Medical Policy

BlueCross BlueShield Kansas
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Title: Gastric Electrical Stimulation

Professional
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Populations	Interventions	Comparators	Outcomes
Individuals: • With gastroparesis	Interventions of interest are: • Gastric electrical stimulation	Comparators of interest are: • Conservative management • Medication • Enteral or total parenteral nutrition	Relevant outcomes include: • Symptoms • Treatment-related morbidity
Individuals: • With obesity	Interventions of interest are: • Gastric electrical stimulation	Comparators of interest are: • Conservative management • Medication • Bariatric surgery	Relevant outcomes include: • Change in disease severity • Treatment-related morbidity

DESCRIPTION

Gastric electrical stimulation (GES) is performed using an implantable device designed to treat chronic drug-refractory nausea and vomiting secondary to gastroparesis of diabetic, idiopathic, or postsurgical etiology. GES has also been investigated as a treatment of obesity. The device may be referred to as a gastric pacemaker.

Objective

The objective of this evidence review is to determine whether gastric electrical stimulation improves the net health outcome for patients with gastroparesis or obesity.

Background

Treatment

Gastroparesis

Gastric electrical stimulation (GES), also referred to as gastric pacing, using an implantable device, has been investigated primarily as a treatment for gastroparesis. Currently available devices consist of a pulse generator, which can be programmed to provide electrical stimulation at different frequencies, connected to intramuscular stomach leads, which are implanted during laparoscopy or open laparotomy (see Regulatory Status section).

Obesity

GES has also been investigated as a treatment of obesity. It is used to increase a feeling of satiety with subsequent reduction in food intake and weight loss. The exact mechanisms resulting in changes in eating behavior are uncertain but may be related to neurohormonal modulation and/or stomach muscle stimulation.

REGULATORY STATUS

In 2000, the Gastric Electrical Stimulator system (now called Enterra™ Therapy System; Medtronic) was approved by the U.S. Food and Drug Administration (FDA) through the humanitarian device exemption process (H990014) for the treatment of gastroparesis. The GES system consists of 4 components: the implanted pulse generator, 2 unipolar intramuscular stomach leads, the stimulator programmer, and the memory cartridge. With the exception of the intramuscular leads, all other components have been used in other implantable neurologic stimulators, such as spinal cord or sacral nerve stimulation. The intramuscular stomach leads are implanted either laparoscopically or during laparotomy and are connected to the pulse generator, which is implanted in a subcutaneous pocket. The programmer sets the stimulation parameters, which are typically set at an “on” time of 0.1 seconds alternating with an “off” time of 5.0 seconds.

Currently, no GES devices have been approved by the FDA for the treatment of obesity. The Transcend® (Transneuronix; acquired by Medtronic in 2005), an implantable gastric stimulation device, is available in Europe for treatment of obesity.

POLICY

A. Gastric electrical stimulation (GES) using the Enterra Therapy System™ may be considered **medically necessary** for the treatment of chronic, intractable (drug refractory) nausea and vomiting secondary to gastroparesis of diabetic or idiopathic etiology when **ALL** of the following criteria are met:

1. Symptomatic gastroparesis ≥ one year, as documented by an initial gastric emptying test; **AND**
2. Refractory or intolerant to at least two anti-emetic and prokinetic drug classes, **AND**
3. On stable medical therapy and, if applicable, stable nutritional support during the month prior to initiation of therapy, **AND**
4. Delayed gastric emptying, defined by > 60% retention at two hours or > 10% retention at four hours, as measured by standardized gastric emptying testing **AND**
5. As a humanitarian approved device, the Enterra Therapy System™ may only be used in facilities that have an Institutional Review Board (IRB) to supervise clinical testing of the device.

B. Gastric electrical stimulation is considered **Experimental / Investigational** for the treatment of obesity.

RATIONALE

This evidence review has been updated regularly with searches of the PubMed database. The most recent literature update was performed through December 10, 2020.

Evidence reviews assess the clinical evidence to determine whether the use of technology improves the net health outcome. Broadly defined, health outcomes are the 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 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 a balance of benefits and harms.

To assess whether the evidence is sufficient to draw conclusions about the net health outcome of technology, 2 domains are examined: the relevance, and quality and credibility. To be relevant, studies must represent 1 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 following is a summary of the key literature to date.

GASTRIC ELECTRICAL STIMULATION FOR GASTROPARESIS

Clinical Context and Therapy Purpose

The purpose of gastric electrical stimulation (GES) is to provide a treatment option that is an alternative to or an improvement on existing therapies, such as conservation management, medication, and enteral or total parenteral nutrition, in patients with gastroparesis.

The question addressed in this evidence review is: Does GES improve the net health outcome for patients with gastroparesis?

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with gastroparesis. Gastroparesis is a chronic disorder of gastric motility characterized by delayed emptying of a solid meal. Symptoms include bloating, distension, nausea, and vomiting. When severe and chronic, gastroparesis can be associated with dehydration, poor nutritional status, and poor glycemic control in diabetic patients. While most commonly associated with diabetes, gastroparesis is also found in chronic pseudo-obstruction, connective tissue disorders, Parkinson disease, and psychological pathologic conditions. Some cases may not be associated with an identifiable cause and are referred to as idiopathic gastroparesis.

Interventions

The therapy being considered is GES.

Patients with gastroparesis are actively managed by a gastroenterologist and primary care provider in an outpatient clinical setting.

Comparators

Comparators of interest include conservative management, medication, enteral or total parenteral nutrition. Treatment includes diet modification and gut motility stimulation.

Outcomes

The general outcomes of interest are symptoms and treatment-related morbidity.

The existing literature evaluating GES as a treatment for gastroparesis has varying lengths of follow-up, ranging from 6 to 12 months. While studies described below all reported at least 1 outcome of interest, longer follow-up was necessary to fully observe outcomes. Therefore, 10 years of follow-up is considered necessary to demonstrate efficacy.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;
- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess longer-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

REVIEW OF EVIDENCE

Systematic Reviews

Several systematic reviews of studies on GES for gastroparesis have been published,[1,2,3,] the most recent and comprehensive of which is by Levinthal et al (2017).[1,] To be selected for the Levinthal et al. review, studies had to include adults with established gastroparesis, report patient symptom scores, and administer treatment for at least 1 week. Five RCTs and 13 non-RCTs meeting criteria were identified. Pooled analysis of data from the 5 RCTs (N =185 patients) did not find a statistically significant difference in symptom severity when the GES was turned on versus off (standardized mean difference, 0.17; 95% confidence interval [CI], -0.06 to 0.40; p=0.15). Another pooled analysis did not find a statistically significant difference in nausea severity scores when the GES was on or off (standardized mean difference, -0.143; 95% CI, -0.50 to 0.22; p=0.45). In a pooled analysis of 13 open-label single-arm studies and data from open-label extensions of 3 RCTs, mean total symptom severity score decreased 2.68 (95% CI, 2.04 to 3.32) at follow-up from a mean of 6.85 (95% CI, 6.28 to 7.42) at baseline. The rate of adverse events in the immediate postoperative period (reported in 7 studies) was 8.7% (95% CI, 4.3% to 17.1%). The in-hospital mortality rate within 30 days of surgery was 1.4% (95% CI, 0.8% to 2.5%), the rate of reoperations (up to 10 years of follow-up) was 11.1% (95% CI, 8.7% to 14.1%), and the rate of device removal was 8.4% (95% CI, 5.7% to 12.2%).

Randomized Controlled Trials

Abell et al. (2003) reported findings from the Worldwide Anti-Vomiting Electrical Stimulation Study (WAVESS).[4,] This double-blind crossover study, initially described in the U.S. Food and Drug Administration (FDA) materials, included 33 patients with intractable idiopathic or diabetic gastroparesis.[5,] The primary endpoint was a reduction in vomiting frequency, as measured by patient diaries. In the initial phase of the study, all patients underwent implantation of the stimulator and were randomly and blindly assigned to stimulation on or stimulation off for the first month, with crossover to off and on during the second month. Baseline vomiting frequency was 47 episodes per month, which declined in both on and off groups to 23 to 29 episodes, respectively. However, no statistically significant differences were found in the number of vomiting episodes between groups, suggesting a placebo effect. In the second, open-label, phase of the trial, all patients had their stimulators turned on for the remainder of the 6- to 12-month follow-up. During this period, vomiting frequency declined in both the idiopathic and diabetic subgroups.

McCallum et al. (2010) reported on a crossover RCT evaluating GES (Enterra device) in patients with chronic intractable nausea and vomiting from diabetic gastroparesis.[6,] In this trial, 55 patients with refractory diabetic gastroparesis (5.9 years of diabetic gastroparesis) were given Enterra implants. After surgery, all patients had the stimulator turned on for 6 weeks and then were randomized to groups that had consecutive 3-month crossover periods with the device on or off. After this period, the device was turned on in all patients, and they were followed unblinded for 4.5 months. During the initial 6-week phase with the stimulator turned on, the median reduction in weekly vomiting frequency (WVF) compared with baseline was 57%. There was no significant difference in WVF between patients who had the device turned on or off during the 3-month crossover period. At 1 year, the WVF for all patients was significantly lower than baseline values (median reduction, 68%; p<0.001). One patient had the device removed due to infection; 2 required surgical intervention for lead-related problems.

McCallum et al. (2013) evaluated GES (Enterra system) in patients with chronic vomiting due to idiopathic gastroparesis in a randomized, double-blind crossover trial.[7,] In this trial, 32 patients

with nausea and vomiting associated with idiopathic gastroparesis, unresponsive or intolerant to prokinetic and antiemetic drugs, received Enterra implants and had the device turned on for 6 weeks. Subsequently, 27 of these patients were randomized to have the device turned on or off for 2 consecutive 3-month periods. Twenty-five of these subjects completed the randomized phase; of note, 2 subjects had the device turned on early, 2 subjects had randomization assignment errors, and 1 subject had missing diaries. During the initial 6-week on period, all subjects showed improvements in their WVF, demonstrating a median reduction of 61.2% (5.5 episodes/week) compared with baseline (17.3 episodes/week; p<0.001). During the on-off crossover phase, subjects demonstrated no significant differences between the on and off phases for the study's primary endpoint, median WVF (median, 6.4 in on-phase versus 9.8 in off-phase; p=1.0). Among the 19 subjects who completed 12 months of follow-up, there was an 87.1% reduction in median WVF (2 episodes/week) compared with baseline (17.3 episodes/week; p<0.001). Two subjects required surgical intervention for lead migration/dislodgement or neurostimulator migration.

Table 1. Summary of Key Randomized Controlled Trial Characteristics

Study; Trial	Countries	Sites	Dates	Participants	Interventions	
					Active	Comparator
Abell et al (2003) [4,]	U.S., Canada, EU	11	NR	Patients with intractable idiopathic or diabetic gastroparesis (N =33)	GES (stimulation on)	GES (stimulation off)
McCallum et al (2010) [6,]	U.S.	8	2002-2007	Patients with chronic intractable nausea and vomiting from diabetic gastroparesis (N =55)	GES (stimulation on)	GES (stimulation off)
McCallum et al (2013) [7,]	U.S.	8	2002-2008	Patients with chronic vomiting due to idiopathic gastroparesis (N =32)	GES (stimulation on)	GES (stimulation off)

EU: European Union; GES: gastric electrical stimulation; NR: not reported.

Table 2. Summary of Key Randomized Controlled Trial Results

Study	Weekly Vomiting Frequency	Total Symptom Score
Abell et al (2003)		
ON	6.8	12.5 ± 1.0
OFF	13.5	13.9 ± 1.1
P-value	<0.05	NR

Study	Weekly Vomiting Frequency	Total Symptom Score
McCallum et al (2010)		
ON	3.81	
OFF	4.25	
P-value	0.215	
McCallum et al (2013)		
ON	6.38	
OFF	9.75	
P-value	1.0	

NR: not reported.

The purpose of the limitation's tables (see Tables 3 and 4) is to display notable limitations identified in each study. This information is synthesized as a summary of the body of evidence following each table and provides the conclusions on the sufficiency of evidence supporting the position statement.

Table 3. Study Relevance Limitations

Study	Population[a]	Intervention[b]	Comparator[c]	Outcomes[d]	Follow-Up[e]
Abell et al (2003)					1. Not sufficient duration for benefit; 2. Not sufficient duration for harms.
McCallum et al (2010)					1. Not sufficient duration for benefit; 2. Not sufficient duration for harms.
McCallum et al (2013)					1. Not sufficient duration for benefit; 2. Not sufficient duration for harms.

The study limitations stated in this table are those notable in the current review; this is not a comprehensive gaps assessment.

[a] Population key: 1. Intended use population unclear; 2. Clinical context is unclear; 3. Study population is unclear; 4. Study population not representative of intended use.

[b] Intervention key: 1. Not clearly defined; 2. Version used unclear; 3. Delivery not similar intensity as comparator; 4. Not the intervention of interest.

[c] Comparator key: 1. Not clearly defined; 2. Not standard or optimal; 3. Delivery not similar intensity as intervention; 4. Not delivered effectively.

[d] Outcomes key: 1. Key health outcomes not addressed; 2. Physiologic measures, not validated surrogates; 3. No CONSORT reporting of harms; 4. Not establish and validated measurements; 5. Clinical significant difference not

prespecified; 6. Clinical significant difference not supported.
[e] Follow-Up key: 1. Not sufficient duration for benefit; 2. Not sufficient duration for harms.

Table 4. Study Design and Conduct Limitations

Study	Allocation[a]	Blinding[b]	Selective Reporting[c]	Follow-Up[d]	Power[e]	Statistical[f]
Abell et al (2003)	3. Allocation concealment unclear			3. High number of crossovers	1. Power calculations not reported	
McCallum et al (2010)				3. High number of crossovers		
McCallum et al (2013)				3. High number of crossovers		

The study limitations stated in this table are those notable in the current review; this is not a comprehensive gaps assessment.
[a] Allocation key: 1. Participants not randomly allocated; 2. Allocation not concealed; 3. Allocation concealment unclear; 4. Inadequate control for selection bias.
[b] Blinding key: 1. Not blinded to treatment assignment; 2. Not blinded outcome assessment; 3. Outcome assessed by treating physician.
[c] Selective Reporting key: 1. Not registered; 2. Evidence of selective reporting; 3. Evidence of selective publication.
[d] Follow-Up key: 1. High loss to follow-up or missing data; 2. Inadequate handling of missing data; 3. High number of crossovers; 4. Inadequate handling of crossovers; 5. Inappropriate exclusions; 6. Not intent to treat analysis (per protocol for noninferiority trials).
[e] Power key: 1. Power calculations not reported; 2. Power not calculated for primary outcome; 3. Power not based on clinically important difference.
[f] Statistical key: 1. Intervention is not appropriate for outcome type: (a) continuous; (b) binary; (c) time to event; 2. Intervention is not appropriate for multiple observations per patient; 3. Confidence intervals and/or p values not reported; 4.Comparative treatment effects not calculated.

Nonrandomized Studies

Laine et al. (2018) published a retrospective, multicenter analysis of patients with severe, medically refractory gastroparesis who received GES.[8,] Fourteen patients (11 diabetic, 1 idiopathic, and 2 postoperative) treated in Finland between 2007 and 2015 were included; median follow-up was 3 years. Eight (57.1%) patients experienced marked relief of gastroparesis symptoms, whereas 3 (21.4%) patients experienced partial relief. There was a median weight gain of 5.1 kg in 11 (78.6%) patients after GES implantation, and at last possible follow-up, 5 out of 10 (50%) patients were without medication for gastroparesis. The study was limited by its retrospective nature, small population size, and relatively short follow-up time.

Shada et al. (2018) published a prospective study of patients with medically refractory gastroparesis who underwent implantation of GES between 2005 and 2016.[9,] One hundred nineteen patients (64 diabetic, 55 idiopathic), with mean follow-up of 39.0 ± 32.0 months, were included in the analysis. Before GES placement, operatively placed feeding tubes were present in 22% of diabetic and 17% of idiopathic patients; however, after GES placement, 67% of feeding tubes were removed. Due to a perceived lack of benefit, 8 patients decided to have their GES device removed after a mean time of 36 ± 29 months. Also, there was significant improvement in Gastroparesis Cardinal Symptom Index scores for both diabetic (p=0.01) and idiopathic (p=0.003) subgroups at ≥2 years after implantation. The study was limited by its retrospective

nature, not all patients being administered the Gastroparesis Cardinal Symptom Index before GES, and a number of patients being lost to follow-up.

Section Summary: Gastric Electrical Stimulation for Gastroparesis
Two nonrandomized studies and 5 crossover RCTs have assessed GES for treating gastroparesis. A 2017 meta-analysis of these 5 RCTs did not find a significant benefit of GES on the severity of symptoms associated with gastroparesis. Patients generally reported improved symptoms at follow-up whether or not the device was turned on, suggesting a placebo effect. For example, there was no significant difference in the on versus off position in symptom severity or nausea severity scores.

GASTRIC ELECTRICAL STIMULATION FOR OBESITY

Clinical Context and Therapy Purpose

The purpose of GES is to provide a treatment option that is an alternative to or an improvement on existing therapies, such as conservative management, medication, and bariatric surgery in patients with obesity.

The question addressed in this evidence review is: Does GES improve the net health outcome for patients with obesity?

The following PICO was used to select literature to inform this review.

Populations

The relevant population of interest is individuals with obesity.

Interventions

The therapy being considered is GES.

Patients with obesity are actively managed by nutritionists and primary care providers in an outpatient clinical setting.

Comparators

Comparators of interest include conservative management, medication, and bariatric surgery. Treatment includes physical exercise, low carbohydrate dieting, and low-fat dieting.

Outcomes

The general outcomes of interest are change in disease status and treatment-related morbidity.

The existing literature evaluating GES as a treatment for obesity has varying lengths of follow-up, ranging from 1 year. While studies described below all reported at least 1 outcome of interest, longer follow-up was necessary to fully observe outcomes. Therefore, 1 year of follow-up is considered necessary to demonstrate efficacy.

Study Selection Criteria

Methodologically credible studies were selected using the following principles:

- To assess efficacy outcomes, comparative controlled prospective trials were sought, with a preference for RCTs;

- In the absence of such trials, comparative observational studies were sought, with a preference for prospective studies.
- To assess longer-term outcomes and adverse events, single-arm studies that capture longer periods of follow-up and/or larger populations were sought.
- Studies with duplicative or overlapping populations were excluded.

Review of Evidence

A single RCT has evaluated the use of GES for treating obesity: the Screened Health Assessment and Pacer Evaluation (SHAPE) trial. Shikora et al (2009) reported on a double-blind RCT that assessed GES obesity.[10,] All 190 trial participants received an implantable gastric stimulator and were randomized to have the stimulator turned on or off. All patients were evaluated monthly, participated in support groups, and reduced their dietary intake by 500 kcal/d. At 12-month follow-up, there was no statistically significant difference in excess weight loss between the treatment group (weight loss, 11.8%) and the control group (weight loss, 11.7%) using intention-to-treat analysis (p=0.717).

Small case series and uncontrolled prospective trials (2002 to 2004) have reported positive outcomes for weight loss and maintenance of weight loss along with minimal complications.[11,12,13,14,15,16,] However, interpretation of these uncontrolled studies is limited.

Section Summary: Gastric Electrical Stimulation for Obesity

For individuals who have obesity who receive GES, the evidence includes an RCT as well as several small case series and uncontrolled prospective trials, which reported positive outcomes. The SHAPE trial did not show significant improvement in weight loss using GES compared with sham stimulation.

Summary of Evidence

For individuals who have gastroparesis who receive GES, the evidence includes randomized controlled trials (RCTs), nonrandomized studies, and systematic reviews. Relevant outcomes are symptoms and treatment-related morbidity. Five crossover RCTs have been published. A 2017 meta-analysis of these 5 RCTs did not find a significant benefit of GES on the severity of symptoms associated with gastroparesis. Patients generally reported improved symptoms at follow-up whether or not the device was turned on, suggesting a placebo effect. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have obesity who receive GES, the evidence includes an RCT. Relevant outcomes are change in disease status and treatment-related morbidity. The Screened Health Assessment and Pacer Evaluation (SHAPE) trial did not show significant improvement in weight loss using GES compared with a sham stimulation. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

SUPPLEMENTAL INFORMATION

Clinical Input From Physician Specialty Societies and Academic Medical Centers

While the various physician specialty societies and academic medical centers may collaborate with and make recommendations during this process, through the provision of appropriate reviewers, input received does not represent an endorsement or position statement by the physician specialty societies or academic medical centers, unless otherwise noted.

2015 Input

Clinical input was sought to help determine whether the use of GES for individuals with gastroparesis would provide a clinically meaningful improvement in net health outcome and whether the use is consistent with generally accepted medical practice. In response to requests, input was received from 1 specialty society (2 reviewers) and 4 academic centers while this policy was under review in 2015. For individuals who have gastroparesis who receive GES, clinical input does not support a clinically meaningful improvement in net health outcome and does not indicate this use is consistent with generally accepted medical practice. Most respondents agreed that gastric electrical stimulation (GES) should be considered investigational for gastroparesis. There was a lack of consensus whether GES should be considered medically necessary for any specific indication (e.g., diabetic gastroparesis, idiopathic gastroparesis, gastroparesis of postsurgical etiology). The reviewers were not asked about the use of GES for treatment of obesity.

2009 Input

Clinical input was sought to help determine whether the use of GES for individuals with gastroparesis or obesity would provide a clinically meaningful improvement in net health outcome and whether the use is consistent with generally accepted medical practice. In response to requests, input was received from 4 academic medical centers (5 reviewers) while this policy was under review in 2009. For individuals who have gastroparesis or obesity who receive GES, clinical input does not support a clinically meaningful improvement in net health outcome and does not indicate this use is consistent with generally accepted medical practice. There was strong agreement among reviewers about the limited data for the use of GES to treat diabetic and idiopathic gastroparesis and about the need for randomized controlled trials (RCTs). There was strong agreement that GES is investigational in the treatment of obesity.

Practice Guidelines and Position Statements

The purpose of the remaining sections in Supplemental Information is to provide reference material regarding existing practice guidelines and position statements, U.S. Preventive Services Task Force Recommendations and Medicare National Coverage Decisions and registered, ongoing clinical trials. Inclusion in the Supplemental Information does not imply endorsement and information may not necessarily be used in formulating the evidence review conclusions. Guidelines or position statements will be considered for inclusion in ‘Supplemental Information if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

National Institute for Health and Care Excellence

In 2014, the National Institute for Health and Care Excellence issued guidance on GES for gastroparesis.[17,] The Institute made the following recommendations:

1.1 “Current evidence on the efficacy and safety of gastric electrical stimulation for gastroparesis is adequate to support the use of this procedure with normal arrangements for clinical governance, consent, and audit."

1.2 "... clinicians should inform patients considering gastric electrical stimulation for gastroparesis that some patients do not get any benefit from it. They should also give patients detailed written information about the risk of complications, which can be serious, including the need to remove the device."

1.3 "Patient selection and follow-up should be done in specialist gastroenterology units with expertise in gastrointestinal motility disorders, and the procedure should only be performed by surgeons working in these units."

American College of Gastroenterology

In 2013, the American College of Gastroenterology published practice guidelines on the management of gastroparesis.[18,] The College recommended that:

“GES [gastric electrical stimulation] may be considered for compassionate treatment in patients with refractory symptoms, particularly nausea and vomiting. Symptom severity and gastric emptying have been shown to improve in patients with DG [diabetic gastroparesis], but not in patients with IG [idiopathic gastroparesis] or PSG [postsurgical gastroparesis]. [Conditional recommendation (there is uncertainty about trade-offs), moderate level of evidence (further research would be likely to have an impact on the confidence in the estimate of effect).]”

An update is in progress from the American College of Gastroenterology.

U.S. Preventive Services Task Force Recommendations

Not applicable.

Ongoing and Unpublished Clinical Trials

Some currently unpublished trials that might influence this review are listed in Table 5.

Table 5. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
Ongoing			
NCT03123809	Gastric Electrical Stimulation (GES) and Pyloroplasty for the Treatment of Gastroparesis (GES + PP)	50	Not reported

NCT: national clinical trial.

CODING

The following codes for treatment and procedures applicable to this policy are included below for informational purposes. This may not be a comprehensive list of procedure codes applicable to this policy.

Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage of these services as it applies to an individual member.

The code(s) listed below are medically necessary ONLY if the procedure is performed according to the "Policy" section of this document.

CPT/HCPCS

43647	Laparoscopy, surgical; implantation or replacement of gastric neurostimulator electrodes, antrum
43648	Laparoscopy, surgical; revision or removal of gastric neurostimulator electrodes, antrum
43659	Unlisted laparoscopy procedure, stomach
43881	Implantation or replacement of gastric neurostimulator electrodes, antrum, open
43882	Revision or removal of gastric neurostimulator electrodes, antrum, open
43999	Unlisted procedure, stomach
64590	Insertion or replacement of peripheral or gastric neurostimulator pulse generator or receiver, direct, or inductive coupling
64595	Revision or removal of peripheral or gastric neurostimulator pulse generator or receiver
95980	Electronic analysis of implanted neurostimulator pulse generator system (e.g., rate, pulse amplitude and duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient measurements) gastric neurostimulator pulse generator / transmitter; intraoperative, with programming
95981	Electronic analysis of implanted neurostimulator pulse generator system (e.g., rate, pulse amplitude and duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient measurements) gastric neurostimulator pulse generator / transmitter; subsequent, without reprogramming
95982	Electronic analysis of implanted neurostimulator pulse generator system (e.g., rate, pulse amplitude and duration, configuration of wave form, battery status, electrode selectability, output modulation, cycling, impedance and patient measurements) gastric neurostimulator pulse generator / transmitter; subsequent, with reprogramming
L8680	Implantable neurostimulator electrode, each
L8685	Implantable neurostimulator pulse generator, single array, rechargeable, includes extension
L8686	Implantable neurostimulator pulse generator, single array, nonrechargeable, includes extension
L8687	Implantable neurostimulator pulse generator, dual array, rechargeable, includes extension

L8688 Implantable neurostimulator pulse generator, dual array, nonrechargeable, includes extension

- There are CPT codes specific to insertion of the gastric stimulation device: 43647, 43648, 43881, 43882, 64590, 64595.
- There are also specific codes for electronic analysis and programming of gastric neurostimulator pulse generator: 95980, 95981, 95982.
- The following HCPCS codes may be used: L8680, L8685, L8686, L8687, L8688.

REVISIONS

12-02-2013	Policy added to the bcbsks.com web site on 10-31-2013 for an effective date of 12-02-2013 for professional and institutional.
01-20-2015	Description section updated
	Rationale section updated
	In Coding section: ▪ HCPCS nomenclature updated: L8660 ▪ Updated Coding notations.
	References updated
04-11-2018	Description section updated
	Rationale section updated
	In Coding section: ▪ Updated Coding notations.
	References updated
05-08-2019	Rationale Section updated
	In Coding section: ▪ Updated Coding notations.
	References updated
04-16-2021	Description Section updated
	In Policy section Removed: A. Gastric electrical stimulation is considered **experimental / investigational** for the treatment of gastroparesis of diabetic, idiopathic, or postsurgical etiology. Added: A Gastric electrical stimulation (GES) using the Enterra Therapy System™ may be considered **medically necessary** for the treatment of chronic, intractable (drug refractory) nausea and vomiting secondary to gastroparesis of diabetic or idiopathic etiology when **ALL** of the following criteria are met: 1. Symptomatic gastroparesis ≥ one year, as documented by an initial gastric emptying test; **AND** 2. Refractory or intolerant to at least two anti-emetic and prokinetic drug classes, **AND** 3. On stable medical therapy and, if applicable, stable nutritional support during the month prior to initiation of therapy, **AND** 4. Delayed gastric emptying, defined by > 60% retention at two hours and > 10% retention at four hours, as measured by standardized gastric emptying testing, **AND** 5. As a humanitarian approved device, the Enterra Therapy System™ may only be used in facilities that have an Institutional Review Board (IRB) to supervise clinical testing of the device.
	Rationale Section updated

	References updated
09-10-2021	In the policy section: ▪ Replaced “AND” with “OR” in Item A.4.

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