Investigations and Diagnosis of the Gastrointestinal System

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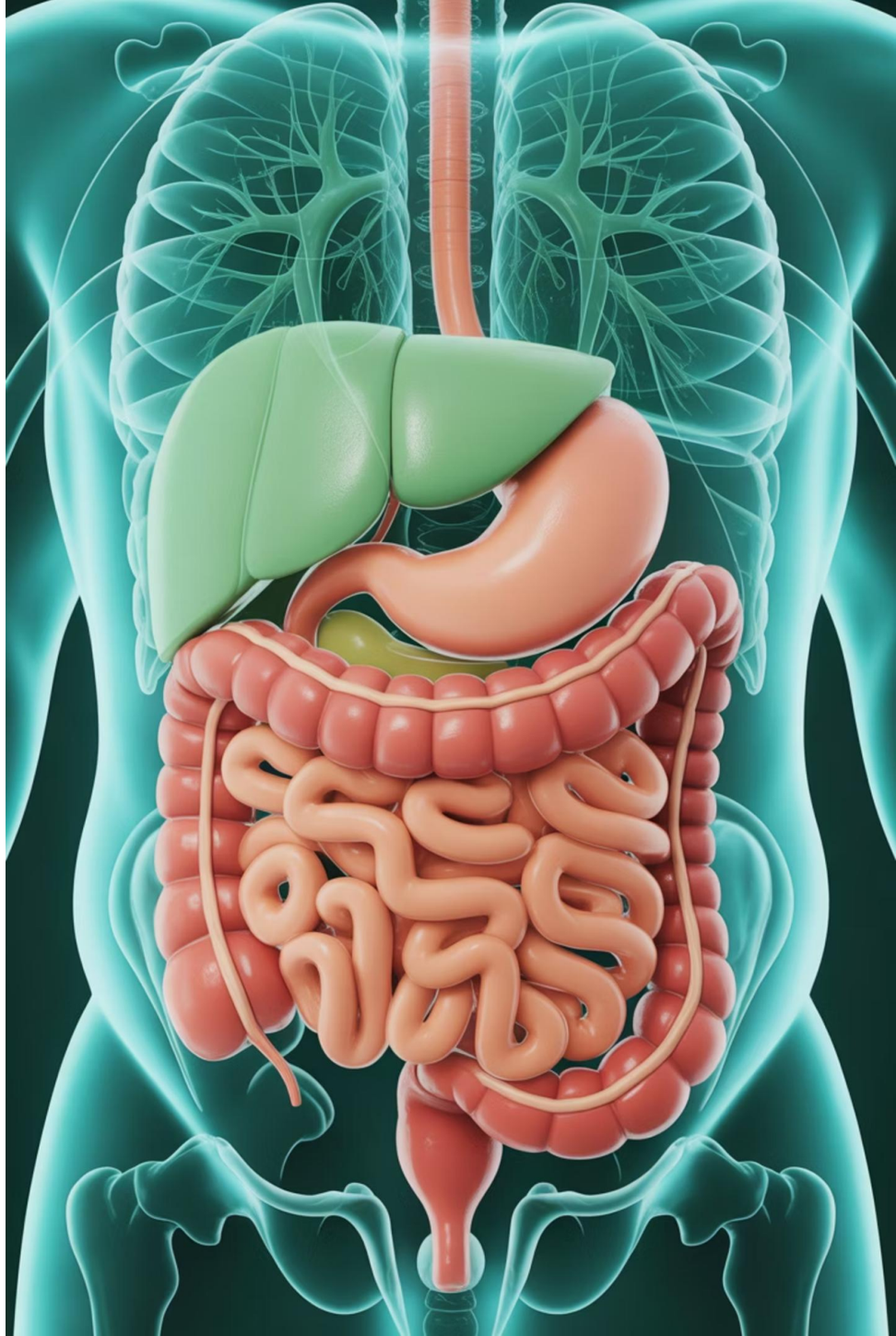
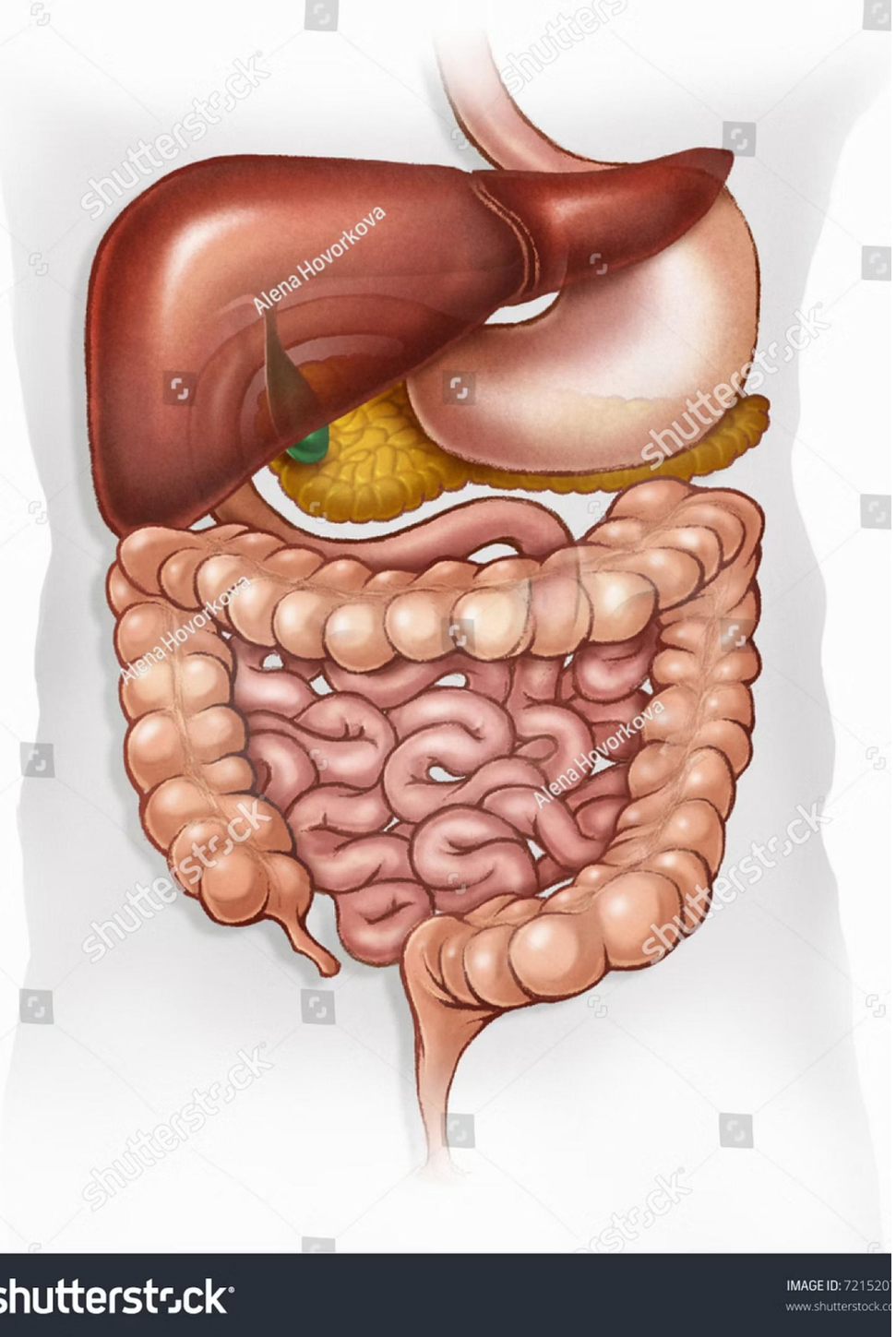


🎯 Learning Objectives

By the end of this lecture, students should be able to:

- [ ] Describe the main diagnostic methods used to evaluate the gastrointestinal (GI) system.
- [ ] Identify the indications and principles of common laboratory, imaging, and endoscopic investigations.
- [ ] Interpret basic findings from stool, blood, and imaging results related to GI diseases.
- [ ] Correlate clinical symptoms with appropriate diagnostic approaches.
- [ ] Demonstrate understanding of practical diagnostic tools used in clinical or laboratory settings.



🧠 Lecture Outline Part 1 – Introduction to GI System Diagnosis

The Gastrointestinal System includes the mouth, esophagus, stomach, small and large intestines, liver, gallbladder, and pancreas.

Diagnosis involves identifying abnormalities in structure or function using:

1. Clinical assessment (history & examination)
2. Laboratory tests
3. Imaging
4. Endoscopy
5. Functional tests

Part 2 – Clinical Evaluation

1. History Taking

Symptoms to ask:

- Dysphagia (difficulty swallowing)
- Nausea, vomiting
- Abdominal pain or bloating
- Diarrhoea or constipation
- Bleeding (haematemesis, melaena)
- Weight loss or loss of appetite

Lifestyle and dietary history also important.

2. Physical Examination

- **Inspection:** scars, distension, visible veins
- **Palpation:** tenderness, organ enlargement (liver, spleen)
- **Percussion & Auscultation:** bowel sounds, fluid, masses

Part 3 – Laboratory Investigations

1. Blood Tests

Test	Purpose	Example Interpretation
CBC	Detect anaemia, infection	↓ Hb = chronic GI bleeding
Liver Function Test (LFT)	Assess hepatobiliary system	↑ ALT/AST = hepatitis
Amylase & Lipase	Pancreatic evaluation	↑ = pancreatitis
CRP & ESR	Inflammation markers	↑ = IBD, infection
Tumour markers (CEA, CA 19-9)	GI malignancies	↑ = colon or pancreatic cancer

2. Stool Tests

Occult blood test (FOBT)

detects hidden bleeding (colon cancer screening).

Stool culture

identifies bacterial infection (e.g., Salmonella, Shigella).

Ova & parasite test

for parasitic infections.

Faecal calprotectin

marker for inflammatory bowel disease (IBD).

Part 4 – Imaging Studies

1. Plain X-ray (Abdominal Radiography)

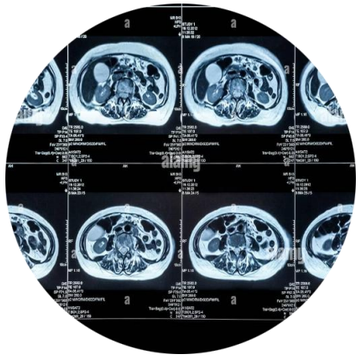
Essential for detecting bowel obstruction (air-fluid levels) and perforation (free air under the diaphragm).

2. Ultrasound

A non-invasive method to examine the liver, gallbladder (for stones or inflammation), and detect ascites.

3. CT Scan (Computed Tomography)

Provides detailed cross-sectional images to detect tumours, abscesses, and inflammation (e.g., appendicitis, Crohn's disease).



4. MRI (Magnetic Resonance Imaging)

Offers superior detailed evaluation of soft tissues, such as the biliary system with MRCP.

5. Barium Studies

Includes Barium swallow (oesophagus & stomach), Barium meal/follow-through (small intestine), and Barium enema (large intestine) for structural assessment.

Part 5 – Endoscopic Examinations

Type	Site Examined	Purpose
Upper GI Endoscopy (Gastroscopy)	Oesophagus, stomach, duodenum	Detect ulcers, bleeding, tumours
Colonoscopy	Large intestine	Detect polyps, cancer, inflammation
Sigmoidoscopy	Rectum & sigmoid	Quick evaluation of lower colon
ERCP	Biliary & pancreatic ducts	Diagnose & treat stones, strictures
Capsule Endoscopy	Small intestine	Non-invasive, wireless camera

Functional & Special Tests

pH Monitoring

for acid reflux (GORD).

Manometry

measures pressure in oesophagus or intestines.

Breath Tests

Urea breath test – H. pylori detection.

Hydrogen breath test – lactose intolerance or bacterial overgrowth.

Part 8 – Common Diagnostic Patterns

Symptom	Likely Test	Possible Disease
Dysphagia	Barium swallow, endoscopy	Stricture, oesophageal cancer
RUQ pain	Ultrasound	Gallstones
Chronic diarrhoea	Stool test, colonoscopy	IBD, infection
Jaundice	LFT, ultrasound, MRCP	Hepatitis, biliary obstruction
Rectal bleeding	Colonoscopy	Polyp, carcinoma, haemorrhoids

Part 9 – Safety and Patient Preparation

1. Fasting before endoscopy or imaging with contrast.
2. Allergic history (contrast media).
3. Consent and explanation of procedure.
4. Post-procedure monitoring for bleeding or perforation.
5.