

Gastrointestinal investigations

Stomach and esophagus

- Endoscopy and Radiology
 - how complete and contribute each others findings
 - fiberoptic
 - biopsy
 - endoscopic US (Tumour staging)
 - upper panendoscopy
 - ERCP

Questions to be answered

Lumen

- patency, diameter, deformity, surroundings (fistule?)

Wall

- Plasticity - rigidity, peristalsis

Mucosa

- Colour, folds, inflammation, hemmorrhage, foreign tissue, protrusion

Sphincter function

Others

- Diverticulum, fistula, perforation, trauma, postop.

Diverticula

- PULSION

bulging of mucosa and submucosa
through the

weakened muscle layer

- Zenker

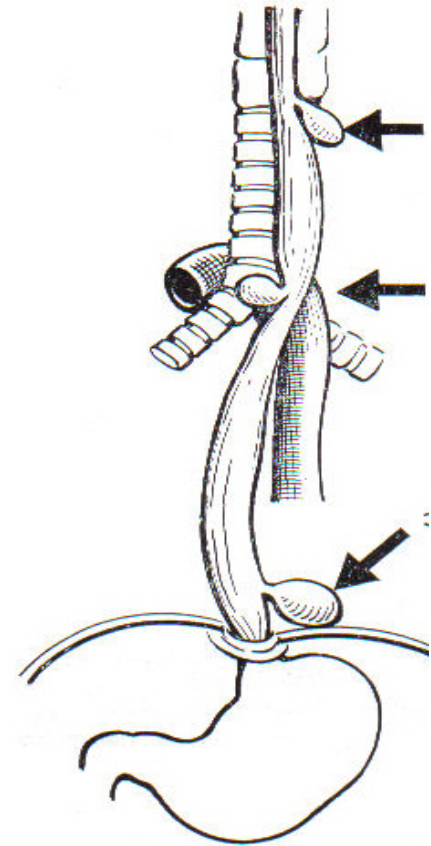
- Epibronchial

- Epiphrenic

- Epicardial

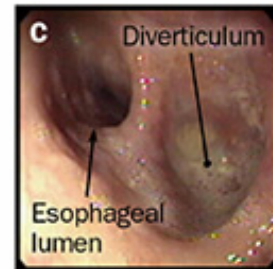
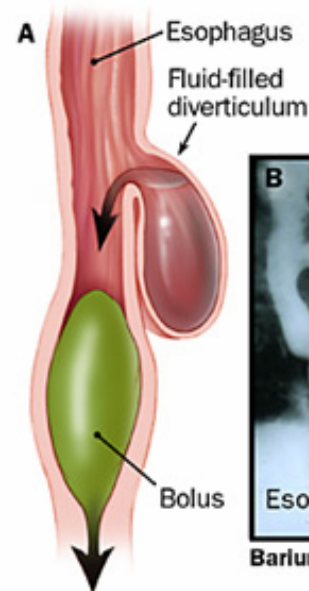
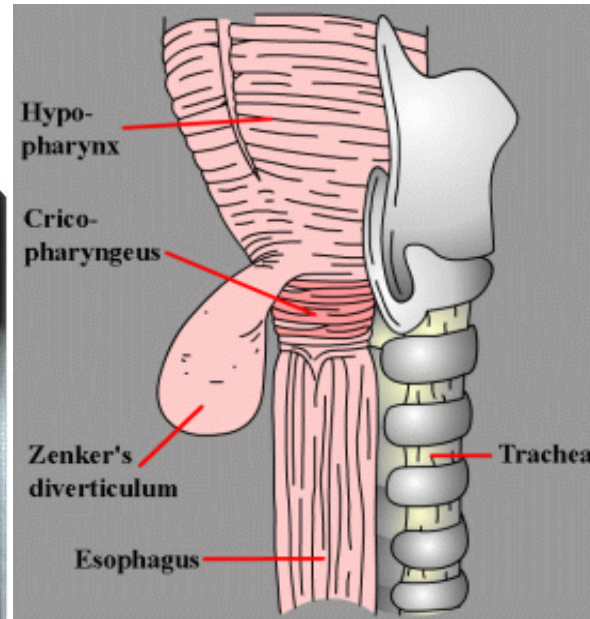
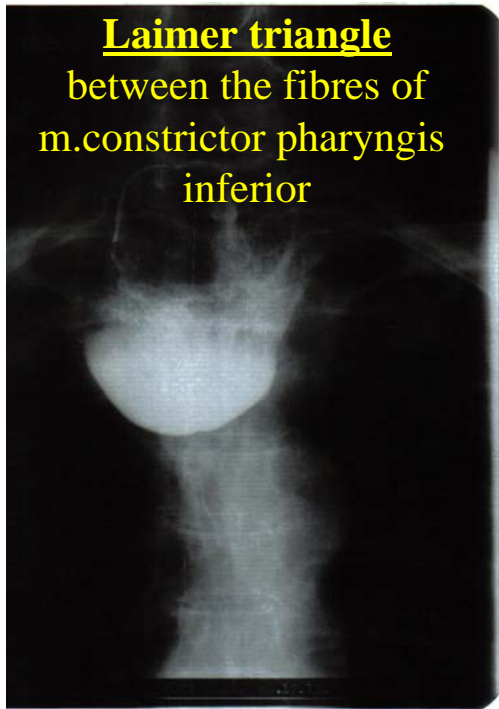
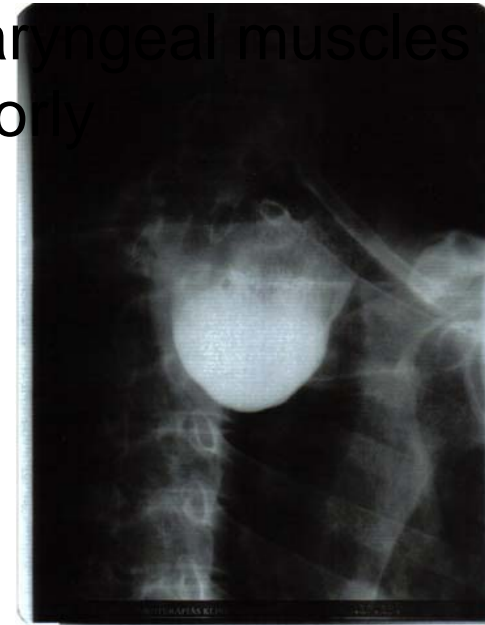
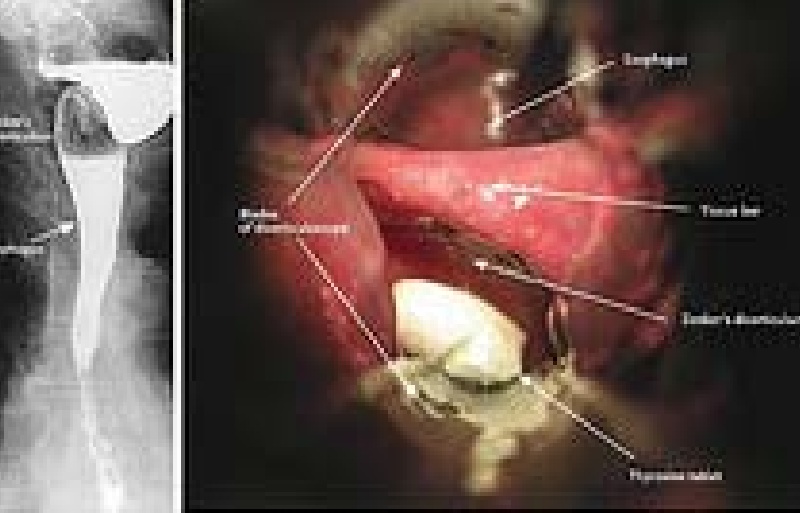
- TRACTION

- all layers of esophageal wall



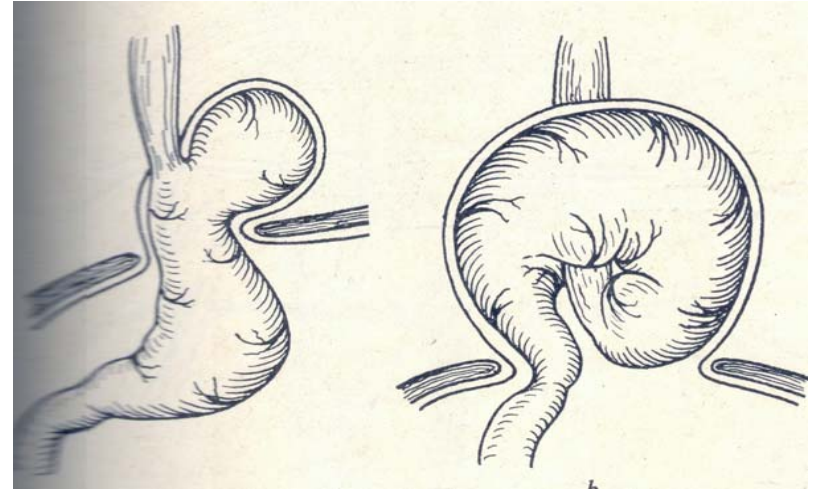
Zenker diverticula

a hypopharyngeal mucosal herniation through the cricopharyngeal muscles posteriorly



Scope view

hiatal hernias
upside down stomach



Motility disturbances

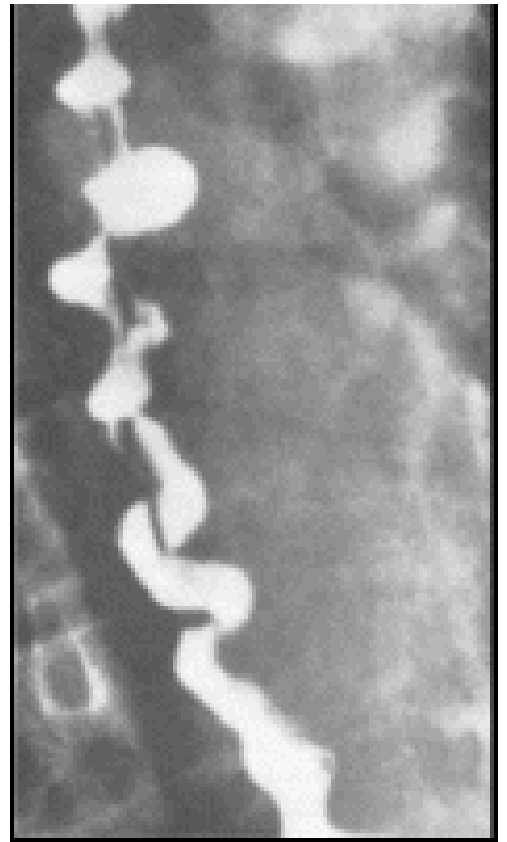
GERD

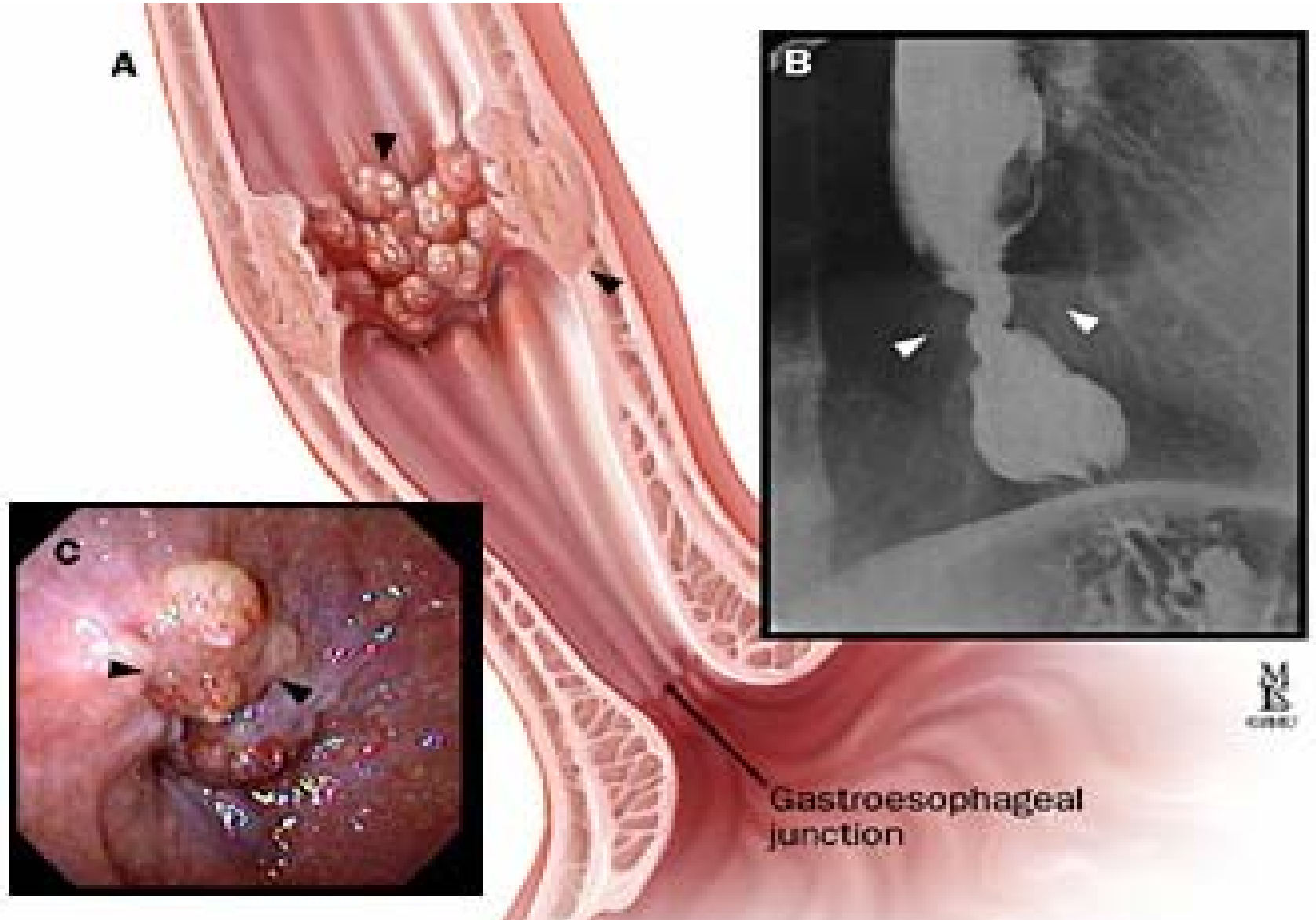
Esophageal reflux

Barrett esophagus

Achalasy

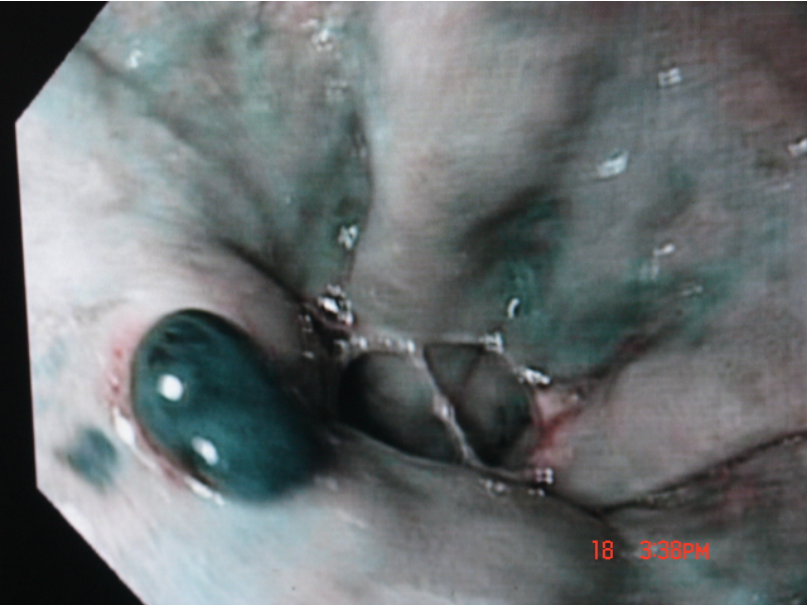
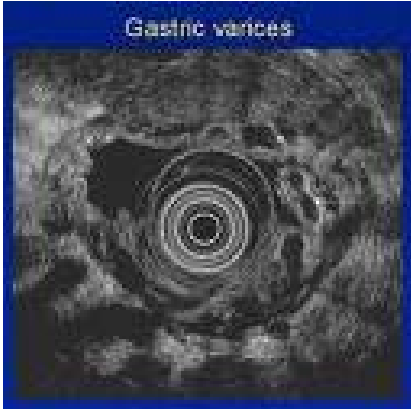
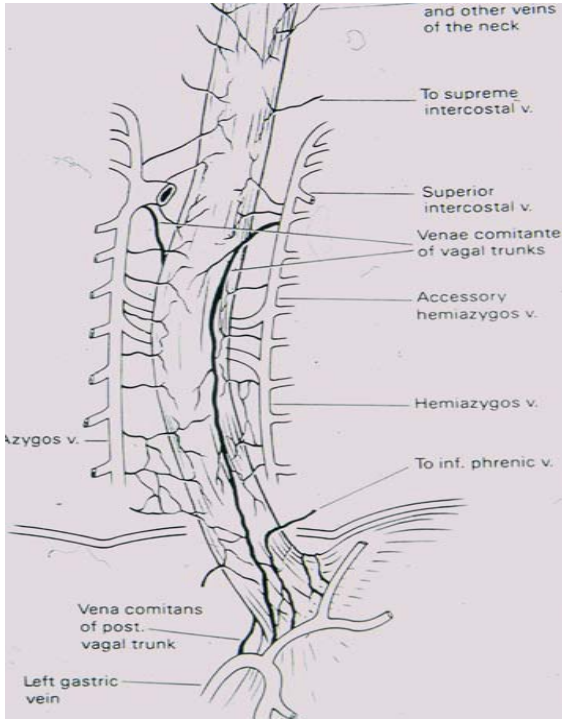
diffuse spasm





Tumor caused swallow - disturbance

VARIX



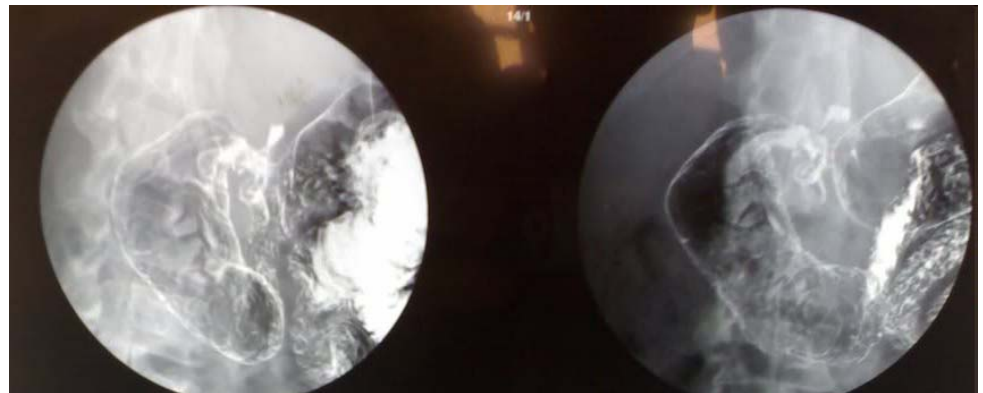
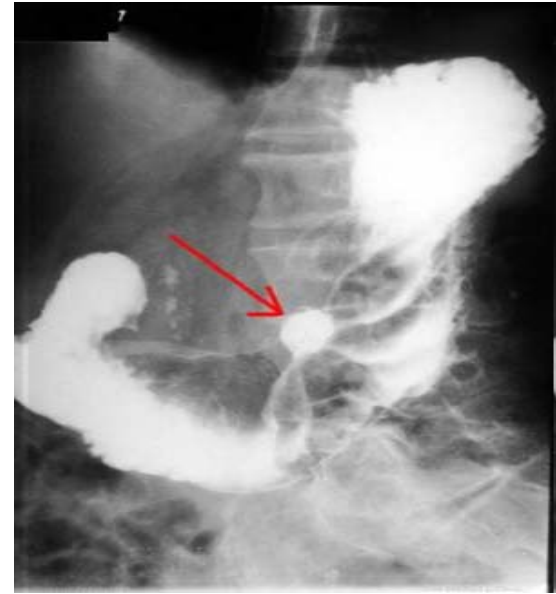
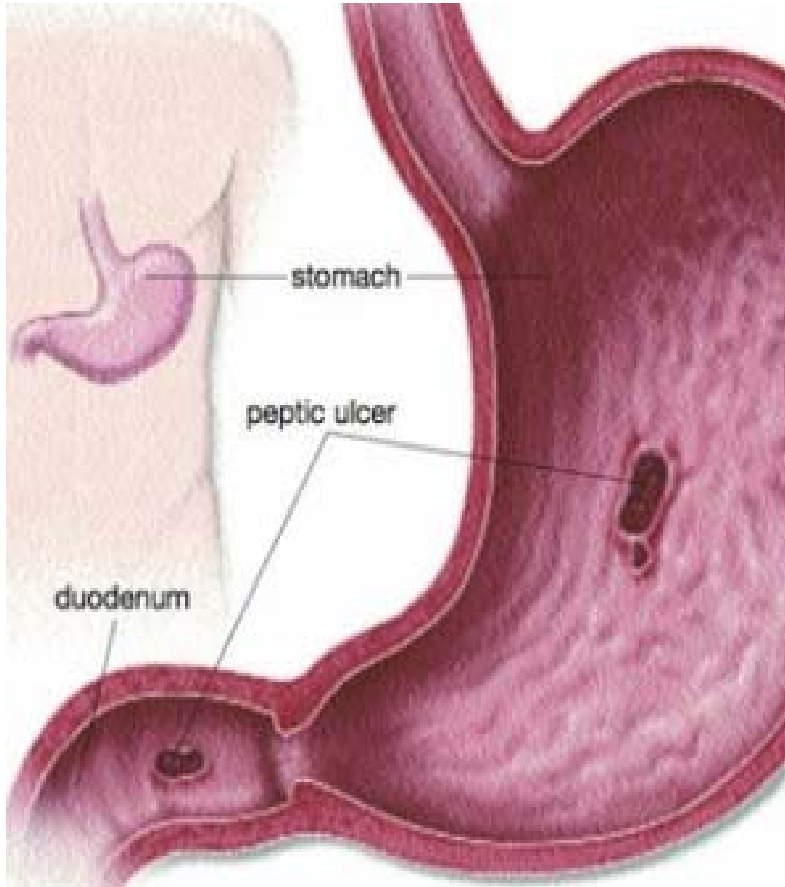
varices



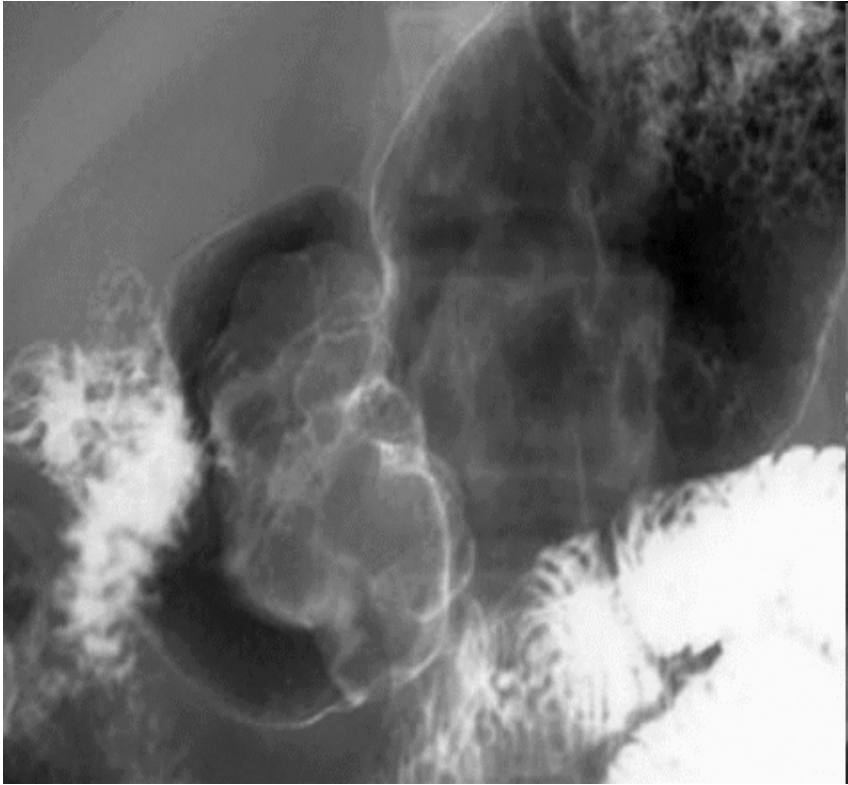
foreign body



gastric and duodenal ulcer



Polypoid carcinoma of the stomach: a double contrast study



Linitis plastica



ABDOMINAL PARENCHYMAL ORGANS

DIAGNOSTIC ALGORITHMS

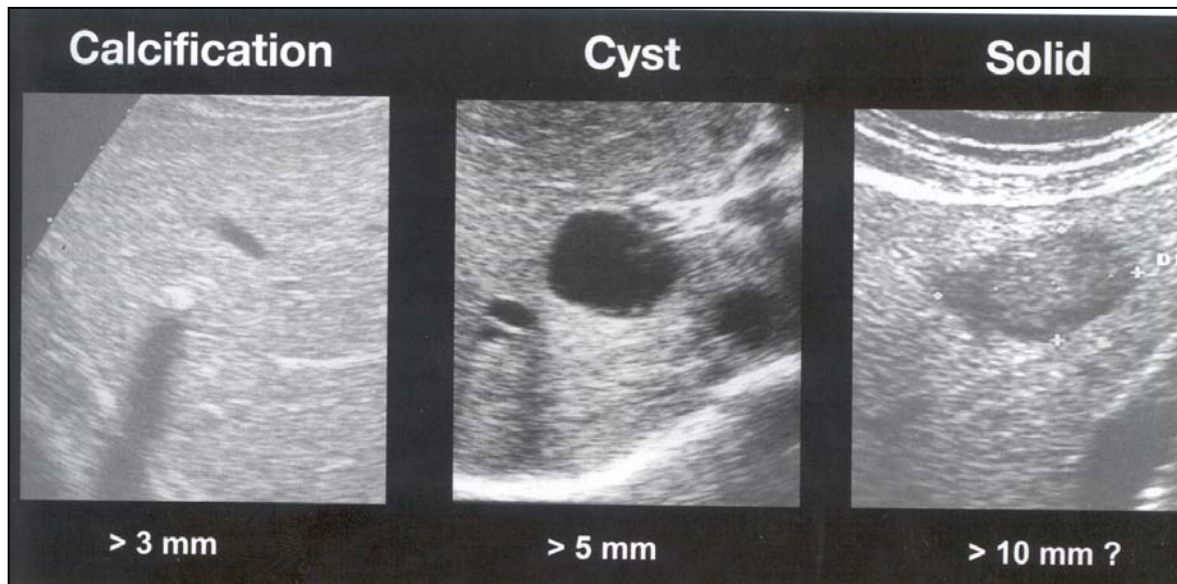
- Is there any pathological?
 - detection
- What is the lesion?
 - characterisation
- Surgical plan
 - segmental localisation
 - vascular map
- Therapeutic response
 - volume, viability

What is the base of characterisation?

- shape
- „colour” (echo, density, signal intensity)
- Vascularity
 - Capillary, tissue contrast enhancement
 - dynamics (a.hepatica, v. portae)
 - distribution
- Specific contrast uptake
 - hepatocyt, biliary excretion
 - RES
 - glucose

characterisation 1.

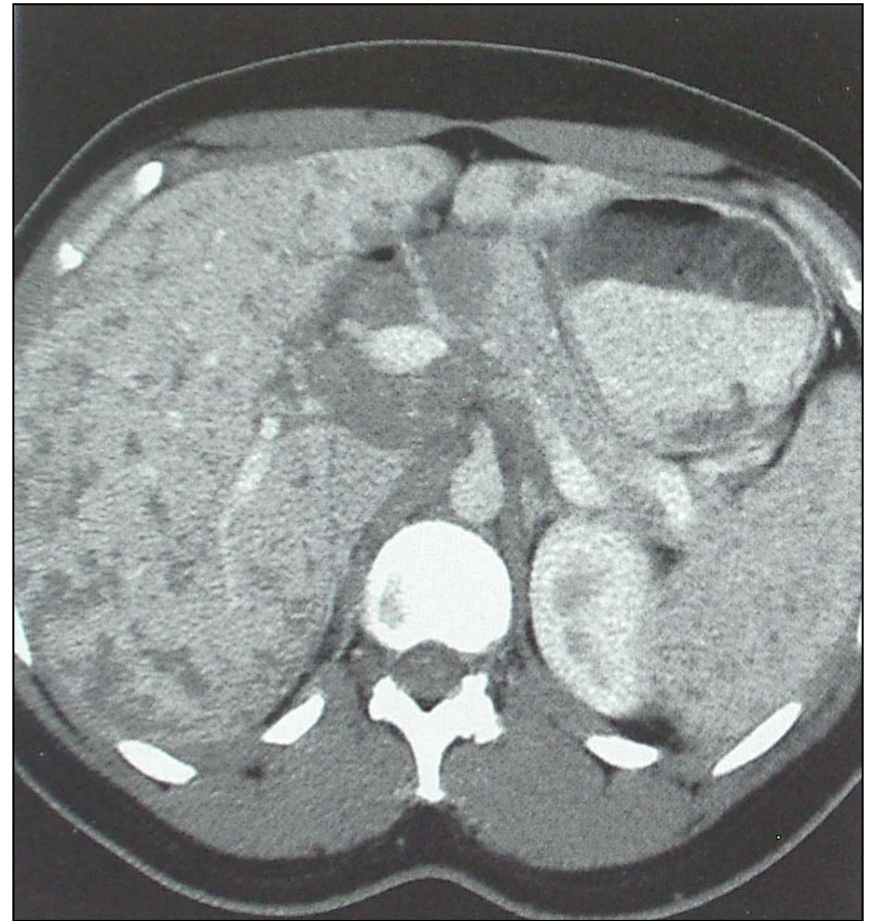
Echo, density, intensity



CT

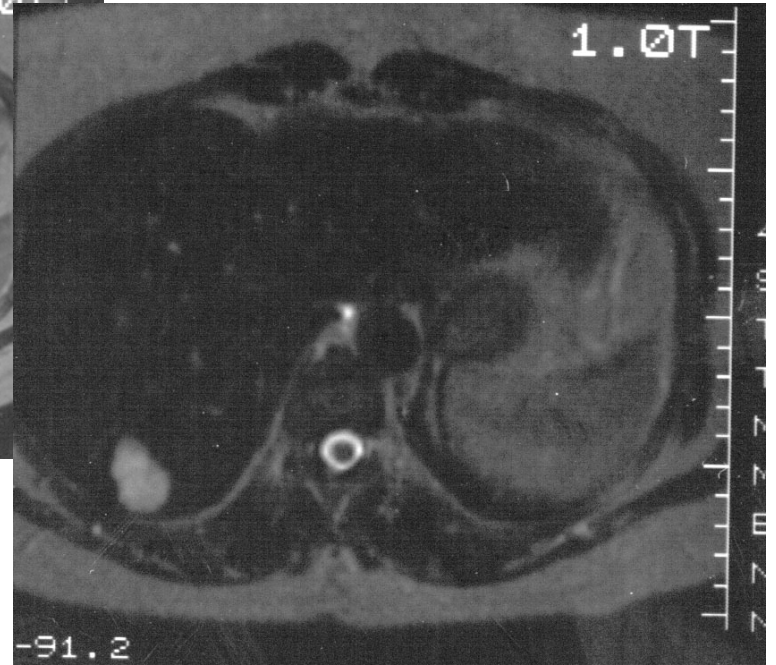
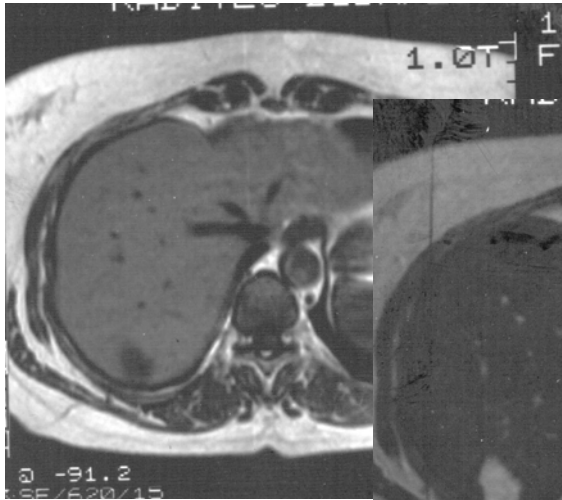
- **Hounsfield scale**

- -100 HU
 - Fat tissue
- -30 HU
 - Fatty soft tissue
- 0 HU
 - water
- 0-20 HU
 - fluid
- 20-70 HU
 - Soft tissues
- 70-90 HU
 - bleeding
- 300-2000 HU
 - calcification



Intensity

haemangioma



- T1

T2

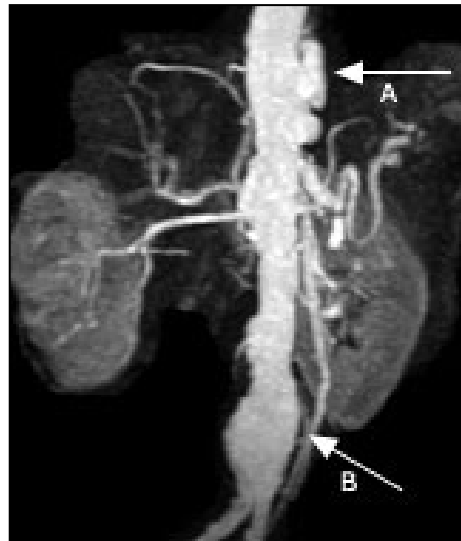
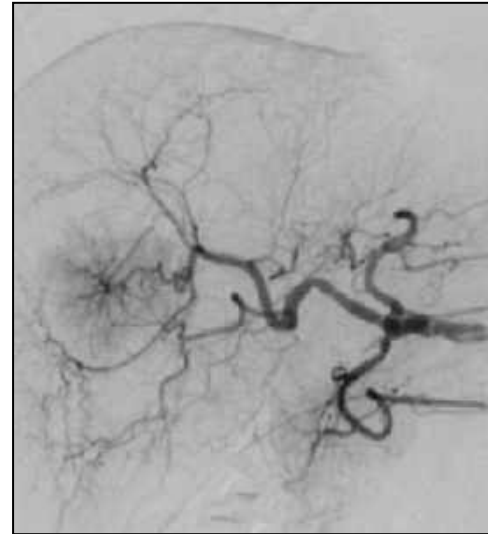
strong T2

Characterisation 2.

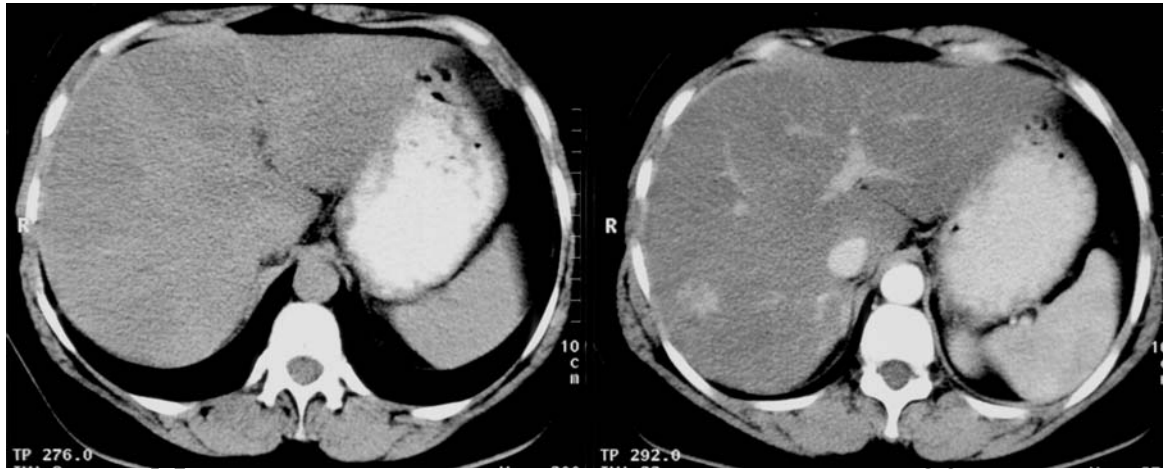
vascularity, contrast uptake

Vascular map
Tumor feed
Vessel structure

intervention!

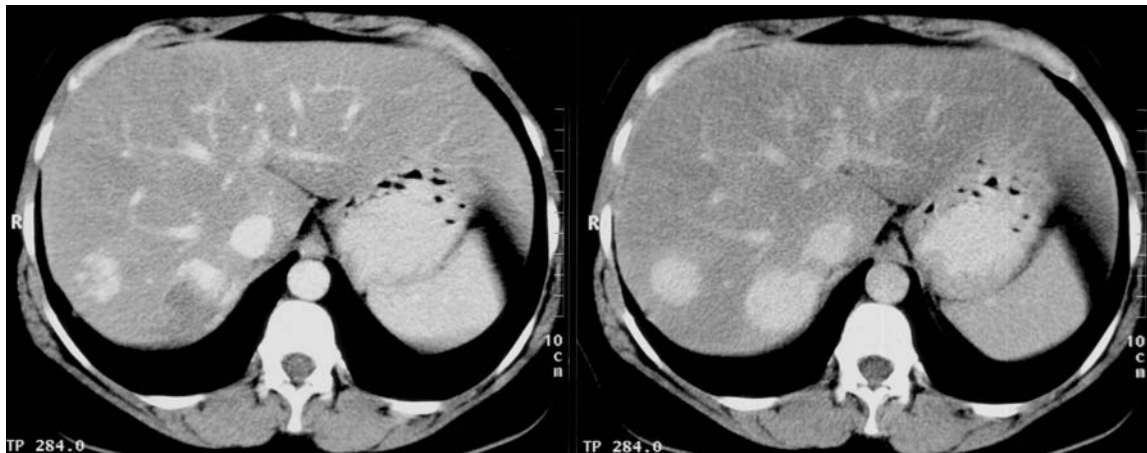


Haemangioma



Nativ

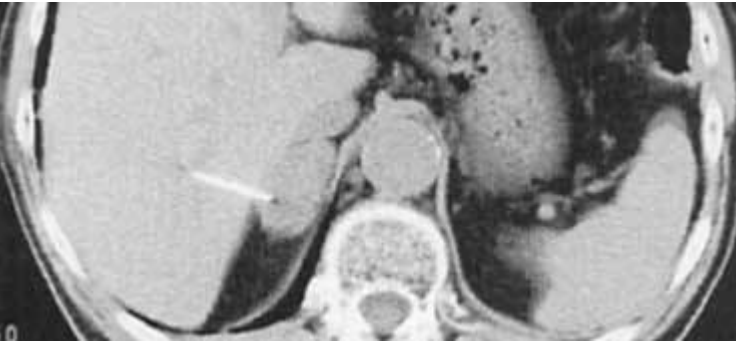
30 sec



60 sec

3 perc

Characterisation with biopsy

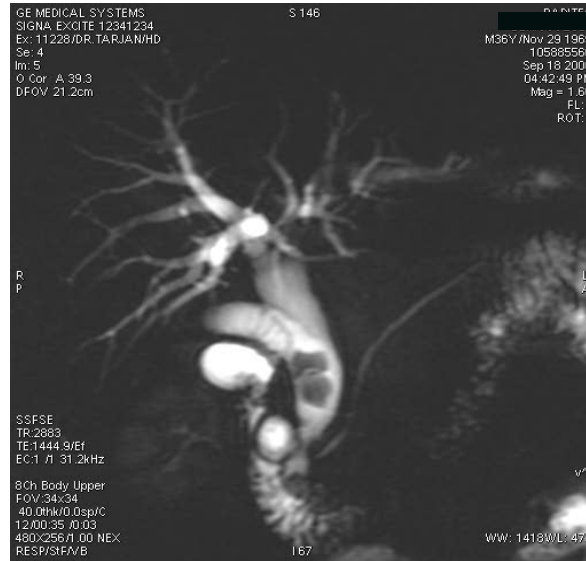


Surgical
Core

Fine needle core

Fine needle aspiration cytology

Detection in ducts



Imaging of the small bowel and colon

Colonoscopy

capule endoscopy

Plain x-ray, fluoroscopy

Mostly in acute abdominal diseases

X-ray: gas, soft tissue, bone

Gastrointestinal organs not separated

Gas content

gas –fluid levels

calcifications

Fluoro: motility of gas content

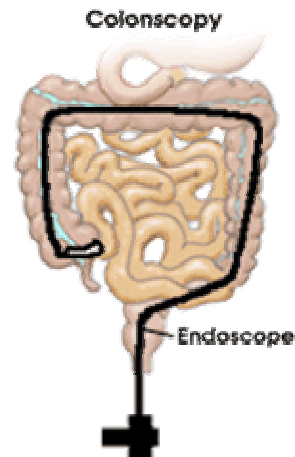
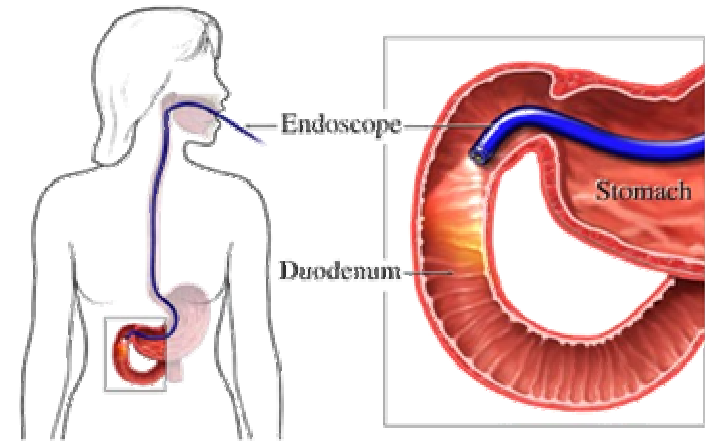
Contrast studies

Perforation – water soluble



Endoscopy: small-, large bowel

- Can be imaged
 - duodenum
 - colon
 - terminal ileum
- jejunum and ileum
 - Can not be reached by conventional endoscopy
- Alternative exams:
 - Passage
 - Enteroclysis



Monocontrast study

- positive contrast material (bariumsulphate)
- shows
 - contour
 - narrowings
 - dilations
 - filling minus
 - filling plus
 - outer impressions
 - function (peristalsis, emptying)

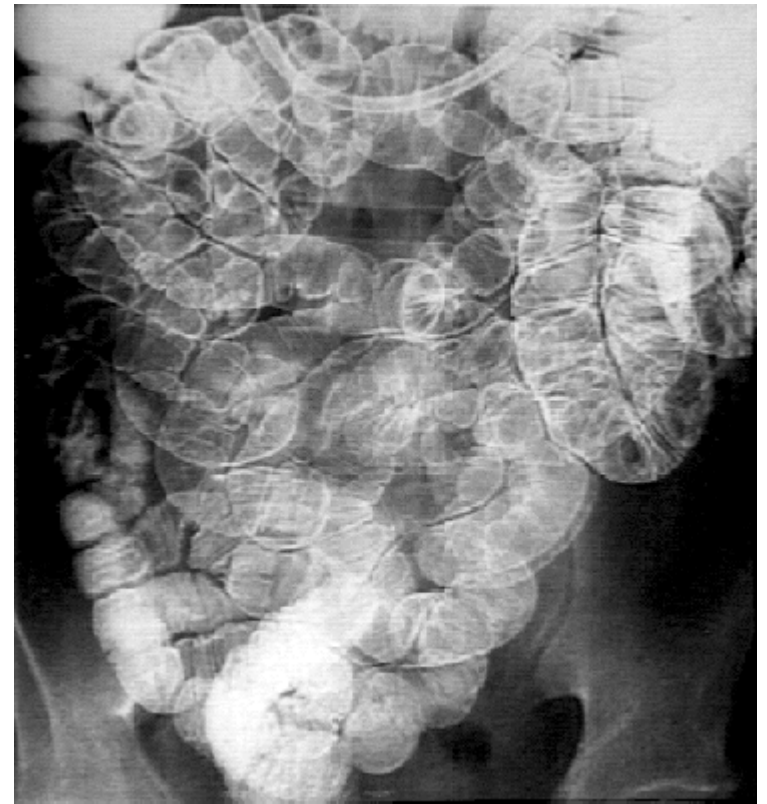
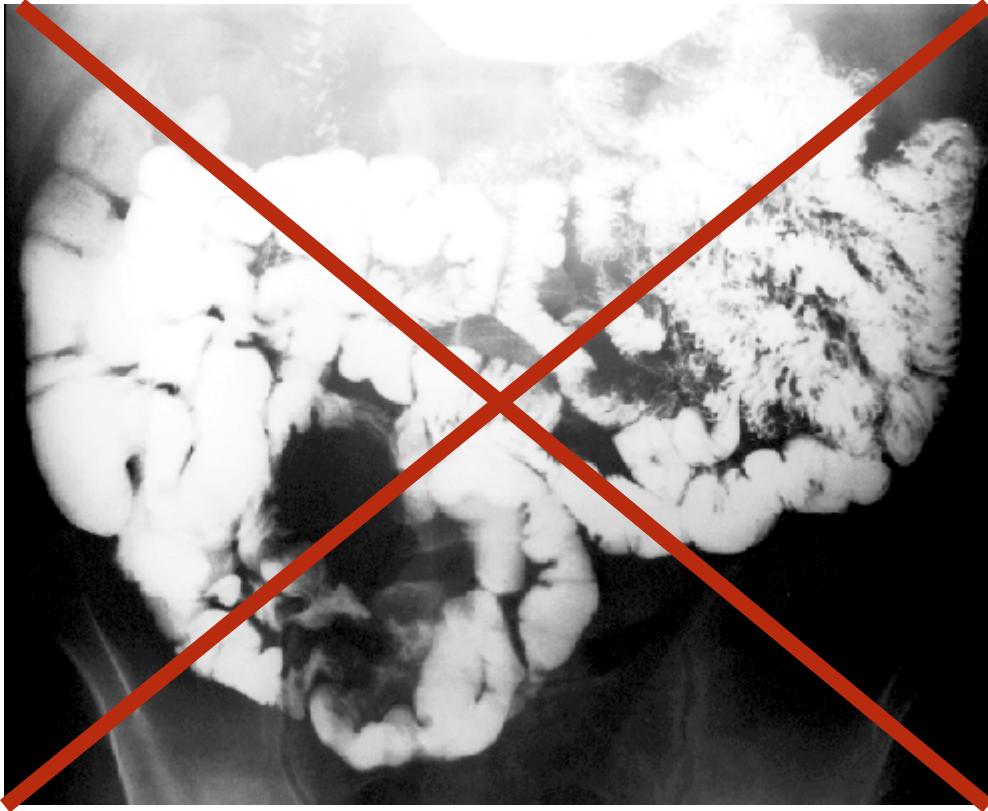
Monocontrast irrigoscopy
Monocontrast Enteroclysis

Double Contrast method

smear mucosa with c.m.
distend the lumen with gas
relax bowel walls with smooth muscle relaxant
shows:
contour
mucosal relief
advantage: fine mucosal details
disadvantage: no function

Double contrast irrigoscopy
Double contrast enteroclysis

Passage or Enteroclysis?

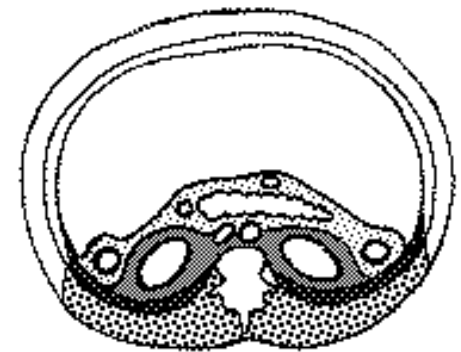
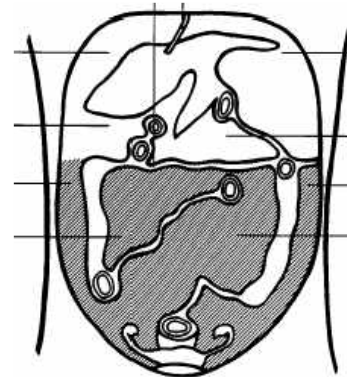


Transectional techniques

- US
- CT
- MR
- Demonstrable
 - wall thickness
 - environment
 - wall layers: US
 - 3D: CT, MR
- ULTRASOUND (US)
- Disadvantage
 - gas
 - bones
- But US:
 - excellent resolution
 - motility, peristalsis
 - compressibility
 - point out the spot of the pain

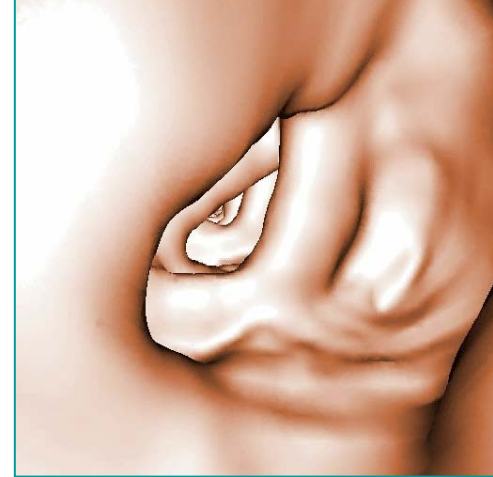
Computerised tomography (CT)

- wall thickness
- lumen narrowing (proper technique)
- surrounding abdominal organs
- Spreadings in the peritoneal and retroperitoneal anatomical compartments



Virtual colonoscopy

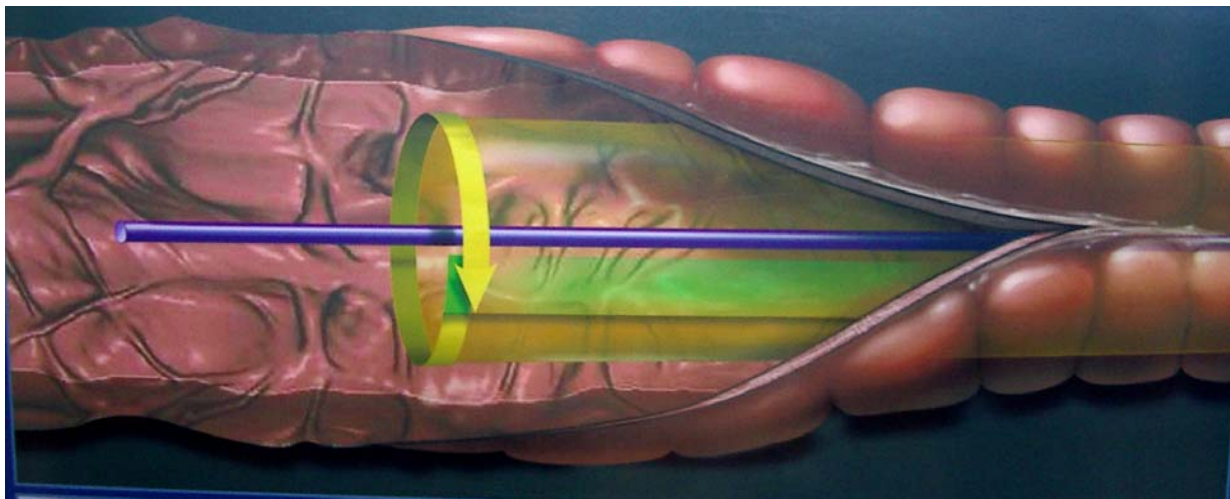
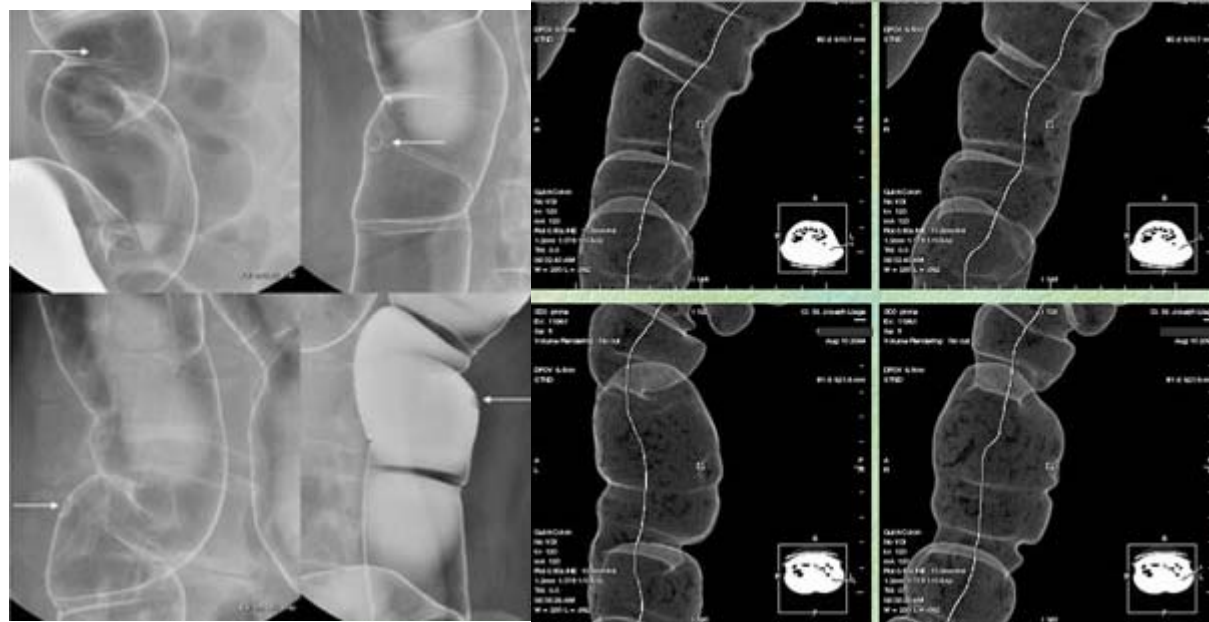
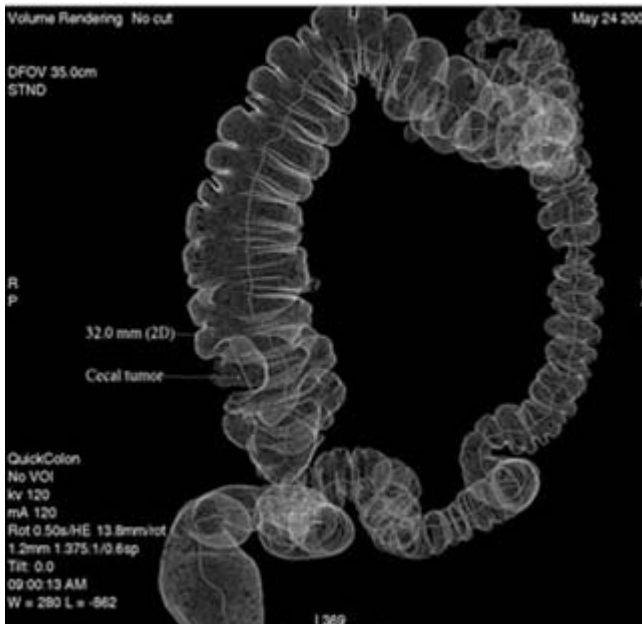
- Non invasive
- Non-loading
- No sedation
- Complete:
 - The whole colon
 - Mucosa
 - Intestinal wall
 - Environment



Indication:

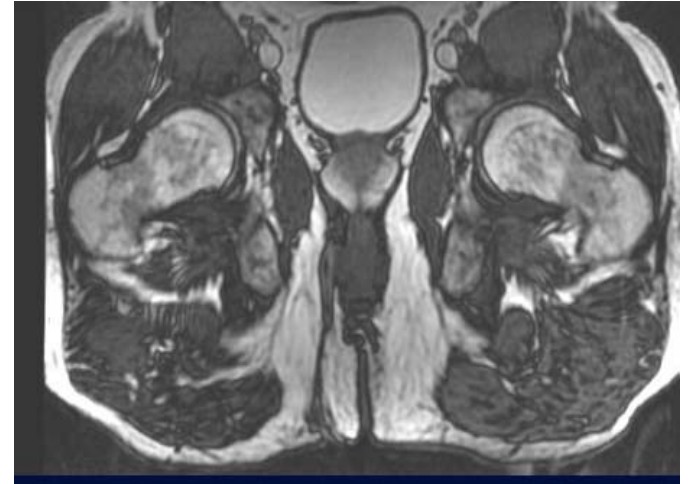
failed endoscopy
proximal to stenosis
IBDs
colon tu. staging
patient denying conventional
colonoscopy
after polypectomy or tumour
excision – follow up
searching for complications

CTC: transparent colon



Magnetic Resonance Imaging (MRI)

- Slow MRI
 - non-moving bowel:
 - Rectum
- Fast MRI:
 - also moving bowels:
 - small bowel
- Surrounding organs



Angiography

- Diagnostic localisation of hemorrhage
- Instead of angio CT angio mostly enough
- Importance:
 - guiding of catheterised interventions

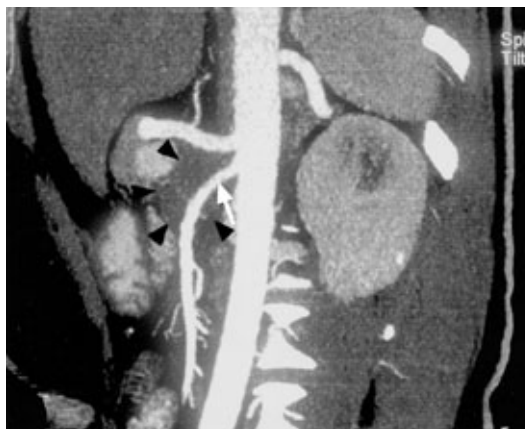
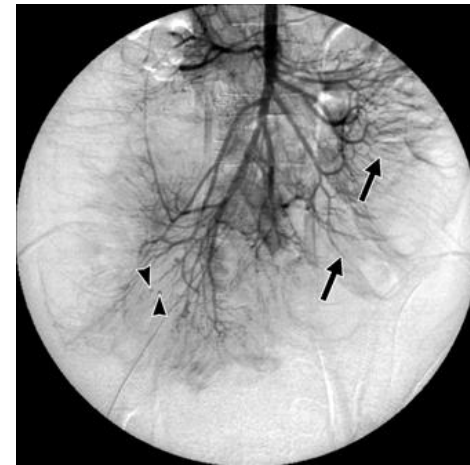
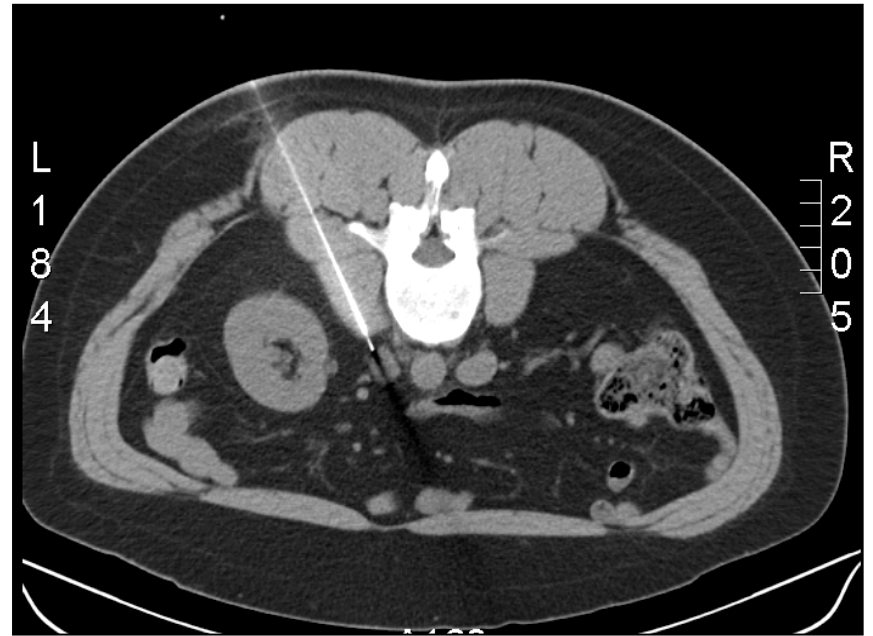


Image guided Biopsy



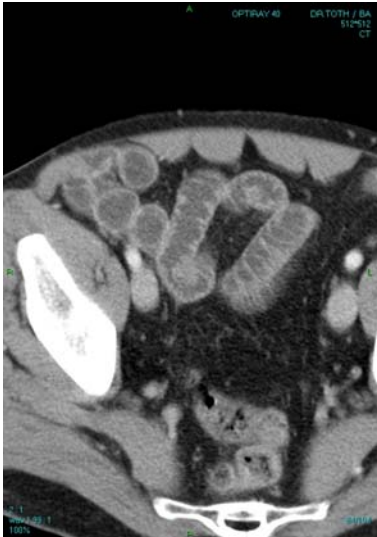
Diseases: small bowel



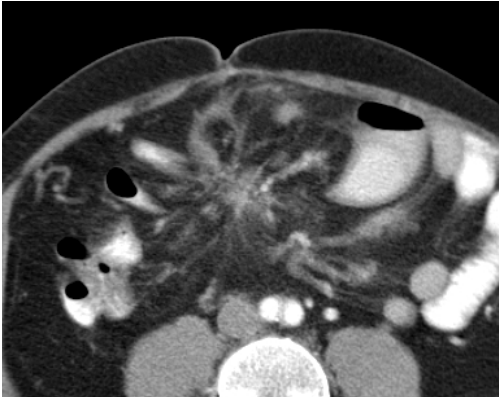
ILEUS



polyp



carcinoid

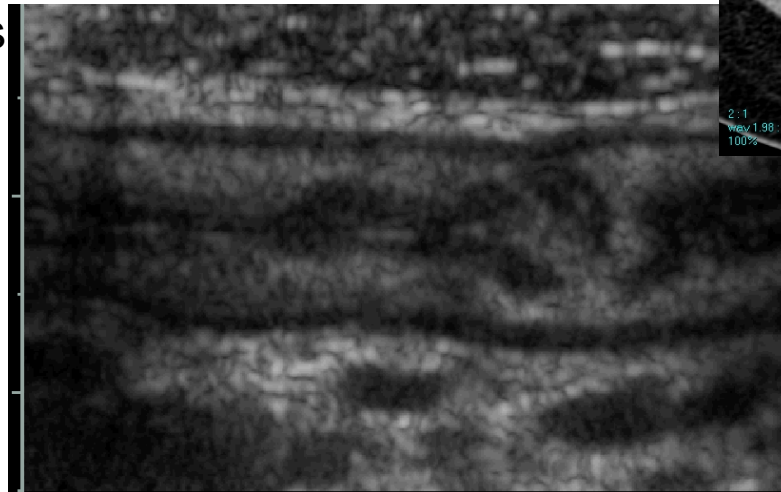
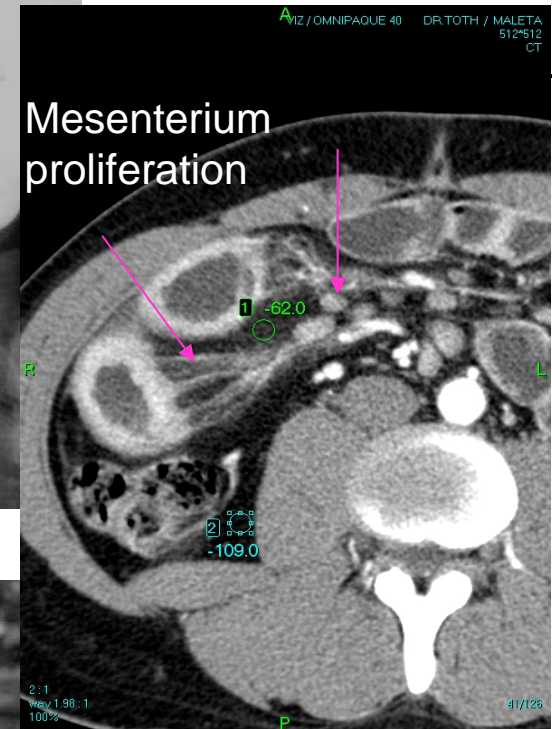
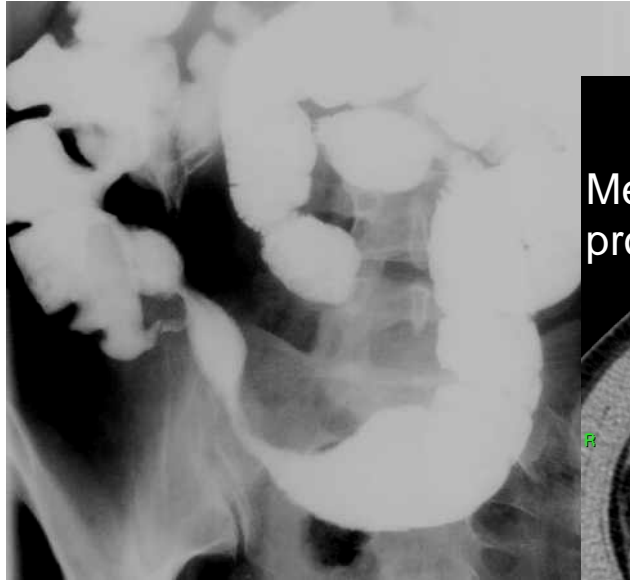


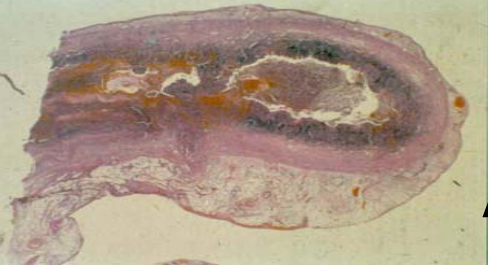
intossuseption



Crohn's disease : radiological signs

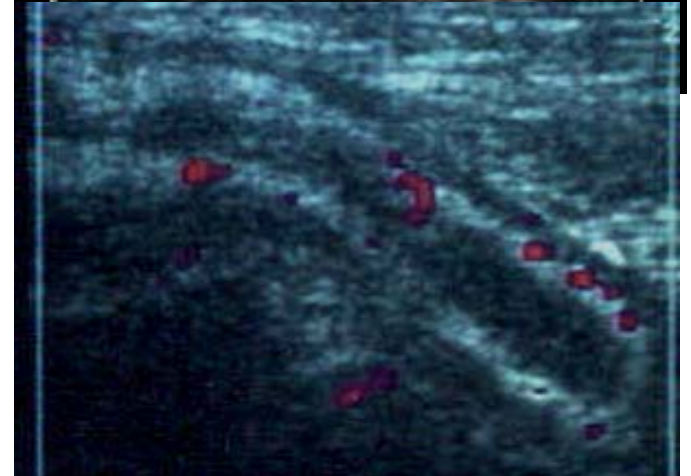
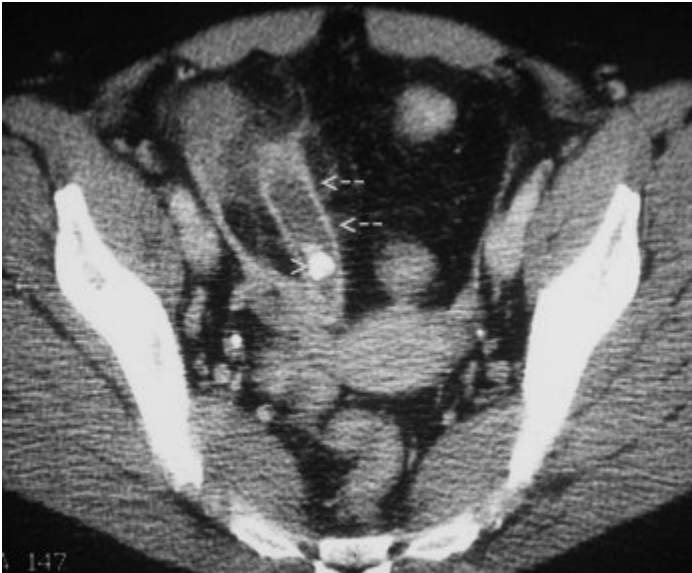
- Wall thickening
 - ileocolic 40-55%
 - only ileum 25-40%
 - only colon 15-35%
- Wall-structure remodeling
- Lumen narrowing
- Lack of peristalsis
- Rigidity
- Increased vascularisation
- Skip lesions
- Mesenterium thickening
- Mesenterial lymph nodes
- Conglomerate





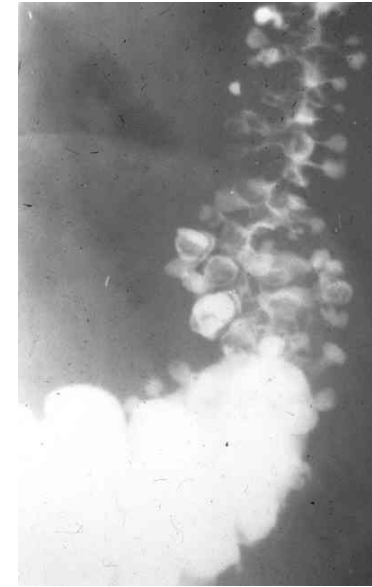
Acute appendicitis

- Signs:
 - Thickening
 - Rigidity
 - Inflammation of periapp fat
 - Increased vascularisation
 - Tenderness caused by compression
 - Abscessus

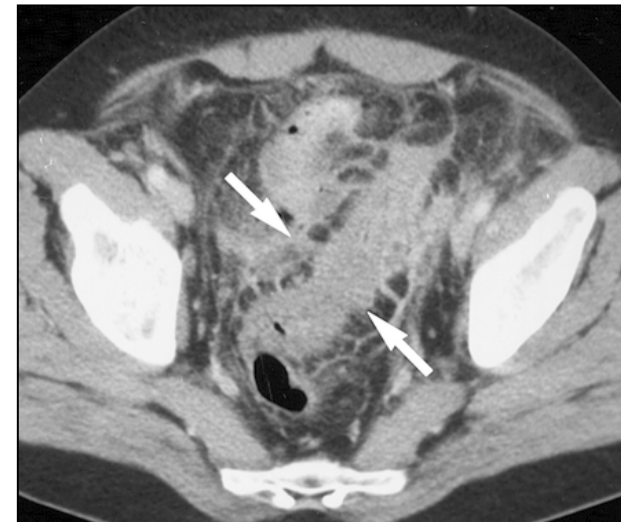


Diverticulosis

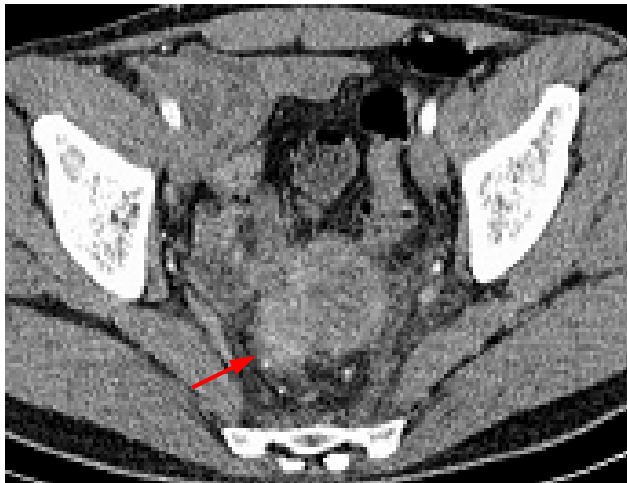
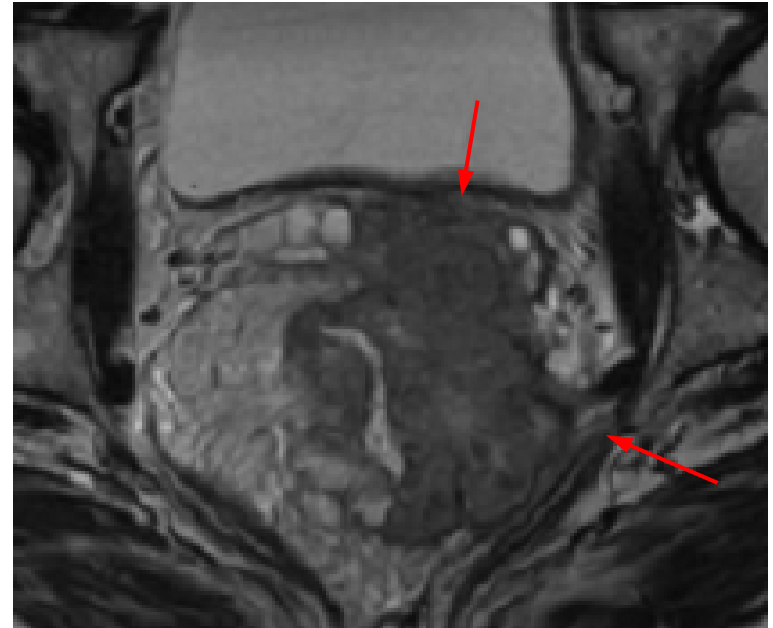
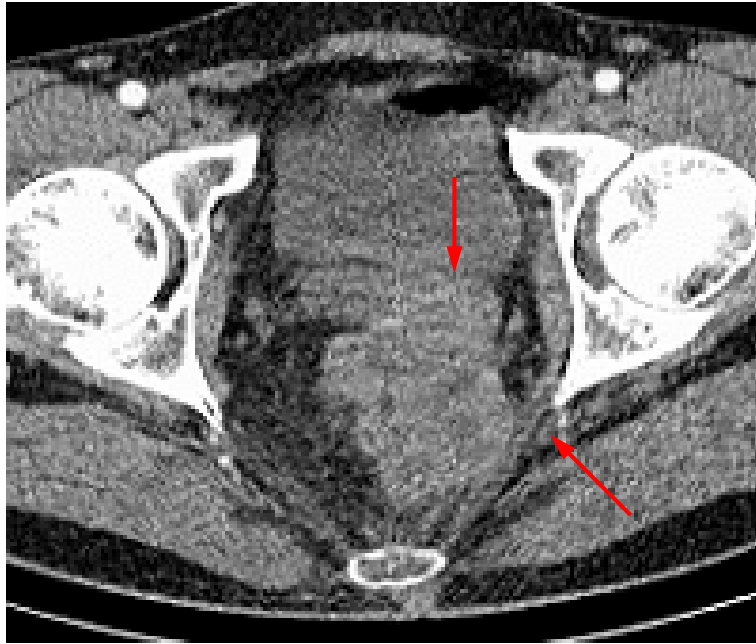
- Prevalency 23%
>50 years 50%
- near tenias
- if inverts - dg.
problematic
- circular muscle
thickening, caliber
narrowing
- diverticulum on the
hastrum, **zig-zag sign**



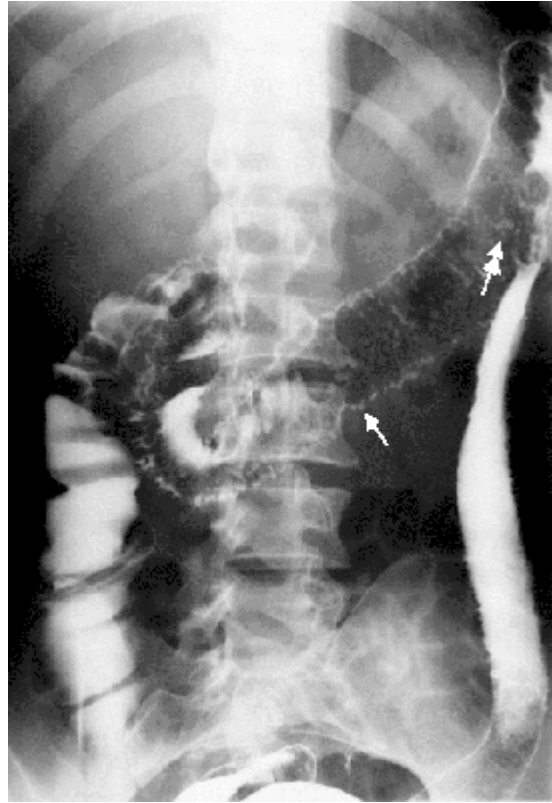
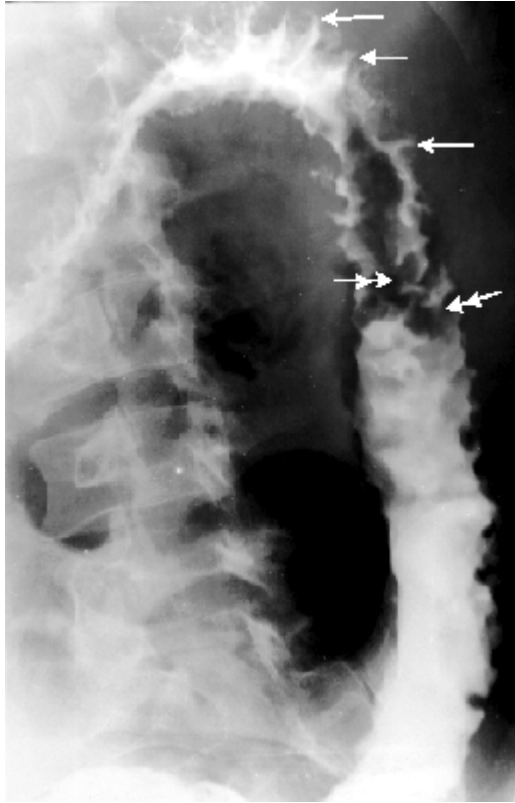
diverticulitis



rectum cc. T4 stadium

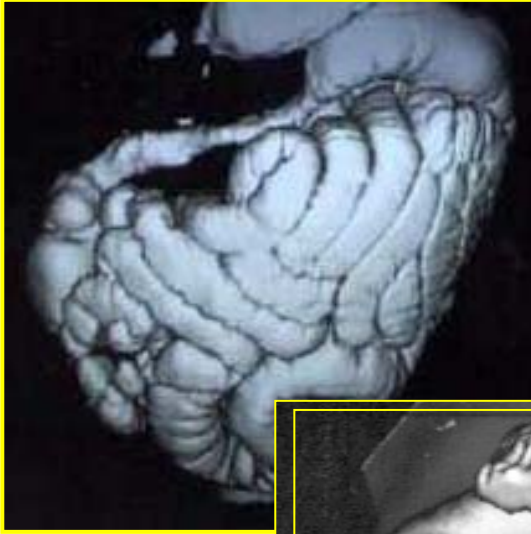


Ulcerous Colitis



pseudodiverticulum, double ulcer: filling plus, spot

Narrowing



Inflated air usually dilates the proximal loops = can be investigated.

Perianal fistules CT, MR

