Transesophageal Endoscopic Therapies for Gastroesophageal Reflux Disease

Policy # 00123
Original Effective Date: 06/24/2002
Current Effective Date: 02/21/2018

Applies to all products administered or underwritten by Blue Cross and Blue Shield of Louisiana and its subsidiary, HMO Louisiana, Inc.(collectively referred to as the "Company"), unless otherwise provided in the applicable contract. Medical technology is constantly evolving, and we reserve the right to review and update Medical Policy periodically.

Note: Endoscopic Radiofrequency Ablation or Cryoablation for Barrett's Esophagus is addressed separately in medical policy 00261.

Note: Injectable Bulking Agents for the Treatment of Urinary and Fecal Incontinence is addressed separately in medical policy 00095.

Services Are Considered Investigational
Coverage is not available for investigational medical treatments or procedures, drugs, devices or biological products.

Based on review of available data, the Company considers endoscopic submucosal implantation of a prosthesis or injection of a bulking agent (e.g., biocompatible liquid polymer, polymethylmethacrylate [PMMA] beads, zirconium oxide spheres) as a treatment of gastroesophageal reflux disease (GERD) to be **investigational.***

Background/Overview

GASTROESOPHAGEAL REFLUX DISEASE

GERD is a common disorder characterized by heartburn and other symptoms related to reflux of stomach acid into the esophagus. Nearly all individuals experience such symptoms at some point in their lives; a smaller number have chronic symptoms and are at risk for complications of GERD. The prevalence of GERD has been estimated to be 10% to 20% in the Western world, with a lower prevalence in Asia.

Pathophysiology
The pathophysiology of GERD involves excessive exposure to stomach acid, which occurs for several reasons. There can be an incompetent barrier between the esophagus and stomach, either due to dysfunction of the lower esophageal sphincter or incompetence of the diaphragm. Another mechanism is abnormally slow clearance of stomach acid. In this situation, delayed clearance leads to an increased reservoir of stomach acid and a greater tendency to reflux.

In addition to troubling symptoms, some patients will have the more serious disease, which results in complications such as erosive esophagitis, dysphagia, Barrett esophagus, and esophageal carcinoma. Pulmonary complications may result from aspiration of stomach acid into the lungs and can include asthma, pulmonary fibrosis, and bronchitis, or symptoms of chronic hoarseness, cough, and sore throat.

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Treatment
Guidelines on the management of GERD emphasize initial medical management. Weight loss, smoking cessation, head of the bed elevation, and elimination of food triggers are all recommended in recent practice guidelines. Proton pump inhibitors (PPIs) have been shown to be the most effective medical treatment. In a 2010 Cochrane systematic review, PPIs demonstrated superiority to H_2-receptor agonists and prokinetics in both network meta-analyses and direct comparisons.

Surgical Treatment
The most common surgical procedure used for GERD is laparoscopic Nissen fundoplication. Fundoplication involves wrapping a portion of the gastric fundus around the distal esophagus to increase lower esophageal sphincter pressure. If a hiatal hernia is present, the procedure also restores the position of the lower esophageal sphincter to the correct location. Laparoscopic fundoplication was introduced in 1991 and has been rapidly adopted because it avoids complications associated with an open procedure.

Although fundoplication results in a high proportion of patients reporting symptom relief, complications can occur, and sometimes require conversion to an open procedure. Patients who have relief of symptoms of GERD after fundoplication may have dysphagia or gas-bloat syndrome (excessive gastrointestinal gas).

Other Treatment Options
Due in part to the high prevalence of GERD, there has been interest in creating a minimally invasive transesophageal therapeutic alternative to open or laparoscopic fundoplication or chronic medical therapy. This type of procedure may be considered natural orifice transluminal surgery. Three types of procedures have been investigated.

1. Transesophageal endoscopic gastroplasty (gastroplication, transoral incisionless fundoplication) can be performed as an outpatient procedure. During this procedure, the fundus of the stomach is folded and then held in place with staples or fasteners that are deployed by the device. The endoscopic procedure is designed to recreate a valve and barrier to reflux.
2. Radiofrequency energy has been used to produce submucosal thermal lesions at the gastroesophageal junction. (This technique has also been referred to as the Stretta procedure.) Specifically, radiofrequency energy is applied through 4 electrodes inserted into the esophageal wall at multiple sites both above and below the squamocolumnar junction. The mechanism of action of the thermal lesions is not precisely known but may be related to ablation of the nerve pathways responsible for sphincter relaxation or may induce a tissue-tightening effect related to heat-induced collagen contraction and fibrosis.
3. Submucosal injection or implantation of a prosthetic or bulking agent to enhance the volume of the lower esophageal sphincter has also been investigated.

One bulking agent, pyrolytic carbon-coated zirconium oxide spheres (Durasphere), is being evaluated.

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The Gatekeeper™‡ Reflux Repair System (Medtronic, Shoreview, MN) uses a soft, pliable, expandable prosthesis made of a polyacrylonitrile-based hydrogel. The prosthesis is implanted into the esophageal submucosa, and with time, the prosthesis absorbs water and expands, creating bulk in the region of implantation. U.S. Food and Drug Administration (FDA) product code: DQX.

Endoscopic submucosal implantation of PMMA beads into the lower esophageal folds has also been investigated.

FDA or Other Governmental Regulatory Approval

U.S. Food and Drug Administration (FDA)

In 2007, EsophyX®‡ (EndoGastric Solutions, Redmond, WA) was cleared for marketing by FDA through the 510(k) process for full-thickness plication. In 2016, EsophyX®‡ Z Device with SerosaFuse Fasteners was cleared for marketing by FDA through the 510(k) process (K160960) for use in transoral tissue approximation, full-thickness plication, ligation in the gastrointestinal tract, narrowing the gastroesophageal junction, and reduction of hiatal hernia of 2 cm or less in patients with symptomatic chronic GERD. In June 2017, EsophyX2 HD and the third-generation EsophyX Z Devices with SerosaFuse fasteners and accessories were cleared for marketing by FDA through the 510(k) process (K171307) for expanded indications, including patients who require and respond to pharmacologic therapy and in patients with hiatal hernias larger than 2 cm when a laparoscopic hiatal hernia repair reduces a hernia to 2 cm or less. FDA product code: ODE.

The Medigus SRS Endoscopic Stapling System (MUSE, Medigus) was cleared for marketing by FDA through the 510(k) process in 2012 (K120299) and 2014 (K132151). MUSE is intended for endoscopic placement of surgical staples in the soft tissue of the esophagus and stomach to create anterior partial fundoplication for treatment of symptomatic chronic GERD in patients who require and respond to pharmacologic therapy. FDA product code: ODE.

In 2000, the CSM Stretta®‡ System was cleared for marketing by FDA through the 510(k) process for general use in the electrosurgical coagulation of tissue and was specifically intended for use in the treatment of GERD. Stretta is currently manufactured by Mederi Therapeutics (Greenwich, CT). FDA product code: GEI.

Durasphere®‡ is a bulking agent approved for treatment of urinary and fecal incontinence (see medical policy 00095). Use of this product for esophageal reflux would be considered off-label use. The website of Carbon Medical Technologies states that the Durasphere®‡ GR product is “intended to treat problems associated with GERD” but is considered an investigational device in the United States.

Centers for Medicare and Medicaid Services (CMS)

There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

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Rationale/Source

This evidence review was informed, in part, on a 2003 TEC Assessment of transesophageal endoscopic treatments for GERD and a 2016 Evidence Street Assessment on transoral incisionless fundoplication (TIF). This review addresses procedures currently available for use in the United States.

Evidence reviews assess the clinical evidence to determine whether the use of a technology improves the net health outcome. Broadly defined, health outcomes are length of life, quality of life, and ability to function—including benefits and harms. Every clinical condition has specific outcomes that are important to patients and to managing the course of that condition. Validated outcome measures are necessary to ascertain whether a condition improves or worsens; and whether the magnitude of that change is clinically significant. The net health outcome is balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of a technology, 2 domains are examined: the relevance and the quality and credibility. To be relevant, studies must represent one or more intended clinical use of the technology in the intended population and compare an effective and appropriate alternative at a comparable intensity. For some conditions the alternative will be supportive care or surveillance. The quality and credibility of the evidence depend on study design and conduct, minimizing bias and confounding that can generate incorrect findings. The randomized controlled trial (RCT) is preferred to assess efficacy; however, in some circumstances, nonrandomized studies may be adequate. RCTs are rarely large enough or long enough to capture less common adverse events and long-term effects. Other types of studies can be used for these purposes and to assess generalizability to broader clinical populations and settings of clinical practice.

The Agency for Healthcare Research and Quality published a systematic review on management strategies for GERD in 2005, which was updated in 2011. The 2005 comparative effectiveness review evaluated studies on the EndoCinch Suturing System, Stretta, Enteryx, and the NDO Plicator. The 2011 update of the Agency for Healthcare Research and Quality report excluded Enteryx and the NDO Plicator, because they were no longer available in the United States, and added the EsophyX procedure (endoscopic fundoplication), which was commercialized after the 2005 review. The 2011 report concluded that for the 3 available endoscopic procedures (EndoCinch, Stretta, EsophyX), effectiveness remained substantially uncertain for the long-term management of GERD. All procedures have been associated with complications, including dysphagia, infection/fever, and bloating, although bloating and dsyphagia are also adverse events of laparoscopic fundoplication. A 2015 review of endoscopic treatment of GERD noted that EndoCinch is no longer manufactured.

TRANSORAL INCISIONLESS FUNDOPLICATION (ESOPHYX)

The following discussion examines separately studies for patients whose symptoms are not controlled by PPIs (see Tables 1 to 4) and those whose symptoms are controlled by PPIs (see Tables 5 and 6). For patients whose symptoms are not controlled by PPIs, the optimal comparator would be fundoplication, while the optimal comparator in patients whose symptoms are controlled by PPIs would be continued PPI therapy.

TIF in Patients Whose Symptoms Are Not Controlled by PPIs

Randomized Trials

Two RCTs have evaluated TIF using ExophyX2 in patients with troublesome symptoms despite daily PPI therapy (see Table 1). Hunter et al (2015) compared treatment using TIF plus placebo pills (n=87) with treatment using sham TIF plus PPIs (n=42) in the RESPECT trial. Increases in medication (placebo or PPI depending on treatment group) were allowed at 2 weeks. At 3 months, patients with continued troublesome symptoms were declared early treatment failures, and failed TIF patients were given PPI and failed sham patients were offered TIF. Trad et al (2015) compared TIF (n=40) with maximum PPI therapy (n=23) without a sham procedure in the TEMPO trial. The primary outcome in both trials was the elimination of symptoms, measured in slightly different ways (see Table 1).

In both trials, the primary outcome was achieved by a higher percentage of patients treated with TIF than with PPIs (see Table 2). Elimination of symptoms was reported by 62% to 67% of patients treated by TIF compared with 5% of patients treated with maximum PPIs and 45% of patients who had a sham procedure plus PPIs. In TEMPO, the relative risk of achieving the primary outcome was 12.9 (95% confidence interval [CI], 1.9 to 88.9; p<0.001).

Secondary outcomes for the RESPECT trial showed no significant differences between treatments. Physiologic measurements such as number of reflux episodes, percent total time pH less than 4, and DeMeester score (a composite score of acid exposure based on esophageal monitoring) showed statistically significant differences between groups, but these measurements were performed when off PPIs for 7 days, and the difference in pH between TIF and continued PPI therapy cannot be determined from this trial.

In TEMPO, self-reported troublesome regurgitation was eliminated in 97% (29/30) of TIF patients who were off PPIs. However, the objective measure of esophageal acid exposure did not differ significantly between groups.

Table 1. Characteristics of Randomized Trials Comparing TIF With Medical Management in Patients Whose Symptoms Were Not Controlled on PPIs

Study	TIF:CTL, n	Patient Symptoms or Other Characteristics	Comparator	FU, mo	Principal Clinical Outcome
Hunter et al (2015) (RESPECT)	87:42	• Hiatal hernia ≤2 cm • Troublesome regurgitation[a] not controlled on PPI	Sham + PPI	6	Relief of regurgitation without PPI in TIF group vs PPI escalation in control group
Trad et al (2015) (TEMPO)	40:23	• Hiatal hernia ≤2 cm • Troublesome symptoms not controlled on PPI[b]	Maximum-dose PPI	6	Elimination of daily symptoms other than heartburn

CTL: control; FU: follow-up; PPI: proton pump inhibitor; TIF: transoral incisionless fundoplication.
[a] Troublesome regurgitation was defined as mild symptoms for ≥2 days a week or moderate-to-severe symptoms >1 day a week.
[b] Gastroesophageal reflux disease for >1 year and a history of daily PPI use for >6 months.

Table 2. Summary of Key Results for RCTs Comparing TIF With Medical Management in Patients Whose Symptoms Were Not Controlled on PPIs

Trial (Year)	Elimination of Symptoms[a]	Change in Regurgitation	Change in Heartburn	Reflux Symptoms	Esophageal pH
	Elimination of Troublesome Regurgitation	**Change in RDQ Regurgitation Score**	**Change in RDQ Heartburn Score**	**Change in RDQ Heartburn Plus Regurgitation Score**	
RESPECT (2015)					
TIF + placebo	67% (58/87)	-3	-2.1	-2.5	
Sham + PPI	45% (19/42)	-3	-2.2	-2.4	
p value	0.023	0.072	0.936	0.313	
	Elimination of Symptoms Other Than Heartburn[b]	**Change in GERD-HRQL Score**	**Change in GERD-HRQL Heartburn Score**	**RSI Score**	**Percent Time With pH >4**
TEMPO (2015)					
TIF	62%	-21.1	-14	-17.4	54%
Maximum-dose PPI	5%	-7.6	-5.2	-3.0	52%
RR (95% CI)	-12.9 (1.9-88.9)				
p value	0.001	NR	NR	NR	0.914
Summary					
TIF	62%-67%				

CI: confidence interval; GERD-HRQL: Gastroesophageal Reflux Disease Health-Related Quality of Life; NR: not reported; PPI: proton pump inhibitor; RCT: randomized controlled trial; RDQ: Reflux Disease Questionnaire; RR: relative risk; RSI: Reflux Symptom Index; TIF: transoral incisionless fundoplication.
[a] Primary outcome measure.
[b] Primary outcome measure - composite of 3 gastroesophageal reflux disease symptom scales: the GERD-HRQL, RSI, and RDQ.

In 2017, Trad et al reported 3-year follow-up for patients treated with TIF in the TEMPO trial (see Table 3). All patients in the control group (maximum PPIs) had crossed over to TIF and were included in the follow-up. Symptom scores, esophagastroduodenoscopy, and 48-hour pH monitoring were conducted off PPIs, and the 2 TIF failures who had undergone fundoplication were assigned the worst scores. Of 63 patients treated with TIF, data on PPI use was available for 52 (83%), with 71% of patients reporting a cessation of PPI use. However, completion of the Reflux Disease Questionnaire and assessment of pH normalization were available for less than 65% of patients. pH normalization was available for 40% of available patients following TIF, whereas 90% reported elimination of troublesome regurgitation.

Table 3. Follow-Up of Patients Treated With EsophyX2 in the TEMPO Trial

Outcome Measure	Baseline	1 Year	2 Years	3 Years
Sample size (% of 63)		60 (95%)	55 (87%)	52 (83%)
Elimination of troublesome regurgitation (RDQ)[a]		88% (42/48)	90% (41/44)	90% (37/41)
Elimination of atypical symptoms (RSI ≤13)[a]		82% (45/55)	84% (43/51)	88% (42/48)
GERD-HRQL score	32.8 (/60)	7.1 (/58)	7.3 (/52)	5.0 (/43)
Esophagitis	55% (33/60)	5% (3/59)	10% (5/50)	12% (5/41)
Cessation of PPI use		78% (47/60)	76% (42/55)	71% (37/52)

pH normalization[b]	41% (24/59)	37% (18/49)	40% (16/40)

Adapted from Trad et al (2017).
GERD-HRQL: Gastroesophageal Reflux Disease Health-Related Quality of Life; PPI: proton pump inhibitor; RDQ: Reflux Disease Questionnaire; RSI: Reflux Symptom Index.
[a] Primary outcome: elimination of daily troublesome regurgitation and atypical symptoms as measured with the RDQ and the RSI. Troublesome symptoms are defined as mild symptoms, occurring ≥2 days a week, or moderate-to-severe symptoms, occurring >1 day a week.
[b] Normality was defined as percent of total recorded time pH <4 equal to ≥5.3%.

Studies Comparing TIF With Laparoscopic Fundoplication

Svoboda et al (2011) compared TIF with laparoscopic fundoplication, but more than half of the patients who had TIF did so with a discontinued device, so that the trial results may not generalize to EsophyX. There was no separate analysis of patients undergoing TIF with the EsophyX device, and the results of this trial are not discussed further.

Nonrandomized Studies

Two nonrandomized comparative studies have compared TIF with laparoscopic fundoplication in patients whose symptoms were not controlled on PPIs.

Frazzoni et al (2011) compared 10 patients undergoing TIF with 10 patients undergoing laparoscopic fundoplication with the first-generation EsophyX procedure (see Table 4). The patients selected which treatment they wanted, but the groups were comparable to a baseline. Regarding clinical outcomes assessed at 3 months, 7 patients undergoing TIF reported only partial/no symptom remission vs 0 patients undergoing fundoplication (see Table 4). Mild dysphagia was reported by 2 patients after fundoplication and 1 patient after TIF. Two patients reported epigastric bloating after fundoplication. Several measures of GERD assessed by manometry and impedance-pH monitoring showed greater improvement in the fundoplication group than in the TIF group. This study reported that TIF with the first-generation EsophyX device is less effective than fundoplication in improving symptoms of GERD.

Table 4. Summary of Key Results in Patients Whose Symptoms Were Not Controlled by PPIs

Study (Year)	Percent Partial or No Symptom Remission	Normalization Esophageal Acid Exposure Time	Normalization of Distal Refluxes	Normalization of Proximal Refluxes	Mild Dysphagia	Bloating
Frazzoni et al (2011)						
TIF, %	70	50	20	40	10	0
Fundoplication, %	0	100	90	100	20	20
p value	0.003	0.03	0.005	0.011	NR	NR

NR: not reported; PPI: proton pump inhibitor; TIF: transoral incisionless fundoplication.

A nonrandomized study by Toomey et al (2014) compared 20 patients undergoing TIF, 20 patients undergoing Nissen fundoplication, and 20 patients undergoing Toupet fundoplication. Age, body mass index and preoperative DeMeester score were controlled, however, the indications for each procedure differed. Patients with abnormal esophageal motility underwent Toupet fundoplication, and only patients who had a

hiatal hernia of 2 cm or less were offered TIF. As a result, only 15% of the TIF group had a hiatal hernia vs 65% and 55% of the 2 fundoplication groups, limiting comparison of both treatments. Adverse events were not reported.

Section Summary: Patients Whose Symptoms Are Not Controlled by PPIs

Studies Comparing TIF With Continued PPIs
The evidence on TIF in patients whose symptoms are not controlled by PPIs includes 2 RCTs, one of which followed TIF patients out to 3 years. The highest quality study is the sham-controlled RESPECT trial by Hunter et al (2015). RESPECT found a significantly greater proportion of patients who reported elimination of troublesome regurgitation compared with sham plus PPIs, however, elimination of regurgitation was achieved in only 67% of patients treated with TIF. Also, other symptom measures were no different between the TIF and sham-PPI group. A strong placebo effect of the procedure is suggested by the subjective outcome measures in the sham group, in which 45% of patients whose symptoms were not previously controlled on PPIs reported elimination of troublesome regurgitation. The strong placebo effect suggested by the RESPECT trial raises questions about the validity of the nonblinded TEMPO trial. TEMPO reported a significant improvement in subjective measures with TIF compared to maximum PPI treatment, but there was no significant difference in the objective measure of esophageal acid exposure. At a 3-year follow-up, about twice as many patients reported symptom improvement compared with improvement in the objective measure. It is not clear whether the discrepancy is due to a general lack of correlation between pH and symptoms, or to a placebo effect on the subjective assessment. Together, these data suggest that the most appropriate comparator for patients whose symptoms are not controlled on PPIs is laparoscopic fundoplication.

Studies Comparing TIF With Laparoscopic Fundoplication
Each study comparing TIF with laparoscopic fundoplication has methodologic problems that do not permit conclusions on the comparative efficacy of the 2 procedures. The Frazzoni nonrandomized study showed that TIF is less effective than fundoplication. However, this study was conducted with an earlier device. The Svoboda RCT included patients who underwent the TIF procedure using a different device. In the Toomey study, patients were assigned to different procedures based on specific baseline characteristics. Two of the studies concluded that TIF and fundoplication were similarly effective based on lack of statistically significant differences across symptom outcomes. However, because of the small sizes of these samples, lack of a statistically significant difference in outcomes cannot be interpreted as equivalent outcomes. For these studies, several outcomes favored fundoplication over TIF. The studies did not report adverse events or rates of postoperative symptoms associated with fundoplication (e.g., dysphagia, bloating). Thus, it is not possible to evaluate whether a difference in effectiveness between procedures might be accompanied by a difference in adverse events. Limited data suggest that the first-generation TIF is considerably inferior to laparoscopic fundoplication in patients who have failed PPI therapy, and this treatment is no longer available. Current data are insufficient to determine the risks and benefits of the second-generation TIF procedure compared with laparoscopic fundoplication in patients whose symptoms are not controlled by PPIs.

TIF in Patients Whose Symptoms Are Controlled by PPIs

Randomized Trials

Two published RCTs have evaluated the efficacy of TIF in patients whose symptoms were adequately controlled on PPIs, but who were considering an intervention over lifelong drug dependence (see Table 5). Hakansson et al (2015) compared TIF (n=22) with sham only (n=22). The expected outcome in the sham group was that, without PPIs, GERD symptoms would eventually recur. Witteman et al (2015) compared TIF (n=40) with continued PPI therapy (n=20) without a sham procedure (see Table 5). The objective was to demonstrate that outcomes with TIF were not significantly worse than those with continued PPI therapy.

The primary outcome of the Hakansson trial was treatment failure, defined as the need for resumption of PPIs (see Table 5). The primary outcome of the Witteman trial was treatment success, defined by an improvement of 50% or more on the Gastroesophageal Reflux Disease Health-Related Quality of Life (GERD-HQRL) score.

In Hakansson et al, Kaplan-Meier curves showed a higher rate of treatment failure in the sham group than in the TIF group ($p<0.001$, time to treatment failure), with significantly more patients in the TIF group in remission at 6 months (59%) compared with the sham without PPI group (18%, $p=0.01$). In Witteman et al, PPI therapy was stepped up or down as necessary during follow-up. At 6 months, 55% of TIF patients had more than 50% improvement in subjective GERD symptoms vs 5% of patients on continued PPI therapy (see Table 6). Mean change in GERD symptoms from baseline was consistent with this result (TIF, -14.1; control, -3.1), however, it is uncertain whether the difference between groups was due to a combination of TIF plus PPI, or if the PPI therapy in the control group was at maximum following the step-up protocol.

Secondary outcomes measuring GERD symptoms in Hakansson et al showed results consistent with more favorable outcomes in the TIF group. However, no statistical between-group analysis was reported for these outcomes. Dysphagia, bloating, and flatulence was reported in twice as many patients undergoing TIF (four, four, and two, respectively) compared with sham (two, two, and one, respectively). These results were reported as not statistically different. However, it is unlikely that the trial was powered to detect differences in these outcomes.

Table 5. Characteristics of Randomized Trials of TIF in Patients Whose Symptoms Were Controlled by PPIs

Study	TIF:CTL, n	Patient Symptoms or Other Characteristics	Comparator	FU, mo	Principal Clinical Outcome
Hakansson et al (2015)	22:22	Controlled on PPI, run-in to confirm PPI dependence	Sham only	≥6	Time to resumption of PPI, percent needing PPI at 6 mo
Witteman et al (2015)	40:20	Controlled on PPI	Continued PPI only	6	Mean GERD symptoms, percent with >50% improvement

CTL: control; FU: follow-up; GERD: gastroesophageal reflux disease; PPI: proton pump inhibitor; TIF: transoral incisionless fundoplication.

Table 6. Principal Clinical Outcomes of RCTs Comparing TIF With Nonsurgical Treatment in Patients Whose Symptoms Were Controlled on PPIs

Study (Year)	Days to PPI Resumption	Change in PPI Therapy	Change in Symptoms	Change in QOL	Change in QOL	Esophagitis	Esophageal pH
		Remission at 6 Months	Change in Median GSRS Score	Change in Median QOLRAD Score	Change in Median QOLRAD Score		Percent Time pH <4
Hakansson et al (2015)							
TIF	197	13 (59%)	4	1.5	1.5		3.6%
Sham only	107	4 (18%)	1.4	0.4	0.4		9.8%
p value	0.001	0.01	NR	NR	NR		NR
			Percent >50% Improvement in GERD-HRQL Score	Mean Change in GERD-HRQL Score		Change in Percentage With Esophagitis	Percent Patients With Normalized pH[a]
Witteman et al (2015)							
TIF			55%	-14.1		-19%	50%
Continued PPI			5%	-3.1		-20%	63%
p value			<0.001	<0.001		>0.05	NR

GERD-HRQL: Gastroesophageal Reflux Disease Health-Related Quality of Life; GSRS: Gastrointestinal Symptom Rating Scale; NR: not reported; PPI: proton pump inhibitor; QOL: quality of life; QOLRAD: Quality of Life in Reflux and Dyspepsia; RCT: randomized controlled trial; TIF: transoral incisionless fundoplication.
[a] Defined as <4% for ≤4.2% of recording time.

In Witteman et al, 26% of TIF patients resumed at least occasional PPI use by 6 months, and 100% of control patients remained on PPI therapy. With the exception of lower esophageal sphincter resting pressure, physiologic and endoscopic outcome measures did not differ significantly between groups. No adverse events related to fundoplication were identified on the Symptom Rating Scale.

TIF patients were followed beyond 6 months, with additional control patients who crossed over to have TIF. Sixty patients eventually underwent TIF. Although GERD symptoms remained improved over baseline ($p<0.05$), esophageal acid exposure did not differ significantly from baseline. At least occasional use of PPI increased between 6 months and 12 months, from 34% to 61%. Endoscopy findings at 6 months and 12 months showed several findings indicating possible worsening of GERD in terms of esophagitis rating, Hill grade rating of the gastroesophageal valve, and size of hiatal hernia. Although this RCT met its principal end point at 6 months, and improvements in GERD symptoms appeared to be maintained for 12 months, long-term reflux control was not achieved, and the authors concluded that "TIF is no[t an] equivalent alternative for PPIs in GERD treatment, even in this highly selected population." The trial was originally designed as a dual-center study, but it was terminated following interim analysis showing loss of reflux control.

Observational Studies
Observational case series and prospective cohort studies can provide information on the durability of the TIF procedure. Studies are included if they provide additional information on treatment durability or address treatment safety.

A case series and a cohort study have evaluated outcomes to 6 years after TIF 2 (see Tables 7 and 8). Both of these studies were performed in patients with hiatal hernias of 2 cm or less in size whose symptoms were adequately controlled on PPIs but did not want to take medication indefinitely. In a prospective cohort by Testoni et al (2015), 72% of the patients were completely responsive to PPIs at baseline, and 24% were partially responsive. Hiatal hernias had recurred by 12 months in 46% of the patients who had hernias at baseline, and at the 24-month follow-up, 20% of TIF procedures were considered unsuccessful. Eight percent of patients had additional surgery for poor response by 2 years. The Johnson-DeMeester score was not significantly improved. A poor response to treatment was associated with a hiatal hernia of 2 cm, higher Hill grade, presence of esophagitis at baseline, and use of fewer fasteners. About half the patients with a complete response initially had gone back to PPI use, although this finding is limited by the low number of patients followed to 6 years. The number of fasteners used in this study might also be lower than current procedures.

Stefanidis et al (2017) reported in a retrospective series that about 75% of patients had elimination of esophagitis and had discontinued PPI use at 6 years, while 62% of the 13 patients with a hiatal hernia had a reduction in hernia size at follow-up.

Table 7. Summary of Characteristics of Observational Studies With Long-Term Outcomes in Patients Whose Symptoms Were Controlled by PPIs

Author (Year)	Country/institution	Participants	Treatment Delivery	Mean FU, mo
Testoni et al (2015)	Prospective study from 2 centers in Italy	Daily PPI, esophagitis or abnormal pH, hiatal hernia ≤2 cm	ExophyX2	53
Stefanidis et al (2017)	Greece	PPI-controlled, hiatal hernia ≤2 cm	EsophyX2	59

FU: follow-up; PPI: proton pump inhibitor.

Table 8. Long-Term Durability of TIF in Patients Whose Symptoms Were Controlled by PPIs

Outcomes by Study	Mean Baseline	6 Months	1 Year	2 Years	3 Years	6 Years
Testoni et al (2015)						
Sample size	50	49[a]	49	45[b]	32	14
GERD-HRQL score off PPI (SD)	46 (19)			16 (13)	17 (14)	
GERD-QUAL score off PPI (SD)	114 (20)			71 (24)	80 (21)	
Johnson-DeMeester score (SD)	22 (12)	18 (15		19 (20)		
PPI discontinuation		61.2%	51.0%	56.1%	53.1%	35.7%
Additional surgery for poor response				8.2%		
Stefanidis et al (2017)						
Sample size	45					44
GERD-HRQL score off PPI	27					4
PPI discontinuation						72.7%

Elimination of esophagitis	n=33	81.8%	72.7%
Reduction in hiatal hernia	n=13		61.5%

GERD-HRQL: Gastroesophageal Reflux Disease Health-related Quality of Life; GERD-QUAL: Gastroesophageal Reflux Disease Quality of Life; PPI: proton pump inhibitor; SD: standard deviation; TIF: transoral incisionless fundoplication.
[a] Excluding 1 failed procedure due to pneumothorax
[b] Excluding 4 patients who underwent Nissen fundoplication for failed procedure.

Adverse Events

In 2017, Huang et al conducted a systematic review with meta-analysis of TIF for the treatment of GERD. They included 5 RCTs and 13 prospective observational studies, of which 14 were performed with the TIF 2 procedure. Efficacy results from the RCTs were combined for patients whose symptoms were controlled by PPIs and for those whose symptoms were not controlled by PPIs, and are not further discussed here. Follow-up to 6 years in prospective observational studies indicated a decrease in efficacy over time. The reported incidence of severe adverse events, consisting of gastrointestinal perforation and bleeding, was 19 (2.4%) of 781 patients. This included 7 perforations, 5 cases of post-TIF bleeding, 4 cases of pneumothorax, 1 case requiring intravenous antibiotics, and 1 case of severe epigastric pain.

Section Summary: TIF in Patients Whose Symptoms Are Controlled by PPIs

The evidence on TIF in patients whose symptoms are controlled by PPIs includes 2 RCTs and observational studies with long-term follow-up. The sham-controlled trial by Hakansson et al (2015) found that the time to resume PPI therapy was longer following TIF and the remission rate was higher, indicating that TIF is more effective than no therapy. Statistical analysis was not reported for other subjective and objective outcome measures, and it is unclear whether the trial was adequately powered for these outcomes. The nonblinded trial by Witteman et al found a benefit of TIF compared with continued PPI therapy for subjective measures, but not for the objective measures of pH normalization and esophagitis, raising questions about a possible placebo effect. Extended follow-up of the TIF patients in the Witteman trial found the use of PPI increased over time, while endoscopy showed several findings indicating possible worsening of GERD. The limited evidence beyond 2 years is consistent with some loss of treatment effectiveness. Increased use of PPIs beyond 2 years occurred in Testoni et al (2015).Adverse events associated with the procedure may be severe. Current evidence is insufficient to determine the effect of this intervention on the net health outcome in patients whose symptoms are adequately controlled by PPIs.

TRANSESOPHAGEAL RADIOFREQUENCY (STRETTA PROCEDURE)

The available evidence on the use of transesophageal radiofrequency (TERF) consists of meta-analyses and 4 small RCTs, three of which included a sham control, along with numerous uncontrolled case series.

Systematic Reviews

A meta-analysis of 4 RCTs (total N=165 patients) was published by Lipka et al in 2015 (see Table 9). Three trials compared Stretta with sham, and one compared Stretta with PPI therapy (see Table 10). Results of the individual sham-controlled trials were inconsistent, generally supporting some improvement in symptoms, but not in objective measures of esophageal acid exposure. For example, Corley et al (2003) reported improvement in heartburn symptoms, quality of life, and general physical quality of life in the active

treatment group compared with the sham group, but there were no significant differences in medication use and esophageal acid exposure. Aziz et al (2010) found statistically significant improvements in GERD-HRQL score in all treatment groups. Arts et al (2012) reported that the symptom score and quality-of-life score for bodily pain improved, but no changes were observed in PPI use, esophageal acid exposure or lower esophageal sphincter pressure after RF. Pooled results of the meta-analysis showed no significant difference between Stretta and either sham treatment or PPI management for the measured outcomes, including the ability to stop PPI therapy (see Table 11). The overall quality of evidence was considered to be very low with a high risk of bias, and the meta-analysis was limited by heterogeneity in the included studies, which might have been due to small sample sizes, differences in measures, and differences in follow-up time.

A 2012 meta-analysis by Perry et al included 20 studies. This review analyzed the within-subjects results following treatment only. The control groups of available clinical trials were not included for comparison. Significant improvements were reported for subjective heartburn scores, GERD-HRQL scores, and 36-Item Short-Form Health Survey Physical Component Summary scores. For the studies that measured esophageal pH, significant improvements were found in the Johnson-DeMeester score, the esophageal acid exposure time, and lower esophageal sphincter pressure. This meta-analysis was limited by the inclusion of lower quality studies and by its analysis of within-subject differences and not between-subject differences, as reported in the RCTs.

Table 9. Meta-Analytic Characteristics of RCTs of TERF

Study (Year)	Dates	Trials	Participants[a]	N (Range)	Design	Duration, mo
Perry et al (2012)	1966-2010	20	Patients with GERD undergoing TERF	1441 (7-558)	Meta-analysis of single arm of 2 RCTs and 18 case series	4-48
Lipka et al (2015)	Inception to Feb 2014	4	Patients with physiologic evidence of GERD who were on PPI therapy	165 (22-64)	Meta-analysis of RCTs	6-12

GERD: gastroesophageal reflux disease; RCT: randomized controlled trial; TERF: transesophageal radiofrequency.
[a] Key eligibility criteria.

Table 10. Characteristics of RCTs of TERF

Study	TERF:CTL, n	Patient Symptoms or Other Characteristics	Comparator	FU, mo	Principal Clinical Outcome
Corley et al (2003)	35:29	Abnormal EAE, symptoms at least partially controlled by PPIs, hiatal hernia ≤2 cm	Sham	6	Heartburn, QOL, PPI use, pH
Aziz et al (2010)	12:12:12	GERD controlled by PPIs, patients were randomized to single or double TERF or sham	Sham	12	GERD-HRQL score
Arts et al (2012)	11:11	GERD at least partially controlled by PPIs and abnormal pH, hiatal hernia	Sham with crossover at 3 mo	3	Composite reflux symptom score, esophageal pH, motility, and distensibility

		≤3 cm			
Coron et al (2008)	20:16	GERD symptoms controlled by PPIs and abnormal EAAE	Continued PPI	6	Stopping or decreasing PPI use

CTL: control; EAE: esophageal acid exposure; FU: follow-up; GERD: gastroesophageal reflux disease; GERD-HRQL: Gastroesophageal Reflux Disease Health-related Quality of Life; pH: acid exposure; PPI: proton pump inhibitor; QOL: quality of life; RCT: randomized controlled trial; TERF: transesophageal radiofrequency.

Table 11. Meta-Analytic Results

Study (Year)	Heartburn	GERD-HRQL Score	SF-36 PCS Score	Acid Exposure Time (pH <4)	Other Objective Outcome Measures
	Heartburn Score				**Johnson-DeMeester Score**
Perry et al (2012)					
N	525 (9 studies)	433 (9 studies)	299 (6 studies)	364 (11 studies)	267 (7 studies)
Mean follow-up, mo	24.1	19.8	9.5	11.9	13.1
Baseline (SE)	3.55 (3.9)	26.11 (27.2)	36.45 (51.6)	10.29% (17.8%)	44.37 (93)
Posttreatment (SE)	1.19 (3.4)	9.25 (23.7)	46.12 (61.9)	6.51% (12.5%)	28.54 (33.4)
p	0.001	0.001	0.001	0.003	0.007
	Ability to Stop PPI Therapy				**Mean LES Pressure**
Lipka et al (2015)					
N	118 (3 studies)	88 (2 studies)		153 (4 studies)	110 (3 studies)
MD (95% CI)	RR=0.87 (0.75 to 1.00)	-5.24 (-12.95 to 2.46)		1.56% (-2.56% to 5.69%)	0.32 mm Hg (-2.66 to 2.02 mm Hg)
p	0.06	0.18		0.46	0.79
I^2 (p)	0%	96% (p<0.001)		99% (<0.001)	96% (<0.001)
Range of N	24-51	22-64		22-64	

CI: confidence interval; GERD-HRQL: Gastroesophageal Reflux Disease Health-related Quality of Life; LES: lower esophageal sphincter; MD: mean difference; PCS: Physical Component Summary; RR; relative risk; SE: standard error; SF-36: 36-Item Short-Form Health Survey.

Controlled Trials Comparing TERF With Laparoscopic Fundoplication

In 2015, Liang et al reported on a prospective comparison of laparoscopic Toupet fundoplication with the Stretta procedure (see Table 12). Of 165 patients treated, 125 (76%) completed the 3-year follow-up (65 fundoplications, 60 Stretta) and were included in the analysis. Although the 2 groups were comparable in symptoms at baseline, 9 patients in the Stretta group had revised treatment and were not included in the final symptom scores. A similar percentage of remaining patients in the 2 groups achieved complete PPI independence and had similar improvements in belching, hiccup, cough, and asthma. The Stretta procedure was less effective than laparoscopic fundoplication in improving symptoms of heartburn, regurgitation, and chest pain (see Table 13). Significantly more patients in the Stretta group underwent reoperation, while more patients in the fundoplication group complained of bloating, but this difference was not statistically significant. This study lacked randomization and, along with not reporting the TERF failures, had a high loss to follow-up. Also, while symptom scores were comparable at baseline, the study may have been subject to selection bias related to treatment choice, which affected baseline differences for other variables.

Table 12. Summary of Characteristics of Key Study Comparing TERF With Laparoscopic Fundoplication

Author (Year)	Study Type	Country	Dates	Participants	Treatment 1	Treatment 2	FU, y
Liang et al (2015)	Comparative cohort	China	2011	165	TERF	Laparoscopic fundoplication	3

FU: follow-up; TERF: transesophageal radiofrequency.

Table 13. Study Results Comparing TERF With Laparoscopic Fundoplication

Study (Year)	PPI Independence	Improvement in Heartburn Score	Improvement in Regurgitation Score	Improvement in Chest Pain Score	Reoperation	Bloating
Liang et al (2015)						
TERF	68.3%	2.53	2.41	2.96	11.8%	0%
Laparoscopic fundoplication	72.3%	4.05	4.03	5.50	0%	6.2%
p	0.627	0.01	0.004	0.005	0.006	0.120

PPI: proton pump inhibitor; TERF: transesophageal radiofrequency.

Prospective Cohort Studies

Long-term follow-up from case series and cohort studies can inform the durability of TERF. For example, 5- and 10-year follow-up after TERF were reported in 2014 (see Table 14). Elimination of PPI use was similar for both studies at around 42% (see Table 15). Liang et al reported that symptoms of heartburn, regurgitation, chest pain, cough, and asthma were all decreased compared with baseline. Noar et al reported symptom improvement in 72% of patients and elimination of dysplasia in 85% of patients, but the interpretation of these findings is limited due to the 34% loss to follow-up in this study.

Table 14. Summary of Key Prospective Cohort Study and Case Series Characteristics

Author (Year)	Country/Institution	Participants	Follow-Up, y	Loss to Follow-Up
Liang et al (2014)	China	152 who had failed PPI therapy	5	9%
Noar et al (2014)	University of Pittsburgh	149 who had failed PPI therapy	10	34% (7% deceased)

PPI: proton pump inhibitor.

Table 15. Summary of Key Prospective Cohort Study and Case Series Results at Follow-Up

Author (Year)	Elimination of PPI Use	Symptom Improvement	Elimination of Dysplasia	Bloating
Liang et al (2014)	42.8%	p<0.001 vs pretreatment		8.7%
Noar et al (2014)	41%	72%	85%	

PPI: proton pump inhibitor.

Section Summary: Transesophageal Radiofrequency (Stretta Procedure)

Four RCTs (N range, 22-64 patients), three of which were sham-controlled, reported some improvements in symptoms following treatment with TERF. However, measures of esophageal acid exposure were typically not improved. Also, meta-analyses of these same studies found no significant improvements in outcomes. The findings of improvements in symptoms but not esophageal acid exposure have led to questions

whether TERF is acting by reducing sensation in the esophagus. Although single-arm studies have shown maintenance of symptom relief at 5 to 10 years, interpretation depends on the efficacy of the procedure in the short term. A nonrandomized comparative study has suggested that symptom relief with TERF is lower than with fundoplication and there is a greater incidence of reoperations. Larger RCTs with longer follow-up are needed to define the risks and benefits of this procedure better.

ESOPHAGEAL BULKING AGENTS

Durasphere
The available evidence for Durasphere consists of a single case series. One open-label pilot study (2009) of 10 GERD patients injected Durasphere (Carbon Medical Technologies), a bulking agent approved for treatment of urinary and fecal incontinence, at the gastroesophageal junction. At 12 months, 7 (70%) patients discontinued all antacid medication completely. No erosion, ulceration, or sloughing of material was noted at any injection site.

Gatekeeper Reflux Repair System
The available evidence for Gatekeeper Reflux Repair System consists of a single RCT from 2010. An industry-funded sham-controlled single-blind, multicenter study randomized 118 patients into Gatekeeper (n=75) or sham (n=43) treatment. An additional 25 patients were treated as lead-ins during the initial training of investigators and included only in the safety analysis. The patients were implanted initially with 4 Gatekeeper prostheses. At 3 months, 44% of implanted patients received retreatment with up to 4 additional prostheses due to unsatisfactory symptom control. The primary safety end point was a reduction in serious device- and procedure-related adverse device events, compared with a surgical procedure composite complication rate of 15%. Four serious adverse events were reported (2 perforations, 1 pulmonary infiltrate related to a perforation, 1 severe chest pain). The primary efficacy endpoint was a reduction in heartburn symptoms using the GERD-HRQL questionnaire. Planned interim analysis after 143 patients were enrolled found that heartburn symptoms and esophageal acid exposure had improved significantly in both the Gatekeeper and sham groups at 6 months, but there was no significant difference between groups. The study was terminated early due to a lack of efficacy.

Polymethylmethacrylate Beads
The available evidence for PMMA beads consists of a single case series. A 2001 case series on transesophageal submucosal implantation of PMMA beads evaluated 10 patients with GERD who were either refractory to or dependent on PPIs. While a significant decrease in symptom scores was noted at posttreatment follow-up (time not specified), the small number of patients and lack of long-term follow-up preclude scientific analysis. No additional studies have been identified evaluating this treatment option.

Section Summary: Esophageal Bulking Agents
The evidence on injection of bulking agents includes an RCT terminated early due to lack of efficacy and case series. High-quality data from large RCTs are needed to compare bulking procedures with both sham controls and with the currently accepted treatments for GERD (i.e., drug therapy, laparoscopic

fundoplication). Well-designed trials should use standardized outcome measures to examine both subjective (e.g., GERD-HRQL scores) and objective (e.g., esophageal acid exposure) effects on health outcomes.

SUMMARY OF EVIDENCE

For individuals who have GERD and hiatal hernia of 2 cm or less that is not controlled by PPIs who receive TIF (eg, EsophyX), the evidence includes 2 RCTs comparing TIF with PPI therapy, nonrandomized studies comparing TIF with fundoplication, and case series with longer term follow-up. Relevant outcomes are symptoms, change in disease status, quality of life, medication use, and treatment-related morbidity. The highest quality RCT (RESPECT) was a sham-controlled together with PPI therapy while the other RCT (TEMPO) compared TIF with maximum PPI therapy. Both trials found a significant benefit of TIF on the primary outcome measure in about 65% of patients, but the sham-controlled trial found improvement in 45% of the sham-controlled group and no benefit on secondary subjective outcome measures. The nonblinded RCT found significant improvements in subjective measures but no difference in objective outcome measures when compared with PPI therapy. Together, these trials suggest a strong placebo effect of the surgery and a modest benefit of TIF in patients whose symptoms are not controlled by PPIs. For these patients, the most appropriate comparator is laparoscopic fundoplication. Studies comparing TIF with fundoplication have limitations that include earlier TIF procedures and unequal groups at baseline and are inadequate to determine relative efficacy. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have GERD and hiatal hernia of 2 cm or less that is controlled by PPIs who receive TIF (e.g., EsophyX), the evidence includes 2 RCTs and observational studies with longer term follow-up. Relevant outcomes are symptoms, change in disease status, quality of life, medication use, and treatment-related morbidity. A sham-controlled trial found that the time to resume PPI therapy was longer following TIF and the remission rate was higher, indicating that TIF is more effective than no therapy. The nonblinded RCT found a benefit of TIF compared with continued PPI therapy for subjective measures, but not for the objective measures of pH normalization and esophagitis. These results raise questions about a possible placebo effect for the procedure. Also, observational studies have indicated a loss of treatment effectiveness over time. Adverse events associated with the procedure (e.g., perforation) may be severe. At present, the available evidence does not support the use of this intervention in patients whose symptoms are adequately controlled by medical therapy. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have GERD who receive endoscopic radiofrequency energy (e.g., Stretta), the evidence includes 4 small RCTs, a nonrandomized comparative study, and observational studies with longer term follow-up. Relevant outcomes are symptoms, change in disease status, quality of life, medication use, and treatment-related morbidity. The RCTs reported some improvements in symptoms and quality of life following treatment with radiofrequency energy compared with sham controls. However, objective measures of GERD and a meta-analysis of these studies found no significant improvements in outcomes, raising questions about the mechanism of the symptom relief. Symptom relief is reported to be lower than after

fundoplication, and reoperations greater. Larger RCTs with longer follow-up, preferably compared with fundoplication, are needed to define the risks and benefits of this procedure better. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have GERD who receive esophageal or bulking agents, the evidence includes an RCT and case series. Relevant outcomes are symptoms, change in disease status, quality of life, medication use, and treatment-related morbidity. The RCT for a single product was terminated early due to lack of efficacy, while other products have only case series to support use. High-quality data from large RCTs are needed to compare bulking procedures with both sham controls and with the currently accepted treatments for GERD (i.e., drug therapy, laparoscopic fundoplication). Well-designed trials should use standardized outcome measures to examine whether subjective improvement (e.g., discontinuation of medication therapy, GERD–Health-Related Quality of Life scores) is supported by objective improvement (e.g., esophageal acid exposure). The evidence is insufficient to determine the effects of the technology on health outcomes.

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Policy History

Original Effective Date: 06/24/2002
Current Effective Date: 02/21/2018

06/20/2002	Medical Policy Committee review.
06/24/2002	Managed Care Advisory Council approval.
04/01/2004	Medical Director review
04/20/2004	Medical Policy Committee review. Format revision. No substance change to policy.
04/26/2004	Managed Care Advisory Council approval
04/05/2006	Medical Director review
04/19/2006	Medical Policy Committee review. Format revision, including addition of FDA and or other governmental regulatory approval and rationale/source. Coverage eligibility unchanged.
04/02/2008	Medical Director review
04/16/2008	Medical Policy Committee approval. No change to coverage eligibility.
04/02/2009	Medical Director review
04/15/2009	Medical Policy Committee approval. No change to coverage eligibility. Title changed to match BCBSA.
04/08/2010	Medical Policy Committee approval
04/21/2010	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
04/07/2011	Medical Policy Committee review
04/13/2011	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
04/12/2012	Medical Policy Committee review
04/25/2012	Medical Policy Implementation Committee approval. Added NDO Plicator and EsophyX procedures as examples of transesophageal endoscopic gastroplasty. Investigational statements were combined on biocompatible polymer and PMMA beads as bulking agents.
04/04/2013	Medical Policy Committee review
04/24/2013	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
04/03/2014	Medical Policy Committee review
04/23/2014	Medical Policy Implementation Committee approval. Removed the second Investigational statement regarding transesophageal radiofrequency to create thermal lesions of the gastrointestinal junction (i.e., the Stretta procedure) as a treatment of GERD.
04/02/2015	Medical Policy Committee approval
04/20/2015	Medical Policy Implementation Committee approval. Coverage eligibility unchanged. Updated rationale and references.
08/03/2015	Coding update: ICD10 Diagnosis code section added; ICD9 Procedure code section removed.
10/01/2015	Coding update
01/01/2016	Coding update

Transesophageal Endoscopic Therapies for Gastroesophageal Reflux Disease

Policy # 00123
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04/07/2016	Medical Policy Committee approval
04/20/2016	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
01/01/2017	Coding update: Removing ICD-9 Diagnosis Codes
01/05/2017	Medical Policy Committee approval
01/18/2017	Medical Policy Implementation Committee approval. Removed transesophageal endoscopic gastroplasty from the policy and policy statements.
02/01/2018	Medical Policy Committee review
02/21/2018	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.

Next Scheduled Review Date: 02/2019

Coding

The five character codes included in the Blue Cross Blue Shield of Louisiana Medical Policy Coverage Guidelines are obtained from Current Procedural Terminology (CPT®)‡, copyright 2017 by the American Medical Association (AMA). CPT is developed by the AMA as a listing of descriptive terms and five character identifying codes and modifiers for reporting medical services and procedures performed by physician.

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CPT is a registered trademark of the American Medical Association.

Codes used to identify services associated with this policy may include (but may not be limited to) the following:

Code Type	Code
CPT	43201, 43236, 43499
HCPCS	No codes
ICD-10 Diagnosis	K21.0 K21.9 K22.8 K22.70 K22.710 K22.711 K22.719

*****Investigational – A medical treatment, procedure, drug, device, or biological product is Investigational if the effectiveness has not been clearly tested and it has not been incorporated into standard medical practice. Any determination we make that a medical treatment, procedure, drug, device, or biological product is Investigational will be based on a consideration of the following:

A. Whether the medical treatment, procedure, drug, device, or biological product can be lawfully marketed without approval of the U.S. Food and Drug Administration (FDA) and whether such approval has been granted at the time the medical treatment, procedure, drug, device, or biological product is sought to be furnished; or
B. Whether the medical treatment, procedure, drug, device, or biological product requires further studies or clinical trials to determine its maximum tolerated dose, toxicity, safety, effectiveness, or effectiveness as compared with the standard means of treatment or diagnosis, must improve health outcomes, according to the consensus of opinion among experts as shown by reliable evidence, including:

1. Consultation with the Blue Cross and Blue Shield Association technology assessment program (TEC) or other nonaffiliated technology evaluation center(s);
2. Credible scientific evidence published in peer-reviewed medical literature generally recognized by the relevant medical community; or
3. Reference to federal regulations.

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