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## Chapter

# Upper and Lower Gastrointestinal System Endoscopy Indications

*Bahadir Kartal and Mehmet Abdussamet Bozkurt*

## Abstract

As endoscopic procedures have become widespread, they have largely replaced radiological methods in the diagnosis of gastrointestinal system diseases; because the accurate diagnosis rates of endoscopic procedures are very high compared to conventional radiological procedures. In addition, tissue and cell sample for histopathological studies It is also advantageous because it can be taken and some diseases can be treated endoscopically. Rigid endoscopes have been replaced by flexible endoscopes, making them widely used in both diagnosis and treatment. The increase in the use of endoscopy brings with it complications. Therefore, the indications for endoscopy should be clearly stated. Indications for endoscopic examination of the digestive system can be divided into three as diagnosis, follow-up and treatment.

**Keywords:** gastroscopy, colonoscopy, indication, gastrointestinal endoscopy

## 1. Introduction - Upper gastrointestinal system endoscopy indications

With the widespread use of flexible endoscopes, the indications for upper gastrointestinal endoscopy (Upper GI) have increased. Upper GI indications; It is divided into three as diagnostic, follow-up and therapeutic (**Table 1**).

## 2. Diagnostic upper GI

### 2.1 Dyspepsia

Upper GI should be performed in patients aged 50 years and older in the presence of new-onset dyspepsia. If under 50 years of age, medical treatment should be given. Endoscopy should be performed if the following alarm symptoms are present with dyspepsia.

Alarm symptoms:

- Persistent vomiting
- Progressive dysphagia
- Obstructive jaundice

Diagnostic	Follow-up	Therapeutic
Dyspepsia	Achalasia	Foreign body
GERD	Tylosis	Upper gastrointestinal bleeding
Upper gastrointestinal bleeding	PUD	Endoscopic resections
Dysphagia and odynophagia	Barrett's esophagus	Polypectomy
Vomiting	Polyps	Dilation and stent
Caustic injury	Intestinal metaplasia/ dysplasia	PEG/ PEJ
Iron deficiency anemia	Post – gastric surgery	Ablation
	Pernicious anemia	Achalasia
	FAP	Obesity
	HNPCC	
	History of upper respiratory and digestive tract cancer	

*FAP: Familial Adenomatous Polyposis, HNPCC: Hereditary Nonpolyposis Colorectal Cancer, PEG: Percutaneous endoscopic gastrostomy, PEJ: Percutaneous endoscopic jejunostomy, GERD: Gastroesophageal reflux disease, PUD: Peptic ulcer disease.*

**Table 1.**  
*Upper gastrointestinal system endoscopy indications.*

- Dysphagia or odynophagia
- Involuntary loss of more than 3 kg in the last two months
- Palpable mass in the epigastrium or peripheral lymphadenopathy
- Upper gastrointestinal bleeding
- Iron deficiency anemia
- Family history of upper gastrointestinal malignancy

Upper GI is performed to diagnose *Helicobacter pylori* or evaluate response to treatment. Upper GI should be performed in patients with dyspeptic complaints who are taking empirical proton pump inhibitors if they do not respond to treatment [1–2].

## 2.2 Gastroesophageal reflux disease

Gastroesophageal reflux disease can be diagnosed with typical (heartburn, regurgitation) symptoms and treated if uncomplicated. However, Upper GI should be performed in patients with alarm symptoms or who do not respond to treatment [3].

## 2.3 Upper gastrointestinal bleeding

If the patient has signs of bleeding from the upper gastrointestinal tract, such as hematemesis and/or melena, Upper GI should be performed [4].

## **2.4 Dysphagia and odynophagia**

The first examination to be performed in patients with dysphagia and odynophagia is endoscopy. If there is progressive dysphagia against solid foods, rapid endoscopy should be planned [5].

## **2.5 Vomiting**

Upper GI should be performed if patients have persistent (more than 48 hours) vomiting and the vomiting is thought to originate from the digestive system [1, 2].

## **2.6 Caustic injury**

EGD is performed to determine the extent and severity of damage in patients taking corrosive substances [6].

## **2.7 Iron deficiency anemia**

Patients over 50 years of age with iron deficiency anemia should also undergo colonoscopy with EGD. A duodenal biopsy is also necessary to investigate celiac disease in patients with iron deficiency anemia [7].

# **3. Follow-up upper GI**

Upper GI is used in the follow-up of some benign, malignant and malignancy-risk diseases.

## **3.1 Achalasia**

Since the onset of the disease, the risk of developing squamous cell cancer has increased. Upper GI should be performed in these patients every 3 years [8].

## **3.2 Tylosis**

Tylosis is an autosomal dominant skin disease. Type A tylosis, which occurs at between the ages of 5 and 15 years and is associated with squamous cell carcinoma of the esophagus. Endoscopic brush cytology once a year and chromoendoscopy every 3 years should be planned at least 10 years before the age at which the diagnosis is usually made in the affected family member [9].

## **3.3 Peptic ulcer disease**

In patients diagnosed with gastric ulcer by biopsy, a control endoscopy should be performed after 4–6 weeks of antisecretory therapy. In patients diagnosed with duodenal ulcer with Upper GI, if there are no symptoms after 4–6 weeks of treatment, there is no need to do endoscopy again [6].

### **3.4 Barrett's esophagus**

In patients with Barrett's esophagus with no evidence of dysplasia on initial endoscopy, a repeat endoscopy should be performed within the next year. Annual endoscopy has been recommended for Barrett's esophagus with low- grade dysplasia [10]. Barret's patients with high- grade dysplasia should undergo Upper GI at frequent intervals (every 3 months) (4-quadrant jumbo biopsies) [11].

### **3.5 Gastric epithelial polyps**

Fundic gland polyps have not been associated with an increased risk of cancer. But, hyperplastic polyps have a rare malignant potential. Adenomatous polyps have malignant potential and this risk correlates with size and older patient age. Biopsy or polypectomy is recommended when a polyp is encountered. Surveillance endoscopy should be planned 1 year after removal of adenomatous gastric polyps. If high-grade dysplasia or early gastric cancer is detected in the follow-up, the necessary treatment should be performed. If the results of this examination are negative, repeat surveillance endoscopy should be performed at 3 to 5 year intervals. No surveillance endoscopy is necessary after adequate sampling or removal of nondysplastic gastric polyps [12].

### **3.6 Gastric intestinal metaplasia and dysplasia**

The risk of developing gastric cancer is 10 times higher in patients with intestinal metaplasia. If low grade dysplasia is detected in a patient with intestinal metaplasia, then surveillance Upper GI with a topographic mapping biopsy strategy should be performed every 3 months, at least for the first year. Surveillance should be suspended when 2 consecutive endoscopies show a negative result. Patients with high grade dysplasia should undergo gastrectomy or endoscopic resection [12].

### **3.7 Post - gastric surgery**

There is insufficient evidence to support the need for routine endoscopic follow-up in patients who have undergone partial gastrectomy for peptic ulcer. In these patients, if there are symptoms, Upper GI should be performed. If surveillance is considered, it should be initiated after an interval of 15 to 20 years [13]. Preoperative Upper GI should be performed in patients scheduled for bariatric surgery [14].

### **3.8 Pernicious anemia and gastric carcinoid tumors**

There are an increased risk of gastric cancer, as well as gastric carcinoid tumors, in patients with pernicious anemia. The benefits of surveillance in patients with pernicious anemia have not been shown. A single endoscopy should be considered to identify lesions (gastric cancer, carcinoid tumors) in patients with pernicious anemia. The follow-up of carcinoid tumors should be personalized according to the patient [15].

### **3.9 Familial adenomatous polyposis (FAP)**

Fundic gland polyps are found in 88% of FAP patients [16]. Adenomatous polyps are found in the stomachs of individuals with FAP, with a prevalence ranging from 2–50% [17]. They are usually located in the antrum. Duodenal adenomas occur in

90% of patients with adult FAP [16]. Duodenal adenomas are usually formed in the duodenal papillae or in the periampullary region. Spigelman classification is used for duodenal polyposis classification [18]. The optimal timing of the first Upper GI of patients with FAP is unknown, but it can be performed around the time when the patient is being considered for colectomy, or at the beginning of the third decade of life. If adenoma is not detected, a re-examination should be performed after 5 years, as there may be adenomatous changes later in the course of the disease. If excision of the papillary adenoma has been complete, one approach is for follow-up endoscopy and multiple biopsies every 6 months for a minimum of 2 years, with endoscopy thereafter at 3-year intervals [12].

### **3.10 Hereditary nonpolyposis colorectal cancer (HNPCC)**

Patients with HNPCC are at increased risk for the development of gastric and small-bowel cancer [19]. Upper GI follow-up is appropriate from the age of 30 [20].

### **3.11 History of upper respiratory tract cancer and upper digestive tract cancer**

There are insufficient data to support routine endoscopic surveillance. A single Upper GI is recommended to identify esophageal cancer [21].

## **4. Therapeutic upper GI**

### **4.1 Removal of foreign bodies**

During the removal of a foreign body, an overtube provides some degree of protection of the airway. The overtube is also useful for protecting the mucosa when it is necessary to pass the endoscope several times to remove a foreign body. After removal of the foreign body, the endoscope should be reinserted in case of adverse events [22].

### **4.2 Upper gastrointestinal bleeding**

In case of upper gastrointestinal bleeding, epinephrine injection, sclerosants, tissue adhesive, thermal coagulation, hemospray, band ligation and hemoclips can be performed by Upper GI [23].

### **4.3 Endoscopic resections**

Endoscopic mucosal resection (EMR) is used to excise focal lesions of the mucosa. The lesions are most commonly located in the stomach. Endoscopic submucosal dissection (ESD) allows for en bloc excision of large mucosal lesions of the gastrointestinal tract [22, 23].

### **4.4 Polypectomy**

Polypectomy is performed using a wire snare or forceps according to the size of the polyp. It should be kept in mind that bleeding and perforation may occur after polypectomy [23].



#### 4.5 Dilation and stent

Esophageal stricture dilation may be performed using bougie dilators, wire-guided dilators, or balloons. Using the same principles for esophageal stricture dilation, through-the-scope (TTS) balloons can be employed for strictures in the pylorus and duodenum. Stent is an effective method in esophageal malignant strictures and perforations [23].

#### 4.6 Placement of feeding or drainage tubes

Percutaneous endoscopic gastrostomy (PEG) or percutaneous endoscopic jejunostomy (PEJ) can be placed for nutritional purposes. Pancreatic pseudocysts can be drained [2, 23].

#### 4.7 Ablation

Ablation of mucosal lesions of the UGI tract can be performed with a variety of devices including heater probes, multipolar electrocoagulation, argon plasma coagulation (APC), radiofrequency ablation (RFA), neodymium-doped yttrium aluminum garnet (Nd-YAG) laser, cryotherapy [22, 23].

#### 4.8 Achalasia

Pneumatic dilatation, botulinum toxin injection and peroral endoscopic myotomy (POEM) are endoscopic methods used to treat achalasia [24].

#### 4.9 Obesity

Endoscopic sleeve gastroplasty (ESG), intragastric injection of botulinum toxin and gastric balloon is endoscopic weight loss procedures [25].

### 5. Lower gastrointestinal system endoscopy (colonoscopy) indications

Colonoscopy has largely replaced radiological methods in the diagnosis of lower gastrointestinal system diseases. In addition, taking tissue samples for pathological studies and endoscopic treatment of some diseases are another advantage of colonoscopy. Colonoscopy indications; It is divided into three as diagnostic, follow-up and therapeutic (**Table 2**).

#### 5.1 Diagnostic colonoscopy

##### 5.1.1 *Diagnosis of colorectal polyps and cancer*

Polyps appear as protrusions of the colon mucosa. Polyps detected during colonoscopy are defined as pedunculated, sessile, flat and depressed. Localization, external structure, size of the detected cancers, whether they prevent the passage of the device or not should be specified [26–28].

Diagnostic	Follow-up	Therapeutic
Colorectal polyps/cancer	Polyyps	Foreign body
Rectal bleeding	After colorectal cancer resection	Anastomotic strictures
Chronic diarrhea	Dysplasia	Hemostasis in colorectal bleeding
Iron deficiency anemia	Families with FAP	Endoscopic resections
Changes in bowel habits/ abdominal pain		Volvulus detorsion
Colitis/IBD		Bridging obstructive tumors
Radiological abnormal findings		Polypectomy
Digestive system symptoms		

*FAP: Familial adenomatous polyposis, IBD: Inflammatory bowel disease.*

**Table 2.**

*Lower gastrointestinal system endoscopy indications.*

### 5.1.2 Rectal bleeding

Melena is generally an indication for gastroscopy, but colonoscopy should be performed if the gastroscopy was nondiagnostic. Hematochezia is usually caused by a lower GI lesion and is often an indication for colonoscopy [29].

### 5.1.3 Chronic diarrhea

A biopsy by colonoscopy in patients with chronic diarrhea is valuable for the diagnosis of inflammatory diseases and colorectal neoplasia [30].

### 5.1.4 Iron deficiency anemia

Asymptomatic colonic and gastric carcinoma may present with Iron deficiency anemia. Therefore, colonoscopy should be performed together with gastroscopy in patients with iron deficiency anemia. [31].

### 5.1.5 Change In bowel habits, unexplained abdominal pain

Especially in young patients, colonoscopy can be performed to evaluate suspected irritable bowel syndrome if there is abdominal pain and changes in bowel habits [32].

### 5.1.6 Diagnosis of ulcerative colitis, Crohn's disease, ischemic colitis or other colitis

Colitis can be diagnosed by the characteristic and distribution of lesions or by colonoscopic biopsies. In colitis, ileum cannulation is recommended [33].



### *5.1.7 Radiologically determined tumor, stenosis, ulcer, diagnosis of lesions such as obstruction*

Colonic abnormalities such as colon polyps, mass, focal wall thickening or stenosis identified by X-ray (barium enema) or abdominal computed tomography should be evaluated by colonoscopy [34].

### *5.1.8 Explaining the findings of patients with digestive system symptoms (such as anorexia, fatigue, weight loss)*

Colonoscopy should be performed to explain the findings of especially elderly patients (>50) with digestive system symptoms [35].

## **5.2 Follow-up colonoscopy**

### *5.2.1 Surveillance of colorectal polyps*

Patients with 1–4 < 10 mm adenomas with low-grade dysplasia or serrated polyps <10 mm without dysplasia, regardless of villous components, do not require endoscopic surveillance. Surveillance colonoscopy is recommended after 3 years for patients with at least 1 adenoma  $\geq$ 10 mm or high-grade dysplasia or  $\geq$  5 adenomas or any serrated polyp  $\geq$ 10 mm or dysplasia. If there is a partial endoscopic resection of polyps  $\geq$ 20 mm, early repeat colonoscopy should be performed at a 3–6 months [36].

### *5.2.2 Recurrent tumor follow-up after colorectal cancer resection*

The first surveillance colonoscopies of patients who have undergone curative resection for colorectal cancer should be scheduled 1 year after surgery. If no neoplastic lesion is detected after the first surveillance colonoscopy following CRC surgery, it would be appropriate to perform the second colonoscopy 3 years later and the third colonoscopy 5 years after the second [37].

### *5.2.3 Dysplasia follow-up of long-standing ulcerative colitis or Crohn's colitis*

Patients with ulcerative colitis or chron colitis whose dysplastic lesions have been completely removed should have endoscopic surveillance at 1 to 6 months and 12 months, and then annual surveillance [38].

### *5.2.4 Follow-up of families with familial adenomatous polyposis*

Colonoscopy surveillance should be planned from the age of 12–14 years in asymptomatic individuals with familial adenomatous polyposis. In patients with familial adenomatous polyposis with an intact colon, colonoscopy surveillance should be performed every 1–2 years, depending on the polyp load [39].

## **5.3 Therapeutic colonoscopy**

### *5.3.1 Foreign body removal*

Foreign body can be removed from the colon utilizing baskets, snares, or biopsy forceps.

### 5.3.2 Expansion of anastomotic strictures

Balloon dilatation, endoscopic stenosis or stent placement can be performed endoscopically in anastomotic strictures after colorectal surgery [40].

### 5.3.3 Hemostasis in colorectal bleeding (ulcer, tumor, vascular anomaly, varicose veins, polyps, hemorrhoids)

Lower gastrointestinal bleeding can be treated colonoscopically with electrocoagulation, argon plasma coagulation, injection or band ligation [41].

### 5.3.4 Endoscopic resections (endoscopic mucosal resection (EMR), endoscopic submucosal dissection (ESD))

Colonic and rectal superficial lesions can be removed curatively by EMR. ESD can be considered for the removal of colon and rectal lesions with a high suspicion of submucosal invasion [42].

### 5.3.5 Volvulus Detorsion

For patients with uncomplicated sigmoid volvulus the first method of treatment is colonoscopic detorsion and placement of a decompression tube should be considered to prevent repeat volvulus [43].

### 5.3.6 Bridging obstructive tumors

Colonic stenting may be considered in patients with clinical symptoms and radiological signs of malignant large bowel obstruction and without signs of perforation. Stenting is an alternative way to emergency surgery as a bridge [44].

### 5.3.7 Polypectomies

Cold snare polypectomy is preferred for the removal of small polyps (size  $\leq 5$  mm) and sessile polyps (6–9 mm). When removing sessile polyps larger than 1 cm, submucosal injection can be done due to the risk of thermal injury. It would be appropriate to perform a hot snare polypectomy for pedunculated polyps [45].

The chapter is aimed to review the indications of upper and lower gastrointestinal system endoscopy. The title is “Upper and Lower Gastrointestinal System Endoscopy Indications”. Indications for upper gastrointestinal endoscopy (gastroscopy) have increased with the widespread use of flexible endoscopes. Indications for gastroscopy are examined as diagnosis, control, and treatment. In addition, colonoscopy has largely replaced radiological methods in the diagnosis of lower gastrointestinal system diseases. Additionally, taking tissue samples for pathological studies and endoscopic treatment of some diseases are another advantage of colonoscopy. Indications for colonoscopy are examined as diagnosis, control, and treatment. The authors summarize the indications of upper gastrointestinal system endoscopy including diagnostic gastroscopy, control gastroscopy, and the treatment of gastroscopy as well as the indications of lower gastrointestinal system endoscopy (colonoscopy) including diagnostic colonoscopy, control colonoscopy, and the treatment of colonoscopy.

## **6. Conclusion**

In conclusion, endoscopy has a broad range of indications. It is used to confirm or exclude a particular diagnosis in patients with gastrointestinal complaints, to monitor the progression of a known disease, and for staging in patients with a systemic disease.

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