Upper Gastrointestinal Endoscopy

Number: 0738

Policy

*Please see amendment for Pennsylvania Medicaid at the end of this CPB.

I. Aetna considers esophagogastroduodenoscopy (EGD)/upper endoscopy medically necessary for high-risk screening in any of the following:

A. Persons with chronic (5 years or more) gastro-esophageal reflux disease (GERD) at risk for Barrett's esophagus (BE).
   (Note: After a negative screening EGD, further screening EGD is not indicated).
B. Persons with symptomatic pernicious anemia (e.g., anemia, fatigue, pallor, red tongue, shortness of breath, as well as tingling and numbness in the hands and feet) to identify prevalent lesions (e.g., carcinoid tumors, gastric cancer).
C. Persons with cirrhosis and portal hypertension but no prior variceal hemorrhage, especially those with platelet counts less than 140,000/mm3, or Child's class B or C disease.

Policy History

Last Review 08/10/2017
Next Review: 08/09/2018

Review History

Definitions

Additional Information

Clinical Policy Bulletin Notes
II. Aetna considers *diagnostic* EGD medically necessary in any of the following:

A. Evaluation of upper abdominal symptoms that persist despite an appropriate trial of therapy.

B. Evaluation of upper abdominal symptoms associated with other symptoms or signs suggesting serious organic disease (e.g., anorexia and weight loss) or in persons over 45 years of age.

C. Evaluation of dysphagia or odynophagia.

D. Evaluation of esophageal reflux symptoms that are persistent or recurrent despite appropriate therapy.

E. Evaluation of esophageal masses and for directing biopsies for diagnosing esophageal cancer.

F. Evaluation of persons with signs or symptoms of loco-regional recurrence after resection of esophageal cancer.

G. Evaluation of persistent vomiting of unknown cause.

H. Evaluation of other diseases in which the presence of upper gastro-intestinal (GI) pathological conditions might modify other planned management (e.g., persons who have a history of ulcer or GI bleeding who are scheduled for organ transplantation, long-term anti-coagulation, or long-term non-steroidal anti-inflammatory drug therapy for arthritis, and those with cancer of the head and neck).

I. Evaluation of familial adenomatous polyposis syndromes.

J. Confirmation and specific histological diagnosis of radiologically demonstrated lesions:

1. Gastric or esophageal ulcer
2. Suspected neoplastic lesion
3. Upper GI tract stricture or obstruction

K. Evaluation of GI bleeding:

1. For persons with active or recent bleeding
2. For presumed chronic blood loss and for iron deficiency anemia when the clinical situation suggests an upper GI source or when colonoscopy results are negative

L. Sampling of upper GI tissue or fluid.

M. Evaluation of persons with suspected portal hypertension to document or treat esophageal varices.
N. Evaluation of acute injury after caustic ingestion.
O. Evaluation of dyspepsia when any of the following is present:
   1. Chronic GI bleeding
   2. Epigastric mass
   3. Iron deficiency anemia
   4. Persistent vomiting
   5. Progressive difficulty swallowing
   6. Progressive unintentional weight loss
   7. Suspicious barium meal (upper GI series)

P. Diagnosis of irritable bowel syndrome when other studies (e.g., colonoscopy, enteroscopy, ileoscopy, capsule endoscopy, and flexible sigmoidoscopy) have negative results.
Q. Differentiation of Crohn's disease from ulcerative colitis in indeterminate colitis.

III. Aetna considers therapeutic EGD medically necessary in any of the following:

A. Banding or sclerotherapy of varices.
B. Dilation of stenotic lesions (e.g., with trans-endoscopic balloon dilators or dilation systems using guide wires).
C. Management of achalasia by means of botulinum toxin, balloon dilation.
D. Palliative treatment of stenosing neoplasms by means of laser, multi-polar electrocoagulation, stent placement.
E. Placement of feeding or drainage tubes (peroral, trans-nasal, percutaneous endoscopic gastrostomy, percutaneous endoscopic jejunostomy).
F. Removal of foreign bodies or selected polypoid lesions.
G. Treatment of bleeding lesions such as ulcers, tumors, and vascular abnormalities by means of electrocoagulation, heater probe, laser photocoagulation, or injection therapy.

IV. Aetna considers sequential or periodic EGD medically necessary in any of the following:

A. Surveillance of persons with BE without dysplasia. For persons with established BE of any length and with no
dysplasia, after 2 consecutive examinations within 1 year, an acceptable interval for additional surveillance is every 3 years.

B. Surveillance of persons with BE and low-grade dysplasia (LGD) at 6 months. If LGD is confirmed, then surveillance at 12 months and yearly thereafter as long as dysplasia persists.

C. Surveillance of persons with BE and high-grade dysplasia every 3 months for at least 1 year. After 1 year of no cancer detection, the interval of surveillance may be lengthened if there are no dysplastic changes on 2 subsequent endoscopies performed at 3-month intervals.

D. Surveillance of persons with a severe caustic esophageal injury every 1 to 3 years beginning 15 to 20 years after the injury.

E. Surveillance of persons with tylosis every 1 to 3 years beginning at 30 years of age.

F. Surveillance of recurrence of adenomatous polyps in synchronous and metachronous sites at 3- to 5-year intervals.

G. Surveillance of persons with familial adenomatous polyposis starting around the time of colectomy or after age of 30 years.

H. Surveillance of persons with hereditary non-polyposis colorectal cancer.

V. Aetna considers EGD (screening, diagnostic, therapeutic, or sequential/periodic) experimental and investigational for any of the following because its effectiveness for these indications has not been established:

A. EGD before bariatric surgery in asymptomatic individuals
B. EGD for confirming placement of gastric band
C. EGD for diagnosing laryngopharyngeal reflux
D. EGD for routine screening.
E. Evaluation of symptoms that are considered functional in origin. (There are exceptions in which an EGD may be done once to rule out organic disease, especially if symptoms are unresponsive to therapy).
F. Evaluation of metastatic adenocarcinoma of unknown primary site when the results will not alter management.

G. Repeat EGD for persons with a prior normal EGD if symptoms remain unchanged.

H. Routine evaluation of abdominal pain in children (i.e., without other signs and symptoms suggestive of serious organic disease).

I. Evaluation of radiographical findings of:

1. Asymptomatic or uncomplicated sliding hiatal hernia
2. Deformed duodenal bulb when symptoms are absent or respond adequately to ulcer therapy
3. Uncomplicated duodenal ulcer that has responded to therapy

J. Surveillance for malignancy in persons with gastric atrophy, pernicious anemia, or prior gastric operations for benign disease (e.g., partial gastrectomy for peptic ulcer disease).

K. Surveillance of healed benign disease (e.g., esophagitis or duodenal/gastric ulcer).

L. Surveillance during repeated dilations of benign strictures unless there is a change in status.

M. Surveillance of persons with achalasia.

N. Surveillance of persons with previous aerodigestive squamous cell cancer.

O. Surveillance of persons with gastric intestinal metaplasia.

P. Surveillance of persons following adequate sampling or removal of non-dysplastic gastric polyps.

VI. Aetna considers endoscopic functional luminal imaging probe (EndoFLIP) (impedance planimetry) experimental and investigational for the management of the following (not an all-inclusive list):

- Achalasia
- Dysphagia
- Esophagitis
- Esophagogastric junction outflow obstruction
Fecal incontinence
Gastro-esophageal reflux disease (GERD)
Gastroparesis
Upper gastro-intestinal tract stenosis

See also CPB 0396 - Gastrointestinal Function: Selected Tests, CPB 0588 - Capsule Endoscopy, CPB 0616 - Gastrointestinal Manometry, CPB 0625 - Dysphagia Therapy, and CPB 0667 - Esophageal and Airway pH Monitoring.

Background
Esophagogastroduodenoscopy (EGD), also known as upper gastro-intestinal (GI) endoscopy, upper endoscopy, or gastroscopy, refers to examination of the esophagus, stomach, and upper duodenum (first part of the small intestine) by means of a flexible fiber-optic endoscope. It has been employed for investigating the cause(s) of abdominal pain, dysphagia (difficulty swallowing), gastro-esophageal reflux disease (GERD), hematemesis (vomiting up blood), persistent nausea and vomiting, as well as occult and obscure GI bleeding. It has also been used in diagnosing esophagitis (inflammation of the esophagus), Schatzki's ring (also known as esophagogastric ring and lower esophageal ring), Mallory-Weiss syndrome (tear in the mucous membrane where the esophagus connects to the stomach), gastritis (inflammation of the stomach), duodenitis (inflammation of the duodenum), GI ulcer and polyps (growth of tissue), diverticula (abnormal pouches in the lining of the intestines), as well as obstruction, stricture (abnormal narrowing), and tumors of the esophagus, stomach, and upper duodenum.

According to the American Gastroenterological Association's (2000) medical position statement on evaluation and management of occult and obscure GI bleeding, occult GI bleeding refers to the initial presentation of a positive fecal occult blood test (FOBT) result and/or iron-deficiency anemia (IDA), with no evidence of passing fecal blood visible to the patient or physician; while obscure GI bleeding is defined as bleeding of unknown origin that persists or recurs (i.e., recurrent or
persistent IDA, FOBT positivity, or visible bleeding) after a negative initial or primary endoscopy (colonoscopy and/or upper endoscopy) result. Thus, obscure GI bleeding can present in 2 forms: (i) obscure-occult, as manifested by recurrent IDA and/or recurrent positive FOBT results, and (ii) obscure-overt, with recurrent passage of visible blood. Upper endoscopy is useful in the management of occult and obscure GI bleeding.

Concha and colleagues (2007) stated that patients with obscure-occult GI bleeding presenting with IDA who have previously undergone upper endoscopy and colonoscopy and who do not respond to iron replacement should undergo a repeat upper endoscopy or enteroscopy and colonoscopy. In obscure-overt GI bleeding, if the patient is not actively bleeding (intermittent melena or hematochezia requiring repeated blood transfusions), a repeat upper endoscopy and colonoscopy is recommended. If negative, push enteroscopy is the next diagnostic step. If negative and if no further bleeding, the patient should undergo wireless capsule endoscopy.

The American Society for Gastrointestinal Endoscopy (ASGE)’s guideline on the role of endoscopy in the assessment and treatment of esophageal cancer (Jacobson et al, 2003) stated that endoscopy is pivotal in the diagnosis and management of this malignancy. Standard upper endoscopy remains the primary method for visualizing esophageal masses and for directing biopsies. Patients presenting with signs or symptoms of loco-regional recurrence after resection of esophageal cancer should undergo endoscopy as part of their evaluation.

The following recommendations on EGD are provided by the ASGE (Cohen et al, 2006).

Esophagogastrroduodenoscopy is generally indicated for the evaluation of:

I. Upper abdominal symptoms that persist despite an appropriate trial of therapy.
II. Upper abdominal symptoms associated with other symptoms or signs suggesting serious organic disease (e.g., anorexia and
weight loss) or in patients greater than 45 years of age.

III. Dysphagia or odynophagia.

IV. Esophageal reflux symptoms that are persistent or recurrent despite appropriate therapy.

V. Persistent vomiting of unknown cause.

VI. Other diseases in which the presence of upper GI pathological conditions might modify other planned management (e.g., patients who have a history of ulcer or GI bleeding who are scheduled for organ transplantation, long-term anticoagulation, or long-term non-steroidal anti-inflammatory drug therapy for arthritis, and those with cancer of the head and neck).

VII. Familial adenomatous polyposis syndromes.

VIII. For confirmation and specific histological diagnosis of radiologically demonstrated lesions:

   A. Suspected neoplastic lesion
   B. Gastric or esophageal ulcer
   C. Upper tract stricture or obstruction

IX. Gastrointestinal bleeding:

   A. In patients with active or recent bleeding
   B. For presumed chronic blood loss and for IDA when the clinical situation suggests an upper GI source or when colonoscopy results are negative

X. When sampling of tissue or fluid is indicated.

XI. In patients with suspected portal hypertension to document or treat esophageal varices.

XII. To assess acute injury after caustic ingestion.

XIII. Treatment of bleeding lesions such as ulcers, tumors, vascular abnormalities (e.g., electrocoagulation, heater probe, laser photocoagulation, or injection therapy).

XIV. Banding or sclerotherapy of varices.

XV. Removal of foreign bodies.

XVI. Removal of selected polypoid lesions.

XVII. Placement of feeding or drainage tubes (peroral, percutaneous...
endoscopic gastrostomy, percutaneous endoscopic jejunostomy).

XVIII. Dilation of stenotic lesions (e.g., with transendoscopic balloon dilators or dilation systems using guide wires).

XIX. Management of achalasia (e.g., botulinum toxin, balloon dilation).

XX. Palliative treatment of stenosing neoplasms (e.g., laser, multipolar electrocoagulation, stent placement).

Esophagogastroduodenoscopy is generally not indicated for the evaluation of:

I. Symptoms that are considered functional in origin (there are exceptions in which an endoscopic examination may be done once to rule out organic disease, especially if symptoms are unresponsive to therapy).

II. Metastatic adenocarcinoma of unknown primary site when the results will not alter management.

III. Radiographical findings of:

A. Asymptomatic or uncomplicated sliding hiatal hernia
B. Uncomplicated duodenal ulcer that has responded to therapy
C. Deformed duodenal bulb when symptoms are absent or respond adequately to ulcer therapy

Sequential or periodic EGD may be indicated for:

I. Surveillance for malignancy in patients with pre-malignant conditions such as Barrett’s esophagus (a condition that increases the risk for developing esophageal cancer).

Sequential or periodic EGD is generally not indicated for:

I. Surveillance for malignancy in patients with gastric atrophy, pernicious anemia, or prior gastric operations for benign disease.

II. Surveillance of healed benign disease such as esophagitis or gastric or duodenal ulcer.

III. Surveillance during repeated dilations of benign strictures
unless there is a change in status.

The ASGE guideline on the role of endoscopy in the surveillance of pre-malignant conditions of the upper GI tract (Hirota et al, 2006) provided the following recommendations:

- Patients with chronic GERD at risk for Barrett's esophagus should be considered for endoscopic screening (B).
- In patients with Barrett's esophagus without dysplasia, the cost effectiveness of surveillance endoscopy is controversial. If surveillance is performed, an interval of 3 years is acceptable (C).
- Although an increased cancer risk has not been established in patients with Barrett's esophagus and low-grade dysplasia, endoscopy at 6 months and yearly thereafter should be considered (C).
- Patients with Barrett's esophagus with confirmed high-grade dysplasia should be considered for surgery or aggressive endoscopic therapy (B).
- Patients with high-grade dysplasia who elect endoscopic surveillance should be followed up closely (i.e., every 3 months) for at least 1 year. If no further high-grade dysplasia is confirmed, then the interval between follow-ups may be lengthened (B).
- There are insufficient data to recommend routine surveillance for patients with achalasia (C).
- Patients with a severe caustic esophageal injury should undergo surveillance every 1 to 3 years beginning 15 to 20 years after the injury (C).
- Patients with tylosis should undergo surveillance endoscopy every 1 to 3 years beginning at age 30 years (C).
- There are insufficient data to support routine endoscopic surveillance for patients with previous aerodigestive squamous cell cancer (C).
- Adenomatous gastric polyps should be resected because of the risk for malignant transformation (B).
- Adenomatous polyps may recur in synchronous and metachronous sites, and surveillance endoscopies should be performed at 3- to 5-year intervals (C).
- Endoscopic surveillance for gastric intestinal metaplasia has
not been extensively studied in the U.S. and therefore cannot be routinely recommended (C). However, there may be a subgroup of high-risk patients who will benefit from endoscopic surveillance (B).

- Patients with confirmed gastric high-grade dysplasia should be considered for gastrectomy or local resection because of the high incidence of prevalent carcinoma (B).
- Patients with pernicious anemia may be considered for a single screening endoscopy, particularly if symptomatic, but there are insufficient data to recommend ongoing surveillance (C).
- There are insufficient data to support routine endoscopic surveillance in patients with previous partial gastrectomy for peptic ulcer disease (C).
- Patients with familial adenomatous polyposis should undergo regular surveillance endoscopy using both end-viewing and side-viewing endoscopes, starting around the time of colectomy or after age 30 years (B).
- Patients with hereditary non-polyposis colorectal cancer have an increased risk of gastric and small-bowel cancer (B). Surveillance should be strongly considered (C).

Definitions:

A: Prospective controlled trials
B: Observational studies
C: Expert opinion

The North of England Dyspepsia Guideline Development Group (2004) recommended that "[u]rgent specialist referral or endoscopic investigation (to be seen within 2 weeks) is indicated for patients of any age with dyspepsia when presenting with any of the following: chronic gastrointestinal bleeding, progressive unintentional weight loss, progressive difficulty swallowing, persistent vomiting, iron deficiency anaemia, epigastric mass, or suspicious barium meal....Routine endoscopic investigation of patients of any age, presenting with dyspepsia and without alarm signs, is not necessary. However, for patients over 55, when symptoms persist despite Helicobacter pylori (H. pylori) testing and acid suppression therapy, consider endoscopic referral for
any of the following: previous gastric ulcer or surgery; continuing need for NSAID treatment; or raised risk of gastric cancer or anxiety about cancer”.

The ASGE guidelines on the role of endoscopy in the management of variceal hemorrhage (Qureshi et al, 2005) recommended that screening EGD should be performed in patients with established cirrhosis, especially in those with platelet counts less than 140,000/mm$^3$, or Child’s class B or C disease.

The ASGE guideline on the role of endoscopy in the patient with lower GI bleeding (Davila et al, 2005) stated that nasogastric-tube placement and/or upper endoscopy to look for an upper GI source of bleeding should be considered if a source is not identified on colonoscopy, especially if there is a history of upper GI symptoms or anemia.

The ASGE guideline on endoscopy in the diagnosis and treatment of inflammatory bowel disease (IBD) (Leighton et al, 2006) stated that EGD or enteroscopy may be helpful for diagnosing IBD when other studies have negative results and for differentiating Crohn’s disease from ulcerative colitis in indeterminate colitis. (Note: ASGE does not recommend routine EGD in all patients suspected of having Crohn’s disease).

The American College of Gastroenterology’s guidelines for the diagnosis and treatment of GERD (DeVault and Castell, 2005) stated that "[i]f the patient's history is typical for uncomplicated GERD, an initial trial of empirical therapy (including lifestyle modification) is appropriate. Endoscopy at presentation should be considered in patients who have symptoms suggesting complicated disease, those at risk for Barrett’s esophagus ... Endoscopy is the technique of choice used to identify suspected Barrett’s esophagus and to diagnose complications of GERD. Biopsy must be added to confirm the presence of Barrett’s epithelium and to evaluate for dyspepsia".

Dughera et al (2007) noted that GERD is known to cause erosive esophagitis, Barrett’s esophagus (BE), and has been linked to the
development of adenocarcinoma of the esophagus. Currently, endoscopy is the main clinical tool for visualizing esophageal lesions, but the majority of GERD patients do not have endoscopic visible lesions and other methods are required. Ambulatory esophageal pH monitoring is the gold standard in diagnosing GERD, since it measures distal esophageal acid exposure and demonstrates the relationship between symptoms and acid reflux.

According to the University of Michigan Health System's guideline on GERD (2007), no gold standard exists for the diagnosis of this disease. Although pH probe is accepted as the standard with a sensitivity of 85% and specificity of 95%, false positives and false negatives still exist. Endoscopy lacks sensitivity in determining pathological reflux. Barium radiology has limited usefulness in the diagnosis of GERD and is not recommended. Furthermore, if symptoms remain unchanged in a patient with a prior normal endoscopy, repeating endoscopy has no benefit and is not recommended.

In a systemic review on EGD in children with abdominal pain, Thakkar et al (2007) stated that the diagnostic yield of EGD in children with unclear abdominal pain is low; however, existing studies are inadequate. The effect of EGD on change in treatment, quality of life, improvement of abdominal pain, and cost-effectiveness is unknown. The predictors of significant findings are unclear. These findings suggested that a large multi-center study examining clinical factors, biopsy reports, and addressing patient outcomes is needed to further clarify the value of EGD in children with abdominal pain.

Absolute contraindications to EGD include shock, peritonitis, fulminant colitis, perforated viscus (e.g., esophagus, stomach, intestine), severe cardiac decompensation, and acute myocardial infarction (unless active, life-threatening hemorrhage is present). Relative contraindications include an obtunded or uncooperative subject, coma (unless the patient is intubated), and cardiac arrhythmias or recent myocardial ischemia (Merck 2005; Cerulli, 2006).
Kawai et al (2010) reported that ultra-thin trans-nasal EGD (TN-EGD) reduces pharyngeal discomfort and is more tolerable for the patients. Ultra-thin transnasal endoscopy has been reported as inferior to transoral conventional EGD (TO-EGD) in terms of image quality, suction, air insufflation and lens washing, due to the smaller endoscope caliber; TN-EGD should be conducted slowly, with short distance observation, and also with image-enhanced endoscopy. With reference to image-enhanced endoscopy, chromoendoscopy method (indigocarmine) is suitable for gastric neoplasm. On the other hand, optical digital method (NBI) and digital method (i-scan, FICE) is suitable for esophageal neoplasm. TN-EGD is applied in various GI procedures such as percutaneous endoscopic gastrostomy, naso-enteric feeding tube placement, endoscopic retrograde cholangiopancreaticography with naso-biliary drainage, long intestinal tube placement in small bowel obstruction, as well as esophageal manometry.

Zhang and colleagues (2012) evaluated the feasibility and efficacy of small-caliber TN-EGD for the placement of naso-enteric feeding tubes (NET) in patients with severe upper GI diseases. Between January 2007 and March 2010, a total of 51 patients underwent trans-nasal endoscopy for the placement of NET in Peking University Third Hospital. Indications for NET included esophageal stricture or gastric outlet obstruction because of corrosive esophagitis or gastritis, partial obstruction due to malignancy, stenosis in stoma or efferent loop, gastroparesis, metallic stent in upper GI tract, tracheo-esophageal fistula, severe acute pancreatitis, anorexia nervosa and intensive care patients. The tubes were endoscopically placed using the guidewire technique. The position of the tube was confirmed by the immediate second endoscopy or abdominal X-ray. If the initiate placement was incorrect, an adjustment or a 2nd placement was conducted immediately. Initial post-pyloric placement of NET was achieved in 43 of 51 patients (84.3 %), but the total success rate reached 98.0 % (50/51) after the 2nd placement. The time required for the procedure ranged from 10 to 35 mins, with a median time of 20.4 mins. Epistaxis occurred in 2 patients. There were no complications of hemorrhage, perforation or aspiration. The authors concluded that trans-nasal endoscopic placement of NET was feasible in patients with upper GI diseases, especially in
Kwon et al (2011) stated that laryngopharyngeal reflux (LPR) is a subset of GERD and given its own identity, because the main symptomatic regions are the larynx and pharynx. Accurate diagnosis and effective treatment of LPR has been challenging. Much research has been dedicated to the elucidation of its complex pathophysiology and the development of accurate diagnostic modalities and effective treatment.

Vardar and associates (2012) noted that the techniques used in the diagnosis of GERD have insufficient specificity and sensitivity in diagnosing LPR. These investigators evaluated the role of EGD and laryngological examination in the diagnosis of LPR. A total of 684 diagnosed GERD and suspected LPR patients were prospectively scored by the reflux finding score (RFS). A total of 484 patients with GERD who had RFS greater than or equal to 7 were accepted as having LPR; 248 patients with GERD plus LPR on whom an endoscopic examination was performed were evaluated. As a control group, results from 82 patients with GERD who had RFS less than 7 were available for comparison. The GERD symptom score (RSS) was counted according to the existence of symptoms (heartburn/regurgitation) and frequency, duration, and severity. The reflux symptom index (RSI) was also evaluated. The relationship between esophageal endoscopic findings, RSS, RFS and RSI was investigated. Mean age was 46 +/- 12 (19 to 80). The mean values of RSS, RFS, and RSI were 18.9 +/- 7.7, 10 +/- 2.2, 16.6 +/- 11.9, respectively. Erosive esophagitis was detected in 75 cases (30 %). Hiatus hernia was observed in 32 patients (13 %). There was no correlation between RSS and RFS, RSI. The severity of esophagitis did not correlate with the severity of the laryngeal findings. The authors concluded that LPR should be suspected when the history and laryngoscopy findings are suggestive of the diagnosis; and EGD has no role in the diagnosis of LPR.

UpToDate reviews on “Endoscopy in patients who have undergone bariatric surgery” (Huang, 2013) and “Overview of upper gastrointestinal endoscopy (esophagogastroduodenoscopy)” (Greenwald and Cohen, 2013)
do not mention confirmation of gastric band placement as an indication of endoscopy/upper gastrointestinal endoscopy.

De Palma and Forestieri (2014) stated that obesity is an increasingly serious health problem in nearly all Western countries. It represents an important risk factor for several GI diseases, such as GERD, erosive esophagitis, hiatal hernia, BE, esophageal adenocarcinoma, H. pylori infection, colorectal polyps and cancer, non-alcoholic fatty liver disease, cirrhosis, and hepatocellular carcinoma. Surgery is the most effective treatment to date, resulting in sustainable and significant weight loss, along with the resolution of metabolic comorbidities in up to 80% of cases. Many of these conditions can be clinically relevant and have a significant impact on patients undergoing bariatric surgery. There is evidence that the chosen procedure might be changed if specific pathological upper GI findings, such as large hiatal hernia or BE, are detected pre-operatively. The value of a routine endoscopy before bariatric surgery in asymptomatic patients (screening EGD) remains controversial.

Schigt and colleagues (2014) noted that Roux-Y gastric bypass (RYGB) is a frequently used technique in bariatric surgery. Postoperative anatomy is altered by exclusion of the stomach, which makes this organ inaccessible for future EGD. The value of pre-operative assessment of the stomach is unclear. Some institutions choose to investigate the future remnant stomach by EGD, others do not. These investigators quantified the yield of pre-operative EGD in their institution. Patients, planned for primary laparoscopic RYGB (LRYGB) or laparoscopic sleeve gastrectomy from December 2007 until August 2012, were screened by EGD in advance. Results of EGD and patient characteristics were retrospectively analyzed and categorized according to a classification system based on intervention needed. A total of 523 patients (122 males, 401 females, mean age of 44.3 years, average body mass index [BMI] of 46.6) underwent pre-operative EGD. In 257 patients (48.9%) no abnormality was found (group A), 117 patients (17.2%) had abnormalities without treatment consequences (B1), 84 patients (of the 326 tested [comment #1, reviewer #1, 26.8%] were H. pylori positive (B2), in 75 (14.3%) treatment with proton pump
inhibitors was required (B3), 6 (1.1 %) required follow-up EGD before surgery (C). For 1 patient (0.2 %) the operation was canceled because pre-operative EGD presented with Barrett's esophagus with carcinoma (D). When all abnormalities were taken into account, baselines did show a significant difference for age, gender and reflux symptoms. The authors concluded that standard pre-operative assessment by EGD in patients who are planned for bariatric surgery is not indicated. The number needed to screen to find clinically significant abnormalities is high.

Aurora et al (2012) noted that sleeve gastrectomy has become a popular stand-alone bariatric procedure with comparable weight loss and resolution of co-morbidities to that of laparoscopic gastric bypass. The simplicity of the procedure and the decreased long-term risk profile make this surgery more appealing. Nonetheless, the ever present risk of a staple-line leak is still of great concern and needs further investigation. An electronic literature search of MEDLINE database plus manual reference checks of articles published on laparoscopic sleeve gastrectomy for morbid obesity and its complications was completed. Keywords used in the search were "sleeve gastrectomy" OR "gastric sleeve" AND "leak". These researchers analyzed 29 publications, including 4,888 patients. They analyzed the frequency of leak after sleeve gastrectomy and its associated risks of causation. The risk of leak after sleeve gastrectomy in all comers was 2.4 %. This risk was 2.9 % in the super-obese [body mass index (BMI) greater than 50 kg/m(2)] and 2.2 % for BMI less than 50 kg/m(2). Staple height and use of buttressing material did not affect leak rate. The use of a size 40-Fr or greater bougie was associated with a leak rate of 0.6 % compared with those who used smaller sizes whose leak rate was 2.8 %. Leaks were found at the proximal third of the stomach in 89 % of cases. Most leaks were diagnosed after discharge. Endoscopic management is a viable option for leaks and was documented in 11 % of cases as successful. The authors concluded that sleeve gastrectomy has become an important surgical option for the treatment of the ever growing morbidly obese population. The risk of leak is low at 2.4 %. Attention to detail specifically at the esophago-gastric junction cannot be stressed enough. Careful patient selection
(BMI less than 50 kg/m(2)) and adopting the use of a 40-Fr or larger bougie may decrease the risk of leak. Vigilant follow-up during the first 30 days is critical to avoid catastrophe, because most leaks will happen after patient discharge. This study did not mention the use of upper GI endoscopy for detection of leak following sleeve gastrectomy.

Sakran and colleagues (2013) stated that laparoscopic sleeve gastrectomy (LSG) remains under scrutiny as a stand-alone bariatric procedure. The most feared complication after LSG is staple line leak. Eight bariatric centers in Israel participated in this study. A retrospective analysis was performed by querying all the LSG cases performed between June 2006 and June 2010. The data collected included patient demographics, anthropometrics, and operative and peri-operative parameters. Among the 2,834 patients who underwent LSG, 44 (1.5 %) with gastric leaks were identified. Of these 44 patients, 30 (68 %) were women. The patients had a mean age of 41.5 years and a BMI of 45.4 kg/m(2). Intra-operative leak tests and routine post-operative swallow studies were performed with 33 patients, and all but 1 patient (3 %) failed to detect the leaks. Leaks were diagnosed at a median of 7 days post-operatively: early (0 to 2 days) in 9 cases (20 %), intermediately (3 to 14 days) in 32 cases (73 %), and late (greater than 14 days) in 3 cases (7 %). For 38 patients (86 %), there was clinical suspicion, later confirmed by imaging or operative findings. Computed tomography, swallow studies, and methylene blue tests were performed for 37, 21, and 15 patients, respectively, and the results were positive, respectively, for 31 (84 %), 11 (50 %), and 9 (60 %) of these patients. Re-operation was performed for 27 of the patients (61 %). Other treatment methods included percutaneous drainage (n = 28, 63.6 %), endoscopic placement of stents (n = 11, 25 %), clips (n = 1, 2.3 %), and fibrin glue (n = 1, 2.3 %). In 33 of the patients (75 %), the leak site was found in the upper sleeve near the gastro-esophageal junction. The median time to leak closure was 40 days (range of 2 to 270 days), and the overall leak-related mortality rate was 0.14 % (4/2,834). The authors concluded that gastric leak is the most common cause of major morbidity and mortality after LSG. Routine tests to rule out leaks seem to be superfluous. Rather, selective utilization is recommended.
Management options vary, depending mainly on patient disposition. An accepted algorithm for the diagnosis and treatment of gastric leak has yet to be proposed.

Abou Rached et al (2014) noted that gastric sleeve gastrectomy has become a frequent bariatric procedure. Its apparent simplicity hides a number of serious, sometimes fatal, complications. This is more important in the absence of an internationally adopted algorithm for the management of the leaks complicating this operation. The debates exist even regarding the definition of a leak, with several classification systems that can be used to predict the cause of the leak, and also to determine the treatment plan. Causes of leak are classified as mechanical, technical and ischemic causes. After defining the possible causes, the authors went into suggesting a number of preventive measures to decrease the leak rate, including gentle handling of tissues, staple line reinforcement, larger bougie size and routine use of methylene blue test perioperatively. These investigators noticed that the most important clinical sign or symptom in patients with gastric leaks are fever and tachycardia, which mandate the use of an abdominal computed tomography, associated with an upper GI series and/or gastroscopy if no leak was detected. After diagnosis, the management of leak depends mainly on the clinical condition of the patient and the onset time of leak. It varies between prompt surgical intervention in unstable patients and conservative management in stable ones in whom leaks present lately. The management options include also endoscopic interventions with closure techniques or more commonly exclusion techniques with an endoprosthesis. This review did not mention the use of routine upper GI endoscopy for evaluation of leak following sleeve gastrectomy.

Also, the American Association of Clinical Endocrinologists, Obesity Society, American Society for Metabolic & Bariatric Surgery’s clinical practice guidelines on “The perioperative nutritional, metabolic, and nonsurgical support of the bariatric surgery patient” (Mechanick et al, 2013) states that “Clinically significant gastrointestinal symptoms should be evaluated before bariatric surgery with imaging studies, upper gastrointestinal
The American Gastroenterological Association (AGA)'s guideline on “The role of upper gastrointestinal biopsy to evaluate dyspepsia in the adult patient in the absence of visible mucosal lesions” (Yang et al, 2015) stated that “In patients undergoing esophagogastroduodenoscopy (EGD) for dyspepsia as the sole indication, the AGA recommends against obtaining routine biopsies of the normal-appearing esophagus or gastroesophageal (GE) junction regardless of immune status”.

**Pre-Operative Upper Endoscopy Before Bariatric Surgery:**

Bennett et al (2016) noted that the necessity of routine pre-operative EGD before bariatric surgery is controversial. These investigators performed a systematic review and meta-analysis to determine the proportion and scope of clinical findings discovered at pre-operative EGD. They performed a search of Medline, Embase, and Cochrane databases included MeSH terms "bariatric surgery", "endoscopy", and "preoperative". Inclusion criteria were any case series, cohort study, or clinical trial describing results of pre-operative EGD for any bariatric surgery. Exclusion criteria were studies with less than 10 patients, patients less than 18 years of age, or revisional operations. Changes in surgical and medical management and proportions of pathologic findings were extracted and combined in a meta-analysis using the random effects model. Initial search identified 532 citations; 48 were included after full text review. Included studies comprised 12,261 patients with a mean (SD) age of 40.5 (1.3) years and BMI of 46.3 (1.5) kg/m2. The majority of patients (77.1 %) were female. The proportion of EGDs resulting in a change in surgical management was 7.8 %. After removing benign findings with controversial impact on management (hiatal hernia, gastritis, peptic ulcer), this was found to be 0.4 %. Changes in medical management were seen in 27.5 %, but after eliminating H. pylori eradication, this was found to be 2.5 %. The authors concluded that pre-operative EGD in average-risk, asymptomatic bariatric surgery patients should be considered optional, as the proportion of EGDs that resulted in important
changes in management was low.

Parikh et al (2016) stated that there is debate regarding pre-operative EGD in patients undergoing bariatric surgery. Some centers perform EGD routinely in all patients; others perform EGD selectively. These investigators performed a systematic review and meta-analysis of the existing literature to estimate how frequently pre-operative EGD changes management. The review yielded 28 studies encompassing 6,616 patients. Baseline characteristics including age and BMI were included. Patients were grouped based on EGD findings into 2 groups: Group 1 -- findings that did not significantly change management (e.g., mild/moderate duodenitis, Grade A/B esophagitis, mild/moderate gastritis, H. pylori infection, hiatal hernia less than 2 cm); and Group 2 -- findings that delayed, altered, or cancelled surgery (e.g., severe duodenitis, Grade C/D esophagitis, gastric varices, hiatal hernia greater than 2 cm, mass/carcinoma). A general estimating equation (GEE) model accounting for the correlated data within each study was used to calculate confidence intervals (CIs) around the estimate of how frequently surgery was delayed or altered. Mean age was 41.4 ± 2.9 years, the majority was women, and mean pre-operative BMI was 47 ± 3.2 kg/m2. Overall, 92.4 % (n = 6,112) had a normal EGD or findings that did not change clinical management and 7.6 % (n = 504) (95 % confidence interval [CI]: 4.6 to 12.4 %) had findings that delayed/altered surgery. The revised estimate was 20.6 %; 95 % CI: 14.5 to 28.2 %] if all esophagitis (regardless of grade) were categorized into Group 2. The approximate incidence of BE and carcinoma were 0.1 and 0.08 %, respectively. The authors concluded that a selective approach to pre-operative EGD may be considered, based on the patients' symptoms, risk factors, and type of procedure planned.

Endoscopic Functional Luminal Imaging Probe (EndoFLIP) (Impedance Planimetry):

According to Michigan Health Lab, endoluminal functional lumen imaging probe (EndoFLIP; Crospon Ltd, Galway, Ireland) is a new, minimally invasive device created to complement traditional diagnostic tests, such as high resolution esophageal manometry
EndoFLIP uses a balloon mounted on a thin catheter placed trans-orally at the time of a sedated endoscopy. In comparison to the traditional diagnostic tests, EndoFLIP offers the additional capability of measuring the cross-sectional area (CSA) and intra-luminal pressure of the esophagus while under distension (as if a solid bolus was present). The technology uses impedance planimetry to estimate CSA.

http://labblog.uofmhealth.org/health-tech/a-better-view-of-esophagus-dysfunction (http://labblog.uofmhealth.org/health-tech/a-better-view-of-esophagus-dysfunction)

Ilczyszyn and Botha (2014) noted that increased esophago-gastric junction (EGJ) distensibility has been implicated in the development of gastro-esophageal reflux disease (GERD). Previous investigators have reported a reduction in distensibility following anti-reflux surgery, but the changes during the operation are unclear. These researchers determined the feasibility of measuring intra-operative distensibility changes and examined if this would have potential to modify the operation. A total of 17 patients with GERD were managed in a standardized manner consisting of pre-operative assessment with symptom scoring, endoscopy, 24-hour pH studies, and manometry. Patients then underwent laparoscopic Nissen fundoplication with intra-operative distensibility measurement using an EndoFLIP EF-325 functional luminal imaging probe. This device measures CSA and distensibility within a balloon-tipped catheter. This was inflated at the EGJ to fixed distension volumes. Thirty-second median CSA and intra-balloon pressure measurements were recorded at 30 and 40 ml balloon distensions. Measurement time-points were: (i) initially after induction of anesthesia, (ii) after pneumo-peritoneum, (iii) after hiatal mobilization, (iv) after hiatal repair, (v) after fundoplication, and (vi) finally pre-extubation. Post-operatively, patients continued on protocol and were discharged after a 2-night stay tolerating a sloppy diet. Patients with a hiatus hernia on high-resolution manometry had a significantly higher initial EGJ distensibility index (DI) than those without. Hiatus repair and fundoplication resulted in a significant overall reduction in the median DI from the initial to final recordings (30 ml balloon distension reduction of 3.26 mm(2)/mmHg (p = 0.0087), 40 ml balloon distension reduction of
There was also a significant reduction in the DI after pneumo-peritoneum, hiatus repair, and fundoplication at 40 ml balloon distension. Two individual cases in the series high-lighted the utility of the system in potentially changing the operation. After fundoplication, patient 7 recorded a DI of 0.47 mm(2)/mmHg, the lowest in the series, and subsequently required re-operation because of significant symptoms of dysphagia. Patient 12 had a fundoplication that appeared visually too tight and was converted intra-operatively to a Lind 270° wrap resulting in a change in the DI from 0.65 to 0.89 mm(2)/mmHg. Laparoscopic Nissen fundoplication resulted in a significant reduction in the distensibility of the EGJ. The authors concluded that the EndoFLIP system was able to demonstrate significant changes during the operation and may help guide intra-operative modification. Moreover, they stated that larger multi-center studies with long-term follow up are needed to develop a target range of distensibility associated with good outcome.

Familiari et al (2014) noted that per-oral endoscopic myotomy (POEM) has been recently introduced in clinical practice for the treatment of achalasia. The EndoFLIP system uses impedance planimetry for the real-time measurement of the diameter of the EGJ. These researchers prospectively evaluated the effect of POEM on the EGJ using EndoFLIP. All the patients who underwent POEM in a single center between April and July 2013 were enrolled in the study. EndoFLIP was used intra-operatively, immediately before and after POEM. During follow-up, patients underwent esophagogastroduodenoscopy, esophageal pH monitoring and manometry. Clinical outcomes were compared with the diameter of the EGJ after POEM. A total of 23 patients (12 men, mean age of 51.7 years) were enrolled, and 21 underwent POEM successfully. Pre-operative mean basal lower esophageal sphincter pressure was 42.1 mmHg (± 17.6). Before POEM, the mean EGJ diameter and CSA were 6.3 mm (± 1.8) and 32.9 mm2 (± 23.1), respectively. After treatment, the mean diameter and CSA of the EGJ were 11.3 mm (± 1.7 SD) and 102.38 mm2 (± 28.2 SD), respectively. No complications occurred during a mean follow-up of 5 months. Median post-operative Eckardt score was 1; 3 patients (14.3 %) reported heartburn. Follow-up
studies revealed GERD in 57.1 % of patients and esophagitis in 33.3 %. No correlations were observed between the diameter of EGJ after POEM and symptoms relief, GERD incidence and lower esophageal sphincter pressure. The authors concluded that the diameter of EGJ substantially increased after POEM. They stated that EndoFLIP is a reliable method for the intra-operative evaluation of EGJ diameter; however, the real usefulness of this technology after POEM remains controversial. The authors stated that additional studies with follow-up are needed to evaluate the true utility of this system during POEM.

Malik et al (2015) stated that pyloric dysfunction has been associated with gastroparesis, especially diabetic gastroparesis. EndoFLIP uses 16 sensors inside a balloon that is inflated inside a sphincter to evaluate physiologic characteristics. These researchers measured the pressure, diameter, CSA, and distensibility of the pylorus using EndoFLIP in patients with gastroparesis. In addition, the relationship between pyloric pathophysiology with gastroparesis etiology, symptoms, and gastric emptying was assessed. EndoFLIP was performed in 54 patients (39 idiopathic gastroparesis, 15 diabetic gastroparesis). The EndoFLIP catheter was passed endoscopically so that the balloon straddled the pylorus. Pressure, diameter, CSA, and distensibility of the pylorus were measured at 20, 30, 40, and 50 cc balloon volume. Pyloric sphincter contour was seen best at 40 cc balloon distension (diameter 12.2 ± 0.44 mm, CSA 125.2 ± 9.15 mm(2), pressure 18.0 ± 1.23 mmHg, length 1.59 ± 0.34 cm, distensibility 10.7 ± 2.57 mm(2)/mmHg). There was a wide range seen in diameter (5.6 to 22.1 mm) and distensibility (1 to 55 mm(2)/mmHg) of the pylorus. Symptoms of early satiety and post-prandial fullness were inversely correlated with pyloric sphincter diameter and CSA. No significant difference was seen between diabetic and idiopathic gastroparetics. The authors concluded that EndoFLIP is a novel technique that can be used to assess pyloric physiologic characteristics. Early satiety and post-prandial fullness were inversely correlated with diameter and CSA of the pyloric sphincter. No significant differences were seen comparing diabetic and idiopathic gastroparetics. They stated that this technology may be of benefit to help select patients with pyloric sphincter abnormalities.
Smeets et al (2015) examined the value of the EndoFLIP technique in GERD patients treated by transoral incisionless fundoplication (TIF). A total of 42 GERD patients underwent EGJ distensibility measurement before TIF using the EndoFLIP technique. In a subgroup of 25 patients, EndoFLIP measurement was repeated both post-operative and at 6 months follow-up. Treatment outcome was assessed according to esophageal acid exposure time (AET; objective outcome) and symptom scores (clinical outcome) 6 months after TIF. Multiple logistic regression analysis showed that pre-operative EGJ distensibility (odds ratio [OR], 0.16; 95 % CI: 0.03 to 0.78; p = 0.023) and pre-operative AET (OR, 0.62; 95 % CI: 0.42 to 0.90; p = 0.013) were independent predictors for objective treatment outcome but not for clinical outcome after TIF. The best cut-off value for objective outcome was 2.3 mm(2)/mmHg for pre-operative EGJ distensibility and 11 % for pre-operative AET; EGJ distensibility decreased direct post-operative from 2.0 (1.2 to 3.3) to 1.4 (1.0 to 2.2) mm(2)/mmHg (p = 0.014), but increased to 2.2 (1.5 to 3.0) at 6 months follow-up (p = 0.925, compared to pre-operative). The authors concluded that pre-operative EGJ distensibility and pre-operative AET were independent predictors for objective treatment outcome but not for clinical outcome after TIF. They stated that according to these findings, the EndoFLIP technique has no added value either in the pre-operative diagnostic work-up or in the post-procedure evaluation of endoluminal anti-reflux therapy.

Gourcerol et al (2016) noted that anal manometry is the standard technique for evaluating anal sphincter function. However, EndoFLIP can be used to measure sphincter distensibility during volume-controlled distensions. These investigators (i) evaluated anal distensibility in patients with fecal incontinence (FI) and in healthy subjects using the EndoFLIP, and (ii) compared the results with anal pressures measured by 3D high-resolution manometry (3D-HRM) to examine if EndoFLIP was more sensitive and specific for diagnosing FI than 3D-HRM. EndoFLIP and 3D-HRM assessments of 34 female FI patients and 40 healthy female subjects were performed. Anal distensibility was measured as the median CSA at the narrowest point divided by the corresponding intra-bag pressure at rest and during peak voluntary contraction and was expressed in mm(2)/mmHg. A 40-
ml anal DI was selected for further comparisons as it provided the best discrimination between the FI patients and the healthy subjects. The DI was significantly higher in the FI patients than in the healthy subjects at rest ($p = 1.10(-4)$) and during voluntary contraction ($p = 1.10(-4)$). The DI at rest and during voluntary contraction appeared to be more appropriate than anal pressures for discriminating between FI patients and healthy subjects. The authors concluded that the findings of this study confirmed that FI is associated with an abnormally high DI at rest and during voluntary contraction; and the ability of the DI to discriminate between FI patients and healthy subjects was significantly better than anal pressure.

Pitt et al (2017) noted that the EndoFLIP can be used to evaluate dimensions and distensibility of the upper and lower esophageal sphincter. The null hypotheses for this study were that EndoFLIP variables would be stable between anesthetic episodes and would not be affected by body position when evaluating the upper and lower esophageal sphincters in healthy dogs. During each of 3 consecutive general anesthesia episodes administered to 8 healthy adult research colony dogs with a standardized protocol, the EndoFLIP catheter was positioned to measure CSA, intra-bag pressure, upper and lower esophageal sphincter length at 2 different balloon fill volumes (30 and 40 ml) and 2 body positions (lateral and dorsal recumbency). From these measured variables, a DI was also calculated. Mixed effect analysis of variance was used to evaluate the fixed marginal and interaction effects of anesthesia episode, body position, and balloon volume on measured and calculated variables. For the upper esophageal sphincter significant interactions were present between anesthetic episode and body position for all variables except intra-bag pressure; adjusting for body position significant differences were present between anesthetic episodes for all variables except DI; adjusting for anesthetic episode CSA, intra-bag pressure, upper esophageal sphincter length and DI were all affected by body position. For the lower esophageal sphincter DI was the only variable where a significant interaction between anesthesia episode and body position occurred; CSA, intra-bag pressure, and lower esophageal length were not significantly affected by anesthesia episode when adjusting for body position;
DI was the only variable significantly affected by body position. Measurements of the geometry of the lower esophageal sphincter as measured by the EndoFLIP device were consistent under conditions of general anesthesia. Similar measurements taken at the upper esophageal sphincter displayed greater variability between anesthetic episodes and were affected to a greater extent by body position. The authors concluded that body position should be standardized in studies using the EndoFLIP to assess geometric and functional characteristics of the upper and lower esophageal sphincters.

Ata-Lawenko and Lee (2017) stated that gastro-intestinal sphincters play a vital role in gut function and motility by separating the gut into functional segments. Traditionally, function of sphincters including the EGJ is studied using endoscopy and manometry. However, due to its dynamic biomechanical properties, data on distensibility and compliance may provide a more accurate representation of the sphincter function. The EndoFLIP system can provide data on tissue distensibility and geometric changes in the sphincter as measured through resistance to volumetric distention with real-time images. With the advent of EndoFLIP studies, EGJ dysfunction and other disorders of the stomach and bowels may be better evaluated. It may be utilized as a tool in predicting effectiveness of endoscopic and surgical treatments as well as patient outcomes.

Wu and colleagues (2017) noted that chemoradiotherapy for head and neck cancer (HNC) with/without laryngectomy commonly causes dysphagia. Pharyngo-esophageal junction (PEJ) stricturing is an important contributor. These researchers examined the EndoFLIP system as a tool for quantitating pre-treatment PEJ distensibility and treatment-related changes in HNC survivors with dysphagia and assessed the diagnostic accuracy of EndoFLIP-derived distensibility in detecting PEJ strictures. These investigators studied 34 consecutive HNC survivors with long-term (greater than 12 months) dysphagia who underwent endoscopic dilation for suspected strictures; 20 non-dysphagic patients undergoing routine endoscopy served as controls; PEJ distensibility was measured at endoscopy with the
EndoFLIP system pre- and post-dilation. PEJ stricture was defined as the presence of a mucosal tear post-dilation. PEJ stricture was confirmed in 22/34 HNC patients (65%). During distension up to 60 mmHg, the mean EndoFLIP-derived narrowest CSA (nCSA) in HNC patients with strictures, without strictures, and in controls were 58 mm² (95% CI: 22 to 118), 195 mm² (95% CI: 129 to 334), and 227 mm² (95% CI: 168 to 316), respectively. A cut-off of 114 mm² for the nCSA at the PEJ had perfect diagnostic accuracy in detecting strictures (area under the receiver operating characteristic curve = 1). In patients with strictures, a single session of dilation increased the nCSA by 29 mm² (95% CI: 20 to 37; p < 0.001). In patients with no strictures, dilation caused no change in the nCSA (mean difference of 13 mm² [95% CI: -4 to 30]; p = 0.13). The authors concluded that EndoFLIP is a highly accurate technique for the detection of PEJ strictures. They stated that EndoFLIP may complement conventional diagnostic tools in the detection of pharyngeal outflow obstruction.

Commenting on “the AGA Clinical Practice Update: Using FLIP to assess upper GI tract”, Chitnis (2017) states that this approach is still in “murky territory – review authors concluded that more study still needs to be done to ascertain exactly what FLIP is capable of and when it can be used to greatest effect. In addition to evaluating its benefit in patients with GERD, research should focus on how to make data obtained via FLIP easier to interpret and put to use”. [http://www.mdedge.com/familypracticenews/article/130808/gastroenterology/aga-clinical-practice-update-using-flip-assess](http://www.mdedge.com/familypracticenews/article/130808/gastroenterology/aga-clinical-practice-update-using-flip-assess).

Furthermore, there is a clinic trial -- “EndoFLIP Use in Upper GI Tract Stenosis (EndoFLIP)” -- that is currently recruiting subjects (last verified January 2017). [https://clinicaltrials.gov/ct2/show/NCT02354716](https://clinicaltrials.gov/ct2/show/NCT02354716).
Information in the [brackets] below has been added for clarification purposes. Codes requiring a 7th character are represented by "+":

Diagnostic EGD:

CPT codes covered if selection criteria are met:

43200   Esophagoscopy, rigid or flexible; diagnostic, with or without collection of specimen(s) by brushing or washing (separate procedure)
43202   with biopsy, single or multiple
43235   diagnostic, with or without collection of specimen(s) by brushing or washing
43237   with endoscopic ultrasound examination limited to esophagus
43238   with transendoscopic ultrasound-guided intramural or transmural fine needle aspiration/biopsy(s), (includes endoscopic ultrasound examination limited to esophagus)
43239   with biopsy, single or multiple
43242   with transendoscopic ultrasound-guided intramural or transmural fine needle aspiration/biopsy(s) (includes endoscopic ultrasound examination of the esophagus, stomach, and either the duodenum and/or jejunum as appropriate)
43259   with endoscopic ultrasound examination, including the esophagus, stomach, and either the duodenum and/or jejunum as appropriate

High-risk screening:

ICD-10 codes covered if selection criteria are met:

C12 - C13.9   Malignant neoplasm of pyriform sinus and hypopharynx [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
C15.3 - C17.9 Malignant neoplasm of esophagus, stomach, and small intestine [to identify prevalent lesions]
C32.0 - C33   Malignant neoplasm of larynx and trachea [to identify prevalent lesions]
D51.0 Vitamin B12 deficiency anemia due to intrinsic factor deficiency [symptomatic (e.g., anemia, fatigue, pallor, Red tongue, shortness of breath, as well as tingling and numbness of feet)]

K21.9 Gastro-esophageal reflux disease without esophagitis [chronic 5 years or more]

K22.70 - Barrett's esophagus
K22.719

K70.2 Alcoholic fibrosis and sclerosis of liver [with no prior variceal hemorrhage especially with platelet counts less than 140,000/mm\(^3\), or Child's Class B or C disease]

K70.30 - Alcoholic cirrhosis of liver [with no prior variceal hemorrhage especially with platelet counts less than 140,000/mm\(^3\), or Child's Class B or C disease]
K70.31

K74.0 Hepatic fibrosis [with no prior variceal hemorrhage especially with platelet counts less than 140,000/mm\(^3\), or Child's Class B or C disease]

K74.3 - Biliary cirrhosis [with no prior variceal hemorrhage especially with platelet counts less than 140,000/mm\(^3\), or Child's Class B or C disease]
K74.5

K74.60 - Other and unspecified cirrhosis of liver [with no prior variceal hemorrhage especially with platelet counts less than 140,000/mm\(^3\), or Child's Class B or C disease]
K74.69

K76.6 Portal hypertension [with no prior variceal hemorrhage especially with platelet counts less than 140,000/mm\(^3\), or Child's Class B or C disease]

**Diagnostic EGD:**

**ICD-10 codes covered if selection criteria are met:**

C12 - C13.9 Malignant neoplasm of pyriform sinus and hypopharynx [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C15.3 - Malignant neoplasm of esophagus, stomach, and small intestine [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C17.9
C32.0 - C33 Malignant neoplasm of larynx and trachea  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C78.1 Secondary malignant neoplasm of mediastinum  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C78.30 - C78.39 Secondary malignant neoplasm of other and unspecified respiratory organs (trachea)  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C78.4 Secondary malignant neoplasm of small intestine  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C81.01 - C81.03 Nodular lymphocyte predominant Hodgkin lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C81.11 - C81.13 Nodular sclerosis classical Hodgkin lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C81.21 - C81.23 Mixed cellularity classical Hodgkin lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C81.31 - C81.33 Lymphocyte-depleted classical Hodgkin lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C81.41 - C81.43 Lymphocyte-rich classical Hodgkin lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal  
[confirmation and specific histological diagnosis of radiologically demonstrated lesions]
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C81.71</td>
<td>Other classical Hodgkin lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]</td>
</tr>
<tr>
<td>C81.73</td>
<td>Hodgkin lymphoma, unspecified, involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]</td>
</tr>
<tr>
<td>C81.91</td>
<td>Follicular lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]</td>
</tr>
<tr>
<td>C81.93</td>
<td>Small cell B-cell lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]</td>
</tr>
<tr>
<td>C82.01</td>
<td>Mantle cell lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]</td>
</tr>
<tr>
<td>C82.03</td>
<td>Diffuse large B-cell lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]</td>
</tr>
</tbody>
</table>
C83.51 - Lymphoblastic (diffuse) lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C83.71 - Burkitt lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C83.81 - Other non-follicular lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C83.91 - Non-follicular (diffuse) lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C84.01 - Mycosis fungoides involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C84.11 - Sezary disease involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C84.41 - Peripheral T-cell lymphoma, not classified, involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C84.61 - Anaplastic large cell lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C84.81 - Cutaneous T-cell lymphoma, unspecified, involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
C84.21 - Other mature T/NK-cell lymphomas involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C84.91 - Mature T/NK-cell lymphomas, unspecified, involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C85.11 - Unspecified B-cell lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C85.21 - Mediastinal (thymic) large B-cell lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C85.81 - Other specified types of non-Hodgkin lymphoma involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C85.91 - Non-Hodgkin lymphoma, unspecified, involving lymph nodes of head, face, neck, intrathoracic and intra-abdominal [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C86.0 - Other specified types of T/NK-cell lymphoma

C86.2 -

C86.3 -

C88.4 - Extranodal marginal zone B-cell lymphoma of mucosa-associated lymphoid tissue [MALT-lymphoma] [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C91.40 - Hairy cell leukemia [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
C96.0 Multifocal and multisystemic (disseminated)
Langerhans-cell histiocytosis [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C96.2 Malignant mast cell tumor [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C96.a Histiocytic sarcoma [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C96.z Other specified malignant neoplasms of lymphoid, hematopoietic and related tissue [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

C96.9 Malignant neoplasm of lymphoid, hematopoietic and related tissue, unspecified [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

D12.0 - D12.6 Benign neoplasm of colon [familial adenomatous polyposis syndromes]

D13.0 - D13.39 Benign neoplasm of esophagus, stomach, duodenum and of other and unspecified parts of small intestine [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

D37.8 - D37.9 Neoplasm of uncertain behavior of other specified and unspecified digestive organs [esophageal masses] [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

D50.0 - D50.9 Iron deficiency anemia [when the clinical situation suggests an upper GI source or when colonoscopy results are negative]

D62 Acute posthemorrhagic anemia
I69.091  Dysphagia, sequelae of cerebrovascular disease
I69.191
I69.291
I69.391
I69.891
I69.991
I85.00 -  Esophageal varices
I85.11
J86.0  Pyothorax with fistula [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
K20.0 -  Esophagitis [persistent or recurrent despite therapy]
K20.0 -  Esophagitis [persistent or recurrent despite therapy]
K21.0  Esophagitis [persistent or recurrent despite therapy]
K21.9  Gastro-esophageal reflux disease without esophagitis [persistent or recurrent despite therapy]
K22.10 -  Ulcer of esophagus [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
K22.11  Ulcer of esophagus [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
K22.2  Esophageal obstruction [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
K22.3  Perforation of esophagus [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
K22.4  Dyskinesia of esophagus [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
K22.5  Diverticulum of esophagus, acquired [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
K22.6  Gastro-esophageal laceration-hemorrhage syndrome [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
K22.70 -  Barrett's esophagus
K22.719
K22.8 Other specified diseases of esophagus [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

K25.0 - K25.9 Gastric ulcer [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

K26.0 - K26.9 Duodenal ulcer [confirmation and specific histological diagnosis of radiologically demonstrated lesions] [complicated that has not responded to therapy]

K27.0 - K27.9 Peptic ulcer, site unspecified [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

K28.0 - K28.9 Gastrojejunal ulcer [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

K30 Functional dyspepsia [with chronic GI bleeding, progressive unintentional weight loss, progressive difficulty swallowing, persistent vomiting, iron deficiency anemia, epigastric mass, or suspicious barium meal (upper GI series)]

K31.7 Polyp of stomach and duodenum [confirmation and specific histological diagnosis of radiologically demonstrated lesions]

K50.00 - K50.919 Crohn's disease [regional enteritis] [differentiation of Crohn's disease from ulcerative colitis in indeterminate colitis]

K51.00 - K51.919 Ulcerative colitis [differentiation of Crohn's disease from ulcerative colitis in indeterminate colitis]

K58.0 - K58.9 Irritable bowel syndrome [when other studies (e.g., colonoscopy, enteroscopy, ileoscopy, capsule endoscopy, and flexible sigmoidoscopy) have negative results]

K63.5 Polyp of colon [familial adenomatous polyposis syndromes]

K76.6 Portal hypertension [with no prior variceal hemorrhage]
K92.0 - Hematemesis, melena and unspecified gastrointestinal hemorrhage [active or recent]
K92.2
Q26.5 Anomalous portal venous connection [bleeding]
Q26.6 Portal vein-hepatic artery fistula [bleeding]
Q27.33 Arteriovenous malformation of digestive system vessel [bleeding]
Q27.8 Other specified congenital malformations of peripheral vascular system [bleeding]
Q39.0 - Congenital malformations of esophagus
Q39.9
Q40.2 - Other specified and unspecified congenital malformations of stomach
Q40.3
R10.11 - Pain localized to upper abdomen, right and left upper quadrant [associated with other symptoms or signs suggesting serious organic disease (e.g., anorexia and weight loss) or in persons over 45 years of age]
R10.12
R10.13 Epigastric and periumbilical pain [associated with other symptoms or signs suggesting serious organic disease (e.g., anorexia and weight loss) or in persons over 45 years of age]
R10.14
R11.10 Vomiting, unspecified [of unknown cause]
R13.0 - Aphagia and dysphagia
R13.19
R93.3 Abnormal findings on diagnostic imaging of other parts of digestive tract [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
R93.5 Abnormal findings on diagnostic imaging of other abdominal regions, including retroperitoneum [confirmation and specific histological diagnosis of radiologically demonstrated lesions]
T28.1xx+ Burn and corrosion of esophagus [from chemical agents]
T28.6xx+
T54.0x1+ - Toxic effect of corrosive substances [acute injury after caustic ingestion]
T54.94x+
T57.1x1+   Toxic effect of phosphorus and its compounds [acute
T57.1x4+   injury after caustic ingestion]

**ICD-10 codes not covered for indications listed in the CPB:**

E66.01 -   Obesity
E66.02

Z01.818   Encounter for other preprocedural examination
[esophagastroduodenoscopy before bariatric surgery]

Z98.84   Bariatric surgery status

Z68.35 -   Body mass index [BMI] 35 and above
Z68.45

**Therapeutic EGD:**

**CPT codes covered if selection criteria are met:**

43191 -   Esophagoscopy, rigid, transoral
43196

43197 -   Esophagoscopy, flexible, transnasal
43198

43200 -   Esophagoscopy, flexible, transoral
43232

43233-   Esophagogastroduodenoscopy, flexible, transoral
43270

**ICD-10 codes covered if selection criteria are met:**

C15.3 -   Malignant neoplasm of esophagus, stomach, and small intestine [palliative treatment of stenosing neoplasms by means of laser, multipolar electrocoagulation, stent placement]

C17.9

D00.1   Carcinoma in situ of esophagus [palliative treatment of stenosing neoplasms by means of laser, multipolar electrocoagulation, stent placement]

D13.0   Benign neoplasm of esophagus

J86.0   Pyothorax with fistula

K21.9   Gastro-esophageal reflux disease without esophagitis [persistent or recurrent despite therapy]

K22.0   Achalasia of cardia [management-not surveillance]

K22.11  Ulcer of esophagus with bleeding
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>K22.2</td>
<td>Esophageal obstruction</td>
</tr>
<tr>
<td>K22.3</td>
<td>Perforation of esophagus</td>
</tr>
<tr>
<td>K22.5</td>
<td>Diverticulum of esophagus, acquired</td>
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<tr>
<td>K22.719</td>
<td></td>
</tr>
<tr>
<td>K22.8</td>
<td>Other specified diseases of esophagus</td>
</tr>
<tr>
<td>K25.0</td>
<td>Gastric, duodenal, peptic and gastrojejunal ulcer</td>
</tr>
<tr>
<td>K28.9</td>
<td></td>
</tr>
<tr>
<td>K29.00</td>
<td>Gastritis and duodenitis</td>
</tr>
<tr>
<td>K29.91</td>
<td></td>
</tr>
<tr>
<td>K44.0</td>
<td>Diaphragmatic hernia with obstruction, without gangrene</td>
</tr>
<tr>
<td>K94.30</td>
<td>Esophagostomy complications</td>
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<tr>
<td>K94.31</td>
<td></td>
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<td>K94.33</td>
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<td>Q39.9</td>
<td></td>
</tr>
<tr>
<td>Q40.2</td>
<td>Other specified and unspecified congenital malformations of stomach</td>
</tr>
<tr>
<td>Q40.3</td>
<td></td>
</tr>
<tr>
<td>S27.812+</td>
<td>Injury of esophagus (thoracic part)</td>
</tr>
<tr>
<td>S27.819+</td>
<td></td>
</tr>
<tr>
<td>S27.813+</td>
<td>Laceration of esophagus (thoracic part) with open wound into cavity</td>
</tr>
<tr>
<td>[S21.301+</td>
<td>also required]</td>
</tr>
</tbody>
</table>
T18.100+ - Foreign body in esophagus and stomach
T18.2xx+

T18.8xx+ - Foreign body in other and unspecified parts of alimentary tract
T18.9xx+

T28.1xx+ - Burn and corrosion of esophagus
T28.6xx+

T54.0x1+ - Toxic effect of corrosive substances
T54.94x+

T57.1x1+ - Toxic effect of phosphorus and its compounds
T57.1x4+

**Sequential or periodic EGD:**

**ICD-10 codes covered if selection criteria are met:**

Numerous Late effect of burns of other specified sites [severe caustic esophageal injury every 1-3 years beginning 15 to 20 years after injury]
Numerous Late effect of internal injury to chest [severe caustic esophageal injury every 1-3 years beginning 15 to 20 years after injury]
Numerous Late effect of toxic effect of nonmedical substances [severe caustic esophageal injury every 1-3 years beginning 15 to 20 years after injury]

C19 Malignant neoplasm of rectosigmoid junction
D12.0 - Benign neoplasm of colon [familial adenomatous polyposis syndromes]
D12.6
D13.0 Benign neoplasm of esophagus
K22.70 - Barrett's esophagus
K22.719

K22.8 Other specified diseases of esophagus [tylosis every 1 to 3 years beginning at 30 years of age]

K63.5 Polyp of colon [familial adenomatous polyposis syndromes]
Z85.020 - Personal history of malignant neoplasm of stomach
Z85.028
Z86.010 Personal history of colonic polyps
Z86.19 Personal history of other diseases of the digestive system
Z87.11 - Personal history of diseases of the digestive system
Z87.19

ICD-10 codes not covered for indications listed in the CPB:

C78.80 - Secondary malignant neoplasm of other and unspecified digestive organs [evaluation of adenocarcinoma of unknown primary site when the results will not alter management]
C78.89
D51.0 Vitamin B12 deficiency anemia due to intrinsic factor deficiency [surveillance for malignancy]
K22.0 Achalasia of cardia [surveillance]
K22.4 Dyskinesia of esophagus [functional in origin]
K26.0 - Duodenal ulcer [uncomplicated that has responded to therapy]
K26.9
K31.89 Other diseases of stomach and duodenum [gastric atrophy] [gastric intestinal metaplasia]
K44.9 Diaphragmatic hernia without obstruction or gangrene [asymptomatic or uncomplicated]
Q40.1 Congenital hiatus hernia [asymptomatic or uncomplicated]
Q43.4 - Other congenital malformations of intestine
Q43.9 [deformed duodenal bulb]
R10.0 - Abdominal pain [routine evaluation in children without other signs and symptoms suggestive of serious organic disease]
R10.13
R10.30 -
R10.33
R10.84
R68.89 Other general symptoms and signs
Z00.00 - Encounter for general examination without complaint
Z00.01 Z00.5 suspected or reported diagnosis [diagnosis]
- Z00.6 Z00.8

Z02.1
Z02.3 Encounter for administrative examination [diagnosis]
Z02.81
Z02.83 -
Z02.89

Z04.6 Encounter for general psychiatric examination, requested by authority [diagnosis]

Z12.10 - Encounter for screening for malignant neoplasm of intestinal tract [without diagnosis]
Z12.11
Z12.13
Z12.89 Encounter for screening for malignant neoplasm of other sites [without diagnosis]
Z13.89 Encounter for screening for other disorder [without diagnosis]
Z13.89 Encounter for screening, unspecified [without diagnosis]

Z15.09 Genetic susceptibility to other malignant neoplasm [without diagnosis]

Z85.01 Personal history of malignant neoplasm of esophagus [surveillance of persons with previous aerodigestive squamous cell cancer]

Z86.010 Personal history of colonic polyps [healed benign disease]
Z86.19 Personal history of other diseases of the digestive system [healed benign disease]

Z87.11 - Personal history of diseases of the digestive system [healed benign disease]
Z87.19

Z87.821 Personal history of retained foreign body fully removed
The above policy is based on the following references:

8. Cerulli MA. Upper gastrointestinal bleeding. eMedicine Medicine Topic 3565. Omaha, NE; eMedicine.com; updated February 3, 2006. Available at:
http://www.emedicine.com/med/topic3565.htm


17. Pungpapong S, Keaveny A, Raimondo M, et al. Accuracy and interobserver agreement of small-caliber vs. conventional


27. Huang CS. Endoscopy in patients who have undergone


AETNA BETTER HEALTH® OF PENNSYLVANIA

Amendment to
Aetna Clinical Policy Bulletin Number: 0738 Upper Gastrointestinal Endoscopy

There are no amendments for Medicaid.

www.aetnabetterhealth.com/pennsylvania  revised 10/27/2017