Subject: Ablative Techniques as a Treatment for Barrett's Esophagus
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Description

This document addresses the use of the following ablative techniques for treating Barrett's esophagus (BE): radiofrequency ablation, cryoablation, laser ablation, argon plasma coagulation, and electrocoagulation.

Clinical Indications

Medically Necessary:

I. High grade dysplasia (HG) or Intramucosal cancer (IMC):

Ablative treatment of Barrett's esophagus is considered **medically necessary** when the following criterion have been met (A, B, *and* C):

A. The pathology findings include *either* of the following**:**
   1. High grade dysplasia (HG); **or**
   2. Intramucosal cancer (IMC);
      and
B. The procedure is intended as an alternative to esophagectomy; **and**
C. *Either* of the following techniques are used:
   1. Radiofrequency ablation; **or**
   2. Cryoablation treatment.

II. Low grade dysplasia (LGD):

Ablative treatment of Barrett's esophagus is considered **medically necessary** when the following criterion have been met (A, B, *and* C):

A. The pathology finding is low grade dysplasia (LGD); **and**
B. The biopsy finding of LGD has been confirmed by two independent physicians*; **and**
C. *Either* of the following techniques are used;
   1. Radiofrequency ablation; **or**
   2. Cryoablation treatment.

*Note: The American Gastroenterological Association recommends that LGD should be confirmed by two pathologists since published studies have reported higher rates of progression of LGD when initial readings have been confirmed by expert pathologists, thereby eliminating or minimizing the rate of false positive diagnoses of LGD.

Not Medically Necessary:

Cryoablation and radiofrequency ablation treatments for Barrett's esophagus are each considered **not medically necessary** when the above criteria have not been met, and for all other indications.

The following techniques as ablative treatment for Barrett's esophagus are considered **not medically necessary** under all circumstances:

1. Electrocoagulation
2. Laser ablation
3. Argon plasma coagulation.

Coding

The following codes for treatments and procedures applicable to this document are included below for informational purposes. Inclusion or exclusion of a procedure, diagnosis or device code(s) does not constitute or imply member coverage or provider reimbursement policy. 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.

When services may be Medically Necessary when criteria are met:

CPT	
	For the following CPT codes **when specified as radiofrequency ablation or cryoablation:**
43229	Esophagoscopy, flexible, transoral; with ablation of tumor(s), polyp(s), or other lesion(s) (includes pre- and post-dilation and guide wire passage, when performed) [*when specified as radiofrequency ablation or cryoablation*]
43270	Esophagogastroduodenoscopy, flexible, transoral; with ablation of tumor(s), polyp(s) or other lesion(s) (includes pre- and post-dilation and guide wire passage, when performed) [*when specified as radiofrequency ablation or cryoablation*]
ICD-10 Procedure	
	For the following ICD-10 procedure codes **when specified as radiofrequency ablation or cryoablation:**
0D514ZZ	Destruction of upper esophagus, percutaneous endoscopic approach
0D518ZZ	Destruction of upper esophagus, via natural or artificial opening endoscopic
0D524ZZ	Destruction of middle esophagus, percutaneous endoscopic approach
0D528ZZ	Destruction of middle esophagus, via natural or artificial opening endoscopic
0D534ZZ	Destruction of lower esophagus, percutaneous endoscopic approach
0D538ZZ	Destruction of lower esophagus, via natural or artificial opening endoscopic
0D544ZZ	Destruction of esophagogastric junction, percutaneous endoscopic approach
0D548ZZ	Destruction of esophagogastric junction, via natural or artificial opening endoscopic
0D554ZZ	Destruction of esophagus, percutaneous endoscopic approach
0D558ZZ	Destruction of esophagus, via natural or artificial opening endoscopic
ICD-10 Diagnosis	
C15.5	Malignant neoplasm of lower third of esophagus

C15.8	Malignant neoplasm of overlapping sites of esophagus
C15.9	Malignant neoplasm of esophagus, unspecified
K22.710-K22.719	Barrett's esophagus with dysplasia

When services are Not Medically Necessary:
For the procedure and diagnosis codes listed above when criteria are not met, or for any other type of ablation other than radiofrequency or cryoablation, or for the following diagnosis:

ICD-10 Diagnosis	
K22.70	Barrett's esophagus without dysplasia

Discussion/General Information

Barrett's esophagus (BE) is a precancerous condition caused by acid damage to the esophageal epithelium. The presence of BE is associated with an increased risk of developing cancer of the esophagus. Surgical treatment options for BE include esophagectomy and endoscopic mucosal resection.

BE occurs as a result of chronic gastroesophageal acid reflux (GERD). GERD affects approximately 20% of the adult population in the United States. Esophageal cancer frequently arises from untreated BE. Once precancerous changes are discovered, the lower esophagus is usually surgically removed, or the abnormal epithelium is endoscopically destroyed. Thermal ablative techniques use heat or cold to destroy abnormal tissue. Thermal ablative techniques include electrocoagulation, argon plasma coagulation, radiofrequency ablation, cryoablation, and laser ablation (neodymium-yttrium aluminum garnet [Nd-YAG] and potassium titanium phosphate [KTP]). Ablation can also be achieved through photochemical injury using a technique called photodynamic therapy.

Radiofrequency Ablation

Radiofrequency ablation uses radio waves and heat to destroy tissue. A balloon catheter containing many small electrodes is placed into the esophagus during endoscopy. Radiofrequency energy is delivered after the balloon is inflated. Literature published when radiofrequency ablation was emerging as a treatment for BE included sham-controlled trials and randomized trials which showed the less invasive technique was effective at reducing risk of disease progression with decreased risk compared with invasive surgical procedures (Haidry, 2015; Phoa, 2014; Shaheen, 2009).

Cotton and colleagues (2017) reported the results from a 5-year follow-up analysis that aimed to evaluate the recurrence of BE in prospectively followed subjects who achieved complete eradication of intestinal metaplasia (CEIM) after radiofrequency ablation as part of a randomized sham-controlled trial. Of 119 subjects, 110 subjects (92%) achieved CEIM. Recurrence of BE or dysplasia after CEIM occurred in 35 of 110 subjects (32%) and of the 35 occurrences, 24 (75%) occurred in the first year. While there was greater probability of recurrence in the first year, neither BE or dysplasia recurred at a constant rate. The authors concluded that subjects who remained free of BE or dysplasia in the first year after radiofrequency ablation had a low risk of recurrence.

Two retrospective cohort studies were released in 2017 that assessed the recurrence of BE, metaplasia, and dysplasia after radiofrequency ablation. Guthikonda and colleagues reported that of 306 subjects, 218 (71%) achieved CEIM. Of the 218 subjects, 52 (24%) had recurrence of BE or metaplasia over 540.6 person-years. Second CEIM was achieved in 30 of the 52 subjects (58%) and 4 subjects (1.8% of total, 7.7% of recurrences) progressed to invasive adenocarcinoma. The authors concluded that in subjects with recurrent BE, radiofrequency ablation helps most subjects achieve second CEIM. Kahn and colleagues divided 173 subjects into one group of 79 subjects (45.7%) who received radiofrequency ablation and another group of 94 subjects (54.3%) who underwent surveillance. After radiofrequency ablation, 7 subjects (8.9%) progressed to HGD or adenocarcinoma compared to 14 subjects (14.9%) undergoing surveillance (p=0.44). The authors concluded that radiofrequency ablation of BE with LGD does not significantly reduce HGD or adenocarcinoma when compared to surveillance.

In 2018, Pandey and colleagues published a systematic review and meta-analysis that evaluated the efficacy of radiofrequency ablation in individuals with LGD. The literature search yielded two randomized controlled trials and six observational cohort studies. The studies included a total of 619 individuals with LGD (radiofrequency ablation=404, surveillance=215). Primary outcome measures included the rates of eradication of CEIM and dysplasia (CE-D). Secondary outcome measures included the recurrence of dysplasia, the rates of progression to HGD or cancer, and adverse events. Follow-up for the eight studies ranged from 12 to 44 months with a median of 26 months. The data showed the overall pooled rates of CEIM and dysplasia after radiofrequency ablation were 88.17% (95% confidence interval [CI], 88.13%-88.20%; p<0.001) and 96.69% (95% CI, 96.67%-96.71%; p<0.001), respectively. Radiofrequency ablation had significantly lower rates of progression to HGD or cancer when compared with surveillance (odds ratio [OR] 0.07; 95% CI, 0.02-0.22). The pooled recurrence rates of intestinal metaplasia and dysplasia were 5.6% (95% CI, 5.57-5.63; p<0.001) and 9.66% (95% CI, 9.61-9.71; p<0.001). While this study shows positive short-term safety and efficacy outcomes in the use of radiofrequency ablation in individuals with LGD, there are several limitations including the potential for selection bias in the included retrospective studies and short-term evaluation in all included studies.

In 2020, Alves and colleagues published a systematic review evaluating diagnosis, treatment, and follow-up of BE. A total of 26 studies specifically addressed treatment, with the majority discussing ablative endoscopic therapies. In comparison, endoscopic resection had higher levels of complications than radiofrequency ablation (24% versus 0%, p=0.02) and required a higher number of therapeutic sessions (6 [1-20] versus 3 [1-8], p=0.00). Other treatment modalities evaluated, such as argon plasma coagulation, did not demonstrate non-inferiority in comparison to radiofrequency ablation. The authors conclude that radiofrequency ablation is the preferred minimally invasive technique for treatment of BE.

In 2021 White and others reported on a prospective, non-randomized trial involving 239 subjects with BE or IMC treated with RFA. The median number of ablation sessions was 3 (range 1–9), and other ablative techniques were used to eradicate small areas of BE in 104 (43.5%) individuals. Argon plasma coagulation was used in the majority of cases (39%) followed by excision biopsy (4%). Resection of metachronous lesions during the initial RFA treatment was required in 13% of subjects. The authors reported a complete remission of intestinal metaplasia (CR-IM) rate of 89.8%, and a complete remission of dysplasia (CR-D) rate of 90.4%. Complete remission was not achieved in 6.7% subjects, primarily due to RFA failure, defined as no endoscopic change in Barrett's length after three sessions, or abandonment.

CR-IM/CR-D was achieved in 150. A total of 6 subjects died in the first 5 years of follow up (4%), all from non-tumor-related causes. In the cohort of individuals who had achieved 5 years of follow up, the 5-year survival rate was 91.9%. During the 15-year follow-up of the study, the overall survival rate was 82% with a median follow up of 38 months (14–60) post CR-IM/CR-D. Recurrence of dysplasia defined as HGD or adenocarcinoma, was detected in 7 subjects (4.7%) after CR-D during the follow-up phase. The median time for recurrence was 14.9 months. No perforations related to RFA were reported, bleeding rate was 0.8%, and stricture rate requiring therapeutic dilatation was 5.4%. The authors concluded that BE endotherapy is minimally invasive, effective, and safe. The data from this longitudinal study provides evidence demonstrating significant long-term health-related outcomes for RFA treatment for BE.

Kobayashi (2021) reported on a case series study involving 433 subjects with BE who were treated with resection and/or RFA. A total of 381 (88%) achieved complete eradication of neoplasia (CE-N). Adequate follow-up was available for 345 (80%) and were included in the analysis. Of that population, a total of 266 (77%) subjects achieved CE-IM at a median follow-up of 45.9 month. Recurrent dysplasia was reported in 20 subjects (5.8%) after achieving CE-N. Survival analysis indicated that time free of recurrence in those who achieved CE-IM was significantly higher than those that did not achieve CE-IM (p=0.002). CE-IM was also associated with a significantly lower hazard of recurrence (HR, 0.2). The number of endoscopic treatments to achieve CE-N was associated with a significantly higher hazard of recurrence (HR 1.1). The authors concluded that, "Achieving CE-IM following CE-N reduces the risk of recurrent dysplasia and should be considered a treatment target among patients with BE undergoing endoscopic therapies."

Wolfson (2022) reported on the long-term durability of RFA for BE in a prospective study involving data from 2535 subjects. The 10-year Kaplan Meier cancer rate was 4.1% with a crude incidence rate of 0.52 per 100 subject years. After 2 years CR-D was 88% and CR-IM was 62.6%; at 8 years, Kaplan Meier relapse rates were 5.9% from CR-D and 18.7% from CR-IM. Most relapses occurred within the first 2 years (2.7%). The authors reported that endoscopic mucosal resection before RFA increased the likelihood of rescue

resection from 17.2% to 41.7%, but did not affect the rate of CR-D, whereas rescue resection after RFA reduced CR-D from 91.4% to 79.7% ($p<0.001$). The authors concluded that “RFA treatment is effective and durable to prevent esophageal adenocarcinoma”.

In 2011, the American Gastroenterological Association (AGA) released its medical position statement on the management of BE. They note the difficulty in distinguishing an accurate degree of dysplasia (low-grade, high-grade, or nondysplastic BE) due to the architecture and aberrancies of the esophagus and that there are no well-defined cut-off points that separate LGD from HGD. The risk of progression from LGD to HGD or adenocarcinoma is not well-known and varies greatly. Rates of progression have been reported as low as 0.22% per year (Bhat, 2011) to 13.4% (AGA, 2011). Despite some variations in determining the risk of progression from LGD to HGD, the AGA report concludes that radiofrequency ablation should be a therapeutic option for those with confirmed LGD in BE. Radiofrequency ablative therapy for those individuals with BE with LGD leads to reversion to normal-appearing squamous epithelium in greater than 90% of cases and the reversion can persist for up to 5 years.

In 2022, the American College of Gastroenterology (Shaheen, 2022) recommended endoscopic ablative therapy for individuals with BE:

17. We recommend endoscopic eradication therapy in patients with BE with HGD or IMC Quality of evidence Moderate, Strength of recommendation Strong
18. We suggest endoscopic eradication therapy in patients with BE with LGD to reduce the risk of progression to HGD or EAC vs close endoscopic surveillance.
    Quality of evidence Moderate, Strength of recommendation Conditional
19. We suggest initial endoscopic resection of any visible lesions before the application of ablative therapy in patients with BE undergoing endoscopic eradication therapy.
    Quality of evidence Very low, Strength of recommendation Conditional

The AGA published a clinical practice update on endoscopic treatment of BE (Sharma, 2020). The update refers to BE therapy (BET) which includes endoscopic mucosal resection, endoscopic submucosal dissection, and/or ablation of the tissue. The update addressing endoscopic ablation states the following:

> Given the presence of level I evidence documenting superiority over endoscopic surveillance and the large number of publications documenting efficacy in a variety of treatment settings, societal guidelines recommend RFA as first-line therapy for ablation of flat-type dysplastic BE or BE after resection of visible lesions.

The National Comprehensive Cancer Network® (NCCN®) Clinical Practice Guideline (CPG) for esophageal and esophagogastric junction cancers (V2.2022) addresses treatment of BE in the following statement:

> The goal of endoscopic therapy [by endoscopic mucosal resection (EMR), endoscopic submucosal dissection (ESD), and/or ablation] is the complete removal or eradication of early-stage disease (pTis, pT1a, selected superficial pT1b without LVI) and pre-neoplastic tissue (Barrett’s esophagus).
>
> If HGD is confirmed, patients should be managed with endoscopic therapy unless they have a life-limiting comorbidity.

Cryoablation

Cryoablation is another treatment for BE. This involves the administration of a cryogen, which is a liquefied gas such as nitrogen or carbon dioxide, through a standard endoscopy to freeze and destroy the diseased tissue (ASGE, 2017). Early literature including pilot studies, prospective studies, and retrospective analyses addressed the use of cryoablation for BE (Dumont, 2009; Greenwald, 2010; Johnston, 2005; Shaheen, 2010). Though there were flaws and biases noted, the authors reported positive results in the treatment of BE with HGD, LGD, and IMC.

In 2017, Künzli and colleagues published a prospective trial to study the efficacy and performance of cryoablation in subjects with flat dysplastic BE. Out of 30 subjects enrolled in the trial, 29 subjects completed the trial with a total of 42 of the 44 identified BE areas (95%) being fully eradicated of intestinal metaplasia and dysplasia through ablation. Some limitations include inclusion of subjects with previous treatment with radiofrequency ablation, a small sample size, the lack of randomization, and a lack of controls. The authors note that the extent of the BE areas treated were limited and further research is needed in cryoablation and subjects with more extensive BE segments.

In 2018, Visrodia and colleagues reported on a systematic review and meta-analysis that evaluated the efficacy of second-line cryoablation in individuals with BE who have persistent dysplasia or intestinal metaplasia after radiofrequency ablation. The literature search yielded 11 studies with a total of 148 participants. Of the 11 studies, 7 were retrospective, 3 were prospective, and 1 did not report the study design. The number of individuals enrolled in each study ranged from 5 individuals to 47 individuals. Two of the studies were multicenter, and 9 of the studies were conducted at single centers. The authors found “the pooled proportion of CE-D was 76.0% (95% CI, 57.7-88.0), with substantial heterogeneity (I^2 = 62%). The pooled proportion of complete eradication of intestinal metaplasia (CE-IM) was 45.9% (95% CI, 32.0-60.5) with moderate heterogeneity (I^2 = 57%). Multiple preplanned subgroup analyses did not sufficiently explain the heterogeneity” (Visrodia, 2018). These results suggest cryoablation as a viable second-line option in individuals with BE who have persistent dysplasia or intestinal metaplasia after radiofrequency ablation.

In 2019, Mohan and colleagues published a systematic review and meta-analysis on cryoablation. The authors aimed to assess the overall efficacy and safety of cryoablation using liquid nitrogen as a treatment option for BE. A total of nine studies with 386 participants were included in the final meta-analysis. There were six retrospective studies and three prospective studies with number of participants ranging from 16 to 81 participants. Four studies were conducted at a single center and five studies were multicenter. The authors found that “the pooled rate of CE-IM was 56.5% (95% CI, 48.5-64.2, I^2 = 47), pooled rate of complete eradication of intestinal dysplasia (CE-D) was 83.5% (95% CI, 78.3-87.7, I^2 = 22.8), and pooled rate of complete eradication of high grade dysplasia CE-HGD was 86.5% (95% CI, 64.4-95.8, I2 = 88.1). Rate of adverse events was 4.7%, and the risk of BE recurrence was 12.7%” (Mohan, 2019). The findings of this meta-analysis show that cryoablation using liquid nitrogen as a treatment option for BE has positive results with a low risk of adverse events.

In 2020, Westerveld and colleagues reported on a systematic review and meta-analysis on the safety and effectiveness of balloon cryoablation for treatment of BE. A review of the evidence resulted in four prospective studies and three retrospective studies with a total of 548 ablation sessions in 272 individuals for inclusion in the meta-analysis. Data showed a pooled rate of technical success (completing ablation as planned) at 95.8% (95% CI: 93.6-97.5%; I^2=13.2%; p=0.3), CE-IM at 85.8% (95% CI: 77.8-92.2 %, I^2=55.5%; p=0.04), and CE-D at 93.8% (95% CI: 85.5-98.7 %, I^2=74.2%; p=0.001). There were 34 (12.5% of individuals) post-procedural adverse events. While this study had several limitations, including lack of large randomized controlled trials, the high rates of CE-IM and CE-D along with a comparable safety profile to spray cryoablation and radiofrequency ablation show balloon cryoablation is an effective treatment strategy for BE.

In 2020, Canto and colleagues published a prospective clinical trial evaluating cryoballoon ablation for eradication of BE. A total of 94 individuals were enrolled and completed cryoballoon ablation. Complete eradication of dysplasia was achieved in 91/94 individuals (97%) and complete eradication of intestinal metaplasia occurred in 86/94 individuals (91%). There were 3 instances that required radiofrequency ablation due to difficulty positioning the balloon or due to repeated balloon deflation. A single individual did progress to neoplasm and required additional treatments. There were no serious adverse events directly related to the procedure, though 1 individual developed a mucosal laceration related to balloon trauma. Cryoballoon ablation showed low rates of postprocedural bleeding and hospitalization, rates were similar to radiofrequency ablation. Cryoballoon ablation for individuals that have not undergone previous ablative techniques showed positive results and was well tolerated.

Fasullo (2021) reported the results of a retrospective comparative trial involving 162 subjects with BE who underwent treatment for BE with either RFA (n=100) or cryoablation with liquid nitrogen spray cryotherapy (n=62). The authors reported on the most common reasons listed in the medical record for choosing cryoablation vs. RFA, with subject preference the most frequent (82.4%), followed by

use of anticoagulation (6.5%) and an alternative to esophagectomy for multi-nodular BE (6.5%). CE-D within 4 ablation sessions was achieved in 77% of subjects and CE-IM in 65%, with no significant difference between the RFA group and cryo groups (81% vs. 71.0%, respectively, p=0.14). The number of sessions required to achieve CE-D was higher in the cryo group vs. the RFA group (4.2 vs. 3.2, p=0.05). Switching procedure types occurred in 15% of subjects who initially underwent RFA and 24% of those that initially received cryotherapy. The most common reason reported for switching was treatment failure, followed by intolerance to initial procedure. No differences between the switching groups were noted with regard to CE-D (p=0.67). Recurrent dysplasia occurred in 11% of RFA and 14% cryo subjects (p=0.52). The likelihood of developing recurrent dysplasia was higher among subjects who did not achieve CE-IM (12%) vs. those who did (4%, p=0.04). No data was provided regarding adverse events. The authors concluded that the two procedures were “equally effective at eradicating dysplasia and IM. Similarly, long-term remission rates were similar regardless of the ablation modality initially selected.”

Laser Ablation

Laser ablation involves the use of high-intensity light to treat cancer. For the esophagus, Nd:YAG lasers are applied through an endoscope and the light is precisely aimed at the diseased tissue, which is destroyed.

Weston and colleagues (2002) reported on the safety and efficacy of laser ablation of BE and HGD. Seventeen participants received laser ablation therapy for high-grade dysplasia. Three participants exited the study. Of the 14 participants who remained in the study, all had successful eradication of their HGD and/or cancer. Eleven participants achieved histologic and endoscopic ablation of all Barrett’s esophageal tissue. Seven of the 11 participants with complete ablation had subsequent follow-up ranging from 2-36 months. Four of the 7 participants demonstrated regrowth, 2 were successfully treated with an electrosurgical generator and 2 were successfully treated with laser ablation. While treatment appears promising, the authors conclude “there is a need for additional controlled trials with a larger number of patients and longer follow-up, as well as for consideration of a head-to-head trial with Photofrin PDT.”

Argon Plasma Coagulation

Argon plasma coagulation is a non-contact thermal method of delivering an electrical current by way of argon gas to the targeted tissue. The argon gas flows through a catheter that is passed through an endoscope. A spark ionizes the argon gas as it is sprayed from the tip of the catheter in the direction of the targeted tissue. This produces tissue coagulation and can be used to treat large surface areas.

In 2007, Mork and colleagues reported on 25 individuals who received argon plasma coagulation and a proton-pump inhibitor prior to and following the ablation procedure. The individuals received endoscopic surveillance following complete eradication of the glandular epithelium and continuing for 51 months with recurrence of BE detected in 14 of the 25 individuals. This study demonstrated a relapse rate of approximately two-thirds after argon plasma eradication of BE. Success rates may be dependent on the thermic energy applied and the proton pump inhibitor schedule. Higher energy may carry more risks, but no standards have been established for this procedure yet.

Formentini (2007) reported on a retrospective analysis of the efficacy of ablation of BE using argon plasma coagulation followed by fundoplication. Twenty-one individuals met study criteria. All individuals received argon plasma coagulation treatments approximately every 4-6 weeks until the metaplastic epithelium was ablated. Then all individuals underwent Nissen fundoplication. Response to treatment was measured every 6-12 months. Recurrence of BE was observed in 6 of the 17 participants. Five of the 6 participants had ablation by argon plasma coagulation (1 participant refused) and were disease-free at the time of publication. The authors acknowledge that “further studies are required to clarify the role of ablation’s procedure in the treatment of BE.”

Bright (2009) reported on a randomized controlled trial which compared 57 participants with BE who underwent argon plasma coagulation versus annual endoscopic surveillance. Annual biopsies were examined by a treatment blinded pathologist (argon plasma coagulation or surveillance). At 12 months, 14 out of 23 participants who had received argon plasma coagulation showed at least 95% ablation of the metaplastic mucosa and 9 participants had complete regression of BE. None of the individuals who had surveillance endoscopy had more than 95% regression. While these results look promising, ablation with argon plasma coagulation is more time-

consuming than routine surveillance endoscopy, participants who have had argon plasma coagulation still need endoscopic surveillance and in this particular study, at least some of the metaplastic columnar mucosa recurred during the first 12 months. It is not possible to predict which individuals will have recurrence and the outcomes at 12 months were not as good as immediately following the treatment. The authors have concluded that argon plasma coagulation "should probably remain within clinical trials."

Manner and colleagues (2014) reported on 63 participants who had been curatively resected of Barrett's neoplasia by endoscopy and were randomized to receive either argon plasma coagulation (n=33) or surveillance only (n=30). The primary outcome was recurrence-free survival. During the follow-up period of 2 years, in the ablation group 1 secondary lesion was found and 11 secondary lesions were found in the surveillance group. While the results showed fewer secondary lesions following argon plasma coagulation, this study was limited by its small group size and according to the authors a "limited follow-up of 2 years."

Shimizu (2012) reported the results of a case series study of 22 subjects with BE who were treated with argon plasma coagulation (40 overall treatments). Both treatment naïve and previously treated individuals were included. Mean follow-up was 134.7 days. Complete resolution of intestinal metaplasia was achieved in 19 of 22 subjects (86.4%) according to histopathology (n=12 with one procedure, n=2 with two procedures, n=1 with three procedures, and n=4 after four treatment procedures). Three individuals did not achieve complete resolution of intestinal metaplasia. Treatment-related strictures requiring balloon dilation occurred in 2 subjects (9.1%). No bleeding or perforation events were reported. This study was limited by its small group size, lack of control group, limited follow-up and other methodological issues.

Knabe (2022) reported the results of a prospective case series study involving 154 subjects with BE treated with hybrid argon plasma coagulation, which consists of argon plasma coagulation following curative endoscopic resection of visible neoplastic lesions. A total of 148 subjects completed the study's 2-year follow-up period. The primary outcome of treatment success was reported to be 83.7% (129/154) in the intent to treat (ITT) analysis. No recurrence was reported in 85 subjects, indicating a successful treatment rate of 65.9% in the ITT population and 70.8% in the per-protocol (PP) analysis. A mean of 2.69 ablation sessions (range 1–5) were reported in the 148 subjects with completed or attempted completed therapy within the protocol. A total of 17 subjects were considered treatment failures. The 2-year recurrence rate was reported to be 34.1% in the ITT analysis and 29.2% in the PP analysis. For combined resection and ablation therapy, CE-IM was reached in 65.9% of cases in the PP analysis and complete eradication of neoplasia (CE-N) was reported in 97.7%. The rate of remaining BE-free at 2 years was 55.2%. The complication rate was 0.5% per procedure session and 6.1% per subject. Two of these complications, major bleeding and perforation (n=1 each) could be considered significant. Post-procedure stricture was reported in 3.9% of subjects and odynophagia in 10.4%. The authors concluded, "Eradication and recurrence rates of Barrett's intestinal metaplasia and neoplasia by means of hybrid argon plasma coagulation at 2 years seem to be within expected ranges. Final evidence in comparison to radiofrequency ablation can only be provided by a randomized comparative trial." While this study had reasonable study population and follow-up, the lack of control group and other methodological issues are problematic. As noted by the authors, an RCT would be helpful to fully evaluate the clinical utility of the hybrid argon plasma coagulation procedure.

Electrocoagulation

Electrocoagulation uses a fine wire probe to deliver radio waves to tissues near the probe. The radio waves cause the tissue to vibrate which increases temperature causing coagulation and leading to destruction of the tissue. Electrocoagulation can be either monopolar or bipolar. For individuals with an implantable device such as a pacemaker or automatic defibrillator, bipolar is the preferred method because the electrical current does not travel beyond the depth of thermal injury and disrupt the programming of these devices. There is minimal literature published for electrocoagulation for use in BE. In 1999, Sharma and colleagues reported on 6 individuals with BE who received laser treatment and electrocoagulation. The number of electrocoagulation sessions ranged from 1-5. Follow-up ranged from 9-86 months. Complete ablation was achieved. The authors concluded "Despite the success achieved in this group of patients, the use of such therapy as an alternative to surgery in all patients with early Barrett's cancer is not currently recommended."

Other Considerations

The gastroenterological societies (American College of Gastroenterology, AGA and American Society of Gastrointestinal Endoscopy) do not have guidelines or position statements endorsing laser ablation, argon plasma ablation or electrocoagulation as a treatment for BE. Current literature consists primarily of uncontrolled, small studies, with only a limited number of randomized controlled trials comparing treatments for BE. While these endoscopic techniques are promising in terms of treating BE, few long-term results are available (Li, 2008). The authors of a Cochrane review in 2010 concluded that ablative therapies have a role in the management of BE, however; “more clinical trial data and in particular randomized controlled trials are required to assess whether or not the cancer risk is reduced in routine clinical practice.”

The American Society for Gastrointestinal Endoscopy (ASGE) (Wani, 2018) published guidelines on endoscopic eradication therapy (EET) for individuals with BE-associated dysplasia and IMC. The ASGE states EET “entails endoscopic mucosal resection (EMR) of visible lesions within the Barrett’s segment and ablative techniques that include radiofrequency ablation (RFA) and cryotherapy” (Wani, 2018). The following is a summary of the ASGE recommendations:

- In Barrett’s esophagus patients with LGD and HGD being considered for EET, we suggest confirmation of diagnosis by at least 1 expert GI pathologist or panel of pathologists compared with review by a single pathologist (Strength of recommendation: Conditional; Quality of evidence: Low).
- In Barrett’s esophagus patients with LGD, we suggest EET compared with surveillance; however, patients who place a high value on avoiding adverse events related to EET may choose surveillance as the preferred option (Strength of recommendation: Conditional; Quality of evidence: Moderate).
- In Barrett’s esophagus patients with confirmed HGD, we recommend EET compared with surveillance (Strength of recommendation: Strong; Quality of evidence: Moderate).
- In Barrett’s esophagus patients with HGD/IMC, we recommend against surgery compared with EET (Strength of recommendation: Strong; Quality of evidence: Very low quality evidence).
- In Barrett’s esophagus patients referred for EET, we recommend endoscopic resection of all visible lesions compared with no endoscopic resection of visible lesions (Strength of recommendation: Strong; Quality of evidence: Moderate).
- In Barrett’s esophagus patients with visible lesions who undergo endoscopic resection, we suggest ablation of the remaining Barrett’s segment compared with no ablation (Strength of recommendation: Conditional; Quality of evidence: Low).
- In Barrett’s esophagus patients with dysplasia and IMC referred for EET, we recommend against routine complete endoscopic resection of entire Barrett’s segment compared with endoscopic resection of visible lesion followed by ablation of remaining Barrett’s segment (Strength of recommendation: Strong; Quality of evidence: Very low).
- In Barrett’s esophagus patients with dysplasia and IMC who have achieved CEIM after EET, we suggest surveillance endoscopy versus no surveillance (Strength of recommendation: Conditional; Quality of evidence: Very low).

Definitions

Argon plasma coagulation: A non-contact thermal technique which uses ionized argon gas to deliver a high-frequency current which coagulates tissue.

Barrett's esophagus (BE): A complication due to chronic severe gastroesophageal reflux disease (GERD), in which the cells that line the esophagus near the stomach become pre-cancerous; resulting in an increased risk of cancer of the esophagus (adenocarcinoma).

Cryoablation: A technique which removes cancerous tissue by killing it with extreme cold.

Electrocoagulation: The use of thermal energy to destroy abnormal tissue.

Endoscopic mucosal resection (EMR): A surgical technique in which fluid is injected into the submucosa, (the layer of the gastrointestinal tract immediately below the mucosa), to elevate the mucosa and allow it to be grabbed with a snare.

Esophagectomy: The surgical removal of a portion of the esophagus; the remaining esophagus is reattached to the stomach so the individual can still swallow.

Laser ablation: The use of high intensity light to treat cancer and other illnesses.

References

Peer Reviewed Publications:

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The use of specific product names is illustrative only. It is not intended to be a recommendation of one product over another, and is not intended to represent a complete listing of all products available.

History

Status	Date	Action
Revised	05/11/2023	Medical Policy & Technology Assessment Committee review (MPTAC). Updated formatting in the Clinical Indications section. Revised MN statements to remove 1 year life expectancy criteria. Updated Discussion and References sections.
Reviewed	05/12/2022	MPTAC review. Updated Discussion/General Information and References sections.
Reviewed	05/13/2021	MPTAC review. Updated Discussion/General Information and References sections. Reformatted Coding section.

Reviewed	05/14/2020	MPTAC review. Updated Discussion/General Information, and References sections.
New	06/06/2019	MPTAC review. Initial document development. Moved content of SURG.00106 Ablative Techniques as a Treatment for Barrett's Esophagus to new clinical utilization management guideline document with the same title. Revised Medically Necessary indications to include IMC and added cryoablation to Medically Necessary criteria. Updated Coding section to include ICD-10-CM codes C15.5, C15.8-C15.9.

Federal and State law, as well as contract language, and Medical Policy take precedence over Clinical UM Guidelines. We reserve the right to review and update Clinical UM Guidelines periodically. Clinical guidelines approved by the Medical Policy & Technology Assessment Committee are available for general adoption by plans or lines of business for consistent review of the medical necessity of services related to the clinical guideline when the plan performs utilization review for the subject. Due to variances in utilization patterns, each plan may choose whether to adopt a particular Clinical UM Guideline. To determine if review is required for this Clinical UM Guideline, please contact the customer service number on the member's card.

Alternatively, commercial or FEP plans or lines of business which determine there is not a need to adopt the guideline to review services generally across all providers delivering services to Plan's or line of business's members may instead use the clinical guideline for provider education and/or to review the medical necessity of services for any provider who has been notified that his/her/its claims will be reviewed for medical necessity due to billing practices or claims that are not consistent with other providers, in terms of frequency or in some other manner.