INVESTIGATIONS OF GASTROINTESTINAL DISEASES

Lecture 1 and 2

_radiological tests of structure (imaging)
**Plain X-ray:** May shows soft tissue outlines like liver, spleen, and kidney. Calcification in such organs as well as in pancreas (chronic pancreatitis) may be seen. Fluid levels in case of paralytic ileus and intestinal obstruction, x-ray of chest may show crescent shaped gas under right dome of diaphragm in case of perforated bowel as well as unrecognized chest problems like pleural effusion.
Pancreatic calcification
Fluid level – Small intestinal obstruction
Air under R dome of diaphragm – Viscus perforation 1
Air under R dome - 2
Right sided pleural effusion
Contrast studies:

Using barium sulphate and other contrast media. Double contrast may show small mucosal lesions. Barium studies are useful for detection of filling defects (e.g. tumor mass), strictures, erosions, ulcers, fistula (as in Crohn’s disease) and motility disorders under screen (e.g. motility disorders of oesophagus like achalasia).
Barium sulphate is harmless inert substance but may accumulate proximal to obstruction and become more solid. Colonoscopy may postpone several days after barium study to obtain clear view. Water soluble contrast is usually used during CT scan and MRI examinations.
Barium swallowing: Achalasia of esophagus
Barium meal: Gastric ulcer
Barium meal carcinoma of stomach (antrum)
Ca. body of stomach.
Barium follow through: Ascariasis, Small Intestine
Barium follow through: Normal (L) and Celiac disease (malabsorption)
Crohn’s disease: Stricture
Barium enema: Inflammatory bowel disease
Barium enema: Ca. of colon
US, CT scan and MRI

These non-invasive investigations are commonly used for diagnosis of many intraabdominal diseases and can detect even very small lesions.

**US:** Can detect abdominal masses and cysts, tumours, abscesses, organomegaly, ascites, biliary tract dilatation, gall stones and guides needle aspiration and biopsy of lesion. It can not detect small lesions and gases in bowel and obesity may obscure lesions.
CT scan: Assessment of pancreatic diseases, hepatic tumors, tumor staging. Can detect small lesions.

MRI: Hepatic tumour staging, MRCP (magnetic resonance cholangiopancreatography). It is indicated in perianal and pelvic disease and for detection of Crohn’s fistula. Contra-indicated in presence of metallic prosthesis and cardiac pacemaker. It is expensive.
MRCP
Endoscopy: Two main types: 1. Old fibrooptic type. 2. New video endoscopes. Uses: They are used for both diagnostic and therapeutic purposes.

A. upper GIT endoscopy: Also called OGD which means oesophagio-gastro duodenoscopy. The tube is 100 cm in length and reaches up to second part of duodenum. The end-view type is used for this purpose (side-view scopes are used for ERCP procedures).
Indications:

1. Dyspepsia in patients 55 years old or those with alarm symptoms.
2. Atypical chest pain
3. Dysphagia.
4. Vomiting
5. Weight loss
6. Acute or chronic gastrointestinal bleeding.
7. Suspicious barium meal
8. Duodenal biopsy in the investigation of malabsorption.
9. Therapeutic procedures.
Contraindication:

1. Shocked patient. 2. Recent myocardial infarction or unstable angina. 3. Severe respiratory disease. 4. Atlantoaxial subluxation. 5. Possibility of visceral perforation.
Complications:

1. Cardiorespiratory depression after heavy sedation especially in elderly or shocked patient. 2. Aspiration pneumonia. 3. Perforation and bleeding especially during therapeutic procedures. 4. Infective endocarditis in people with valve lesions who underwent examination without prophylaxis.
Endoscopic view of normal lower oesophagus
Normal endoscopy (stomach and duodenum)
ESOPHAGITIS
Reflux esophagitis with ulcer hemorrhage
Erosive and bile induced gastritis
Other types of gastritis
Antral gastric carcinoma
GASTRIC CARINOMA BODY, ANTRUM
A. Normal duodenum. B. Duodenitis
DU and bleeding DU
Colonoscopy:

**Indications:** 1. Suspected inflammatory bowel disease. 2. Chronic diarrhea. 3. Altered bowel habit. 4. Rectal bleeding or anaemia. 5. Assessment of abnormal barium enema. 6. Colorectal cancer screening. 7. Colorectal adenoma follow-up. 8. Therapeutic procedures.
Complications: 1. cardiopulmonary depression due to excessive sedation  
2. Bleeding and perforation 3. Infective endocarditis in susceptible patient when antibiotic prophylaxis was not given.
Normal rectum and sigmoid
Normal splenic flexure and transverse colon
Colonic ulceration. Malignant?
Colonoscopy: Ulcerative colitis
Colonic polyps
Colonic carcinoma
Colonoscopy: Crohn’s colitis
Colonoscopy: Crohn’s disease
Therapeutic procedures which can be done through endoscopy:

1. control of bleeding by using: injection sclerotherapy (for varices), variceal ligation (for varices), diathermy, lasser therapy, endoscopic clipping and injection of diluted adrenaline into the lesion.

2. Treatment of tumours and polyps:
3. Therapeutic procedures during ERCP (Endoscopic retrograde cholangiopancreatography) for biliary and pancreatic disorders like stone removal.

4. Treatment of strictures by using of ballons and by dilators e. g. oesophageal strictures.
POLYPECTOMY
Enteroscopy

This is another type of endoscopy of different subtypes used for diagnosis of small bowel lesions. It needs special experience by examiner for its use.
ENTEROSCOPE
CAPSULE ENDOSCOPY

Especially useful in cases of small bowel pathology as in cases of obscure GIT bleeding.
Tests of infection:

e. g. stool cultures in cases of diarrhea, serological tests for detection of anti-H. Pylori antibodies and breath test for H. pylori.

Note: Other invasive tests for H. pylori detection (Urease test and histopathology with special staining) are not used routinely in practice.
Breath test for H. pylori
Breath test for H. pylori
H. Pylori: Rapid serological test
Tests of function:

for study of motility disorders of oesophagus, intestine and colon. It also uses for gastric emptying disorders e.g. gastro-paresis when no structures defects are detected by usual investigation. The tests also use for small intestine transit time (lactulose-hydrogen breath test).
Radioisotope tests:
e. g. in diagnosis of MECKEL’S DIVERTICULUM (an abnormal gastric mucosa presents in a diverculem in upper part of intestine and may lead to GIT bleeding undetected by usual investigation). Also used for detection of bacterial overgrowth in intestine and active intestinal bleeding.
bleeding demonstrated by Tc-99m erythrocyte
Biopsy and pathology:

1. study of duodenal and jejunal biopsy material for diagnosis of celiac disease (mucosal abnormalities). 2. To diagnose lesions like: e. g. inflammatory bowel disease (e.g. cryptic abscess in UC and granuloma in Crohn’s disease) and tumors. 3. Also used for diagnosis of infection like Giardiasis, H. pylori and fungal infection. 4. Some time enzyme study is done from biopsy material.
Histopathology: Celiac disease
Histopathology: Ulcerative colitis (cryptic abscess)
Granuloma formation: Crohn’s disease