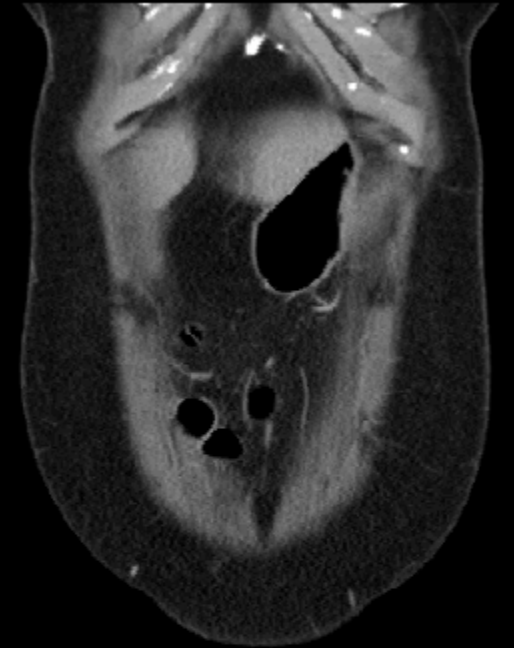
50 mAs

- Kollimation 16x 0,75 mm, Pitch 1,5 und Schichtdicke 1,0 mm
- Kein erkennbarer Unterschied in der Darstellung selbst des kleinsten Polypen (1,5 mm) bei Halbierung der mAs

Dünndarm nach Sellink



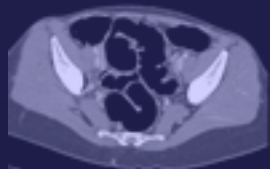
CT-Enteroclyse



Spin: -0
Tilt: 0

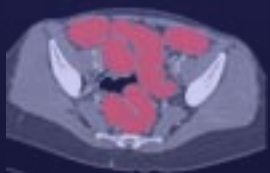
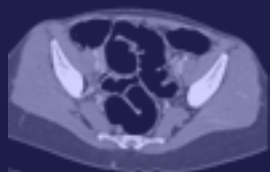
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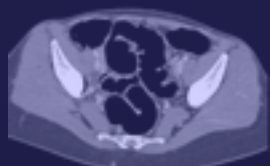


- Chronisch entzündliche Darm-erkrankungen (v.a. M. Crohn)
- Tumor-Suche
- Meckel-Divertikel
- Blutungen
- Stenosen, Fisteln, Abszesse

32 jährige Frau, M. Crohn
bisher 138 Röntgenuntersuchungen
erneut UB-Schmerzen rechts
intra- / extraluminale Pathologien?
(Stenose, Fistel, Abszess)



Material zur CT-Enteroclyse



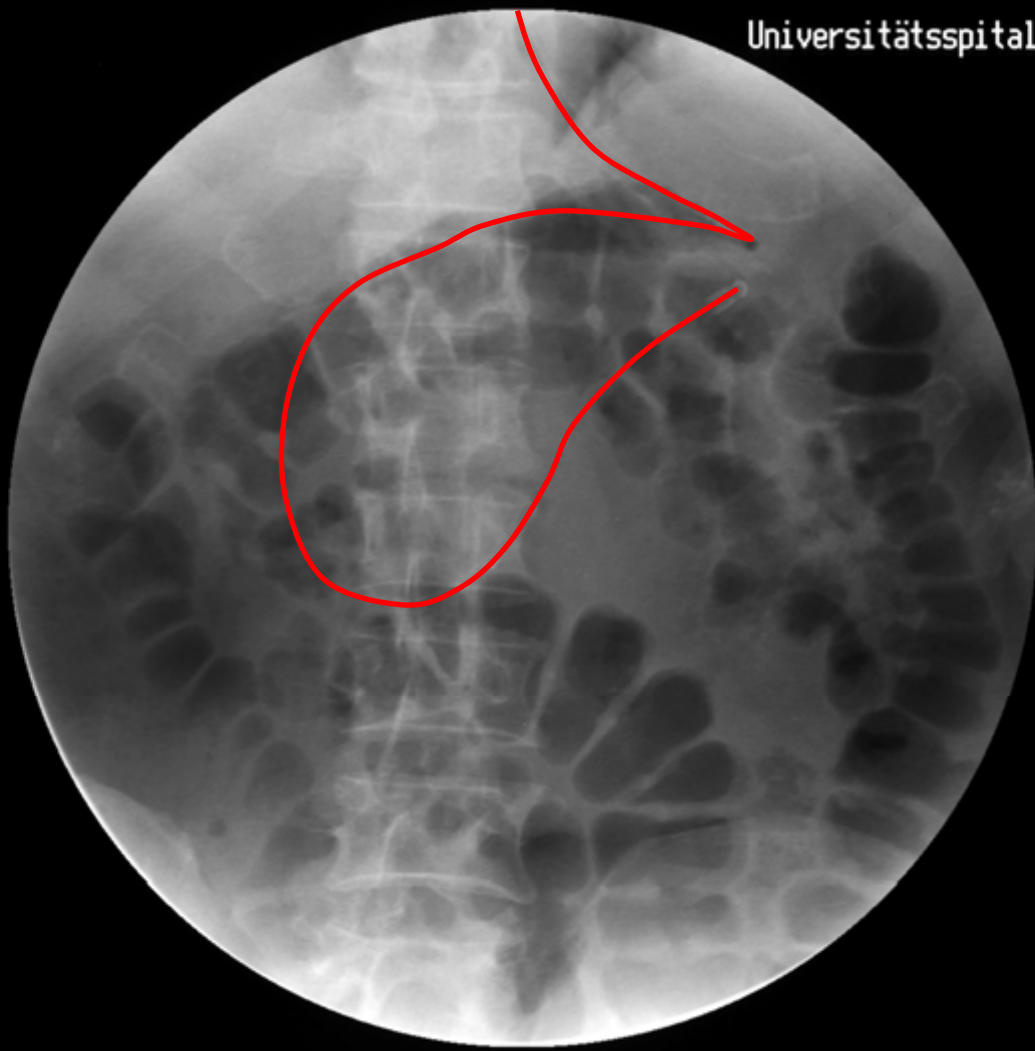
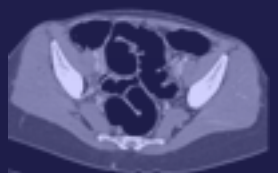
- 1... Duodenalsonde
- 2... Xylocainspray
- 3... Gleitmittel
- 4... Methylzellulose
- 5... Gastrographin
- 6... Behälter
- 7... Verbindungsstücke

Kontrastmittel:

30g Methylzellulose
60 ml Gastrographin
2 Liter Wasser



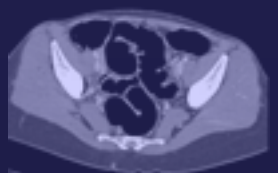
CT-Enteroclyse - Sondenplatzierung



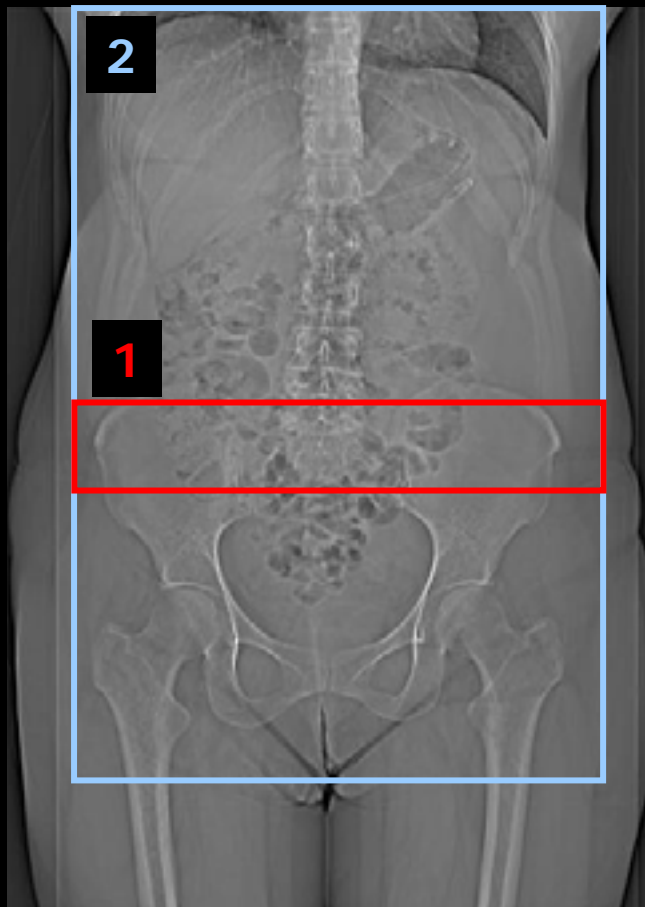
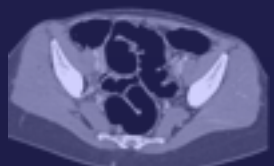
1
1



Motorpumpe



CT-Enteroclyse - Untersuchungsablauf



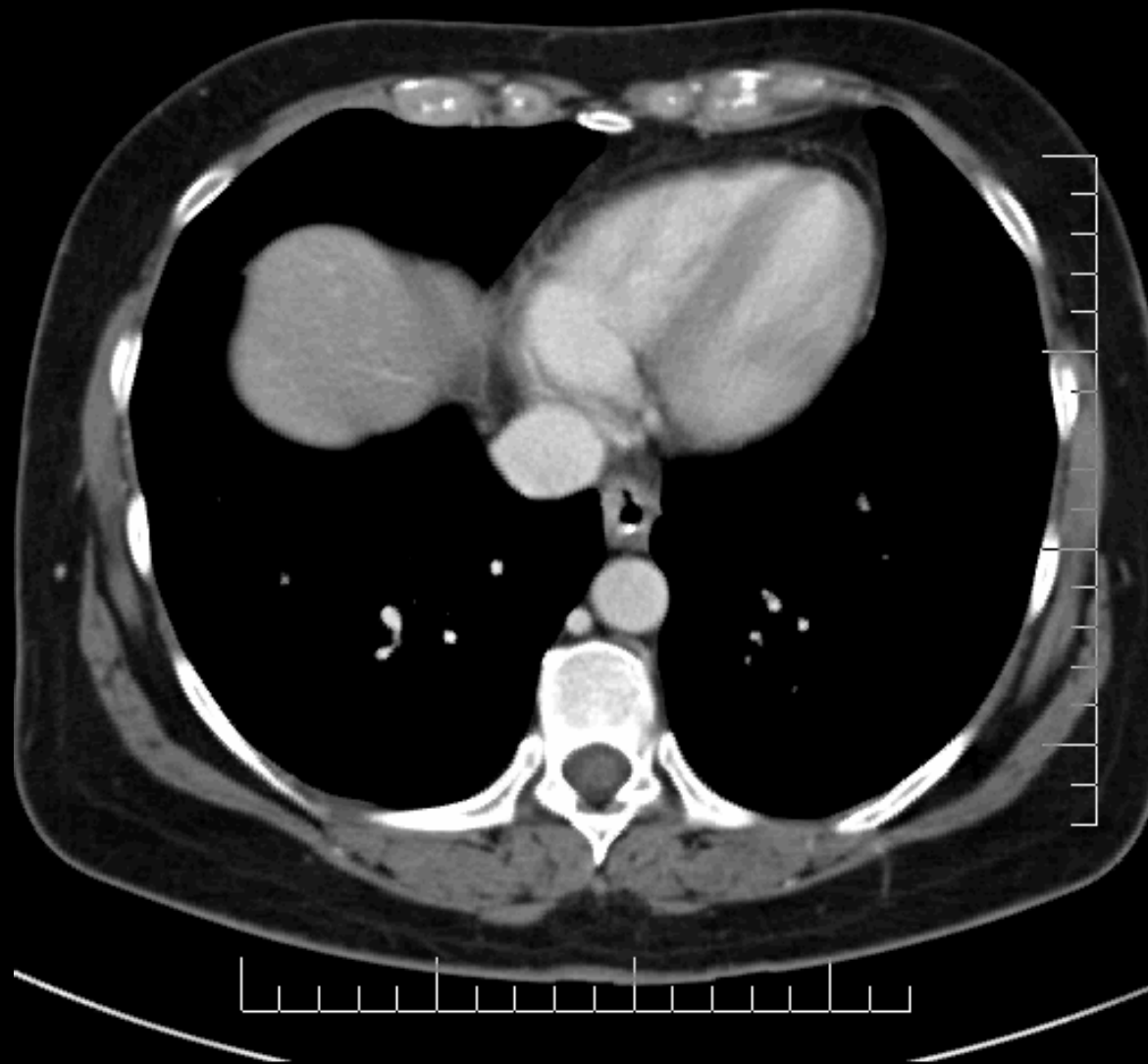
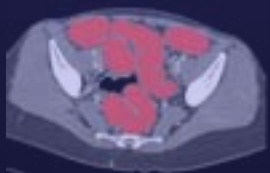
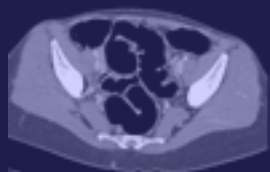
	4-Zeiler	16-Zeiler
Kollimation	4 x 1,0 mm	16 x 0,75 mm
Tischvorschub	6 mm / U	12 mm / U
Rotationszeit	0,5 sec	0,5 sec
Schichtdicke	1,25 mm	1,0 mm
Schichtabstand	0,8 mm	0,6 mm
Kontrastmittel	120 ml	120 ml
Flow	3 ml /sec	3 ml/sec
Delay	80 sec	80 sec

➤ KM-applikation über Motorpumpe (etwa 100-200 ml/min)

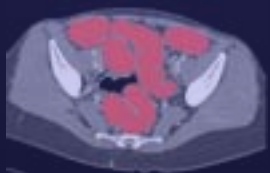
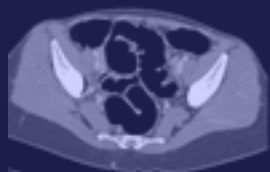
1...Kontrollspiralen mit 20 mAs

2...Spirale Abdomen normale Dosis

CT-Enteroclyse – axiale Schichten

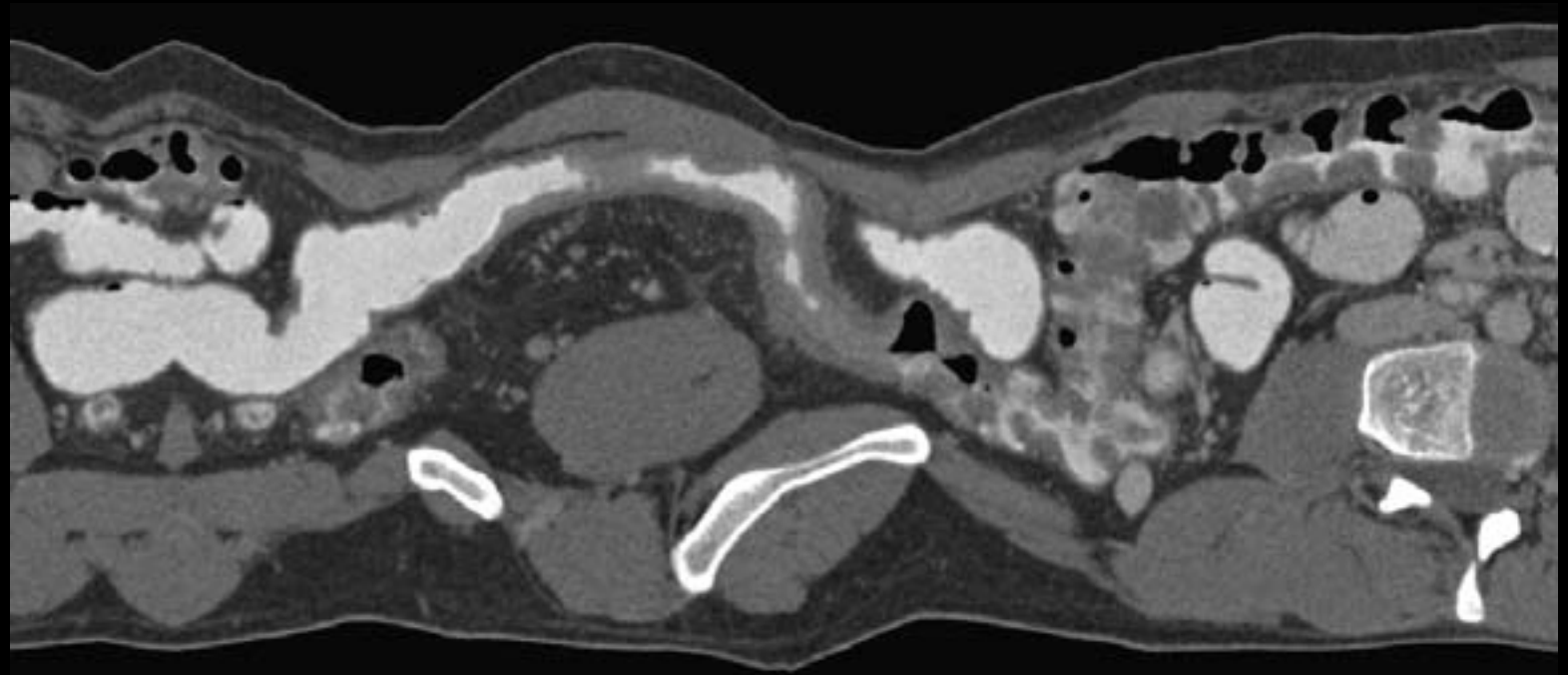
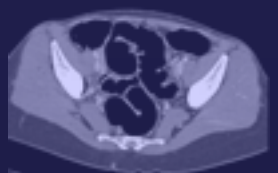


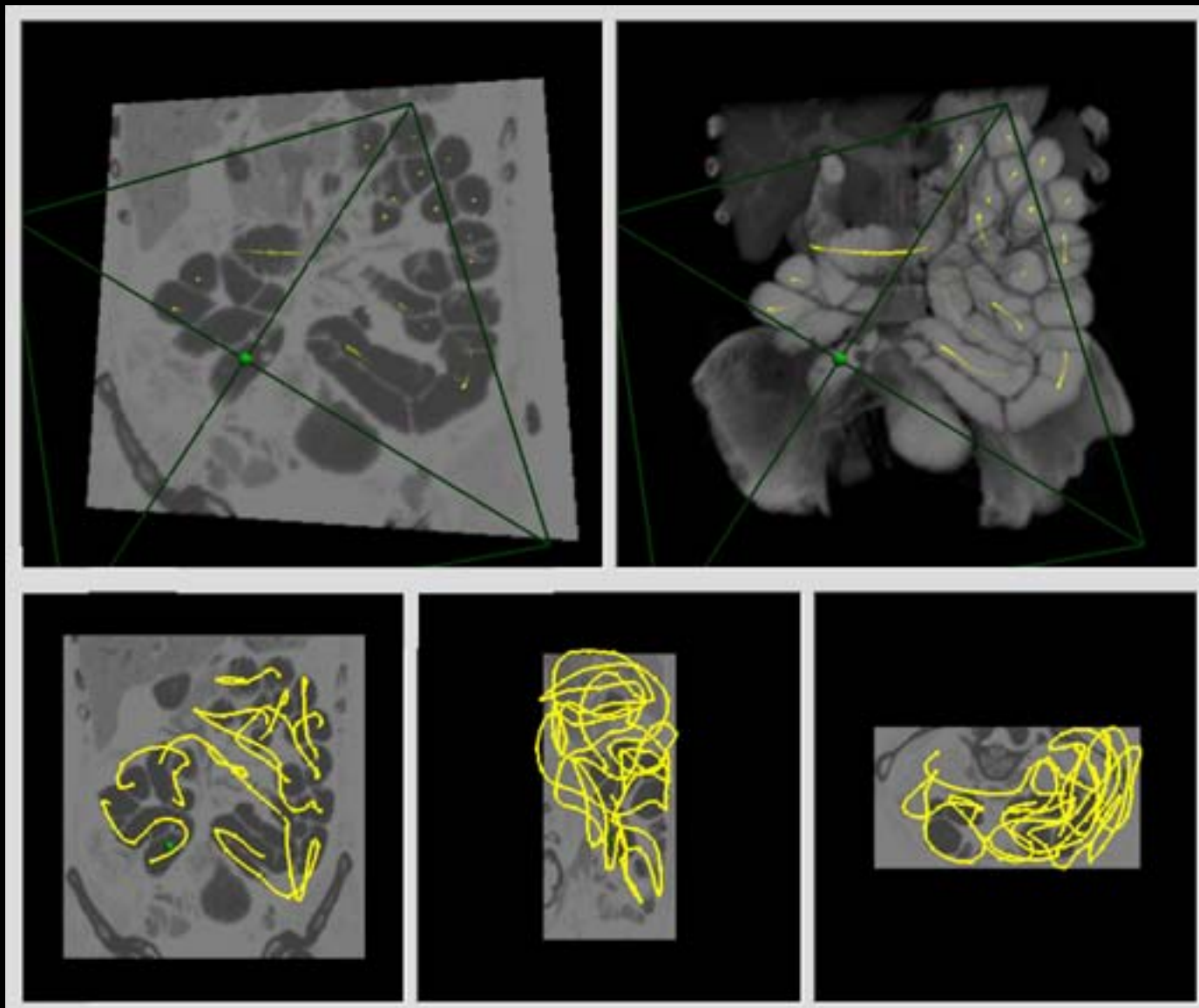
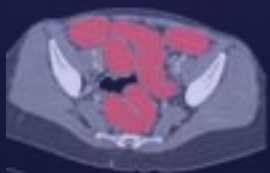
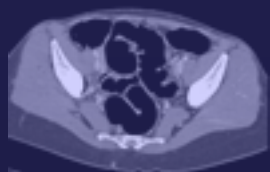
Coronare Reformation

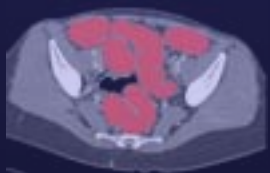
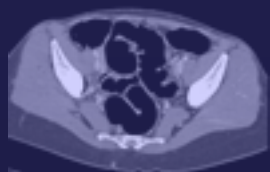




Gekurvte Reformation

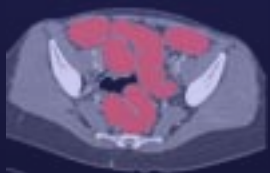
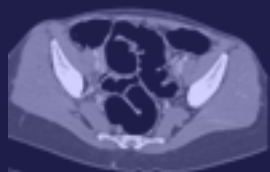






- Das MSCT spielt die führende Rolle in der Abdomendiagnostik
 - MSCT , Sonographie, MRI, konv. gastrointestinales Rx
- Akutdiagnostik ⇒ schnelle und zuverlässige Abklärung
- Tumordiagnostik mit Staging und Therapieverlauf
- Neue Untersuchungsmöglichkeiten
 - CT-Colonographie
 - CT-Enteroclyse
 - CT-Angiographie der Mesenterialgefäße

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Check out:

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