



## RECENT ADVANCEMENT IN DAIGNOSIS OF GASTROINTESTINAL DISEASES

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### ABSTRACT

Gastrointestinal diseases refer to ulcerative disorders of the upper gastrointestinal tract. Stomach acids and some enzymes can damage the lining of the G.I. tract if natural protective factors are not functioning normally. Causes of gastrointestinal diseases are use of aspirin, alcohol and tobacco, poor diet (too many fried, fatty foods, sugar and refined foods), poor food combining, drinking with meals. Various diagnostic tests that can be performed for gastrointestinal diseases are Colonoscopy, ERCP, Flexible Sigmoidoscopy, Lower GI Series, Liver Biopsy, Upper GI Series, Upper Endoscopy.

## INTRODUCTION

**Gastrointestinal tract:** The tube that extends from the mouth to the anus in which the movement of muscles and release of hormones and enzymes digest food. The gastrointestinal tract starts with the mouth and proceeds to the esophagus, stomach, duodenum, small intestine, large intestine (colon), rectum and, finally, the anus. It is also called the alimentary canal, digestive tract and, perhaps most often in conversation, the GI tract.

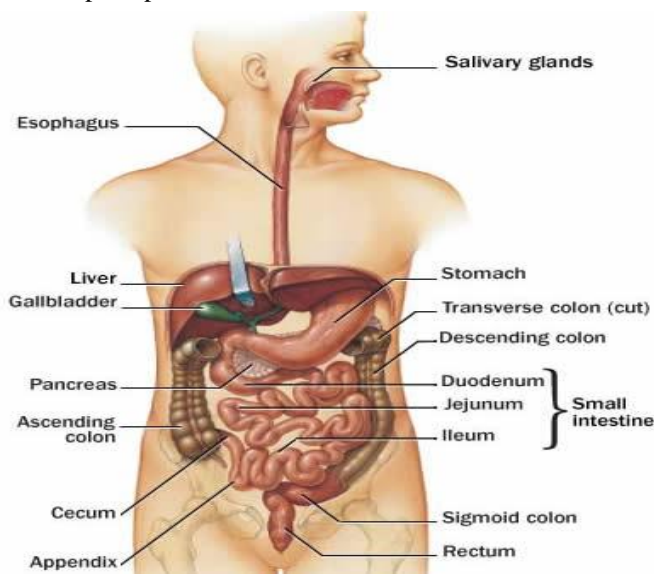


Fig. 1 Human Gastrointestinal (GI) Tract

**Gastrointestinal Diseases:** Gastrointestinal diseases refer to ulcerative disorders of the upper gastrointestinal tract. Stomach acids and some enzymes can damage the lining of the G.I. tract if natural protective factors are not functioning normally.

**Symptoms** of gastrointestinal diseases are indigestion, heartburn, nausea, loss of appetite, abdominal pain that is often worse after eating, and gastrointestinal bleeding (signs of this are vomiting material that looks like coffee-grounds, or having dark stools). Some other symptoms are acid bile reflux in the throat, asthma-like symptoms, often irritable bowel syndrome, and chronic poor digestion with sharp abdominal and chest pains, hoarseness and chronic cough.

**Causes** of gastrointestinal diseases are use of aspirin, alcohol and tobacco, poor diet (too many fried, fatty foods, sugar and refined foods), poor food combining, drinking with meals, over eating especially spicy foods, eating too fast or too often, food allergies, candida overgrowth, stress, serious illness. Various pathogens, which usually get into our body through contaminated food and water, can produce an infection of the gastrointestinal tract. This manifests itself in diarrhea, often accompanied by pains in the stomach, nausea and vomiting.

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Among the most frequent pathogens at fault are the E.coli bacteria, salmonella and poison from staphylococcus.

Other causes of gastrointestinal disease may be reflux injury (such as bile backing up into the stomach and esophagus, trauma (for example surgery, radiation, chemotherapy, severe vomiting and having swallowed a foreign object), bacterial, viral, fungal and parasitic infections, pernicious anemia and systemic disease for example (Crohn's) disease.

**Gastrointestinal bleeding:** Gastrointestinal bleeding refers to any bleeding that starts in the gastrointestinal tract, which extends from the mouth to the large bowel. The degree of bleeding can range from nearly undetectable to acute, massive, and life-threatening.

Bleeding may come from any site along the gastrointestinal tract, but is often divided into:

1. Upper GI bleeding: The upper gastrointestinal (GI) tract is located between the mouth and outflow tract of the stomach.
2. Lower GI bleeding: The lower GI tract is located from the outflow tract of the stomach to the anus (small and large bowel included).

**Common Causes:** Some of the possible causes of gastrointestinal bleeding include:

- Haemorrhoids
- Duodenal ulcer
- Gastric (stomach) ulcer
- Bleeding diverticulum
- Ulcerative colitis
- Crohn's disease
- Oesophageal varices
- Arterio-venous malformations
- Nose bleed
- Mallory-Weiss tear (tear in esophagus after vomiting)
- Esophagitis
- Dysentery (bloody, infectious diarrhoea)
- Ischemic bowel
- Colon cancer
- Intestinal polyps
- Celiac sprue
- Radiation injury to the bowel
- Portal hypertensive gastropathy
- Stomach cancer
- Intestinal vasculitis
- Small intestinal cancer
- Dieulafoy's lesion

- Meckel's diverticulum
- Aorto-enteric fistula
- Cow's milk allergy
- Intestinal obstruction (twisted bowel)
- Intussusception (bowel telescoped on itself)
- Anal fissure

#### DIAGNOSTIC TESTS

- Colonoscopy
- ERCP
- Flexible Sigmoidoscopy
- Lower GI Series
- Liver Biopsy
- Upper GI Series
- Upper Endoscopy

#### Colonoscopy:

Colonoscopy is the endoscopic examination of the colon and the distal part of the small bowel with a CCD camera or a fiber optic camera on a flexible tube passed through the anus. It may provide a visual diagnosis (e.g. ulceration, polyps) and grants the opportunity for biopsy or removal of suspected lesions.<sup>[1]</sup> Virtual colonoscopy, which uses 2D and 3D imagery reconstructed from computed tomography (CT) scans or from nuclear magnetic resonance (MR) scans, is also possible, as a totally non-invasive medical test, although it is not standard and still under investigation regarding its diagnostic abilities. Furthermore, virtual colonoscopy does not allow for therapeutic maneuvers such as polyp/ tumor removal or biopsy nor visualization of lesions smaller than 5 millimeters. If a growth or polyp is detected using CT colonography, a standard colonoscopy would still need to be performed.<sup>[2]</sup> Colonoscopy can remove polyps as small as one millimetre or less. Once polyps are removed, they can be studied with the aid of a microscope to determine if they are precancerous or not. Colonoscopy is similar to, but not the same as, sigmoidoscopy - the difference being related to which parts of the colon each can examine. A colonoscopy allows an examination of the entire colon (measuring four to five feet in length). A sigmoidoscopy allows an examination of only the final two feet of the colon. A sigmoidoscopy is often used as a screening procedure for a full colonoscopy -- done in many instances in conjunction with a fecal occult blood test (FOBT), which can detect the formation of cancerous cells throughout the colon. At other times, a sigmoidoscopy is preferred to a full colonoscopy

in patients having an active flare of ulcerative colitis or Crohn's disease to avoid a perforation of the colon. Additionally, surgeons have lately been using the term pouchoscopy to refer to a colonoscopy of the ileoanal pouch.

### Risks

This procedure has a low (0.35%) risk of serious complications.<sup>[3]</sup>

1. According to a study published in the Annals of Internal Medicine, for which researchers reviewed colon cancer screening data from 1966 to 2001 the most severe complications from colonoscopy are perforation (that occurred in 0.38% of cases), heavy bleeding (occurring in 1.4% of colonoscopies) and death (occurring in 0.016% of colonoscopy patients).
2. The most serious complication generally is the gastrointestinal perforation, which is life-threatening and requires immediate major surgery for repair. An analysis of the relative risks of sigmoidoscopy and colonoscopy, published in the February 5, 2003 issue of the Journal of the National Cancer Institute brought into attention that the risk of perforation after colonoscopy is approximately double that after sigmoidoscopy, even though this difference appeared to be decreasing.
3. Bleeding complications may be treated immediately during the procedure by cauterization via the instrument. Delayed bleeding may also occur at the site of polyp removal up to a week after the procedure and a repeat procedure can then be performed to treat the bleeding site. Even more rarely, splenic rupture can occur after colonoscopy because of adhesions between the colon and the spleen.
4. As with any procedure involving anaesthesia, other complications would include cardiopulmonary complications such as a temporary drop in blood pressure, and oxygen saturation usually the result of overmedication, and are easily reversed. Anesthesia can also increase the risk of developing blood clots and lead to pulmonary embolism or deep venous thrombosis (DVT). In rare cases, more serious cardiopulmonary events such as a heart attack, stroke, or even death may occur; these are extremely rare except in critically ill patients with multiple risk factors. In very rare cases, coma associated with anesthesia may occur. Virtual colonoscopies carry risks that are associated with radiation exposure.
5. Severe dehydration caused by the laxatives that are usually administered during the bowel preparation for colonoscopy also may occur. Therefore, patients must drink large amounts of fluids during the days of colonoscopy preparation to prevent dehydration. Loss of electrolytes or dehydration is potential risk that can even get deadly. In rare cases, severe dehydration can lead to kidney damage or renal dysfunction under the form of phosphate nephropathy.
6. Colonoscopy preparation and colonoscopy procedure can cause inflammation of the bowels and diarrhea or even bowel obstruction.
7. During colonoscopies where a polyp is removed (a polypectomy), the risk of complications has been higher, although still very uncommon, at about 2.3 percent. One of the most serious complications that may arise after colonoscopy is the postpolypectomy syndrome. This syndrome occurs due to potential burns to the bowel wall when the polyp is removed. It is however a very rare complication and as a result patients may experience fever and abdominal pain. The condition is treated with intravenous fluids and antibiotics while the patient is recommended to rest.
8. Bowel infections are a potential colonoscopy risk, although very rare. The colon is not a sterile environment as many bacteria live in the colon to assure the well-functioning of the bowel and therefore the risk of infections is very low. Infections can occur during biopsies when too much tissue is removed and bacteria protrude in areas they do not belong to or in cases when the lining of the colon is perforated and the bacteria get into the abdominal cavity. Infection may also be transmitted between patients if the colonoscope is not cleaned and sterilized properly between tests, although the risk of this happening is very low.<sup>[4]</sup>
9. Minor colonoscopy risks may include nausea, vomiting or allergies to the sedatives that are used. If medication is given intravenously, the vein may become irritated. Most localized irritations to the vein leave a tender lump lasting a number of days but going away eventually. The incidence of these complications is less than 1%.
10. On very rare occasions, intracolonic explosion may occur. Although complications after colonoscopy are uncommon, it is important for patients to recognize early signs of any possible

complications. They include severe abdominal pain, fevers and chills, or rectal bleeding (more than half a cup).

### Advantages

1. Virtual colonoscopy does not require the insertion of a colonoscope into the entire length of the colon. Instead, a thin tube is inserted through the anus and into the rectum to expand the large intestine with air.
2. No sedation is needed. A patient can return to usual activities or go home after the procedure without the aid of another person.
3. Virtual colonoscopy provides clearer, more detailed images than a conventional X-ray using a barium enema—sometimes called a lower GI series.
4. Virtual colonoscopy takes less time than either conventional colonoscopy or a lower GI series.
5. Virtual colonoscopy can see inside a colon that is narrowed due to inflammation or the presence of an abnormal growth.

### Disadvantages

1. As with conventional colonoscopy, virtual colonoscopy requires bowel preparation and the insertion of a tube into the rectum for expanding the large intestine with gas or liquid.
2. Virtual colonoscopy does not allow the doctor to remove tissue samples or polyps.
3. Virtual colonoscopy does not detect pre-cancerous polyps smaller than 10 millimetres.
4. Medicare and many health insurance plans do not pay for virtual colonoscopy cancer screening.
5. Virtual colonoscopy is a newer technology and is not as widely available as conventional colonoscopy.

### ERCP (Endoscopic Retrograde cholangio pancreatography)

It is a technique that combines the use of endoscopy and fluoroscopy to diagnose and treat certain problems of the biliary or pancreatic ductal systems. Through the endoscope, the physician can see the inside of the stomach and duodenum, and inject dyes into the ducts in the biliary tree and pancreas so they can be seen on X-rays.

ERCP is used primarily to diagnose and treat conditions of the bile ducts, including gallstones, inflammatory strictures (scars), leaks (from trauma and surgery), and cancer. ERCP can be performed for diagnostic and therapeutic reasons, although the

development of safer and relatively non-invasive investigations such as magnetic resonance cholangiopancreatography (MRCP) and endoscopic ultrasound has meant that ERCP is now rarely performed without therapeutic intent.<sup>[5]</sup>

### Risks

1. The major risk of an ERCP is the development of pancreatitis, which can occur in up to 5% of all procedures. This may be self-limited and mild, but may require hospitalization, and rarely, may be life-threatening. Patients at additional risk for pancreatitis are younger patients, patients with previous post-ERCP pancreatitis, females, procedures that involve cannulation or injection of the pancreatic duct, and patients with sphincter of Oddi dysfunction.<sup>[6]</sup>
2. Gut perforation is a risk of any endoscopic procedure, and is an additional risk if a sphincterotomy is performed. As the second part of the duodenum is anatomically in a retroperitoneal location (that is, behind the peritoneal structures of the abdomen), perforations due to sphincterotomies are also retroperitoneal. Sphincterotomy is also associated with a risk of bleeding.<sup>[6]</sup>
3. Over sedation can result in dangerously low blood pressure, respiratory depression, nausea, and vomiting.
4. There is also a risk associated with the contrast dye in patients who are allergic to compounds containing iodine.

### LIVER BIOPSY

Liver biopsy is the biopsy (removal of a small sample of tissue) from the liver. It is a medical test that is done to aid diagnosis of liver disease, to assess the severity of known liver disease, and to monitor the progress of treatment.<sup>[7]</sup>

### Types

Liver biopsies may be taken

1. Percutaneously (via a needle through the skin),
2. Transvenously (through the blood vessels) or directly during abdominal surgery.

The sample is examined by microscope, and may be processed further by immunohistochemistry, determination of iron and copper content, and microbiological culture if tuberculosis is suspected.<sup>[8]</sup>

### Value and limitations

1. For the last century liver biopsy has been considered as the gold standard for assessing the stage and the grade of chronic liver disease. Consensus conference statements recommended liver biopsy in the management of almost all patients with hepatitis C and B.
2. Liver biopsy is generally a safe procedure, but it is invasive. Complications of liver biopsy are rare but potentially lethal. The majority of complications (60%) occur within two hours, and 96% occur within 24 hours following the procedure. Approximately 2-3% of patients undergoing liver biopsy require hospitalization for the management of an adverse event.<sup>[9]</sup> Thirty percent of patients experience significant pain during the procedure. Significant bleeding after a liver biopsy occurs in 1-2 out of 100 patients who are biopsied. Bleeding usually becomes apparent within three to four hours. It often stops on its own, but if it persists, a blood transfusion may be needed. Surgery or angiography (a procedure in which the bleeding site is identified and treated) may be required if the bleeding is severe or does not stop on its own. Intraperitoneal hemorrhage is the most serious consequence of bleeding. Fatal complications have been reported in up to 0.01-0.3% of biopsied patients.
3. Biopsy results show significant variability (up to 40% for fibrosis diagnosis) which can lead to a wrong diagnosis. The result depends on the representatives of the punctured sample.
4. The cost of liver biopsy is estimated at USD\$1,032 without complications and USD\$2,745 with complications.
5. Only 5% of patients at risk of fibrosis have liver biopsy. In 2002, the consensus conferences in France and in the USA raised the possibility of treating patients with chronic hepatitis without liver biopsy.. These conferences also underlined the necessity of developing reliable non-invasive tests that might be an alternative to liver biopsy both in hepatitis B and C.
6. Liver biopsy will likely remain particularly important in the diagnosis of unexplained liver disease. Non-invasive tests for liver fibrosis in alcoholic, nonalcoholic and viral liver diseases are likely to become more widely used.

### UPPER GI SERIES

An upper GI series uses X-rays to help diagnose problems of the upper GI tract, which includes the esophagus, stomach, and

duodenum. The duodenum is the first part of the small intestine.

### Risks

1. Mild constipation from the barium liquid is the most common complication of an upper GI series. Rarely, barium liquid causes bowel obstruction, a life-threatening condition that blocks the intestines. Drinking plenty of liquids after an upper GI series flushes out the barium and helps reduce the risks of constipation and bowel obstruction.
2. Although infrequent, barium can cause an allergic reaction, which is treated with antihistamines. Some barium liquids contain flavours, which may also cause an allergic reaction.
3. The risk of radiation-related damage to cells or tissues from an upper GI series is low. People who have recently undergone other X-ray tests should talk with their doctor about potential risks.

Patients who experience any of the following rare symptoms should contact their doctor immediately:

- Severe abdominal pain
- Failure to have a bowel movement within 2 days after the procedure
- Inability to pass gas
- Fever

### UPPER GI ENDOSCOPY

Upper GI endoscopy is a procedure that uses a lighted, flexible endoscope to see inside the upper GI tract. The upper GI tract includes the oesophagus, stomach, and duodenum—the first part of the small intestine.

Upper GI endoscopy can detect:

- Ulcers
- Abnormal growths
- Precancerous conditions
- Bowel obstruction
- Inflammation
- Hiatal hernia

### Risks

Risks associated with upper GI endoscopy include

1. Abnormal reaction to sedatives
2. Bleeding from biopsy
3. Accidental puncture of the upper GI tract

Patients who experience any of the following rare symptoms after upper GI endoscopy should contact their doctor immediately:

- Swallowing difficulties
- Throat, chest, and abdominal pain that worsens
- Vomiting
- Bloody or very dark stool
- Fever

## CONCLUSION

Gastrointestinal diseases refer to ulcerative disorders of the upper gastrointestinal tract. Stomach acids and some enzymes can damage the lining of the G.I. tract if natural protective factors are not functioning normally. Symptoms of gastrointestinal disease are indigestion, heartburn, nausea, loss of appetite, abdominal pain that is often worse after eating, and gastrointestinal bleeding.

Causes of gastrointestinal disease are aspirin use, alcohol and tobacco use, poor diet (to many fried, fatty foods, sugar and refined foods), poor food combining, drinking with meals, over eating especially spicy foods, eating too fast or too often, food allergies, candida overgrowth, stress, serious illness. Various pathogens, which usually get into our body through contaminated food and water, can produce an infection of the gastrointestinal tract. This manifests itself in diarrhea, often accompanied by pains in the stomach, nausea and vomiting. Among the most frequent pathogens at fault are the e-coli bacteria, salmonella and poison from staphylococcus. There are various diagnostic tests for gastrointestinal diseases such as Colonoscopy, ERCP, Flexible Sigmoidoscopy, Lower GI Series, Liver Biopsy, Upper GI Series and Upper Endoscopy. Prevention is better than treatment of any diseases.

But in the cases of disease occur treatment is done in 2 steps first is Non clinical treatment by avoiding the various causes which are responsible for git diseases such as smoking, alcohol, NSAIDs and spicy food, irregular food and irregular sleep poor diet (to many fried, fatty foods, sugar and refined foods), poor food combining, drinking with meals, over eating especially spicy foods, eating too fast or too often, food allergies, candida overgrowth, stress, serious illness etc. second steps are clinical treatments by using medicines which are given by Doctors after complete diagnosis of patients.

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