

RADIOLOGY OF ABDOMEN

DR VALENTINA OPANCINA, MD, PHD

ASSOCIATE PROFESSOR

**DEPARTMENT OF RADIOLOGY, FACULTY OF MEDICAL
SCIENCES, UNIVERSITY OF KRAGUJEVAC**



УНИВЕРЗИТЕТ
У КРАГУЈЕВЦУ



Objectives

- ▶ Ro pathology of the digestive tract,
- ▶ UZ, CT and MR examinations of the abdomen,
- ▶ Getting to know the pathology of the abdomen using imaging examination techniques

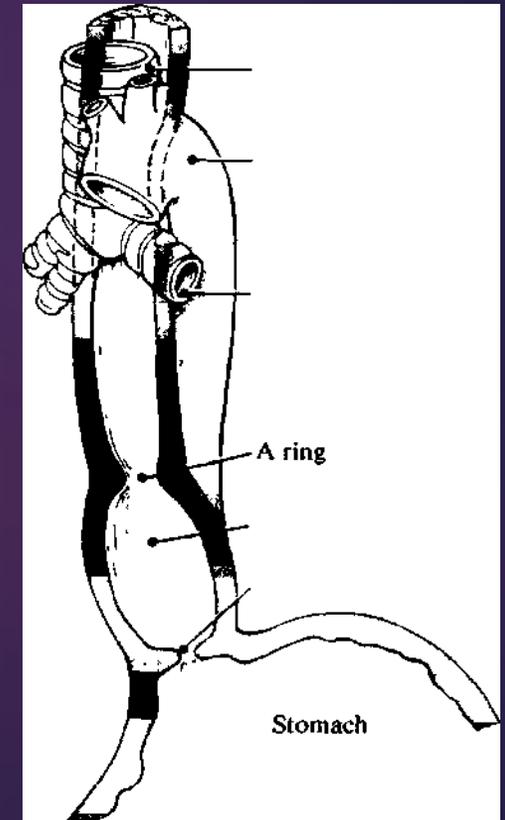
ANATOMY REMINDER

ANATOMIC AND FUNCTIONAL OF THE ESOPHAGUS

- ▶ The normal functions of the esophagus are simple - the transport of food from the pharynx to the stomach and the prevention of reflux of gastric contents. Disease processes that affect either function may result in profound clinical symptoms.
- ▶ It is a muscular tube that begins as a continuation of the pharynx at about the level of the sixth cervical vertebra. It is a relatively mobile structure, fixed only at its proximal and distal ends. The trachea lies immediately anterior to the esophagus from its origin in the neck to the tracheal bifurcation at the level of the fifth thoracic vertebra. The right and left recurrent laryngeal nerves ascend in grooves between the trachea and cervical esophagus, where they are vulnerable to involvement by proximal esophageal tumors. Also adjacent to the cervical esophagus are the right and left common carotid arteries and part of the thyroid gland.

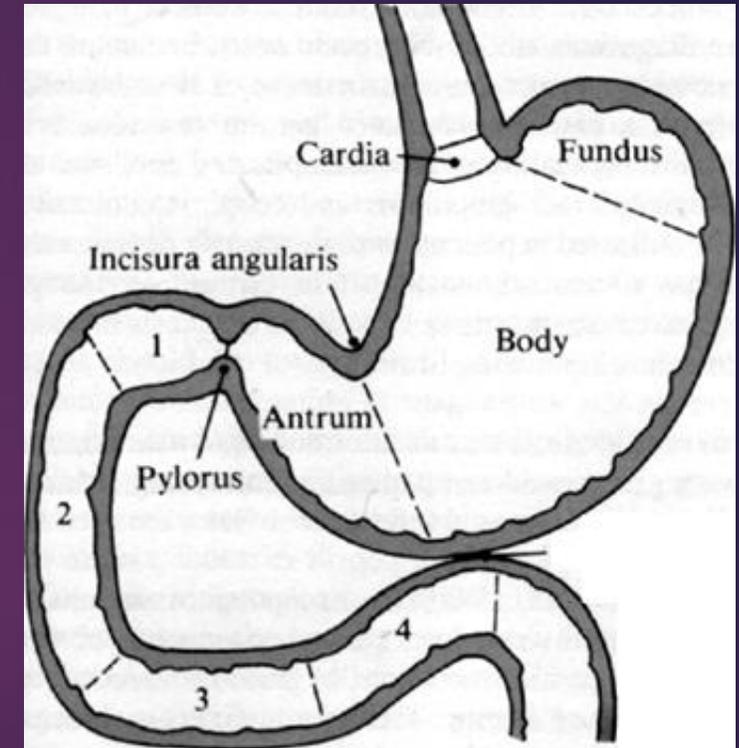
FLUOROSCOPY OF ESOPHAGUS

- ▶ **Barium contrast examination of the normal esophagus reveals an indentation at the level of the fourth thoracic vertebra caused by the arch of the aorta. Just below the aortic arch, the anterior aspect of the esophagus may be narrowed slightly by the left main bronchus.**
- ▶ **Below the left main bronchus, the left atrium lies just anterior to the esophagus.**
- ▶ **Because of these intimate anatomic associations, any enlargement of the thyroid gland, carinal lymph nodes, or left atrium or aorta (aneurysm) can be recognized by characteristic impressions on the barium-filled esophagus.**
- ▶ **The muscular coat of the proximal third of the esophagus is comprised predominantly of striated muscle, while that of the distal two-thirds is largely smooth muscle. Therefore, the esophagus is vulnerable to diseases affecting either type of muscle.**



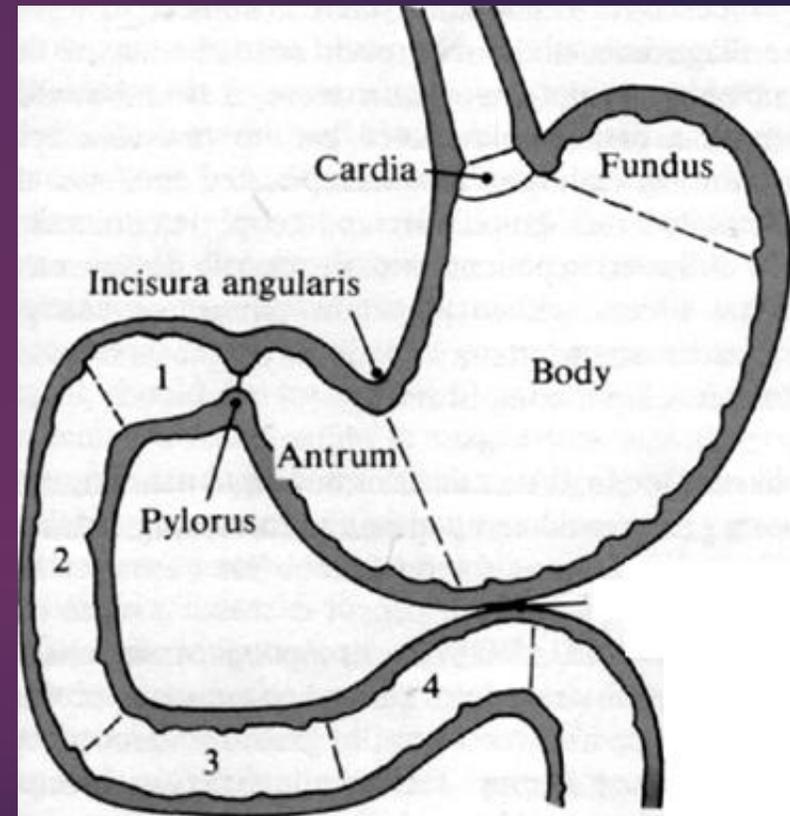
CLINICAL ANATOMY OF THE STOMACH

- ▶ The size and shape of the stomach vary from moment to moment depending on the volume of its contents and on body posture.
- ▶ For clinical purposes, it is useful to divide this distensible organ into four anatomic regions.
- ▶ The cardia is the portion of the stomach immediately adjacent to the esophagus; the fundus is the region that rises above the cardia.
- ▶ The body of the stomach extends from the fundus to the incisura angularis, an indentation on the lesser curvature that is best appreciated by barium contrast examination.
- ▶ The antrum is the region beyond the incisura angularis where the stomach turns horizontally toward the pyloric sphincter.



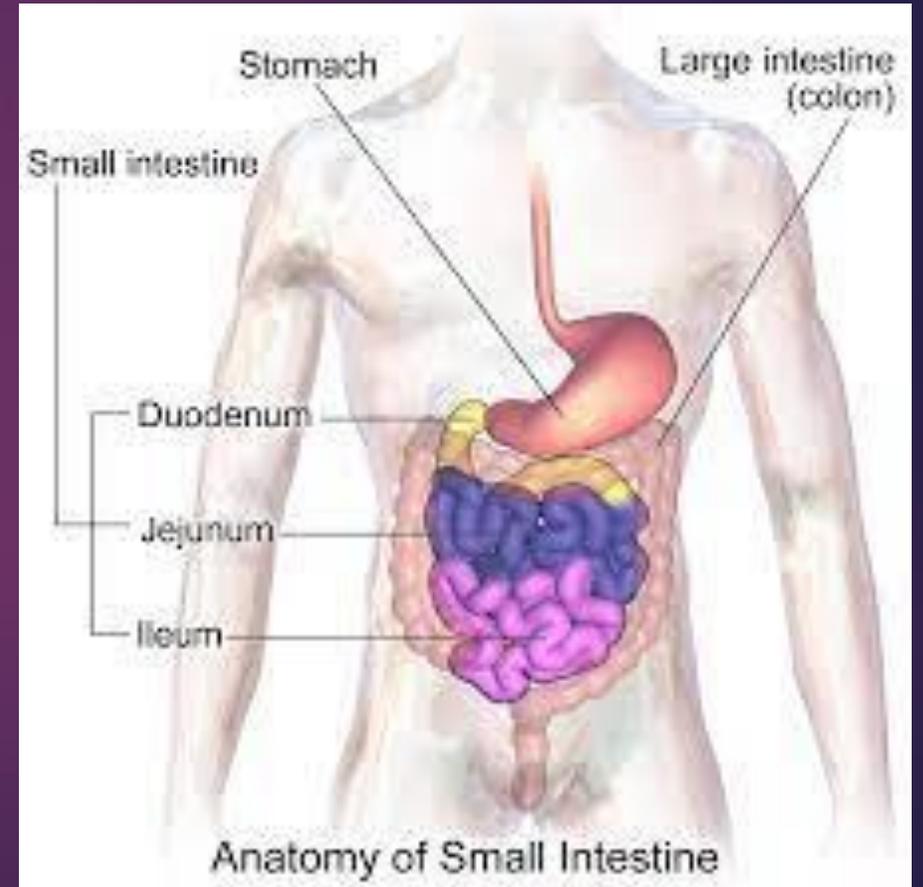
CLINICAL ANATOMY OF THE DUODENUM

- ▶ The duodenum may also be divided into four anatomic regions.
- ▶ The first portion of the duodenum extends posteriorly and superiorly from the pylorus to the first duodenal flexure; it is entirely intraperitoneal and normally assumes a characteristic conical shape when distended with barium (duodenal bulb).
- ▶ The second portion of the duodenum extends vertically downward from the first to the second duodenal flexure. Its medial wall is adjacent to the head of the pancreas, which when enlarged by carcinoma or pancreatitis, produces a tell tale impression on the barium-filled second duodenal portion.
- ▶ The ampulla of Vater, the intestinal opening of the major pancreatic duct and common bile duct, is located in this duodenal segment.
- ▶ The third portion is the horizontal segment situated just anterior to the inferior vena cava and aorta; the superior mesenteric artery and vein lie anterior to this duodenal segment.
- ▶ The fourth portion of the duodenum is the ascending segment that begins just to the left of the aorta
- ▶ A fibromuscular ligament arising from the right cms of the diaphragm (ligament of Treitz) attaches to the small intestine at the duodenojejunal flexure, which delimits the end of the duodenum and the beginning of the jejunum. Except for a small segment near the duodenojejunal flexure, the second, third, and fourth portions of the duodenum are entirely retro-peritoneal.



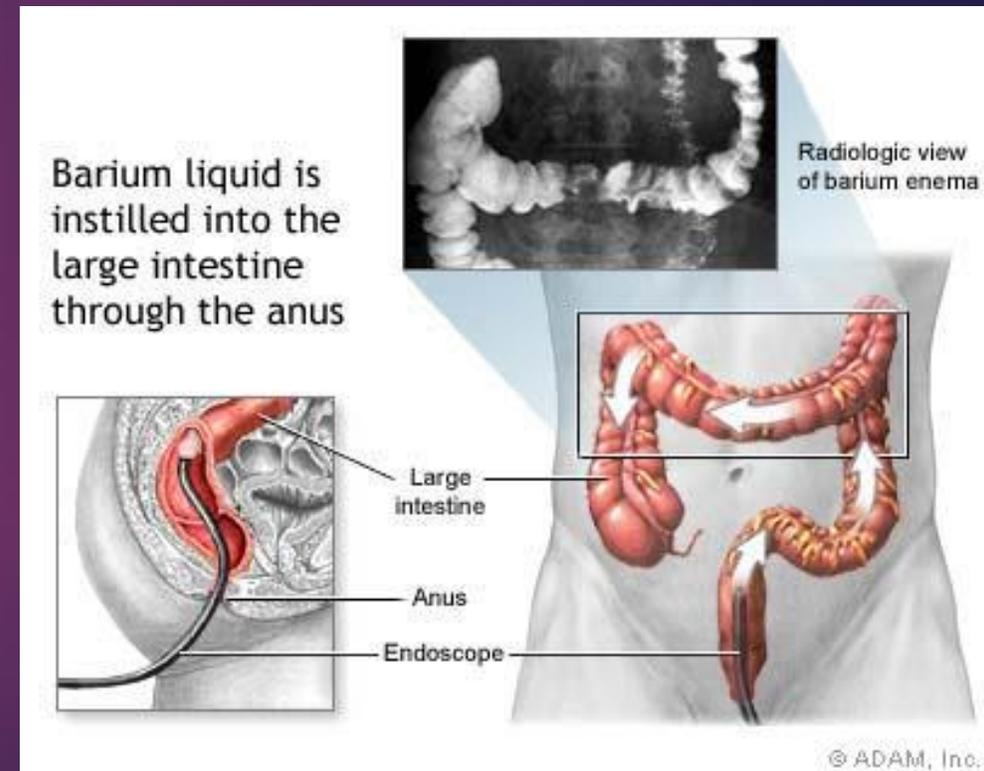
GENERAL ANATOMIC AND FUNCTIONAL OF THE SMALL INTESTINE

- The most remarkable feature of the small intestine is its enormous surface area, which is conferred not so much by its length as by its multitude of circumferential folds, villi, and microvilli.
- The anatomic regions of the small intestine, designated as duodenum, jejunum, and ileum, have no clear boundaries with respect to absorptive cell characteristics; functionally their similarities are greater than their differences



ANATOMIC AND FUNCTIONAL OF THE COLON

- ▶ **The colon has no digestive function per se; its principal roles are to assist in maintaining the body's electrolyte and water balance and to excrete the unabsorbed remains or feces by means of its absorptive, secretory, storage, and excretory functions.**
- ▶ **Absorption and secretion of electrolytes and water occur principally in the right half of the colon; the ability of the colon to perform these functions decreases toward the rectum.**
- ▶ **Nonpropulsive, segmental contractions that probably produce the haustra move the bowel contents forward and backward over short segments of mucosa, thus enhancing absorption. Periodically, a peristaltic contraction propels the contents forward either for a short distance or on into the sigmoid colon or rectum. Distention of the rectum induces a desire to defecate, which can be overcome by voluntary contraction of the internal and external anal sphincters**



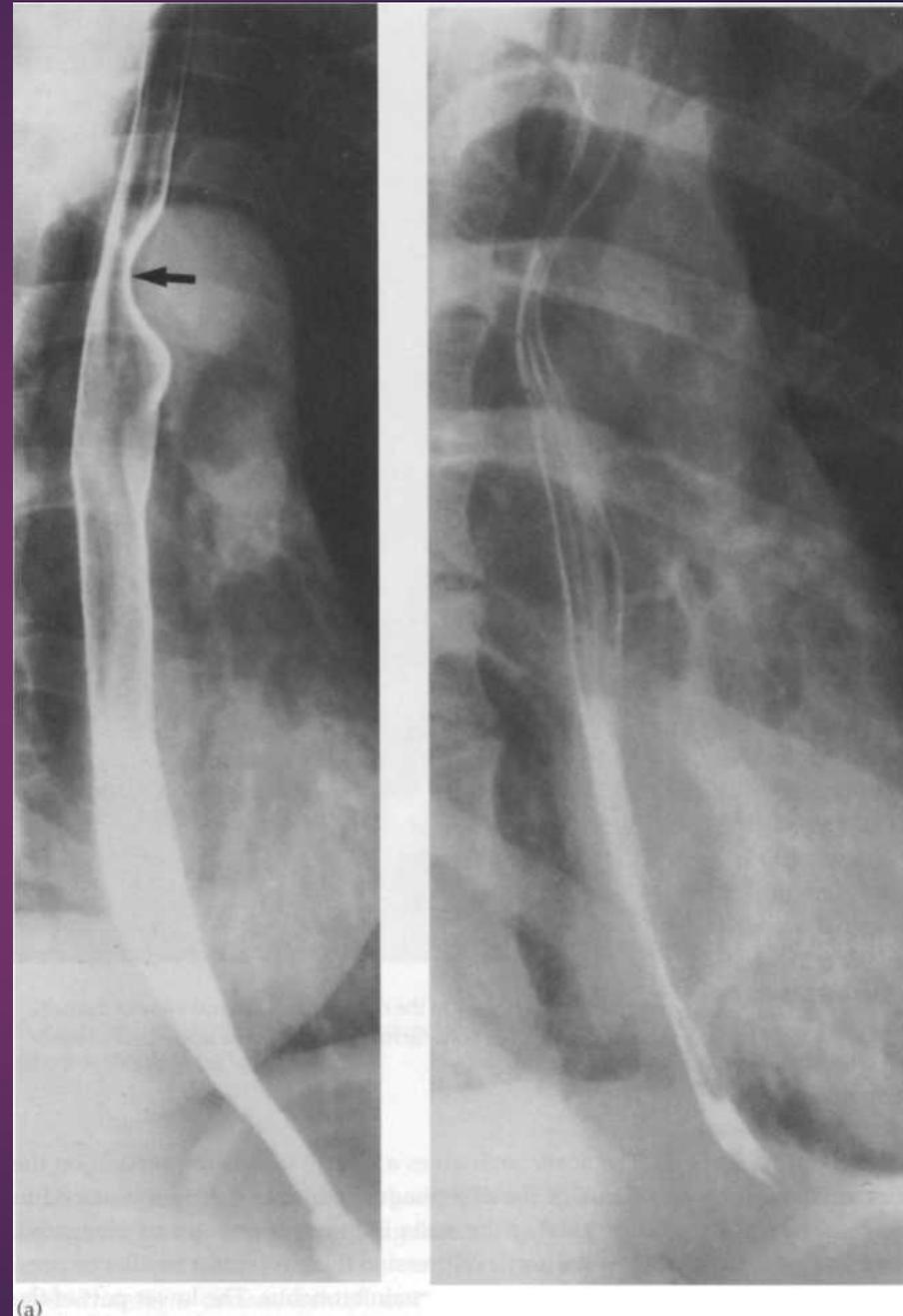
DYSPHAGIA

Causes	Radiological features
Post-cricoid carcinoma	Irregular narrowing; mass displacing larynx forwards
Pharyngeal diverticulum	Variable size, arising posteriorly
Oesophageal web	Characteristic appearance; associated with iron-deficiency anaemia
Malignant stricture	May be primary oesophageal cancer or invasion by bronchial or mediastinal tumour. Characteristic appearance - irregular narrowing, 'shouldering', partial or complete obstruction
Stricture secondary to reflux oesophagitis and hiatus hernia complex	Reflux shown during fluoroscopy; mucosal ulceration, hiatus hernia; strictures tend to be smooth but may mimic carcinoma
Achalasia	Generalised motility defect with dysfunction of cardia causing obstruction and sometimes gross dilatation of oesophagus, with food and liquid residue
Miscellaneous causes: corrosive strictures	Severe ulceration initially. Tendency to perforate
moniliasis, herpes infection	Opportunistic infection. Severe ulceration and pain
systemic sclerosis	Impaired peristalsis
neurological disorders	Swallowing difficulties with aspiration into lungs

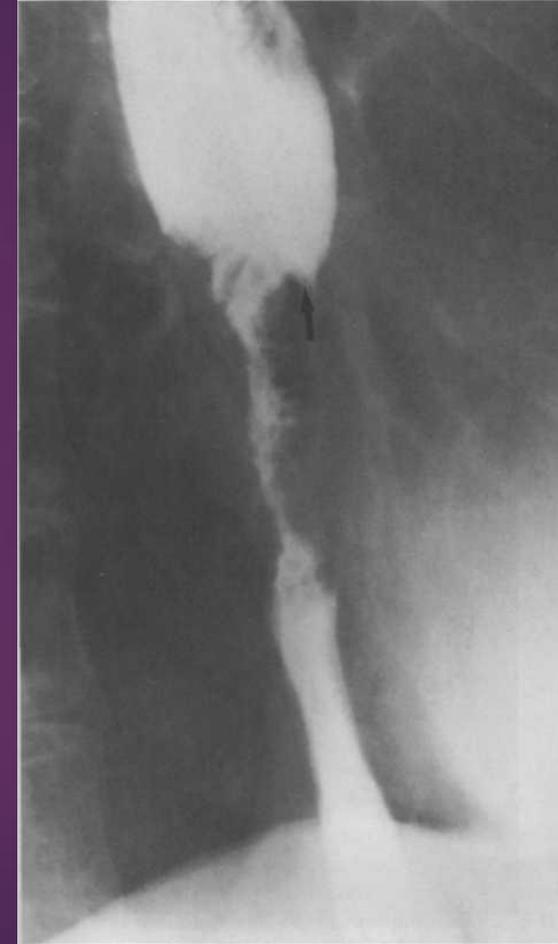
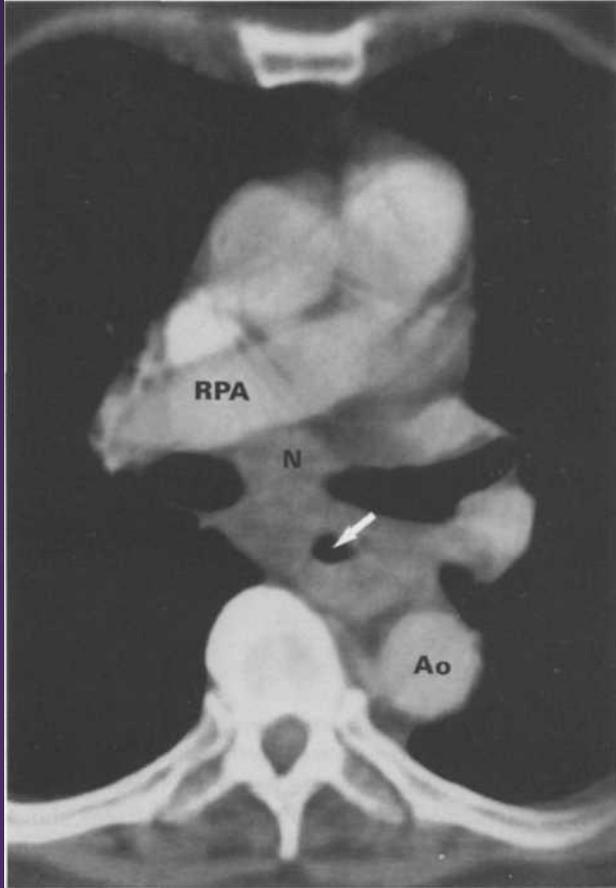
Dyspepsia

Cause	Radiological features
Oesophageal disease hiatus hernia complex	Superficial mucosal ulceration in the oesophagus indicates oesophagitis. Reflux may be detected but barium studies are less sensitive than endoscopy or pH studies. Strictures may develop and may be indistinguishable from malignant strictures
Gastric abnormalities ulceration	Barium collection in crater. Radiating folds of mucosa to edge of crater. Surrounding deformity and oedema. Heal to form distinctive scars. May be malignant from outset. Careful endoscopic follow-up necessary, with biopsies
Polip(s)	Multiple polyps in body of stomach form part of chronic gastritis spectrum - usually hyperplastic in nature, and benign. Adenomatous polyps, usually in antrum, may be premalignant lesion(s). Should be removed. Other types of polyps may be part of familial polyposis syndromes
Cancer	Characteristic signs in advanced disease. Either ulcerating or polypoid, or mixture of both. Early or superficial cancers resemble benign ulcers but with specific signs such as 'clubbed' mucosal folds and geographical areas of very superficial ulceration
Non-mucosal tumours	Usually large and may have surface ulceration or excavation. Exogastric extension. May be leiomyoma, sarcoma or lymphoma
Duodenal disease:e.g. ulceration	Characteristic ulcer crater(s) in first part of duodenum, with deformity. Atypical signs in Crohn's disease and Zollinger-Ellison syndrome

Normal oesophagus, (a) Full of barium to show the smooth outline and indentation made by the aortic arch (arrow), (b) Film taken after the main volume of barium has passed, to show the parallel mucosal folds.



Carcinoma of the oesophagus.



The carcinoma is shown as a mass around the lumen of the oesophagus (arrow). Subcarinal nodes (N) are also present. Ao, descending aorta; RPA, right pulmonary artery . There is an irregular stricture with shouldering (arrow) at the upper end.

Peptic stricture due to gastro-oesophageal reflux in a patient with a hiatus hernia. There is a short smooth stricture at the oesophagogastric junction with an ulcer crater within the stricture (arrow).



Achalasia. The very dilated oesophagus containing food residues shows a smooth narrowing at its lower end.



GASTROINTESTINAL BLEEDING

- ▶ **Bleeding may be the first manifestation and presenting feature of gastrointestinal disease. The clinical picture may vary from severe haematemesis to anaemia due to occult blood loss (e.g. cancer of the stomach or colon), melaena or frank rectal bleeding. Careful questioning may pinpoint other symptoms, and clinical examination may reveal signs that help to localise the cause of the bleeding. Very occasionally no cause is found after exhaustive investigation and these patients may require exploratory operations.**
- ▶ **Endoscopic techniques are the preferred method of investigation because the sources of bleeding, both in the upper gastrointestinal tract and in the colon, can be identified.**

Upper gastrointestinal bleeding

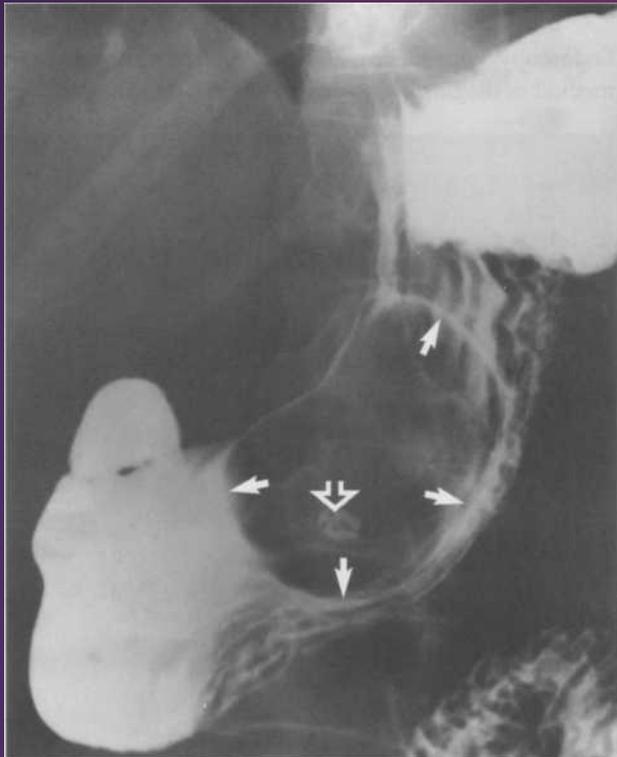


Cause	Radiological features
<ul style="list-style-type: none">Oesophagus Varices due to portal hypertension	Serpiginous filling defects on barium studies of the lower oesophagus
Mucosal tear following vomiting (Mallory-Weiss lesion)	Tears rarely shown radiologically. Endoscopy preferred
Oesophagitis, ill causes	Endoscopy more sensitive. Barium studies may show ulceration
<ul style="list-style-type: none">Stomach	
Erosions	Characteristic multiple 'target' lesions. Acute or chronic gastritis
Ulcer, tumour, varices	Characteristic appearances. Varices here usually accompanied by varices in the oesophagus, though not invariable
<ul style="list-style-type: none">Duodenum	
Ulceration, invasion from adjacent tumour	Characteristic findings in duodenal ulceration; signs of malignant infiltration also characteristic

Oesophageal varices. Tortuous, worm-like filling defects are seen in the lower half of the oesophagus.



Leiomyoma



There is an intramural filling defect in the oesophagus below the aortic arch (arrows). The sharp angle this makes with the wall of the oesophagus indicates that the filling defect is due to a mass arising in the wall of the oesophagus

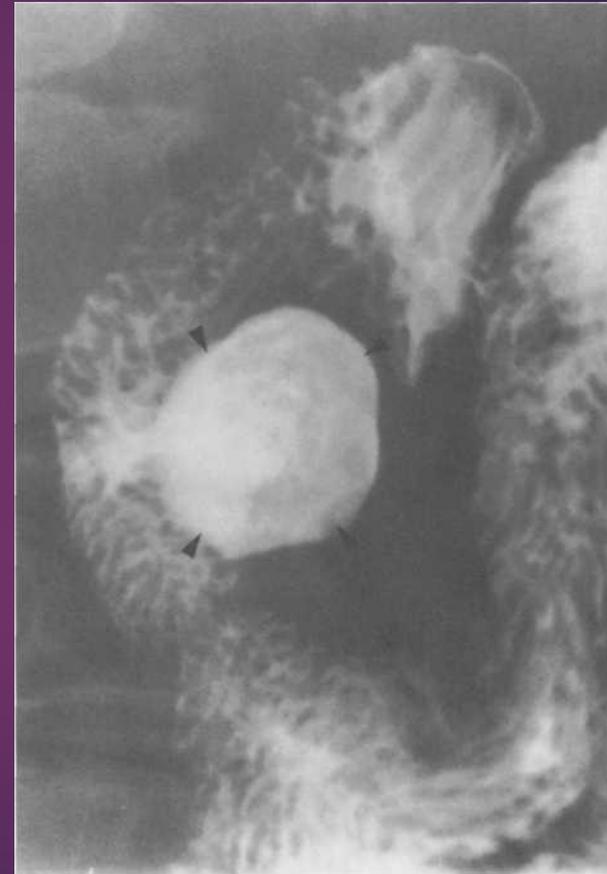


. There is a large filling defect in the stomach with smooth borders (outer arrows). An ulcer crater (central arrow) is present within the filling defect - a characteristic feature of a leiomyoma

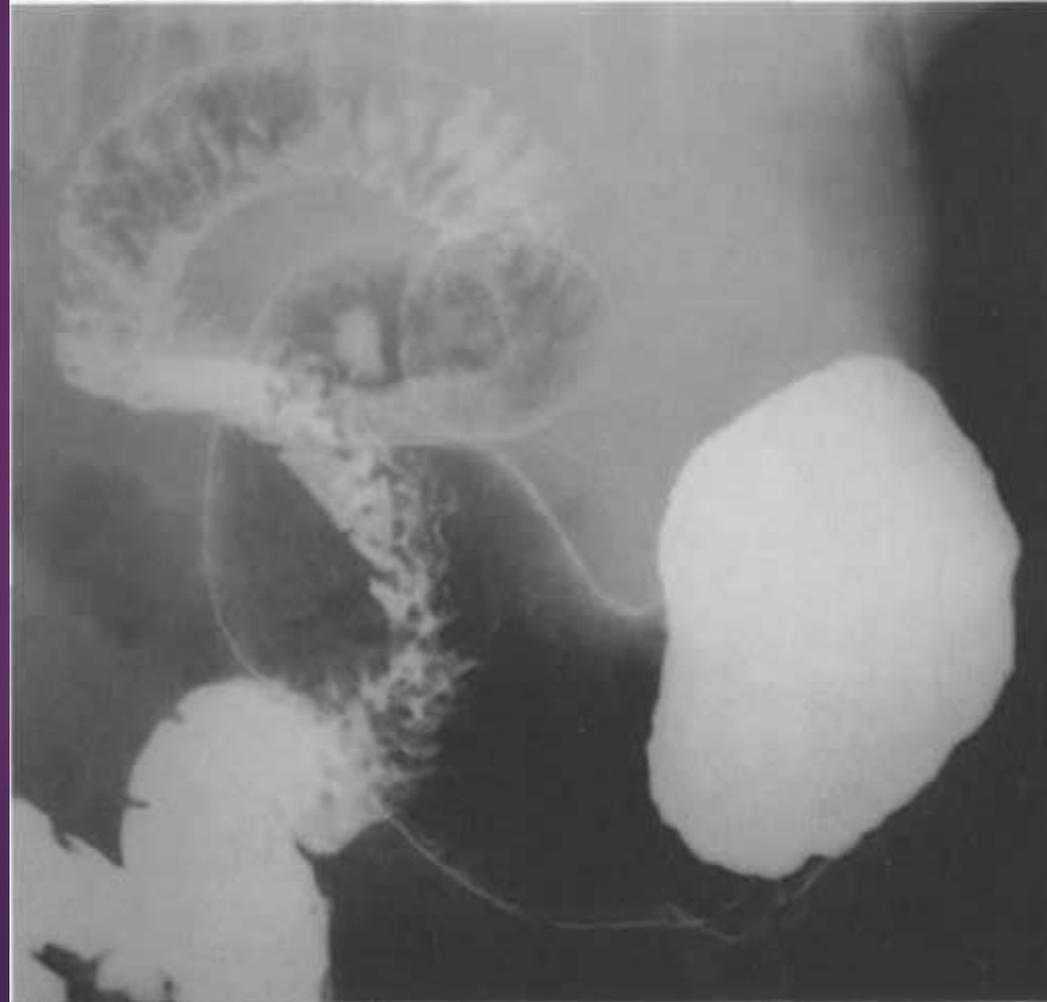
Pharyngeal pouch (Zenker's diverticulum). The pouch is lying behind the oesophagus which is displaced forward.



Duodenal diverticulum arising from the second part of the duodenum (arrows)



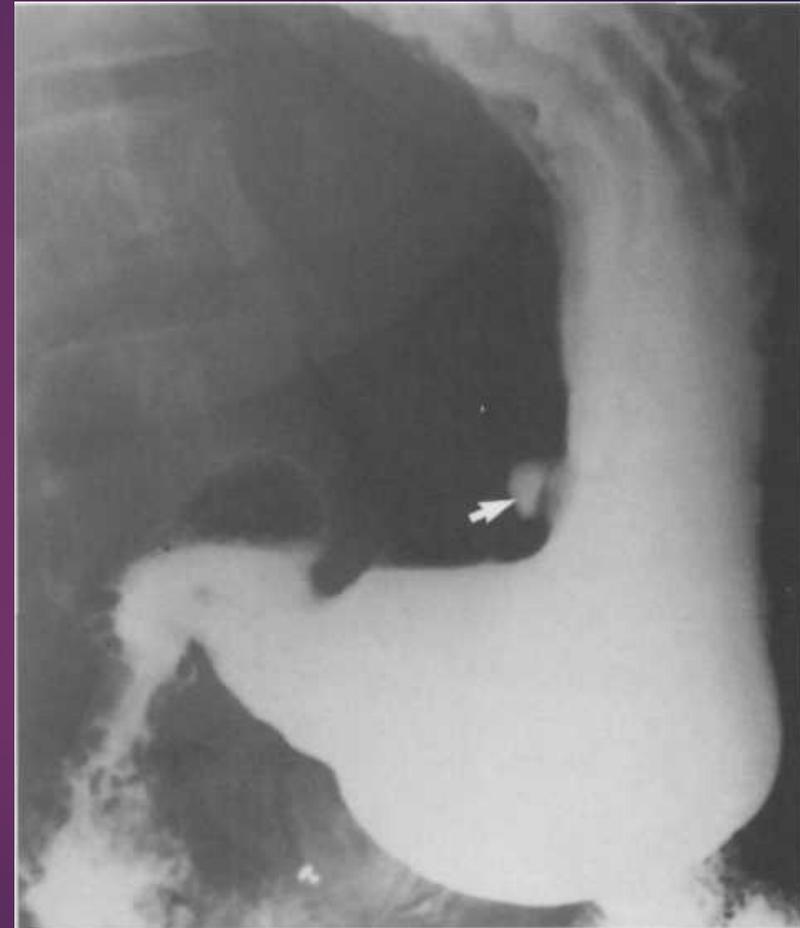
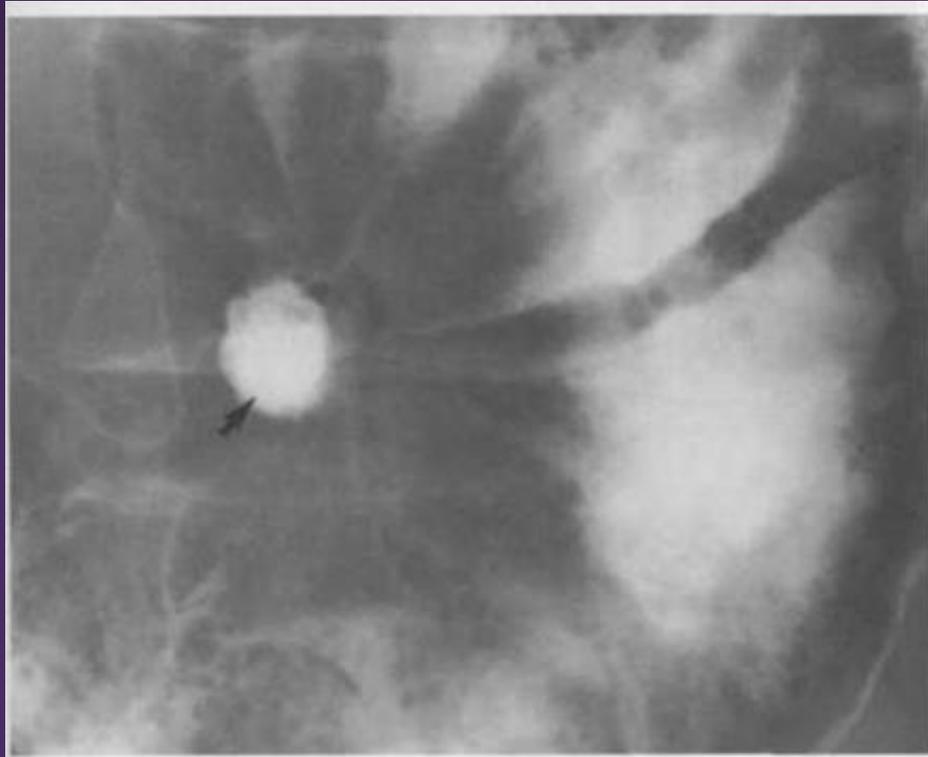
Normal stomach and duodenum: double-contrast barium meal. On this supine view barium collects in the fundus of the stomach. The body and the antrum of the stomach together with the duodenal cap and loop are coated with barium and distended with gas. Note how the fourth part of the duodenum and duodenojejunal flexure are superimposed on the body of the stomach



Carcinoma. There are a number of large filling defects in the antrum and body of the stomach



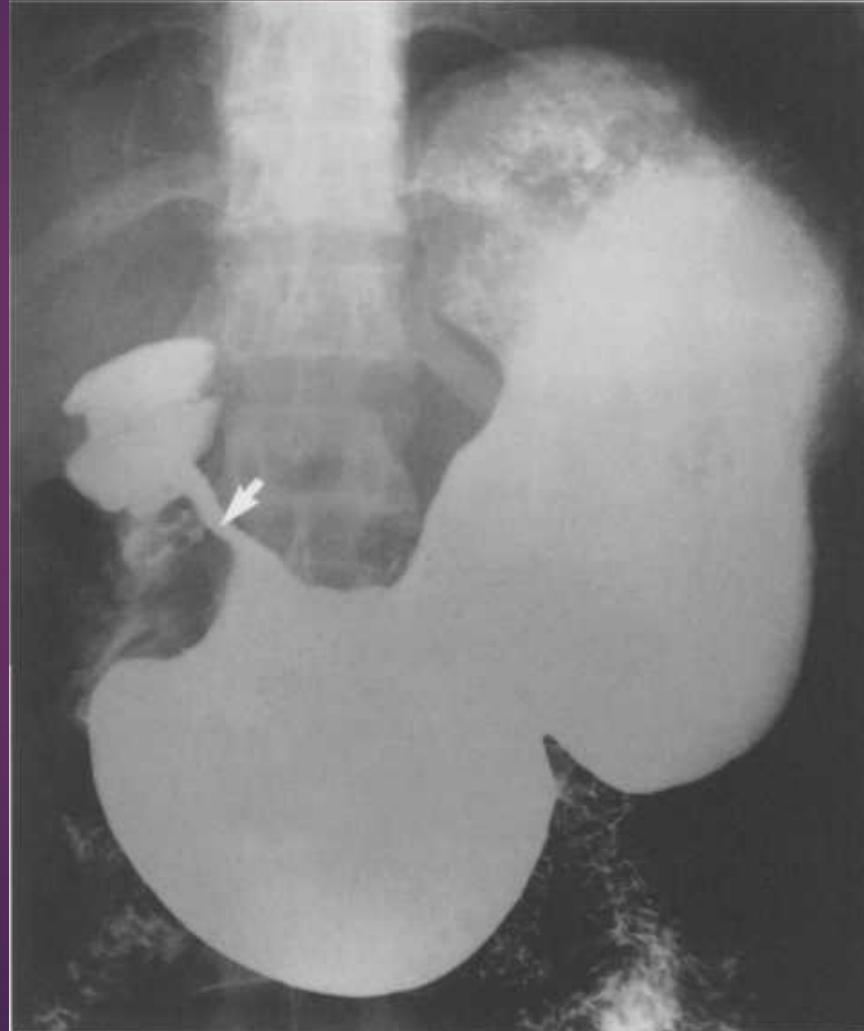
Benign ulcer, (a) In profile the ulcer (arrow) projects from the lesser curve of the stomach,
(b) *En face* the ulcer (arrow) is seen as a rounded collection of barium.



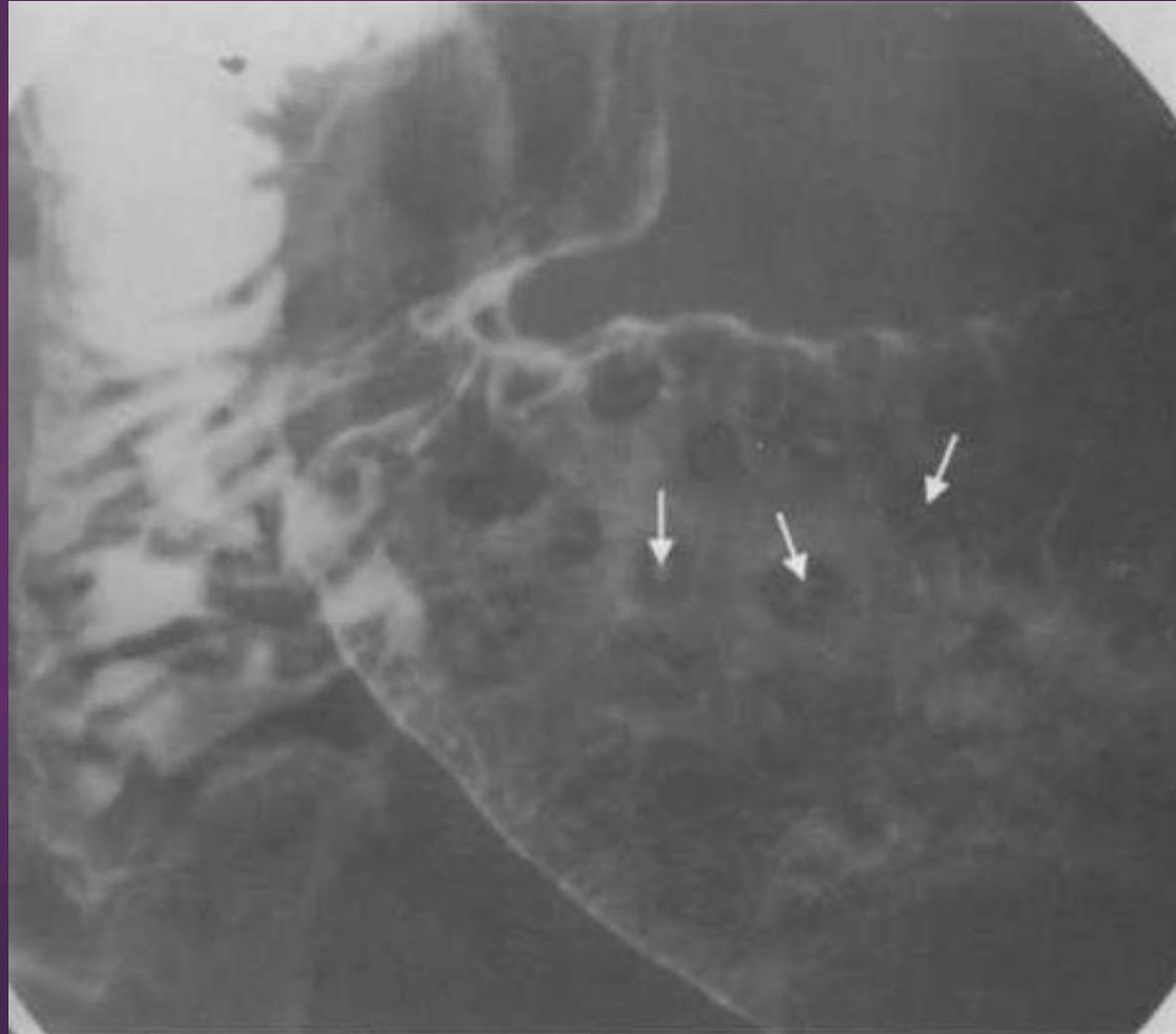
Malignant ulcer. The ulcer (arrow) does not project from the lumen of the stomach. Note how the mucosal folds do not reach the ulcer crater. The stomach is narrowed by an extensive carcinoma converting it to a rigid tube with obliteration of mucosal folds.



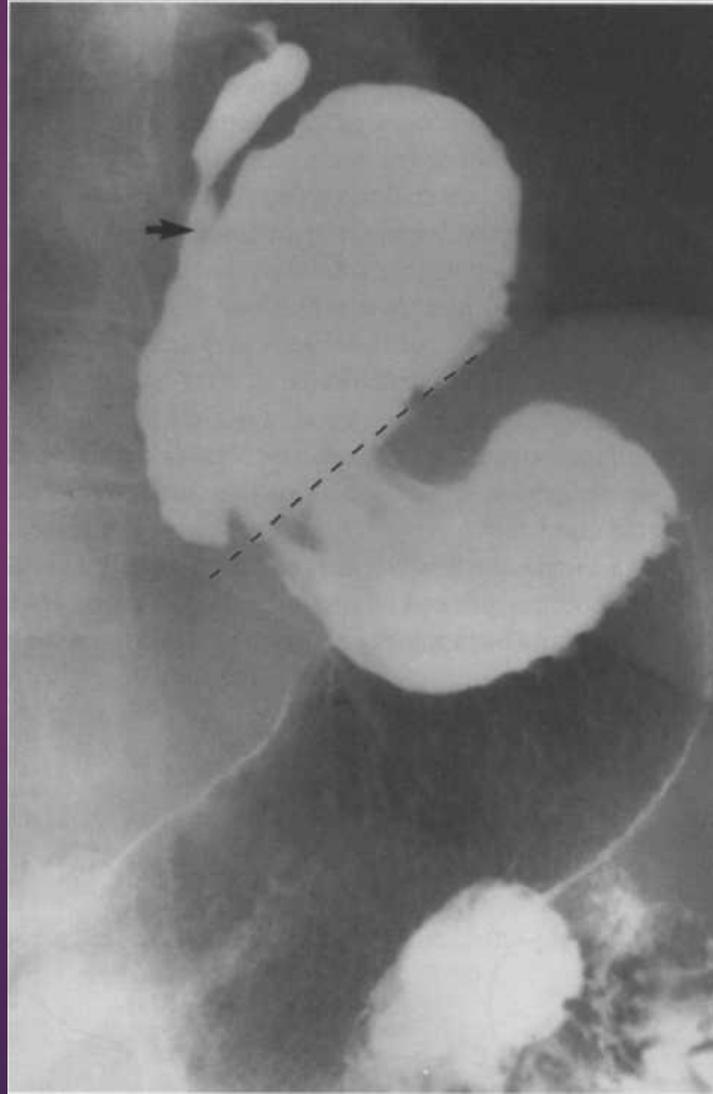
Gastric outlet obstruction. A carcinoma is causing narrowing of the antrum (arrow). The speckled appearance in the fundus of the enlarged stomach is due to food residues



Erosive gastritis. The erosions appear on this double-contrast barium meal as many small collections of barium, some of which are arrowed, surrounded by a radiolucent halo of oedema.



Hiatus hernia, Sliding: the fundus of the stomach and the gastro-oesophageal junction (arrow) have herniated through the oesophageal hiatus and lie above the diaphragm (dotted line)



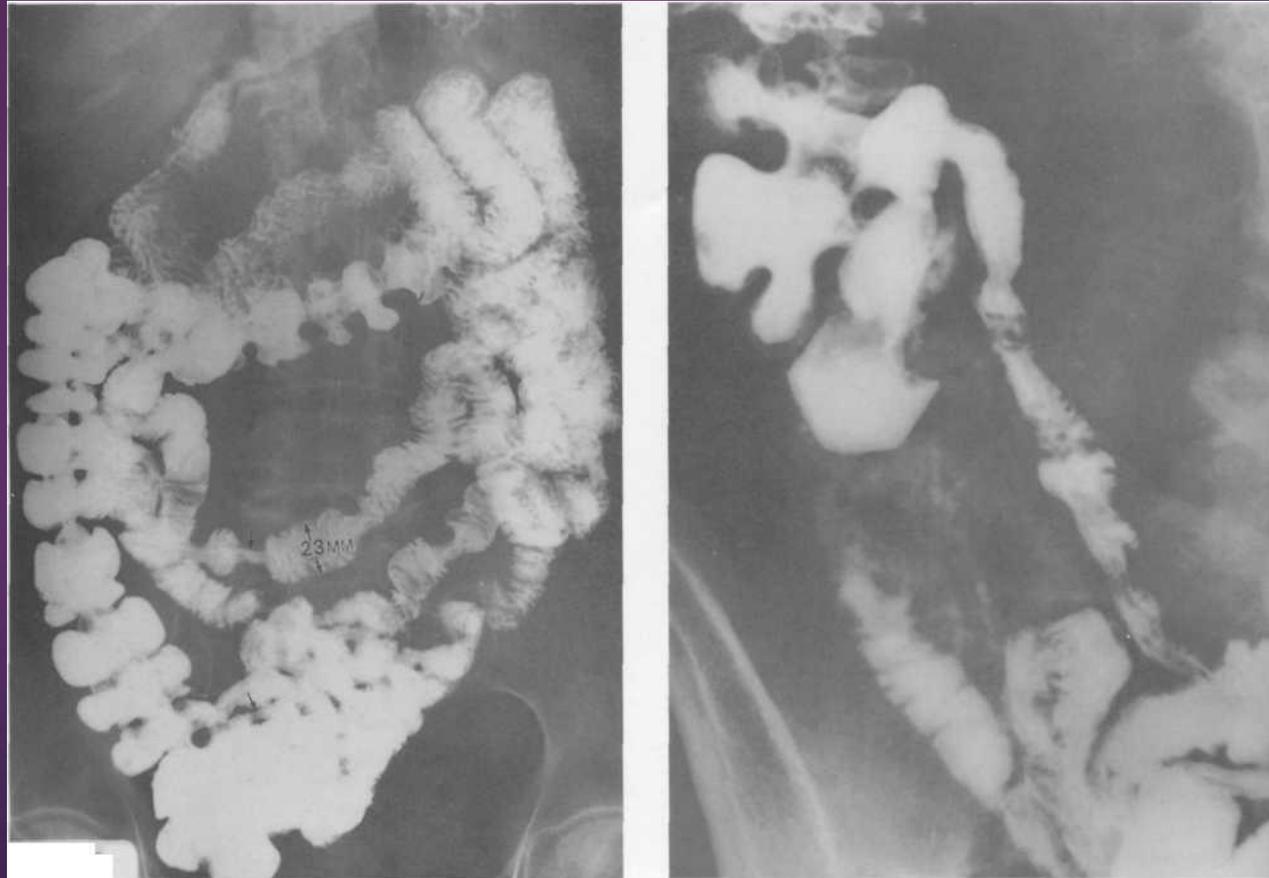
THE SMALL INTESTINE

- ▶ The usual indications for investigating the small intestine are:
 - ▶ abdominal pain, weight loss, diarrhoea symptoms suggesting inflammatory disease;
 - ▶ colicky abdominal pain, distension, vomiting - symptoms suggesting obstruction, which may be intermittent;
 - ▶ anaemia, malabsorption - caused by a variety of small bowel disorders.
- ▶ Abdominal radiographs may show signs of small bowel obstruction but the cause may not be apparent. Evidence of inflammatory disease in the colon is helpful

Small bowel disorders

Cause	Radiological features
<ul style="list-style-type: none">• Crohn's disease	<p>Signs of bowel inflammation - characteristic fissuring or 'rose-thorn' ulcers, nodular or 'cobble-stone' mucosa, strictures, thickened bowel wall, adherence of adjacent loops, fistulae to adjoining structures, 'skip' lesions, dilated and obstructed loops of bowel, involvement of stomach, duodenum and colon. Terminal ileum is commonly affected, but disease may be extensive</p>
<ul style="list-style-type: none">• Obstruction due to causes other than inflammation	<p>Small bowel contrast studies usually localise site of obstruction provided proximal loops are not too distended. Adhesions produce characteristic deformities of affected loops, especially when using small bowel enema technique</p>
<ul style="list-style-type: none">• Malabsorption problems, other than those caused by inflammatory disease	<p>Coeliac syndrome causes non-specific dilatation of small bowel loops in severe cases but small bowel biopsy is much more specific. Jejunal diverticulosis, blind loops, fistulae and strictures may all cause malabsorption and are detectable on contrast studies</p>

(a) Normal barium follow-through. The small intestine, ascending and transverse colon are filled with barium. The jejunum in the left side of the abdomen has a much more marked mucosal fold pattern than the ileum which is lying in the pelvis. When a peristaltic wave contracts the bowel the mucosal folds lie longitudinally (arrows). Note the way of measuring the diameter of the bowel. In the pelvis **the** loops overlap and details of the bowel become hidden, (b) Normal terminal ileum



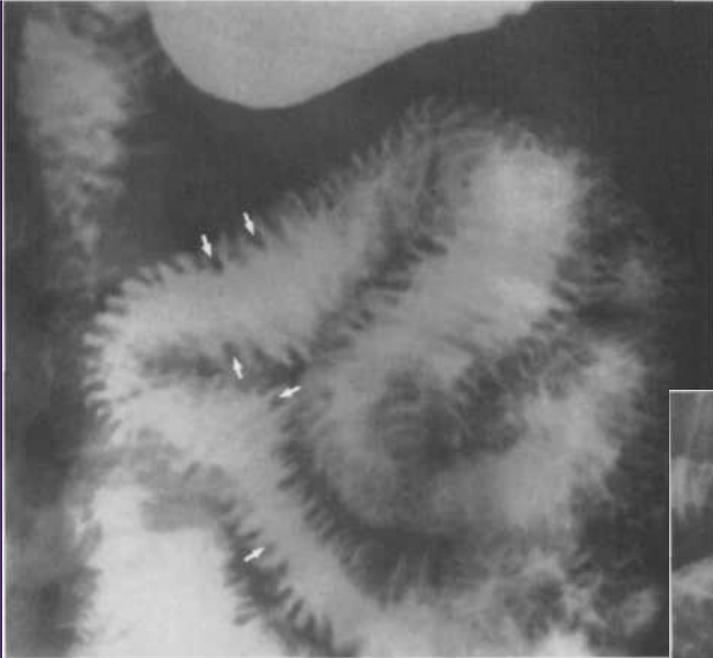
Normal small bowel enema. This technique gives good mucosal detail. The arrow points to the terminal ileum. Note that a tube has been passed through the stomach into the jejunum



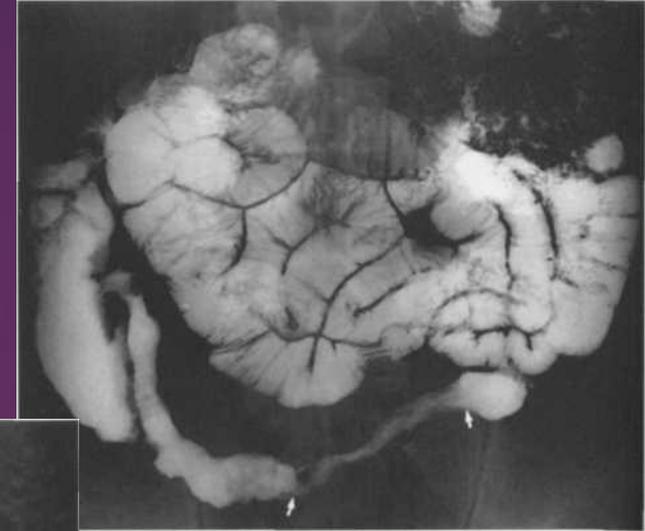
Dilatation from small bowel obstruction. The diameter of the bowel is greatly increased. The feathery mucosal pattern is lost and the folds appear as thin lines traversing the bowel, known as valvulae conniventes (arrows).



Mucosal abnormality with infiltration of the bowel, in this case from oedema. The mucosal folds become thickened. Some of the thickened folds are arrowed



Narrowing. There is a long irregular stricture (arrows) in the terminal ileum due to Crohn's disease. There is an abnormal mucosal pattern in the remainder of the terminal ileum. Note the contracted caecum - another feature of the disease



Ulceration. Abnormal loops of bowel in Crohn's disease showing the ulcers as outward projections (arrows).



Displacement. The small bowel is displaced around enlarged abdominal lymph nodes from a metastatic teratoma of the testis.

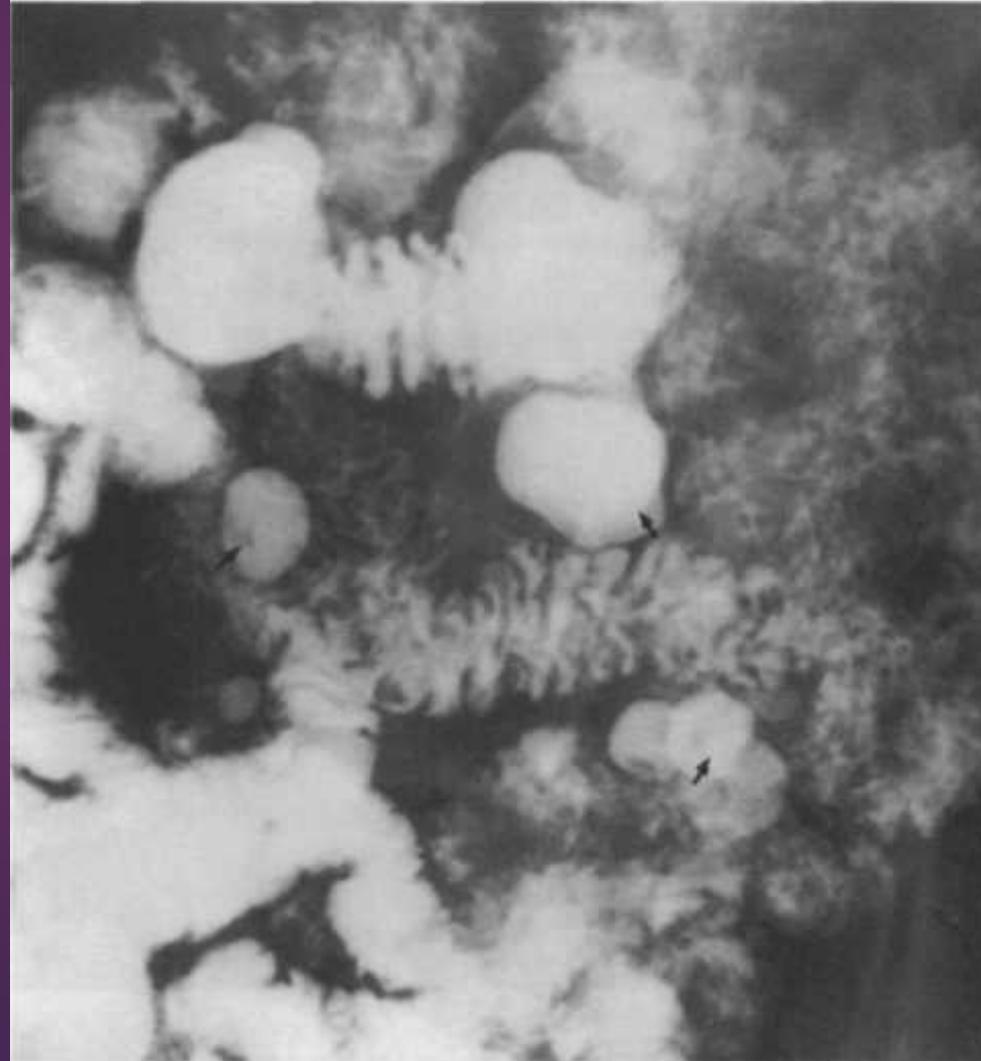


Malrotation. The small bowel is situated in the right side of the abdomen. Later films showed the colon on the left side.

Crohn's disease



Diverticulosis. A number of diverticula of varying size are arising from the small bowel. Some of these are arrowed multiple small bowel diverticula a dilated loop cut off from the main stream of the bowel in which there is delayed filling and emptying (blind loop)



THE LARGE INTESTINE

- ▶ Symptoms such as altered bowel habit, rectal bleeding, abdominal pain, weight loss and anaemia may indicate serious colonic disease. Colonoscopy and barium studies are complementary and equally useful but their deployment depends to a large extent on the availability of colonoscopy services. Many clinicians use the barium enema as the first-line diagnostic investigation and either combine this with flexible fiberoptic sigmoidoscopy or reserve a full colonoscopy for those instances where a barium study is inconclusive or where a lesion shown radio-logically requires further direct examination and biopsy.
- ▶ Barium studies require full bowel preparation using one of a variety of cleansing techniques (faecal residue may mimic polyps or tumours). A double-contrast technique involves inflation of the colon using air or carbon dioxide, and peristaltic activity is temporarily abolished using a short-acting atropine-like pharmacological agent.
- ▶ Colonoscopy provides direct access to lesion- or suspicious areas of mucosa for biopsy: small polypoid lesions may be amenable to removal during the same diagnostic procedure. The examination may not be complete because in a significant proportion (10-30%) the caecum is not reached and there are also 'blind' spots at points of angulation of the colon. Advanced diverticular disease produces deformity and narrowing that is difficult to assess both in barium studies and during colonoscopy.
- ▶ Colonoscopy has a significantly higher risk of complications than barium enema, and the procedure is more time consuming.

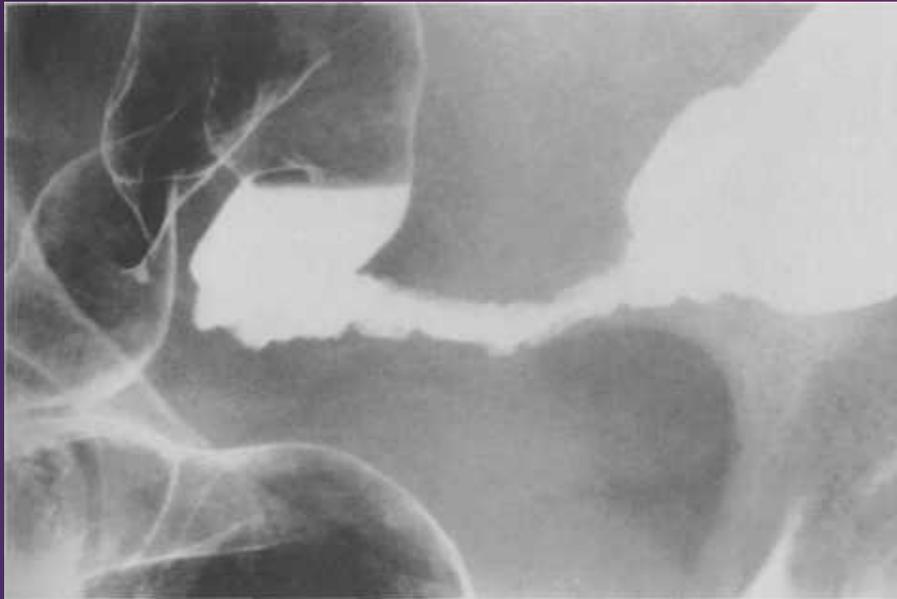
Common disorders of the large intestine

- ▶ **Carcinoma:** Most are irregular strictures with ‘shouldering’. Destroyed mucosal pattern, proximal dilatation and obstruction. Invasion of adjoining tissues and organs. May appear as polyp, usually more than 2 cm with complex surface pattern. Long-standing ulcerative colitis and familial polyposis coli are predisposing conditions.
- ▶ **Diverticular disease:** Multiple diverticula particularly in sigmoid region, but may be widespread. Narrowing and deformity. Common, so may coexist with cancer. May bleed or perforate, or form fistulae, e.g. with bladder.
- ▶ **Ulcerative colitis:** Diffuse, uniform fine ulceration; loss of haustra, giving featureless tubular colon. Toxic megacolon and carcinoma are complications. May only involve distal colon or rectum in some cases.
- ▶ **Crohn’s disease:** Areas of narrowing, deep ulceration, strictures. Perianal disease is common. Prone to form fistulae. Coexists with small bowel disease often.
- ▶ **Ischaemic colitis:** Cause of profuse bleeding and acute abdominal pain. Narrowing of lumen, often affecting localised segment, with mucosal oedema (‘thumb-printing’). Occasionally difficult to distinguish from Crohn’s disease

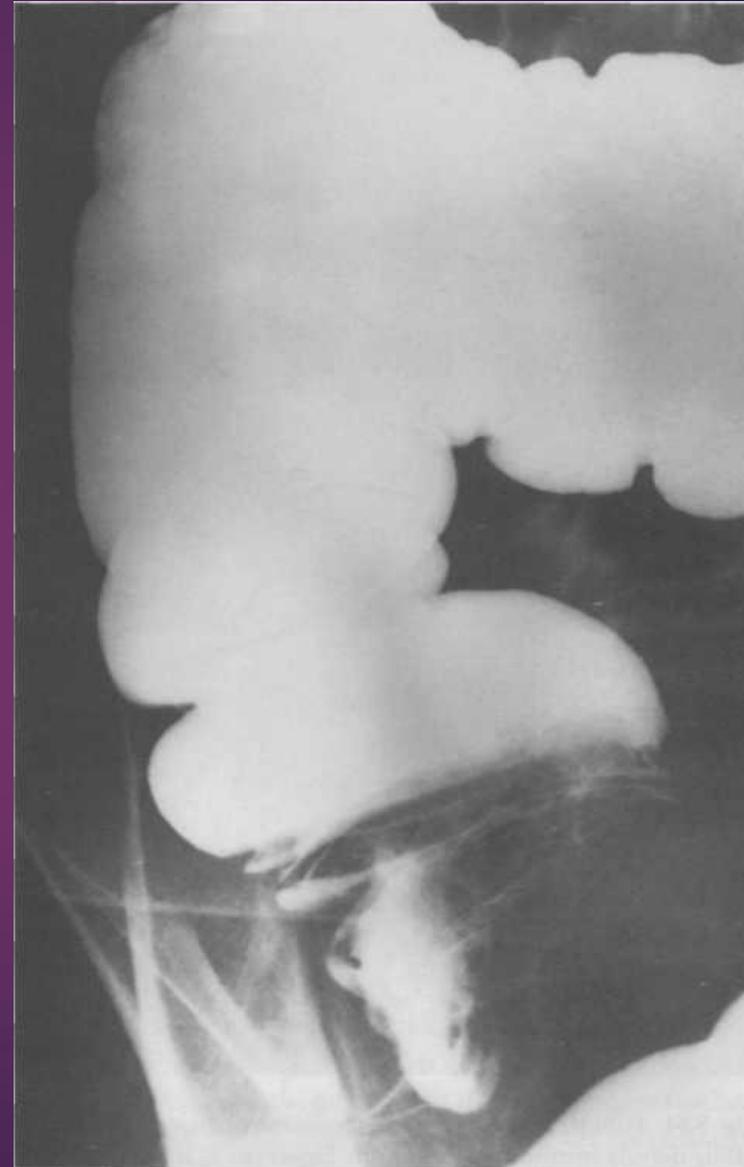
Stricture. A short circumferential narrowing is seen in the sigmoid colon (arrow) from a carcinoma.



Extrinsic compression. A narrowed length of sigmoid colon is seen caused by compression by an adjacent ovarian



Extrinsic compression. An appendix abscess is compressing and narrowing the caecum.



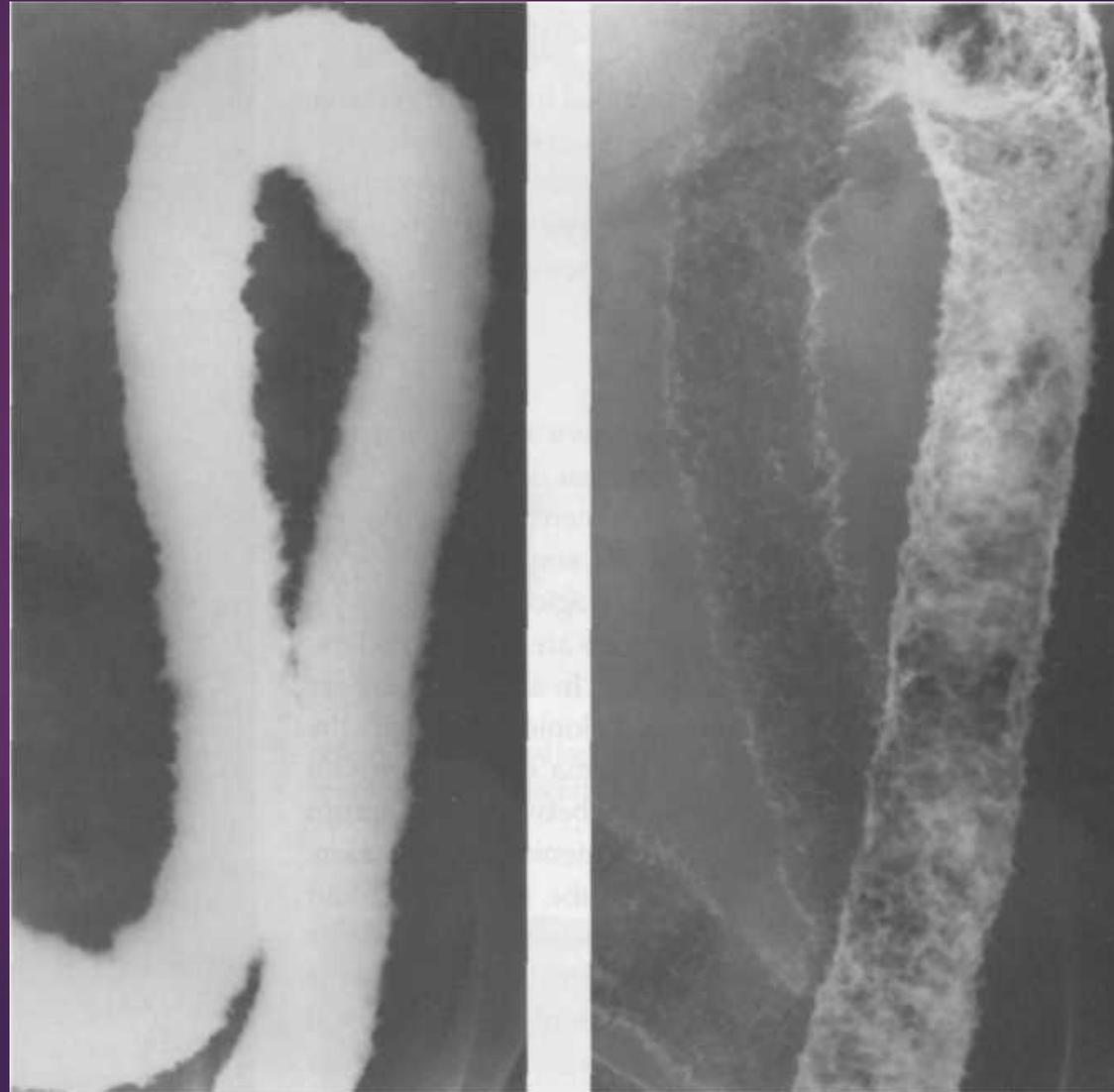
Filling defects. Lumps of faeces have caused smooth filling defects surrounded by barium. However, in the sigmoid colon there is a large filling defect with ill-defined edges (arrow). This is a carcinoma. A clean colon is essential for a satisfactory barium enema.



Muscle hypertrophy and diverticula. Muscle hypertrophy gives the sigmoid colon a serrated appearance. Two small diverticula are arrowed



Ulceration, (a) Single contrast. (b) Double contrast. In this case of ulcerative colitis the ulceration causes the normally smooth outline of the colon to be irregular.



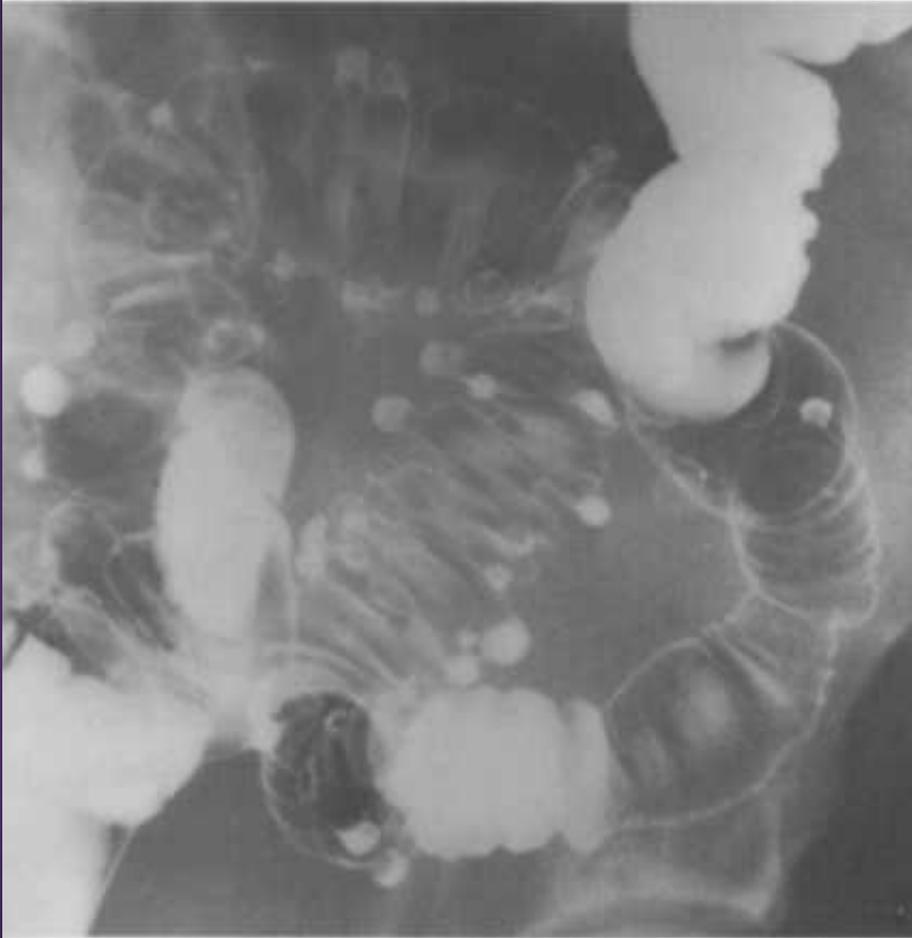
Ulcerative colitis. With long-standing disease the haustra are lost and the colon becomes narrowed and shortened coming to resemble a rigid tube. Reflux into the ileum through an incompetent ileocaecal valve has occurred.



A). Crohn's disease. The mucosal pattern has a 'cobblestone' appearance due to criss-crossing fine ulceration. B). Crohn's disease - strictures. A long stricture is present in the transverse colon (between curved arrows) and a shorter one in the sigmoid colon (between small arrows). In this case the outline of the strictures are irregular, due to ulceration. C). These two abnormal segments with normal intervening bowel are an example of skip lesions' - an important diagnostic feature of Crohn's



Diverticular disease. Numerous diverticula are seen as out-pouchings from the sigmoid colon



Diverticular disease. A stricture is present (arrow). Although there is recognizable diverticular disease at both ends of the stricture, it is impossible to exclude definitely a carcinoma

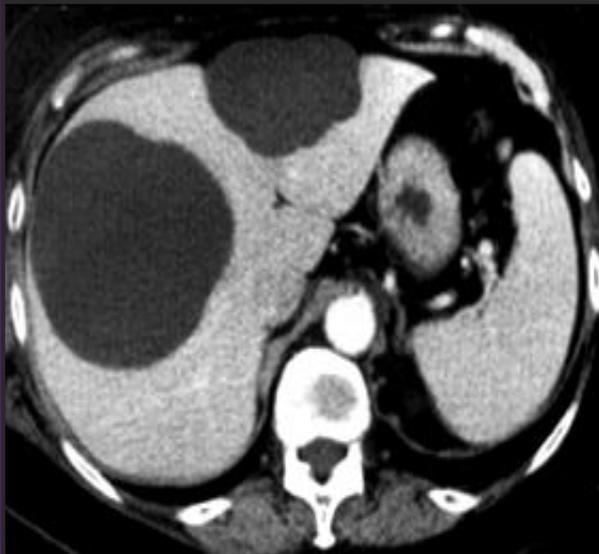


Polyps within the colon may be demonstrated as radiolucent filling defects displacing the contrast substance. Note stalk, which is well seen.



Hepatic pathology

Benign lesions



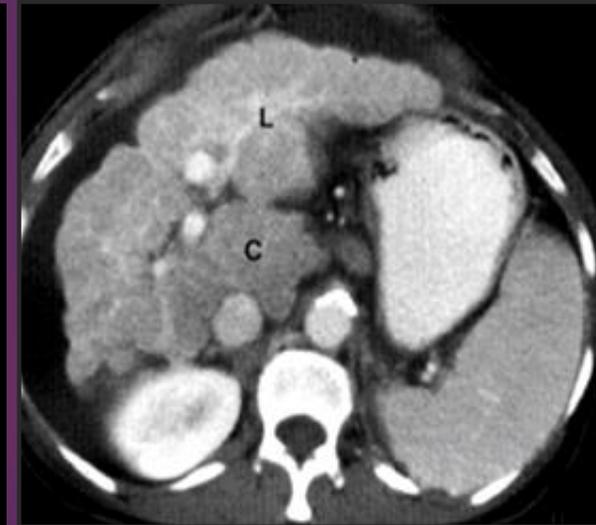
- ◆ Liver cysts.
- ◆ Hemangioma.
- ◆ Adenoma.
- ◆ Focal nodular hyperplasia.

Malignant lesions



- ◆ Hepatocellular carcinoma.
- ◆ Fibrolamellar carcinoma.
- ◆ Hepatoblastoma.
- ◆ Metastasis.

Diffuse lesions



- ◆ Fatty liver
- ◆ Cirrhosis
- ◆ Storage diseases

Hepatic cysts

- ◆ Congenital lesions but detected late
- ◆ Isolated or associated with congenital cystic disease
- ◆ Usually asymptomatic
- ◆ Complications [rupture or hage] lead to symptoms
- ◆ Few mms to several cms in size

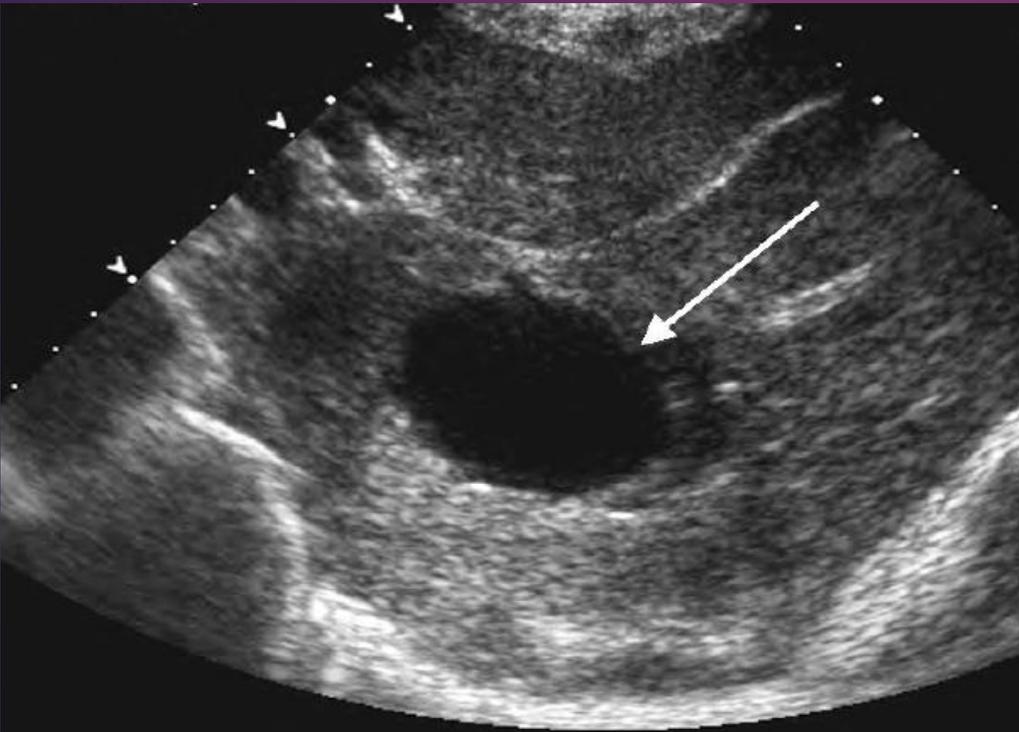
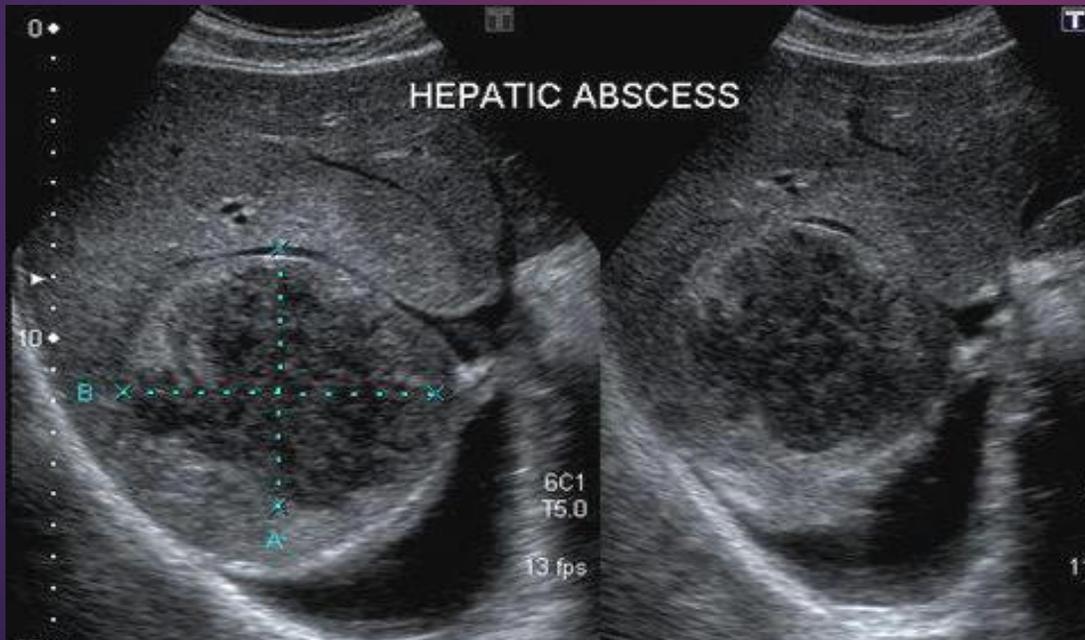


Figure 1-16. Ultrasonography of the liver, demonstrating a simple hepatic cyst (arrow). The lesion is well circumscribed and is hypoechoic with increased through transmission. This constellation of findings is characteristic of a simple cyst.

Hepatic

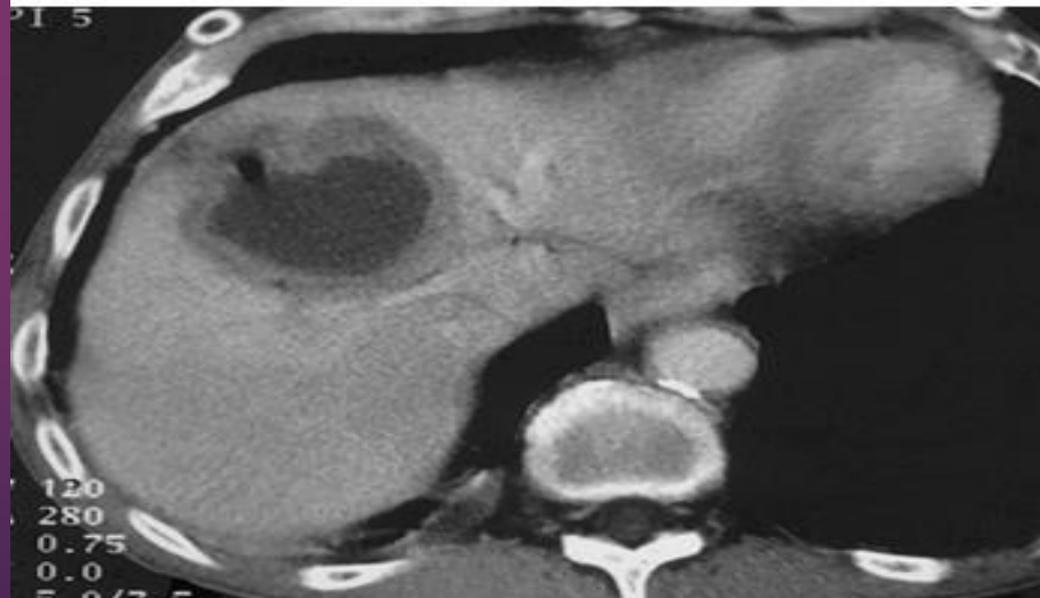
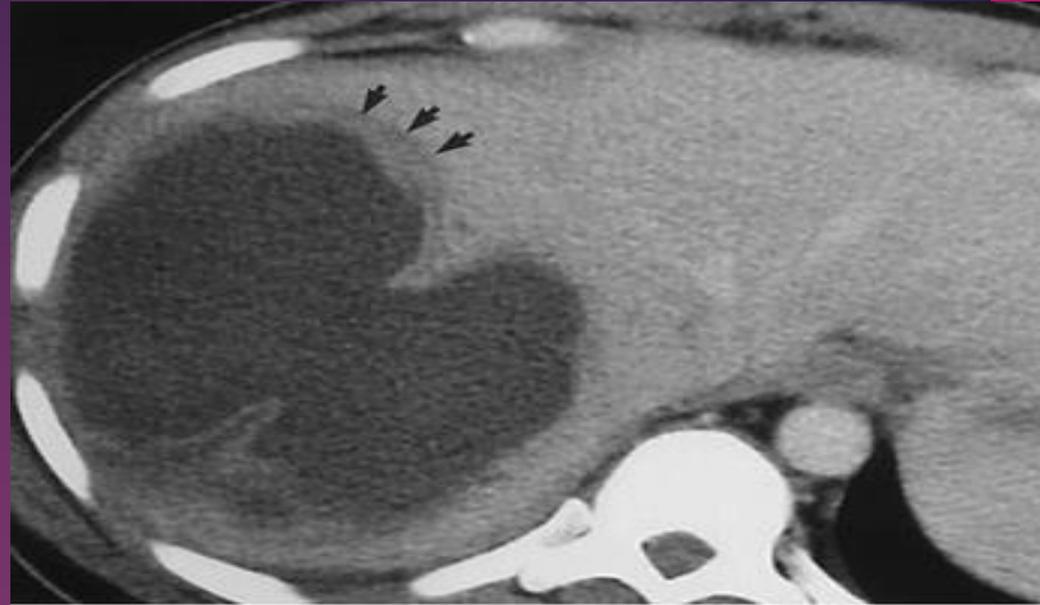
Hepatic abscess [Pyogenic]

- ◆ Frequently indolent with no signs of infection
- ◆ May present with profound septicemia
- ◆ Micro abscesses (>2cm) cluster or scattered
- ◆ Macro abscesses :Unilocular or multilocular
- ◆ Marginal enhancement 6% ?!
- ◆ Gas containing abscesses uncommon



Amebic abscess

Peripheral edema is evident



Hepatocellular carcinoma

- ◆ Single or multiple masses that are hypo dense to normal liver
- ◆ Calcification may be seen
- ◆ After contrast injection [**should be Triphasic study**]
 - ◆ **Arterial phase** : Very early arterial perfusion.
 - ◆ **Portal phase** : contrast washout

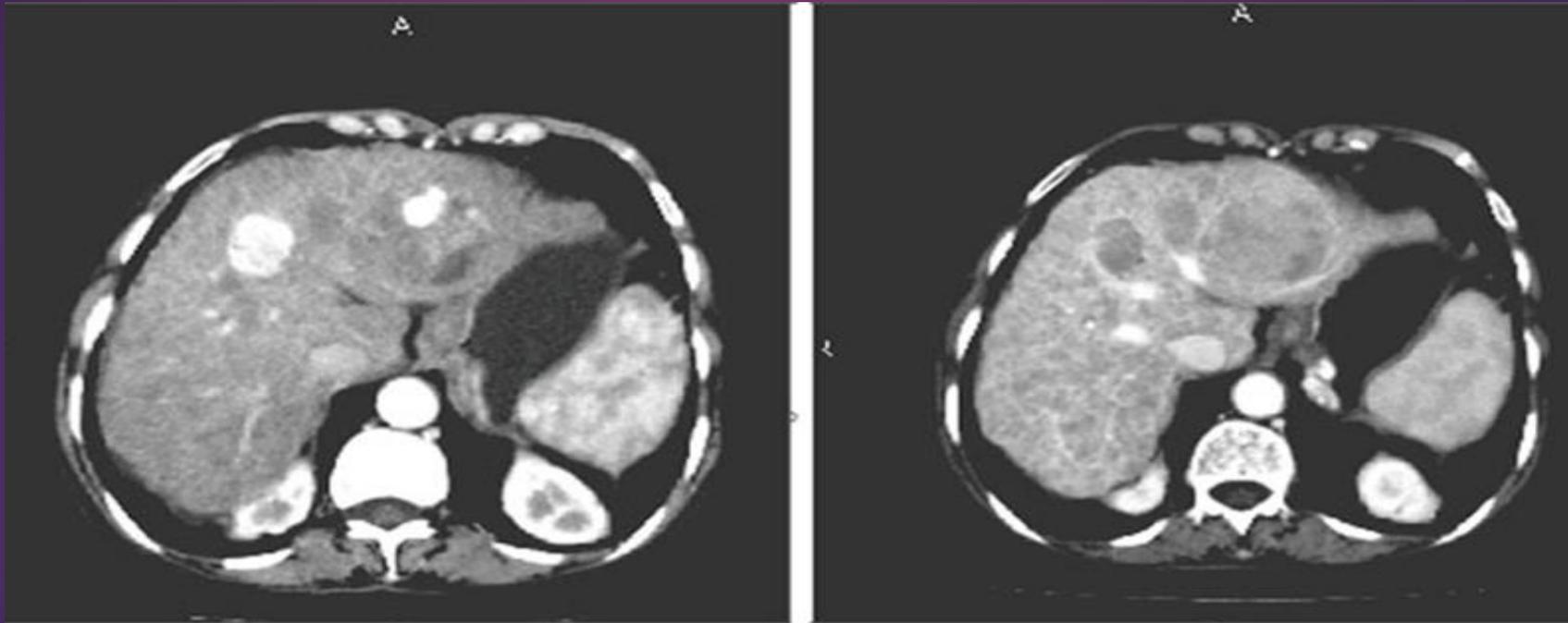
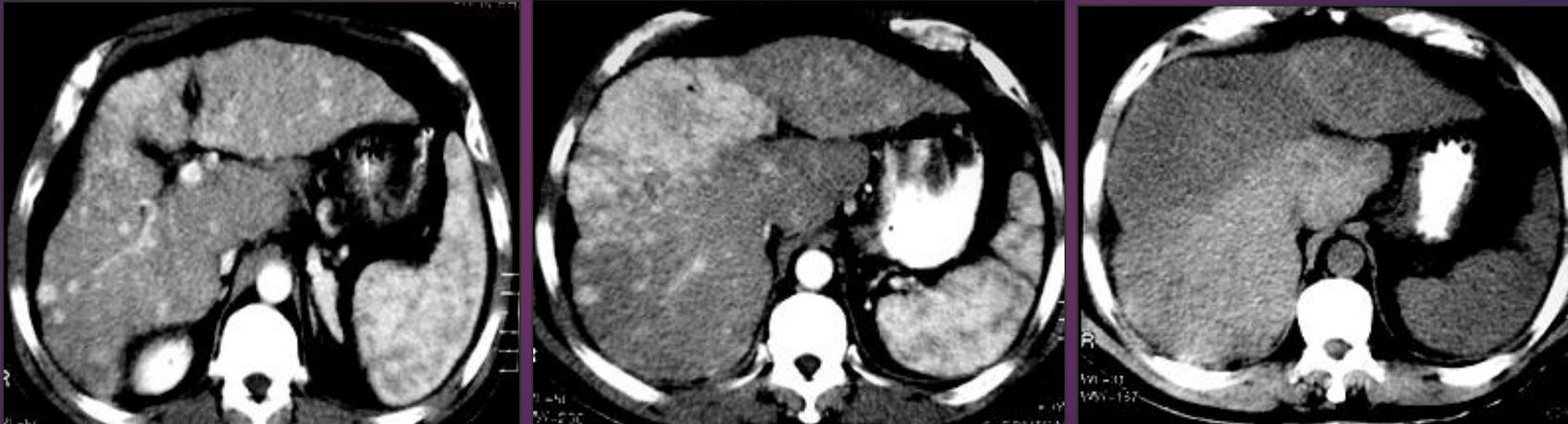


Figure-2: Hepatoma: Enhancing lesions in arterial phase with washout in portovenous phase.

Hepatocellular carcinoma

- ◆ Detects a greater number of HCC than usual scanning
- ◆ Detects intravascular thrombosis [portal vein]
- ◆ Better delineation of tumour capsule in capsulated lesions
- ◆ Detects early arteriovenous shunting [sign of malignancy]



Cholangiocarcinoma

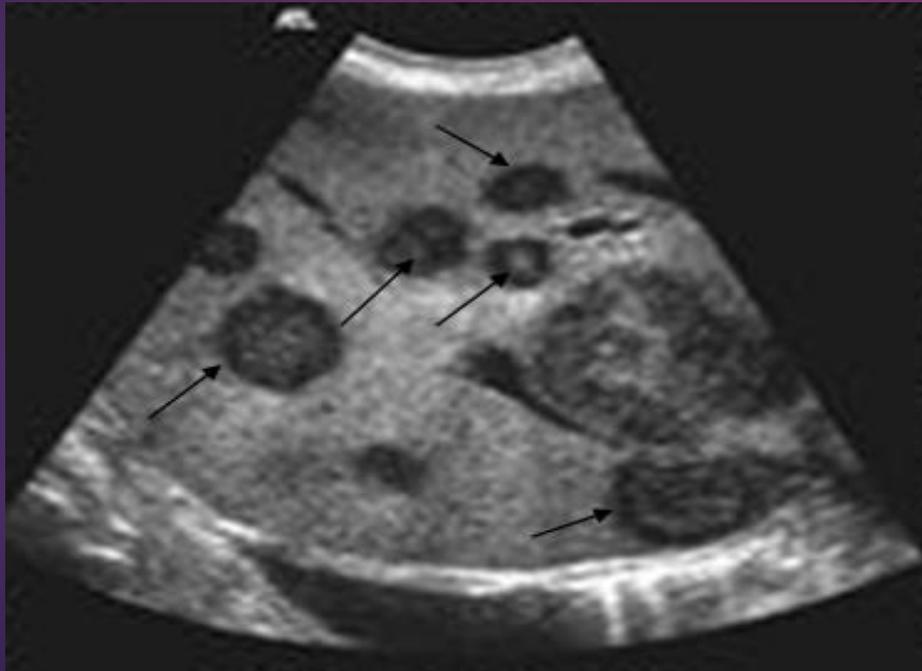
- ◆ The 2nd most common primary malignant tumor
- ◆ Arise from bile duct epithelium [3 TYPES]
 - ◆ Intrahepatic arises from **small ducts**
 - ◆ Or the major ducts near the helium
 - ◆ Or at the bifurcation of the CHD [Klatskin tumor]



- ◆ HCC: intrahepatic cholangiocarcinoma = 10:1
- ◆ No strong association with cirrhosis
- ◆ No specific MR appearance

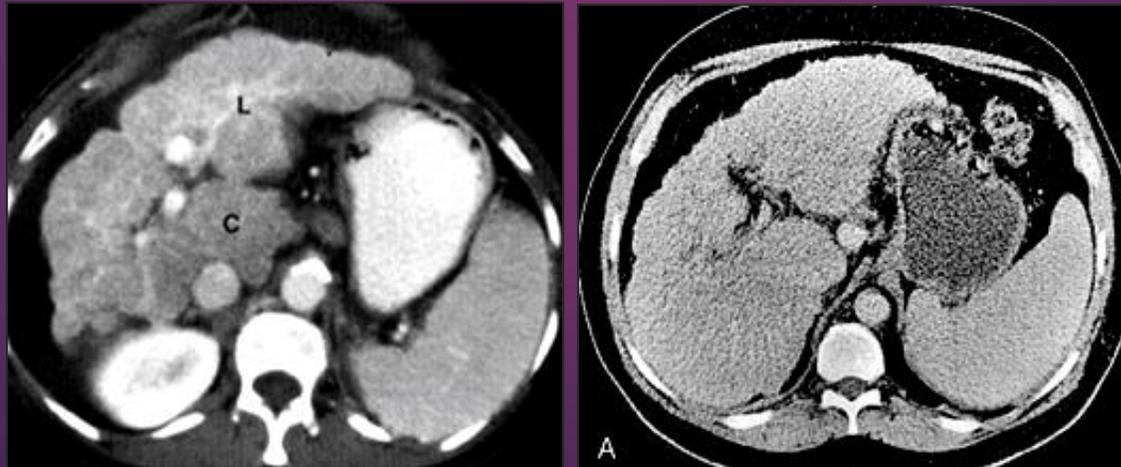
Hepatic deposits

- ◆ Most of hepatic deposits are hypo vascular
- ◆ Hepatic neoplasms receive most of their blood supply via hepatic artery
- ◆ Hyper vascular deposits should be assessed by dual phase CT or dynamic MRI
- ◆ CTAP and intra operative US are the most sensitive methods for detection of deposits



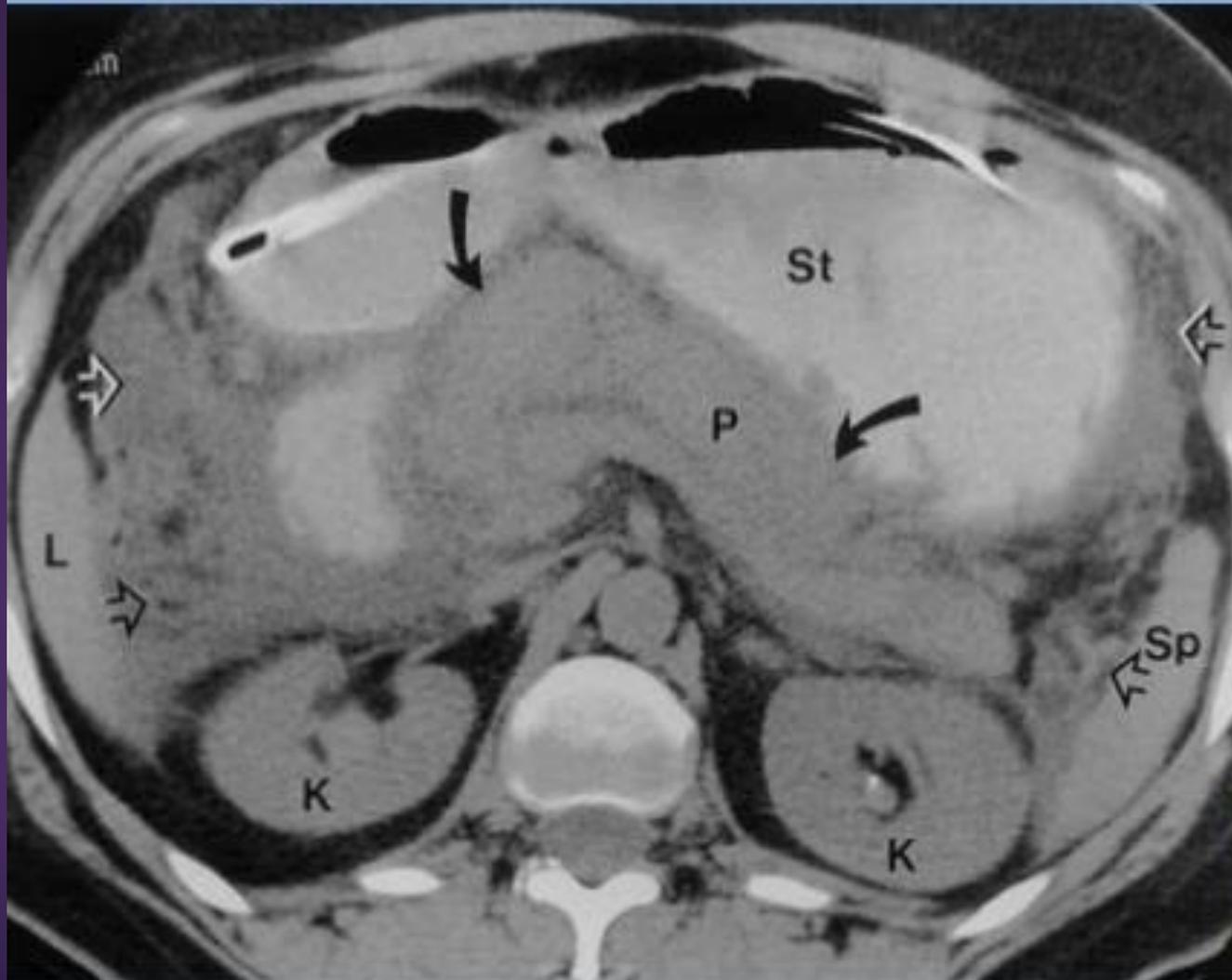
Cirrhosis

- Repeated episodes of hepatic injury → fibrosis + regeneration
 - Small fibrotic right lobe with regenerative enlargement of the caudate and left lobe
 - Caudate/ right lobe ratio = 0.65 or more
 - Portal vein diameter more than 1.3 cm
 - Splenomegaly, ascites
 - Dilated perisplenic collateral venous channels



Acute Pancreatitis

CT Findings



Transverse nonenhanced CT scan shows a homogeneously enlarged pancreas. There are large heterogeneous peripancreatic fluid collections. peripancreatic fluid collections.

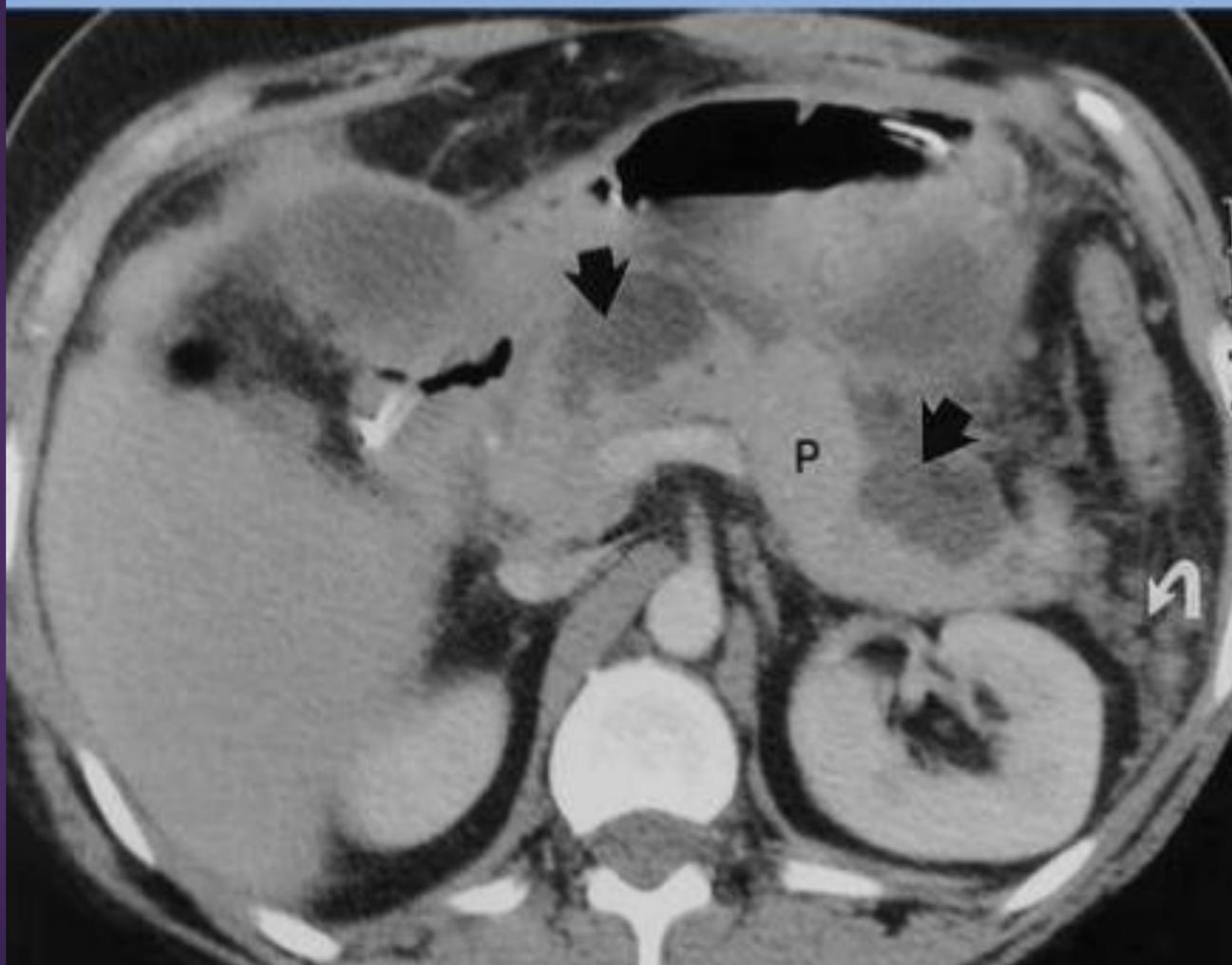
Gland necrosis cannot be ruled out.

Grade C

Severity Index 2

Acute Pancreatitis

CT Findings



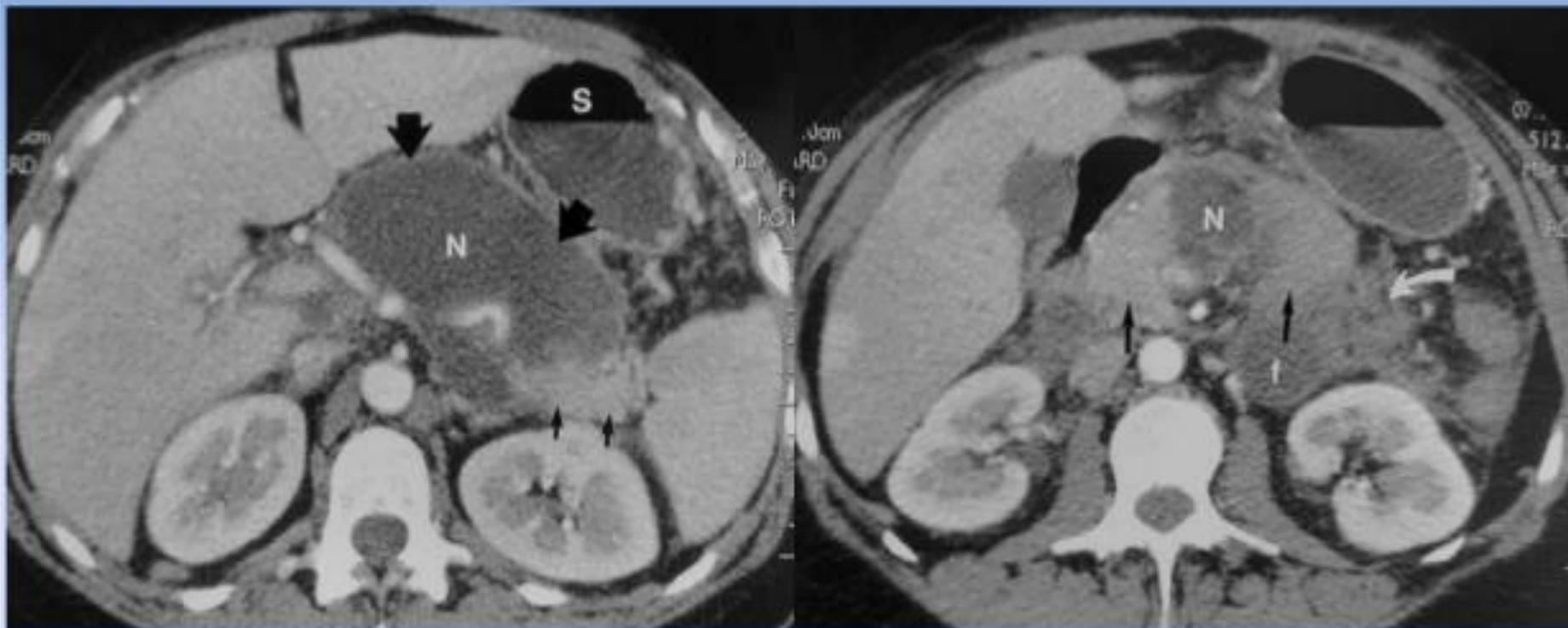
Contrast-enhanced CT scan reveals two zones of liquefied pancreatic necrosis in the neck and tail of the gland. There are residual nodular areas adjacent to the tail of the pancreas, consistent with fat necrosis (curved arrow).

Grade D

Severity Index 7

Acute Pancreatitis

CT Findings

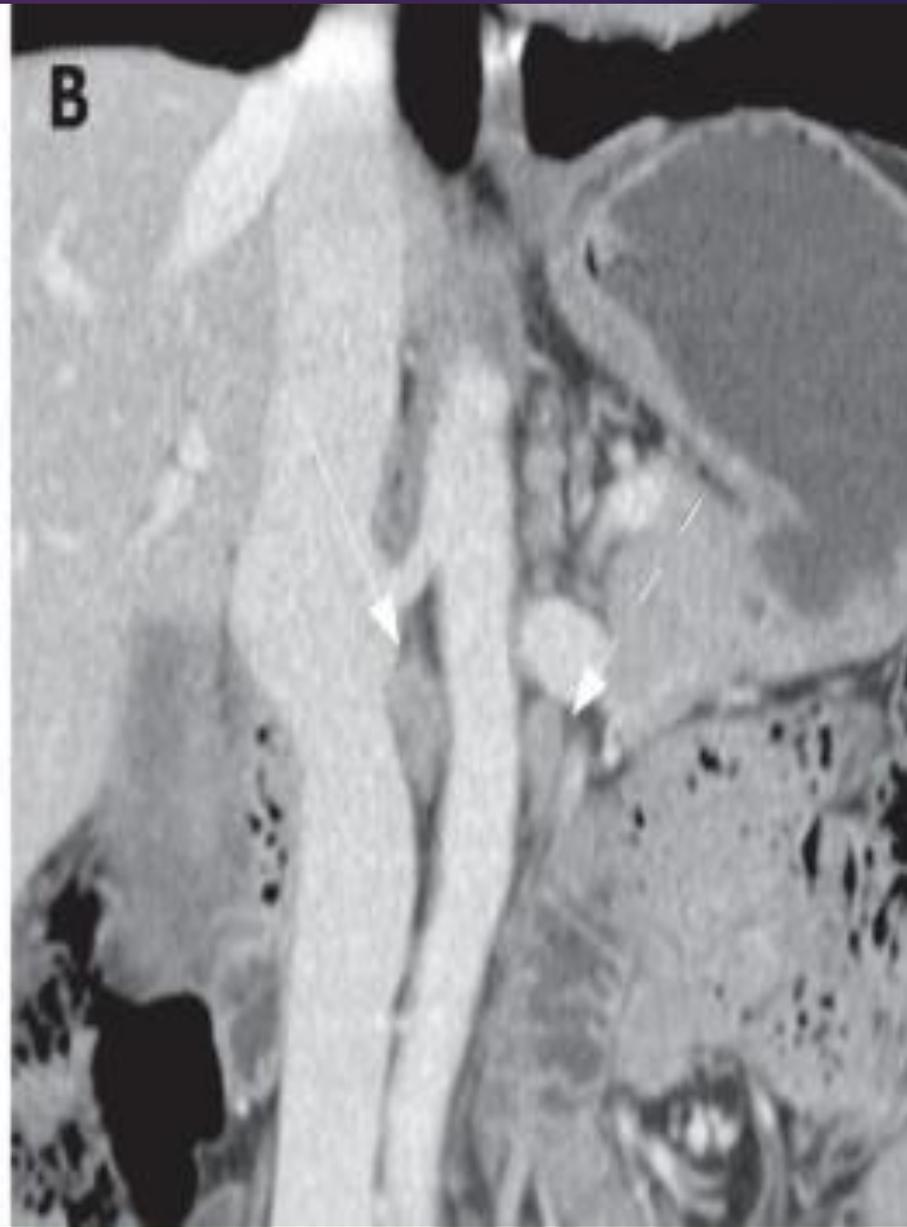


CT scans reveal an encapsulated fluid collection associated with liquefied necrosis in the body of the pancreas. The head, part of the body, and the tail of the pancreas are still enhancing. Residual fluid collections and areas of soft-tissue attenuation (curved arrow) consistent with fat necrosis are seen adjacent to the pancreas. *f* = fluid, *N* = liquefied gland necrosis, *S* = stomach.

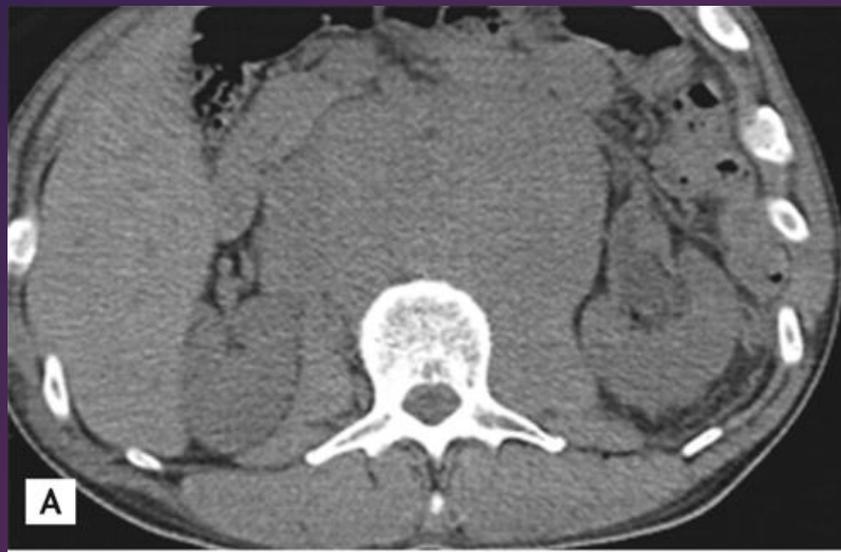
Grade E, Severity Index 10



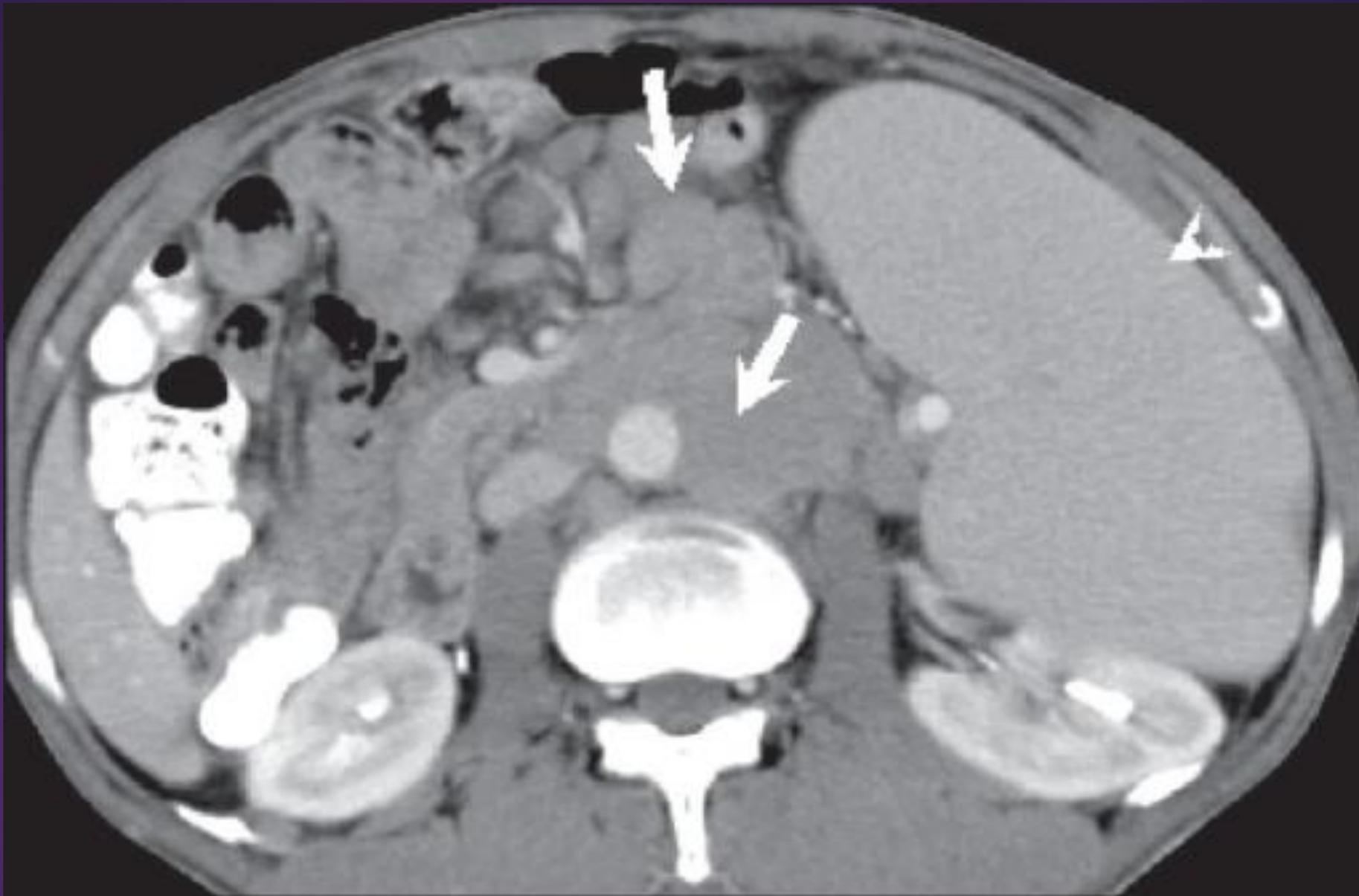
An abdominal and pelvic CT scan(IV contrast but no oral contrast) showed marked lymphadenopathy (arrows) in the retroperitoneum and mesentery .



Two metastatic para-aortic lymph nodes in a 49-year-old man with gallbladder cancer.



Computed tomography (CT) scan showing para-aortic metastatic lymphadenopathy,



Lymphoma. A non-Hodgkin lymphoma has para-aortic and mesenteric lymphadenopathy (arrows) along with splenomegally (arrowhead), on a contrast-enhanced, axial CT scan of the abdomen



Thank You