

# Gastrointestinal Pathology

August 2007

# Case 1

Dysphagia and halitosis



# Case 1

- Dilatation of the oesophagus with a smooth narrowing of its lower end.
- The large volume of contained fluid indicates delayed emptying.
- The appearance of the lower oesophagus resembles the tail of a rat or a long curved beak of a bird.



## Case 2

Incidental finding in a young woman under investigation for dyspepsia.



## Case 2

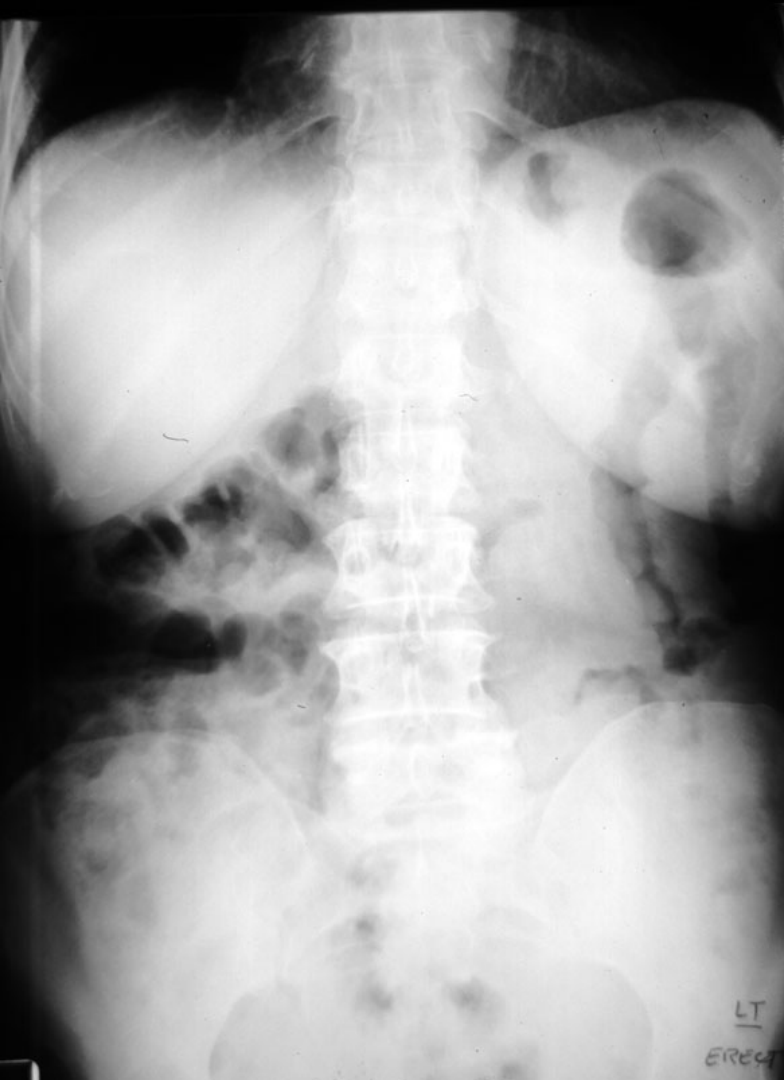
**The stomach and duodenal cap are under filled.**

**The bowel lies on the right side, but is otherwise normal.**

**Instead of winding around the head of the pancreas to the normal site of the duodeno-jejunal flexure on the upper left margin of the second lumbar vertebra, the bowel lies in the right para-colic gutter.**

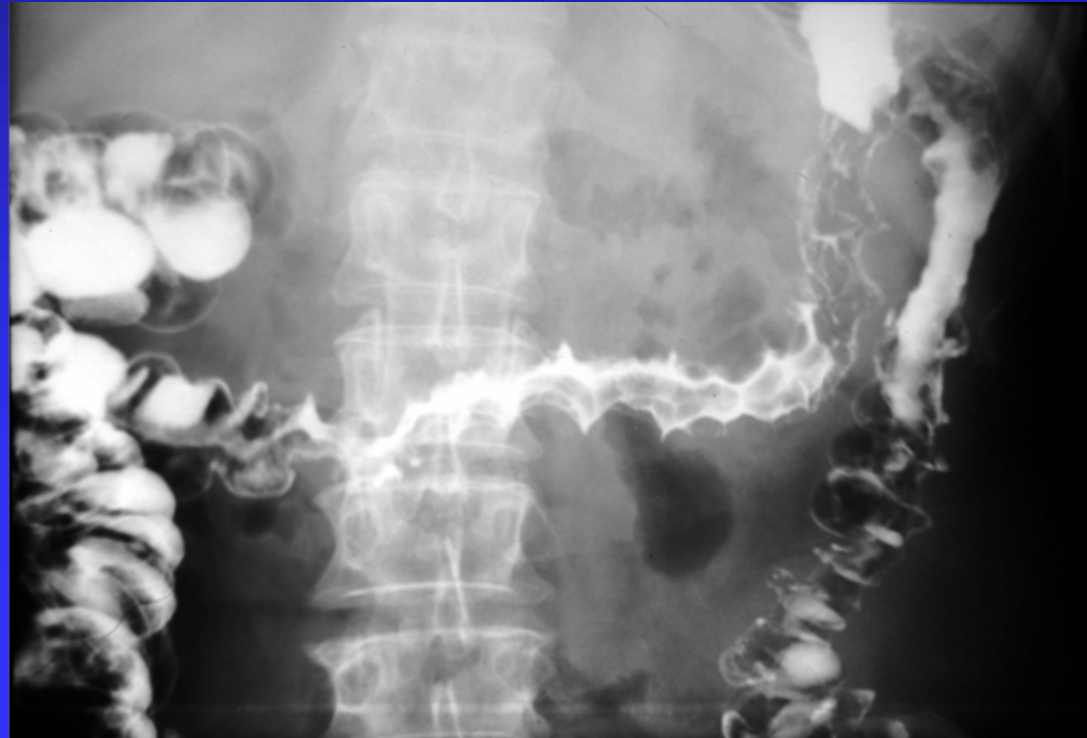
**There is no extrinsic impression or obstruction.**





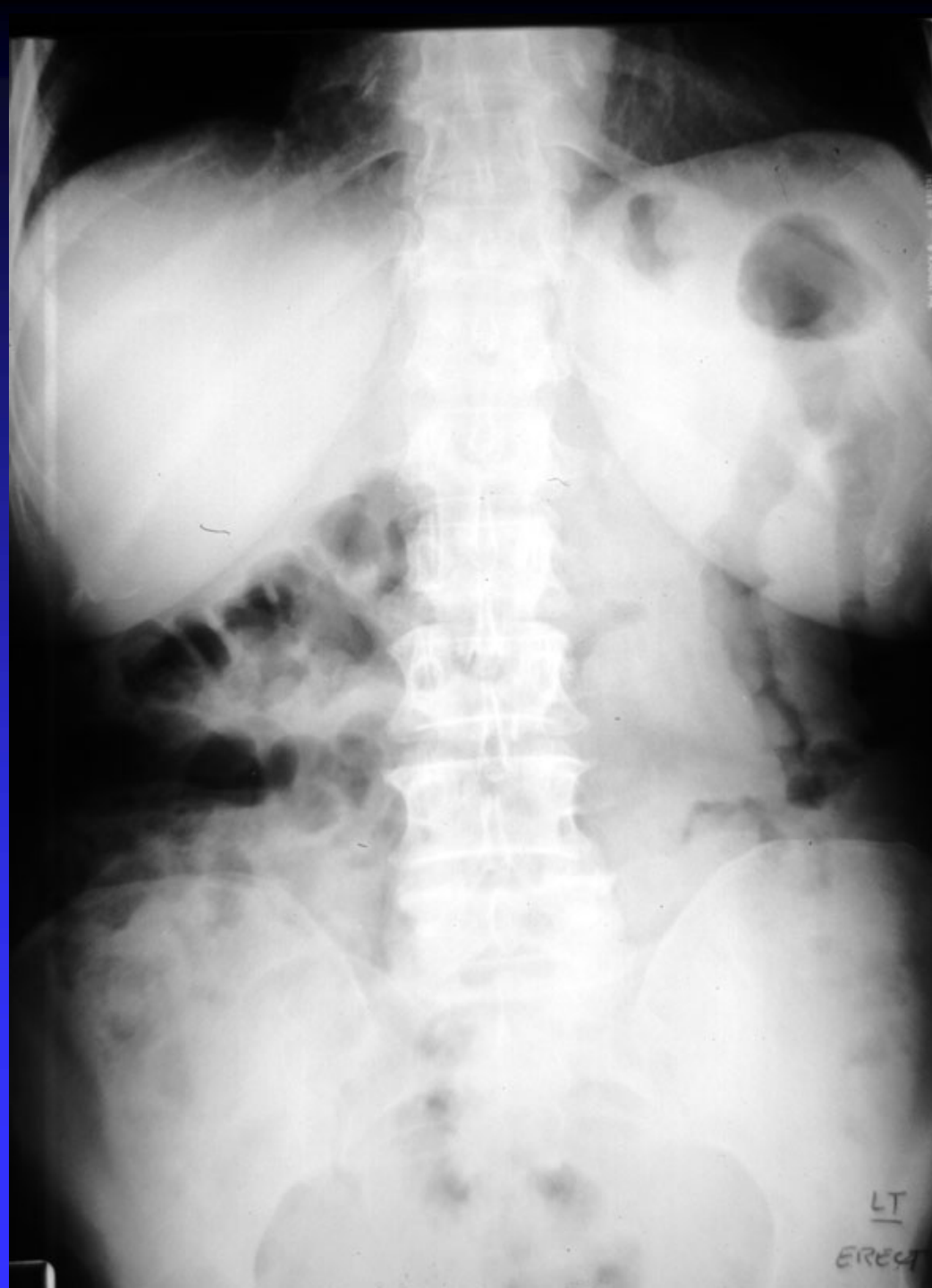
## Case 3

Adult male with abdominal pain and sudden recent change in bowel habit.



The erect plain view shows a thick line of gas marking the irregular narrowing of the splenic flexure and descending colon.

The extreme length of involved bowel implies local lack of peristaltic activity.





The enema demonstrates the “thumbprint” appearance of irregular mucosal thickening.



# Achalasia

= failure of organised peristalsis and relaxation at the level of the lower oesophageal sphincter.

Cause unknown, however histology demonstrates degeneration of the myenteric plexus in the region of the gastro-oesophageal junction (GOJ). The end result is failure of relaxation of the GOJ. Association with Chagas disease.

1 in 100,000 people.

Can affect all age groups.

Presentation: insidious, increasing dysphagia, repeated attacks of aspiration pneumonia are common.

Long standing disease of more than 20 years – SCC due to the degree of oesophageal obstruction and thus stasis.

## **BARIUM STUDIES**

- **Early changes:** defective distal peristalsis associated with slight narrowing of GOJ
- **Disease progresses:** characteristic bird-beak/rattail appearance of GOJ. Body of the oesophagus slightly dilated and aperistalsis
- **Severe achalasia:** dilatation of the oesophagus containing residue of food and food debris

## **CXR**

- **right convex opacity behind the right heart border**
- **air filled fluid level at the level of the aortic arch or above**
- **small/absent gastric air bubble patchy bilateral alveolar opacities - acute chronic aspiration pneumonia**
- **lateral view – anterior displacement and bowing of the trachea**

## **TREATMENT**

**Pneumatic dilatation or surgical myotomy.**

## **DIFFERENTIAL DIAGNOSIS**

1. **Neoplasm (separation of the gastric fundus from the diaphragm, normal peristalsis and asymmetric tapering).**
2. **Peptic stricture of the oesophagus.**

## Oesophageal Carcinoma

### **Clinical presentation:**

**Mature adult female with dysphagia and weight loss.**

- **There is an irregular narrowing with an "apple core" appearance and a neighbouring soft tissue mass of the mid-oesophagus.**
- **The lumen is narrowed by irregular thickening of the wall with lobulation and fissures.**
- **The abnormal area forms an acute angle with normal mucosa inferiorly, indicating mucosal thickening.**



# Small Bowel Malrotation

- **Malrotation of the intestine occurs when the normal embryologic sequence of bowel development and fixation is interrupted and there is incomplete rotation of the intestine (<270° of anti-clockwise rotation).**
- **Development of the human gut takes place during the first months of fetal life.**
- **Normal embryos - physiological herniation of the gut through the umbilicus at 6 weeks' gestation + a 270° anti-clockwise rotation of the developing intestine around the superior mesenteric artery (SMA).**
- **10-12 weeks, the intestine returns to the abdomen and assumes its normal adult anatomic position.**
- **Normal small bowel mesentery has a broad attachment stretching diagonally from the duodenojejunal junction (ligament of Treitz) in the left upper quadrant, to the cecum, in the right lower quadrant.**

## Malrotation disorders can be divided into 3 categories:

- **NON-ROTATION** -  $0^\circ$  to  $90^\circ$  of anti-clockwise rotation, occurring before 6 weeks
- **REVERSE ROTATION** - abnormal rotation between  $90^\circ$  and  $180^\circ$ , causing obstruction or reversal of the normal duodenal/SMA relationship, occurring in weeks 6-10
- **MALROTATION** most often associated with malfixation, between  $180^\circ$  and  $270^\circ$  of anti-clockwise rotation, occurring after 10 weeks

## ANATOMY

- The DJF is low and to the right of the normal location.
- The proximal small bowel (jejunum) is in the right upper quadrant.
- The cecum is in the upper and/or left abdomen.
- The large bowel is in the left abdomen.

## FREQUENCY

**1 in 500 live births (actual frequency of malrotation is unknown because many asymptomatic patients never present)**

**No racial or gender predilection**

## AGE

**60% of patients presents by 1 month of age.**

**Another 20-30% of patients present at 1-12 months of age.**

**May remain clinically "silent" for some time and can present at any age.**

## MORTALITY/MORBIDITY

- **Midgut volvulus:** The close proximity of the cecum to the duodenum is associated with a narrow stalk of mesentery around which the gut may twist, resulting in midgut volvulus. Accompanying superior mesenteric vascular compromise (first venous, followed by arterial) can lead to life-threatening ischemia of the small bowel and gangrenous necrosis. Mortality associated with midgut volvulus is at least 15%, and there is a high incidence of short gut syndrome, total parenteral nutrition dependence, and resultant cirrhosis.
- **Duodenal obstruction:** Coiling of the duodenum with the ascending colon produces complete or partial duodenal obstruction.

## Clinical Details

**Neonates:** malrotation with midgut volvulus classically presents with bilious vomiting and high intestinal obstruction

**Older children :** failure to thrive  
chronic recurrent abdominal pain  
malabsorption, or other vague presentations.  
non-rotation may be asymptomatic/incidental finding

## Associated anomalies

Seen in approximately 60% of patients and include...

- congenital heart disease with heterotaxy
- congenital diaphragmatic hernia and abdominal wall defects
- imperforate anus
- duodenal atresia
- duodenal web
- preduodenal portal vein
- annular pancreas
- biliary atresia.

## Plain Abdominal Radiograph

- may appear normal.

### *in midgut volvulus*

- Partial or complete duodenal obstruction
- gasless abdomen, ileus, or a distal small bowel obstruction with multiple dilated loops and air-fluid levels.

## Barium Examination

- The DJF is displaced downward and to the right
- The duodenum has an abnormal course
- Abnormal positioning of the jejunum

### *In malrotation with midgut volvulus*

- a dilated, fluid-filled duodenum
- a proximal small bowel obstruction
- a "corkscrew" pattern (proximal jejunum spiralling downward in the right- or mid-upper abdomen)
- mural oedema and thick folds



# Ischaemic Colitis

Reduced blood supply to part of the colon sufficient to compromise cellular viability.

Presenting with sudden onset abdominal pain, rectal bleeding, abdominal tenderness and diarrhoea

Age > 50 years old

- Ppt Factors:
1. Bowel Obstruction: volvulus, cancer (proximal bowel segment affected)
  2. Thrombosis: CVS disease, collagen vascular disease, sickle cell disease, haemolytic-uraemic syndrome, OCP
  3. Trauma: history of aorto-iliac reconstruction (2% with ligation of IMA)

Location:

- Left colon (90%)
- Splenic flexure (80%)
- Sigmoid
- Rectum sparing

Plain film usually normal, may be segmental thumbprinting

BE in 90% are abnormal.

Thumbprinting (75%) due to sub-mucosal haemorrhage and oedema.

Transverse ridging = markedly enlarged mucosal folds (spasm)

Serrated mucosa = inflammatory oedema

Superficial longitudinal /circumferential ulceration.

Deep penetrating ulcers (late)

CT

symmetrical lobulated segmental thickening of colonic wall.

Irregular narrowed atonic lumen (thumbprinting)

curvilinear collection of intramural gas,

portal and mesenteric venous air.

Blood clot in SMA/SMV.

Angiogram

normal slightly attenuated arterial supply

mild acceleration of AV transit time

Small tortuous ectatic draining veins.

“transient” ischaemic colitis - minimal damage and the colon soon returns to normal  
“gangrenous” ischaemic colitis - extensive necrosis  
“stricturing” ischaemic colitis - ulceration that healed with fibrosis and structure formation.

## Complications

toxic megacolon

free perforation

clostridial invasion of the necrotic wall with the production of intramural gas or gas in veins (e.g intrahepatic portal tracts).

Treatment is symptomatic, although surgery may be required for gangrene, perforation or stricture formation

2-3 months after acute attack barium enema to exclude stricture formation.

# MCQ 1

Regarding the radiological features of colitis:

- A) Normal mucosal islands seen on plain film indicate severe disease.
- B) A transverse colon diameter of greater than 5.5cm combined with the presence of normal mucosal islands is sufficient evidence to diagnose toxic megacolon.
- C) The usual site of perforation in UC is the caecum.
- D) The presence of ascities favours a diagnosis of pseudo-membranous colitis.
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- A) **TRUE**      These represent islands of normal mucosa and their existence implies that a large area of mucosa has been ulcerated. Sometimes ulceration is so extensive that few mucosal islands remain.
- B) **TRUE**      Changes are seen best in the transverse colon, which is the least dependent part of the colon and thus accumulates the greatest amount of air.
- C) **FALSE**      The most common site of perforation is the sigmoid colon. It is usually the result of deep ulceration or toxic megacolon.
- D) **TRUE**
- E) **TRUE**      This is because the ischaemic segment at the splenic flexure acts as an area of functional obstruction.

# MCQ 2

The following are normal features of the oesophagus on a barium swallow:

- A) The cervical oesophagus starts at the cricopharyngeus impression – usually C3-C4 level.
- B) The post-cricoid impression is a small, posterior, web-like indentation.
- C) Herring bone pattern of mucosal folds on double contrast examination.
- D) The A ring (tubulovesicular junction) varies in calibre during the examination.
- E) The mucosal gastro-oesophageal junction cannot be identified on double contrast studies.

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- A) FALSE      The crico-pharyngeal impression is usually at C5-C6 level.
- B) FALSE      This is an anterior impression (as opposed to the posteriorly – placed cricopharyngeus impression, that is like a web but changes shape with swallowing).
- C) TRUE        This is a normal transient phenomenon
- D) TRUE        This ring is visible only if the vestibule and tubular oesophagus are adequately distended.
- E) FALSE        This normal feature is occasionally visible as a thin, slightly radiolucent line. It is also known as the Z line, or ora serrata.

# MCQ 3

Plain radiographic signs supporting a diagnosis of sigmoid volvulus include:

- A) The presence of haustra.
- B) The margin of the dilated loop overlaps the soft tissue shadow of the inferior border of the liver.
- C) The dilated loop overlies dilated large bowel in the left flank.
- D) The apex of the loop usually underlies the right hemi-diaphragm.
- E) Shouldering is present on a barium enema.



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- 
- A) FALSE      Haustra are more often absent**
  - B) TRUE        This is the so-called liver overlap sign**
  - C) TRUE        This is the so called left flank overlap sign and indicates that, as the descending colon is dilated the obstruction is distal to this**
  - D) FALSE      The apex of the loop usually lies underneath the left hemi-diaphragm in sigmoid volvulus**
  - E) TRUE        In chronic volvulus, shouldering may be seen due to localised thickening of bowel wall at the site of the twist**