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Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery

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Endoscopic, arthroscopic, laparoscopic and thorascopic procedures **may be considered medically necessary** as an alternative to the corresponding open surgical procedures when they duplicate the same surgical techniques and principles of the corresponding open technique with the only difference being the surgical access. Some surgeries can combine an open approach with the endoscopic approach, such as a laparoscopic assisted vaginal hysterectomy.

Transanal endoscopic microsurgery (TEMS) **may be considered medically necessary** for treatment of rectal adenomas (benign tumors), including recurrent adenomas that cannot be removed using other means of local excision.

TEMS **may be considered medically necessary** for treatment of clinical stage T1 rectal adenocarcinomas that cannot be removed using other means of local excision and that meet **ALL** of the following criteria:

- Located in the middle or upper part of the rectum; and
- Well or moderately differentiated (G1 or G2) by biopsy; and
- Without lymphadenopathy; and
- Less than 1/3 the circumference of the rectum.

TEMS **is considered experimental, investigational and/or unproven** for treatment of any rectal condition that does not meet the criteria noted above.

Bronchoscopic occlusion of a persistent bronchopleural fistula **may be considered medically necessary** for patients who are not surgical candidates.

The following additional endoscopic, arthroscopic and laparoscopic procedure **is considered experimental, investigational and/or unproven** as the surgical technique differs significantly from the open surgical procedure:

- Thermally-induced capsulorrhaphy of the hip, shoulder, knee, wrist, elbow and ankle including thermal augmentation of joint ligaments (thermal shrinkage).

The surgical instruments, devices and adjuncts a surgeon selects for performing a surgical procedure are regarded as integral to achieving a successful outcome for that procedure. Robotic assistance, as an adjunct to the primary procedure, **is considered not medically necessary**.

NOTE 1: Medical records may be requested for determination of medical necessity. When medical records are requested, a letter of support and/or explanation is helpful but alone will not be considered sufficient documentation to make a medical necessity determination.

Description:

As used in this policy, endoscopic surgery is a general term describing a form of minimally invasive surgery in which access to a body cavity is achieved through several small percutaneous incisions. The surgery is performed using specialized instrumentation inserted through the incisions (i.e., trocar sites) and guided by the use of a fiberoptic endoscope that provides visualization of the body cavity on a video screen. In endoscopic surgery, the surgeon does not have direct visualization of the surgical field, and thus endoscopic techniques require specialized skills compared to the corresponding open surgical techniques. Endoscopic surgery may also refer to the use of a fiberoptic endoscope inserted through a body orifice into a body cavity such as the gastrointestinal tract, bronchi, uterus, or bladder.

While endoscopic surgery is a general term, laparoscopic, thoracoscopic, and arthroscopic surgery describe endoscopic surgery within the abdomen, thoracic cavity, and joint spaces, respectively. In most instances, the endoscopic technique attempts to duplicate the same surgical techniques and principles as the corresponding open techniques, with the only difference being surgical access. For example, laparoscopic cholecystectomy, performed since 1990, espouses the same surgical principles as open cholecystectomy. The advantages of endoscopic surgery include shorter hospital stays and more rapid recovery such that the patient may be able to return to work promptly. Disadvantages include a longer operative time, particularly if the surgeon is early on the learning curve for these techniques.

Some endoscopic approaches entail novel surgical principles, and thus raise issues of safety and effectiveness apart from the safety and effectiveness of the endoscopic approach itself. For example, open herniorrhaphy is typically done from an inguinal approach, while laparoscopic herniorrhaphy involves a unique abdominal approach. In other procedures, the surgical dissection can be done entirely with endoscopic guidance, but the resulting surgical specimen may be too large to remove

through the small trocar incision. Novel approaches have been devised to overcome this limitation. For example, in laparoscopic splenectomy or nephrectomy, the resected specimens are placed into a bag intra-abdominally, morcellated, and then removed through a small muscle-splitting incision. Similarly, laparoscopic colectomy specimens can be removed through either a muscle-splitting incision or transanally for distal specimens. Surgeries can combine an open and laparoscopic approach; for example, laparoscopic-assisted vaginal hysterectomy may entail a laparoscopic surgical dissection, with removal of the specimen through a vaginal incision similar to an open vaginal hysterectomy.

In most instances, it is assumed that an endoscopic approach is a direct substitution for the corresponding open approach. However, the decreased morbidity of endoscopic surgeries in general may broaden the patient selection criteria for certain surgeries. For example, open gastric fundoplication is typically limited to those patients who have failed medical management with histamine 2 blockers and antimotility agents. Now, however, laparoscopic fundoplication may be considered an alternative to lifelong medical management. Similarly, open plantar fasciotomy is typically reserved for those symptomatic patients who have failed a prolonged attempt at conservative management. The decreased morbidity of an endoscopic approach may prompt a shortened period of conservative management.

Transanal Endoscopic Microsurgery (TEMS)

Transanal endoscopic microsurgery (TEMS) is a minimally invasive approach for local excision of rectal lesions that cannot be directly visualized. It is an alternative to open or laparoscopic excision and has been studied in the treatment of both benign and malignant conditions of the rectum.

Transanal endoscopic microsurgery (TEMS) is a minimally invasive approach to local excision of rectal lesions. It has been used in benign conditions such as large rectal polyps (that cannot be removed through a colonoscope), retrorectal masses, rectal strictures, rectal fistulae, pelvic abscesses, and in malignant conditions (e.g., malignant polyps). Use of TEMS for resection of rectal cancers is more controversial. TEMS can avoid the morbidity and mortality associated with major rectal surgery, including the fecal incontinence related to stretching of the anal sphincter, and can be performed under general or regional anesthesia.

The TEMS system has a specialized magnifying rectoscope with ports for insufflation, instrumentation, and irrigation. This procedure has been available for over 20 years in Europe but has not been widely used in the United States (U.S.) Two reasons for this slow adoption are the steep learning curve for the procedure and the limited indications. For example, most rectal polyps can be removed endoscopically, and many rectal cancers need a wide excision and are thus not amenable to local resection.

The most common treatment for rectal cancer is surgery; the technique chosen will depend on several factors. The size and location of the tumor, evidence of local or distal spread, and patient characteristics and goals are

all attributes that will affect treatment approach. Open, wide resections have the highest cure rate but may also have significant adverse events. Most patients find the potential adverse events of lifelong colostomy and/or bowel, bladder, or sexual dysfunction acceptable in the face of a terminal illness. Laparoscopic-assisted surgery, with lymph node dissection as indicated, is technically difficult in the pelvic region but is being investigated as a less invasive alternative to open resection.

Local excision alone does not offer the opportunity for lymph node biopsy and therefore has been reserved for patients in whom the likelihood of cancerous extension is small, local excision can occur under direct visualization in rectal tumors within 10 cm of the anal verge. TEMS extends local excision ability to the proximal rectosigmoid junction. Adenomas, small carcinoid tumors, and nonmalignant conditions (e.g., strictures, abscesses) are amenable to local excision by either method.

The use of local excision in rectal adenocarcinoma is an area of much interest and may be most appropriate in small tumors (<4 cm) confined to the submucosa (T1, as defined by the tumor, node, and metastasis staging system). Presurgical clinical staging, however, may miss up to 15% of regional lymph node spread. During local excision, the excised specimen should be examined by a pathologist; if adverse features such as high-grade pathology or unclear margins are observed, the procedure can be converted to a wider resection. Despite this increased risk of local recurrence, local excision may be an informed alternative for patients. TEMS permits local excision beyond the reach of direct visualization equipment.

Bronchopleural Fistula

A bronchopleural fistula (BPF) is a passageway between the pleural space and the lung which can be caused by various reasons such as rupture of a lung abscess, cysts, and trauma and are associated with a high mortality rate. Initial management will be individualized but may include tube thoracostomy for chest tube drainage and intravenous antibiotic therapy. Subsequent treatment will vary depending on the magnitude and duration of air leak, underlying cause, and the patient's overall medical condition. BPFs that do not heal by this method may be subjected to surgery. However, surgery may not be feasible due to extensive underlying lung disease, comorbidity, poor general condition, or advanced age. Bronchoscopy has been gaining acceptance as a therapeutic modality in patients with BPF. The bronchoscope has been successfully used to visualize the track of a BPF. By using balloons to systematically occlude the bronchial segments, the fistula can be located and sealed. Multiple modalities/devices have been cited for use in closure of the fistula including, ethanol, polyethylene glycol, lead shots, cyanoacrylate glue, fibrin glue, blood clots, antibiotics, albumin-glutaraldehyde tissue adhesive, gel foam, coils, balloon catheter occlusion, silver nitrate, and stents.

Thermal Capsulorrhaphy

Thermal capsulorrhaphy uses thermal energy to restructure collagen in the capsule or ligaments to reduce the capsule size. This procedure has

primarily been evaluated for shoulder joint instability and proposed to treat capsular laxity in other joints.

Shoulder instability is a relatively common occurrence, reported in between 2% and 8% of the population. The condition may arise from a single traumatic event (i.e., subluxation or dislocation), repeated microtrauma, or constitutional ligamentous laxity, resulting in deformation and/or damage in the glenohumeral capsule and ligaments. Shoulder instability may be categorized according to the movement of the humeral head (i.e., either anterior, posterior, inferior, or multidirectional instability). Multidirectional instability most frequently consists of anterior and inferior subluxation or dislocation. Inferior movement is also classified as multidirectional.

Initial treatment of shoulder subluxation or dislocation is conservative in nature followed by range-of-motion and strengthening exercises. However, if instability persists, either activity modifications or surgical treatment may be considered. Activity modification may be appropriate for patients who can identify a single motion that aggravates instability, such as overhead throwing motions. Surgical treatment may be considered in those who are unwilling to give up specific activities (i.e., related to sports) or when instability occurs frequently or during daily activities.

Surgery consists of inspection of the shoulder joint with repair, reattachment, or tightening of the labrum, ligaments, or capsule performed either with sutures or sutures attached to absorbable tacks or anchors. While arthroscopic approaches have been investigated over the past decade, their degree of success has been controversial due to a higher rate of recurrent instability compared with open techniques, thought to be related in part to the lack of restoration of capsular tension. Reports of arthroscopic techniques have described various suturing techniques for tightening the capsule, which require mastery of technically difficult arthroscopic intra-articular knot-tying.

Thermal capsulorrhaphy has been proposed as a technically simpler arthroscopic technique for tightening the capsule and ligaments. The technique is based on the observation that the use of nonablative levels of radiofrequency thermal energy can alter the collagen in the glenohumeral ligaments and/or capsule, resulting in their shrinkage and a decrease in capsular volume, both thought to restore capsular tension. Thermal capsulorrhaphy may be used in conjunction with arthroscopic repair of torn ligaments or other structures (i.e., repair of Bankart or superior labrum anterior and posterior lesion). In addition, thermal capsulorrhaphy has been investigated as an arthroscopic treatment of glenohumeral laxity, a common injury among overhead athletes, such as baseball players, resulting in internal impingement of the posterior rotator cuff against the glenoid labrum. Internal impingement is often accompanied by posterior rotator cuff tearing and labral injury. Thermal capsulorrhaphy has also been proposed as a sole arthroscopic treatment. For example, the technique may be considered in patients with chronic shoulder pain without recognized instability, based on the theory that the pain may be related to occult or microinstability. This diagnosis may be considered when a diagnostic arthroscopy reveals only lax ligaments and is commonly seen among baseball players. Finally,

thermal capsulorrhaphy may be considered in patients with congenital ligamentous laxity, such as Ehlers-Danlos or Marfan syndrome.

While thermal capsulorrhaphy was initially investigated using laser energy, the use of radiofrequency probes is now more commonly employed.

Robotically Assisted Procedures

Robotically assisted procedures are those in which a minimally invasive surgical procedure is performed from a computerized workstation, where a surgeon views the operative field through a specialized camera arrangement, and manipulates robotic arms to hold and position instruments that will grasp, cut, dissect, cauterize and suture tissue via hand controls and foot switches. It may also be used in some traditional open surgical procedures.

NOTE 2: A listing of patient selection criteria for each laparoscopic, thoracoscopic, arthroscopic, and/or endoscopic procedure is beyond the scope of this policy. However, in general, candidates for such an endoscopic procedure should meet patient selection criteria for the corresponding open procedure; endoscopic procedures should not be considered an alternative to appropriate medical management.

Regulatory Status

Transanal Endoscopic Microsurgery (TEMS)

In 2001, the Transanal Endoscopic Microsurgery (TEMS) Combination System and Instrument Set (Richard Wolf Medical Instruments) was cleared for marketing by the U.S. Food and Drug Administration (FDA) through the 510(k) process. The FDA determined that this device was substantially equivalent to existing devices for use in inflating the rectal cavity, endoscopically visualizing the surgical site, and accommodating up to 3 surgical instruments. In 2011, the SILS™ Port (Covidien) was cleared for marketing by the FDA through the 510(k) process. The SILS™ Port is a similar instrument that can be used for rectal procedures including TEMS. Another device determined by the FDA to be substantially equivalent to these devices is the GelPOINT® Path (Applied Medical Resources). FDA product codes: HIF, GCJ, FER.

Thermal Capsulorrhaphy

Thermal capsulorrhaphy is a surgical procedure and, as such, is not subject to regulation by the FDA. Previously a number of electrosurgical cutting and coagulation devices were cleared for marketing by the FDA through the 510(k) process. FDA product code: GEI.

Rationale:

This medical policy was developed in 1999 and has been updated periodically with literature review.

Assessment of efficacy for therapeutic intervention involves a determination of whether an intervention improves health outcomes. The optimal study design for this purpose is a randomized controlled trial (RCT) that includes clinically relevant measures of health outcomes. Intermediate outcome

measures, also known as surrogate outcome measures, may also be adequate if there is an established link between the intermediate outcome and true health outcomes. Nonrandomized comparative studies and uncontrolled studies can sometimes provide useful information on health outcomes but are prone to biases such as noncomparability of treatment groups, placebo effect, and variable natural history of the condition.

Transanal Endoscopic Microsurgery (TEMS)

Rectal Adenoma(s)

The endoscopic approach to benign or premalignant lesions is similar to that throughout the colon, and studies focus on the relative safety of the technique. Although the evidence presented in this section may include adenomas, the focus is on the safety of the procedure.

Systematic Reviews

In 2011, Barendse et al. reported on a systematic review to compare transanal endoscopic microsurgery (TEMS) with endoscopic mucosal resection (EMR) for rectal adenomas larger than 2 cm. (1) Included in the review were 48 TEMS and 20 EMR studies; all were treated as single-arm studies. No controlled trials were identified that compared TEMS with EMR directly. Early adenoma recurrence rates, within 3 months of the procedure, were 5.4% (95% confidence interval [CI], 4.0% to 7.3%) with TEMS and 11.2% (95% CI, 6.0% to 19.9%) with EMR (p=0.04) in pooled estimates. After 3 months, late adenoma recurrence rates in pooled estimates were 3.0% (95% CI, 1.3% to 6.9%) with TEMS and 1.5% (95% CI, 0.6% to 3.9%) for EMR (p=0.29). Lengths of hospitalization and readmission rates did not differ significantly between procedures. For TEMS, mean hospital length of stay was 4.4 days and 2.2 days for EMR (p=0.23). Hospital readmission rates were 4.2% for TEMS and 3.5% for EMR (p=0.64). Complication rates after TEMS, for rectal adenomas only, were 13.0% (95% CI, 9.8% to 17.0%) and 3.8% (95% CI, 2.8% to 5.3%) after EMR, for colorectal adenomas (p<0.001). Postoperative complications were found to increase significantly with larger polyp size (p=0.04). However, postoperative complication rates remained higher for TEMS after adjusting for a larger mean polyp size in the TEMS studies (8.7%; 95% CI, 5.8% to 12.7%) than in EMR studies (4.2%; 95% CI, 2.9% to 6.3%; p=0.007). These results suggest that TEMS may be associated with less early cancer recurrence than with EMR but late cancer recurrence (after 3 months) may not differ significantly between procedures. Complications were significantly higher with TEMS for rectal adenomas larger than 2 cm. This systematic review was limited by the low quality of the available studies, particularly on the single-arm study evidence base.

Middleton et al. (2005) conducted a systematic review of TEMS in 2005 based on published results through August 2002. (2) Three comparative studies, including a randomized control trial (RCT), and 55 case series were included. The first area of study was the safety and efficacy in the removal of adenomas. In the RCT, no difference could be detected in the rate of early complications between TEMS (10.3% of 98 patients) and direct local excision (LE; 17% of 90 patients) (relative risk, 0.61; 95% CI, 0.29 to 1.29).

TEMS resulted in less local recurrence (6% [6/98]) than direct LE (22% [20/90]) (relative risk, 0.28; 95% CI, 0.12 to 0.66). The 6% local recurrence rate for TEMS in this trial is consistent with rates found in TEMS case series.

Case Series

Numerous case series of TEMS have evaluated the treatment of rectal adenomas; many included mixed populations of patients with benign and malignant lesions. (3-15) Most were retrospective, and a few compared outcomes with other case series of standard excision. These case series offer useful information on the completeness of resection, local recurrence, and complications, but do not provide definitive evidence on the comparative efficacy of this procedure because the comparisons were limited by potential selection bias leading to differences in the patient populations.

Al-Najami et al. (2016) reported on longer term follow-up for a prospective cohort study of 280 patients with advanced polyps and early rectal cancer treated with TEMS. (16) Most patients (n=163 [63%]) had benign disease. Postoperative complications were more frequent in malignant cases (24.0%) than in benign cases (10.8%; p=0.03). A standard follow-up protocol was followed by 83% and 85% of benign and malignant cases, respectively. Over a mean follow-up of 16.4 and 15.2 months in the benign and malignant groups, recurrences occurred in 8.3% and 13.5% of patients, respectively.

Section Summary: Rectal Adenoma(s)

There is a lack of high-quality trials comparing TEMS with standard surgical approaches for removal of rectal adenomas. The available evidence is primarily from single-arm studies and has reported that TEMS can be performed with relatively low complication rates and low recurrence rates. It is not possible to determine the comparative efficacy of TEMS and other surgical approaches with certainty based on the available evidence. Systematic reviews of nonrandomized comparative studies have concluded that the local recurrence rate with TEMS may be lower than for other procedures, but that short-term complication rates may be higher. These conclusions are limited by potential selection bias, leading to differences in the patient populations; in particular, it is possible that patients undergoing TEMS have lower disease severity than patients undergoing standard excision. Therefore, it is not possible to form conclusions about the comparative efficacy of TEMS and alternative approaches.

Rectal Adenocarcinoma

Systematic Reviews

A 2015 meta-analysis by Lu et al. compared TEMS with total mesorectal excision for T1 rectal cancer. (17) Studies selected included 1 RCT and 6 non-RCTs (303 treated with TEMS; 557 treated with total mesorectal excision). For the outcome of postoperative recurrence, the rate of local recurrence was higher after TEMS (pooled odds ratio [OR], 4.63; 95% CI, 2.03 to 10.53; p<0.001, I^2=0%). For the 6 studies reporting on overall

survival (OS), there were no significant differences between TEMS and total mesorectal excision groups (pooled OR=0.87; 95% CI, 0.55 to 1.38; p=0.55, I^2=0%).

Clancy et al. published a systematic review in 2015 on the comparative efficacy of TEMS and standard transanal excision for early rectal cancer. (18) Six studies including outcomes for 927 excisions were selected, all of which were nonrandomized. On combined analysis, TEMS had a higher rate of negative surgical margins (OR=5.3; 95% CI 3.2 to 8.7) and a lower rate of recurrence (OR=0.25; 95% CI, 0.15 to 0.40) compared with standard excision. Complication rates did not differ significantly between techniques (OR=1.018; 95% CI, 0.658 to 1.575).

Sajid et al. reported on a systematic review and meta-analysis of TEMS and radical resection for stage T1 and T2 rectal cancers in 2014. (19) Included in the review were 5 RCTs and 5 cohort studies (445 TEMS patients, 438 radical resection patients). In random-effects models, there was a greater risk of local recurrence with TEMS than with radical resection (OR=2.78; 95% CI, 1.42 to 5.44; p<0.003) and a greater risk of overall recurrence (OR=2.01; 95% CI, 1.18 to 3.42; p<0.01). The risk of distant recurrence did not differ significantly between procedures (OR=0.87; 95% CI, 0.41 to 1.83; p=0.71) nor did OS rates (OR=0.90; 95% CI, 0.49 to 1.66; p=0.74). In a subgroup analysis of the 5 RCTs, the risk of overall recurrence remained higher with TEMS (OR=2.21; 95% CI, 1.10 to 4.41; p<0.03). OS rates, however, did not differ significantly between TEMS and radical resection (OR=0.80; 95% CI 0.43 to 1.47; p=0.47), and postoperative complications were significantly lower with TEMS (OR=0.19; 95% CI, 0.08 to 0.44; p<0.001).

In 2011, Wu et al. published a meta-analysis on TEMS and conventional surgery for stage T1 rectal cancers. (20) Five studies were selected, including a prospective RCT and 4 retrospective, nonrandomized studies for a total of 397 (216 TEMS, 181 conventional rectal surgery) patients. Combined analyses were performed for mortality, postoperative complications, recurrence rates, and 5-year survival. No deaths were reported from either procedure, and TEMS had fewer postoperative complications (16/196) than conventional surgery (77/163). On combined analysis, the odds for complications was 0.10 (95% CI, 0.05 to 0.18). There was a higher rate of local recurrence or distant metastasis at 40-month follow-up for TEMS (12% [26/216]) than for conventional radical surgery (0.5% [1/181]). On combined analysis, the odds for recurrence in the conventional surgery group was 8.64 (95% CI, 2.63 to 28.39). The 5-year survival (not specified as disease-specific or overall), as reported in 4 studies, did not differ significantly between groups (80.1% [157/196] for TEMS vs 81% [132/163] for conventional surgery). These results supported the conclusion that TEMS is associated with fewer early complications but higher rates of recurrence than standard resection, with no demonstrable differences in OS.

Sgourakis et al. (2011) conducted a meta-analysis of stage T1 and T2 rectal cancer treatment that compared TEMS with standard resection and transanal excision (TAE). (21) Eleven studies were selected for analysis

and included 3 randomized controlled, 1 prospective, and 7 retrospective trials (total N=1191 patients; 514 TEMS, 291 standard resection, 386 TAE). Numerous combined analyses were performed to measure mortality, complications, and recurrence rates. For postoperative complication rates, combined analysis showed a significantly lower rate of major complications for TEMS than for standard resection (OR=0.24; 95% CI, 0.07 to 0.91). Minor complications did not differ significantly between groups. Overall postoperative complications did not differ significantly between TEMS and TAE when stage T1 and T2 tumor data were pooled. Follow-up for all studies was a mean or median of more than 30 months (except for follow-up >20 months in 1 treatment arm in 2 studies). For T1 tumors, local recurrence was significantly higher for the TEMS group than for the standard resection group (OR=4.92; 95% CI, 1.81 to 13.41), as was overall recurrence (OR=2.03; 95% CI, 1.15 to 3.57). Distant metastasis (OR=1.05; 95% CI, 0.47 to 2.39) and OS (OR=1.14; 95% CI, 0.55 to 2.34) did not differ significantly between groups. Results were similar when data were analyzed for T1 and T2 tumors, except that disease-free survival was significantly longer with TEMS than with TAE. There was less evidence for T2 tumors, and conclusions for that group of patients were less clear. The results of this review also supported conclusions that TEMS is associated with fewer postoperative complications than standard resection, higher local and distant recurrence rates, and no differences in the long-term OS.

Doornebosch et al., in a 2009 systematic review, discussed weaknesses in the evidence and unresolved issues about the role of TEMS. (22) Reviewers posed 3 questions: “First, is there enough evidence to propagate LE as a curative option in selected (T1) rectal carcinomas? Second, if LE is justified, which technique should be the method of choice? Third, can we adequately identify, pre- and postoperatively, tumors suitable for LE?” They noted that selection bias in studies complicated answering the first question; and a significant portion of tumors recurred in all studies using various techniques for LE (including TEMS), although it seemed not to influence survival rates. Reviewers noted that the published case series reporting outcomes after TEMS for T1 rectal carcinomas used inclusion criteria that were not always clear and used of salvage procedures that could introduce bias. TEMS was demonstrated to be a safe procedure in all series; complication rates varied between 5% and 26%, and complications were generally minor. Local recurrence rates for TEMS varied between 4% and 33% in the studies reviewed. On the third question, reviewers assessed whether high recurrence rates could be improved by better tumor selection. They noted that TEMS had been incorporated into surgical practice based largely on retrospective case series, and noted that, despite the lack of level I evidence, its use seemed justified in well-selected T1 rectal cancers. They also indicated that some view TEMS as an alternative for patients with T1 lesions who are currently undergoing other methods of LE (e.g., using the Parks technique instead of radical surgery).

Randomized Controlled Trials

In 2008, G. Lezoche et al. published an RCT evaluating 70 subjects with stage T2 rectal cancer without evidence of lymph node or distant metastasis on imaging. (23) Patients were randomized to TEMS or

laparoscopic resection via total mesorectal excision. All patients received chemoradiation before surgery. Median follow-up was 84 months (range, 72-96 months). Two (5.7%) local recurrences were observed after TEMS and 1 (2.8%) after laparoscopic resection. Distant metastases occurred in 1 patient in each group. The probability of survival from rectal cancer was 94% for both groups.

In 2012, E. Lezoche et al. published a report on a similar RCT of 100 patients with T2 rectal cancers without evidence of lymph node or distant metastasis randomized to TEMS or laparoscopic total mesorectal excision. (24) All patients also received neoadjuvant chemoradiation before surgery. All patients in the TEMS group completed the procedure. With laparoscopic resection, 5 (10%) patients required conversion to open surgery (p=0.028), and 23 patients required a stoma. Postoperative complications did not differ significantly between groups. Disease-free survival also did not differ significantly between groups (p=0.686) at a median follow-up of 9.6 years (range, 4.7-12.3 years for laparoscopic resection; range, 5.5-12.4 years for TEMS). Local recurrence or metastases occurred in 6 TEMS patients and 5 laparoscopic patients. Overlap of patients studied in the 2008 and 2012 trials could not be determined.

Case Series

A large number of case series and retrospective nonrandomized comparative reviews have been published. (3-13) The case series offer useful information on the completeness of resection, local recurrence, and complications, but do not provide definitive evidence on the comparative efficacy of TEMS because the comparisons were limited by potential selection bias leading to differences in patient characteristics.

Much of the research has focused on the technical aspects of TEMS and on other, non-neoplastic applications. Other studies have investigated the use of TEMS with adjuvant therapy or additional techniques. For example, in 2010, Walega et al. reported on a small study that added endoscopic mesorectum resection to TEMS. (25)

In 2008, Moore et al. retrospectively reviewed patients who underwent transanal excision for rectal neoplasms and compared results for traditional transanal resection with TEMS. (26) Of 296 patients identified, 76 were excluded because of surgery due to abscesses, fistulas, inflammatory bowel disease, or multiple lesions. Forty-nine patients were excluded because of incomplete or missing charts. Records of 171 patients were analyzed; 82 patients who underwent TEMS and 89 who had a transanal resection. For patients who received TEMS, those with stage T1 lesions without adverse histologic features (poor differentiation, lymphovascular invasion) received LE alone. Patients with T1 lesions with adverse features or T2 lesions received postoperative chemoradiation. LE was performed for T3 lesions only in high-risk patients or those who refused radical resection. In the TEMS group, there were 40 polyps, 5 carcinoma in situ, 21 T1 lesions, 7 T2 lesions, 8 T3 lesions, no indeterminate lesions, and 1 carcinoid lesion; in the transanal resection group, there were: 38 polyps, 4 carcinoma in situ, 20 T1 lesions, 19 T2 lesions, 6 T3 lesions, 1 indeterminate lesion, and 1 carcinoid lesion. There were 12 (15%)

postoperative complications (4 major) in the TEMS group and 15 (17%) complications in the transanal resection group (6 major). In the TEMS group, 90% had negative tumor margins, and none had indeterminate margins vs 71% negative and 15% indeterminate margins in the transanal resection patients. Local recurrence was less frequent after TEMS (4%) than after transanal resection (24%; p=0.004). The difference between groups in distant recurrence was not statistically significant. Three TEMS patients with malignant lesions underwent radical resection and were excluded from recurrence analyses. The recurrence rate among cancer patients did not differ statistically between groups. For patients with adenomas, the overall recurrence rate after TEMS was 3% and 32% for transanal resection. In patients with polyps, clear margins were achieved more frequently after TEMS (83%) than after transanal resection (61%).

A number of studies identified have raised questions about disease recurrence after TEMS for stage T1 rectal cancer. (27-29) For example, Doornebosch et al. (2010) reported on TEMS for 88 patients, 18 (20.5%) of whom had a local recurrence. (27) Of them, 16 patients had salvage surgery. At 3-year follow-up, the OS rate was 31%, and the cancer-related survival rate was 58%. Authors concluded that further tailoring patient and tumor selection before a decision for LE may improve survival.

In an editorial accompanying this study, Friel (2010) commented on the use of LE in the treatment of T1 rectal lesions. (30) He noted that the reported recurrence rate should raise concerns and calls for additional studies of recurrence with LE to verify the Doornebosch findings. Friel also noted that LE must still be considered as an oncologic compromise between lower surgical morbidity but higher disease recurrence and that, once fully informed, patients may find this compromise acceptable.

Section Summary: Rectal Adenocarcinoma

The evidence on the use of TEMS for rectal adenocarcinoma consists of a limited number of RCTs, nonrandomized studies, and numerous case series. Two RCTs compared TEMS with laparoscopic excision, rather than to standard transanal excision, and may have included overlapping populations. This evidence generally supports the conclusion that TEMS may be associated with lower complication rates than other surgical approaches but that local recurrence rates may be higher with TEMS. However, at least 1 RCT has reported that the complication rates with TEMS did not differ from those for laparoscopic resection. No differences in OS rates have been reported for TEMS vs other approaches. Overall, this evidence has demonstrated that TEMS has efficacy in treating early rectal cancer, but the evidence base is not sufficient to determine the comparative efficacy of TEMS and alternative techniques.

Summary of Evidence for TEMS

For individuals who have rectal adenoma(s) who receive TEMS, the evidence includes a few nonrandomized comparative studies and numerous single-arm case series. Relevant outcomes are overall survival, functional outcomes, health status measures, quality of life, and treatment-related morbidity. The evidence supports conclusions that removal of polyps

by TEMS is associated with low postoperative complication rates and low risk of recurrence. However, due to the low quality of the evidence base, no conclusions can be made on the comparative efficacy of TEMS and standard procedures. The evidence is insufficient to determine the effects of the technology on health outcomes.

For individuals who have early rectal adenocarcinoma who receive TEMS, the evidence includes 2 small randomized controlled trials, a few nonrandomized comparative studies, and numerous single-arm case series. Relevant outcomes are overall survival, functional outcomes, health status measures, quality of life, and treatment-related morbidity. The evidence supports conclusions that TEMS is associated with fewer postoperative complications but higher local recurrence rates and possibly higher rates of metastatic disease. There is no demonstrated difference in long-term overall survival with TEMS in available studies. However, due to the low quality of the evidence base, these conclusions lack certainty. The evidence is insufficient to determine the effects of the technology on health outcomes.

Practice Guidelines and Position Statements

National Comprehensive Cancer Network

The National Comprehensive Cancer Network (NCCN) guidelines on the treatment of rectal cancer (v.3.2017) state that, when criteria for transanal resection are met, transanal endoscopic microsurgery (TEMS) can be used when the tumor can be adequately identified in the rectum. (31) The NCCN further states that TEMS for more proximal lesions (>8 cm from anal verge) may be technically feasible. The guidelines are based on level 2A evidence.

National Cancer Institute

The 2017 National Cancer Institute (NCI) guidelines on treatment of rectal cancer indicate the management of rectal cancer is multimodal and involves a multidisciplinary team of cancer specialists with expertise in gastroenterology, medical oncology, surgical oncology, radiation oncology, and radiology. (32) Based on the increased risk of local recurrence and poor overall prognosis, management of rectal cancer diverges from colon cancer. The differences include surgical technique, use of radiotherapy, and method of chemotherapy administration. Additional issues are maintenance or restoration of the normal anal sphincter and genitourinary function. NCI recommends as a primary treatment for patients with rectal cancer surgical resection of the primary tumor. NCI guidance specific to this evidence review includes "…Transanal local excision and transanal endoscopic microsurgery for select clinically staged T1/T2 N0 rectal cancers.

American Society of Colon and Rectal Surgeons

In 2013, the American Society of Colon and Rectal Surgeons updated its 2010 Practice Parameters for the Management of Rectal Cancer. (33) The 2013 guidelines indicated that curative local excision is an appropriate treatment modality for carefully selected, well to moderately differentiated T1 rectal cancers. Tumor size must be less than 3 cm in diameter and less than one-third of the bowel lumen circumference. Additionally, patients must not have lymphovascular or perineural invasion. The guidelines noted that

visualization with TEMS appears to be superior to the transanal approach, but randomized controlled trials are lacking. T2 lesions should be treated with radical mesenteric excision unless the patient is a poor candidate for a more extensive surgical procedure.

American College of Radiology

The American College of Radiology (ACR) updated its 2010 Appropriateness Criteria on Local Excision of Early-Stage Rectal Cancer in 2015. (34, 35) ACR noted that TEMS is an appropriate operative procedure for locally complete excision of distal rectal lesions and has been "evaluated for curative treatment of invasive cancer." ACR also noted that TEMS has "been shown to be as effective, and associated with less morbidity than conventional transanal excision" and is considered safe after treatment with chemoradiation. These ACR guidelines were based on expert consensus and analysis of current literature.

Bronchopleural Fistula

Although controlled trials are lacking regarding occlusion of persistent bronchopleural fistula via bronchoscopy, the evidence thus far in case reports suggest its efficacy in selected patients not eligible for surgery. Various endoscopic options are successful in 35% to 80% of cases and have been responsible for significantly reducing the morbidity and mortality from bronchopleural fistulae. (37-40)

Thermal Capsulorrhaphy

At the time this medical policy was created, there were minimal data published in the peer-reviewed literature on the use of thermal capsulorrhaphy, and there were a number of unresolved issues on the technique. (41, 42)

Thermal Capsulorrhaphy of the Shoulder

The evidence on thermal capsulorrhaphy of the shoulder is derived from 1 small randomized controlled trial (RCT) several nonrandomized comparative studies, and 2 large case series with midterm follow-up. Reports of adverse events are also reviewed.

Randomized Controlled Trials

In 2006, a Canadian workgroup reported a multicenter RCT that had been recruiting subjects since 1999. (43) Enrollment was slower than anticipated; 19 patients treated with thermal capsulorrhaphy and 15 subjects treated with surgical repair had completed 2-year follow-up as of publication. This trial was completed in February 2010 with an enrollment of 58 patients.

Nonrandomized Comparative Studies

In 2001, Levitz et al. reported a study of 82 baseball players undergoing arthroscopic surgery for internal impingement. (44) The first 51 patients underwent traditional arthroscopic surgery, consisting of débridement of tears in the rotator cuff and attachment of labral tears. There was no attempt to reduce the capsular laxity. The next 31 patients underwent traditional arthroscopic surgery and also underwent thermal capsulorrhaphy.

The main outcome measure was time to return to competition. Among those who did not undergo thermal capsulorrhaphy, 80% returned to competition at a mean time of 7.2 months, with 67% still competing after 30 months. Among those who did undergo thermal capsulorrhaphy, 93% returned to competition at a mean time of 8.4 months, with 90% still competing after 30 months.

In 2000, Savoie and Field compared the outcomes of patients with multidirectional instability who were treated with either thermal capsulorrhaphy (n=30) or arthroscopic capsular shift (i.e., suture repair) (n=26). (45) Additional arthroscopic procedures were performed in both groups, as needed. Two patients treated with thermal capsulorrhaphy had an unsatisfactory outcome compared with 3 patients in the suture repair group.

In 2005, Chen et al. reported on 40 patients who underwent combined arthroscopic labral repair and thermal capsulorrhaphy from 1999 to 2002; the results were compared with a historical control group of 32 patients who underwent the same surgery without capsulorrhaphy during 1996 to 1999. (46) There was no difference in outcomes in the 2 groups, leading the authors to conclude that thermal capsulorrhaphy neither improved nor compromised the results of conventional arthroscopic treatment.

In 2001, Levy et al. reported on 90 patients (99 shoulders) with shoulder instability treated with thermal capsulorrhaphy using either radiofrequency (34 patients, 38 shoulders) or laser energy (56 patients, 61 shoulders) and followed for means of 23 and 40.5 months, respectively. (47) In the laser-treated group, 59% of the patients considered their shoulder(s) to be “better” or “much better;” the failure rate in this group was 36.1%. In the radiofrequency-treated group, 76.3% of patients felt better or much better; the failure rate was a 23.7%.

Case Series

In 2004, D’Alessandro et al. published the results of a prospective study of 84 patients (84 shoulders) who underwent thermal capsulorrhaphy for various indications. (48) With an average follow-up of 38 months, 37% of patients reported unsatisfactory results, based on reports of pain, instability, return to work, and the American Shoulder and Elbow Surgeons Shoulder Assessment score. The authors reported that the high rate of unsatisfactory results was of great concern. Levine et al. reported that the initial wave of enthusiasm for thermal capsulorrhaphy has largely subsided, given the negative results reported by in this study. (49)

In 2007, 2- to 6-year follow-up was reported on 85 of 100 consecutive patients treated with thermal capsulorrhaphy for glenohumeral instability. (50) Thirty-seven patients (43.5%) were considered to have had a failed procedure, defined as recurrent instability, revision of surgery, and recalcitrant pain or stiffness requiring manipulation. Deterioration of efficacy over time was reported from a series of 12 overhead athletes (volleyball, tennis, baseball, swimming) who presented with internal impingement at an average age of 27 years (range, 23-34 years). (51) At 2 years after surgery, average modified Rowe score had increased from 45.8 to 90.4; at 7 years

postoperatively, the Rowe score had decreased to 70.4 and visual analog scale score for pain was 4.8. At 7 years, 25% of athletes reported that they had returned to their preinjury level of competition, 25% played at a lower level, and 50% had stopped because of their shoulder pain.

Thermal Capsulorrhaphy of Other Joints

Literature on thermal capsulorrhaphy for joints other than the shoulder is limited. One small case series (13 patients) from 2007 reported use of thermal capsulorrhaphy for palmar midcarpal instability. (52) A 2008 publication describes thermal capsulorrhaphy for the parapatellar capsule as controversial. (53)

Adverse Events

In 2007, Good et al. conducted a retrospective chart review on patients who had been referred for shoulder stiffness and had developed glenohumeral chondrolysis. (54) Of the 8 patients who had developed glenohumeral chondrolysis after shoulder arthroscopy, 5 had undergone thermal capsulorrhaphy for shoulder instability, and 3 had a thermal procedure with labral repair or synovectomy. The onset was described as early and rapid, with repeat arthroscopy to confirm the diagnosis of chondrolysis and rule out infection at an average of 8 months after the initial shoulder arthroscopy. The mean age of the patients was 23 years (range, 15-39 years). None of the patients had evidence of chondral damage at the index arthroscopy, and none had received postoperative intra-articular pain pumps, a procedure which has also been associated with chondrolysis. The patients required between 1 and 6 procedures after the onset of chondrolysis to manage their pain, including glenoid allograft, humeral head arthroplasty, and total shoulder arthroplasty. Good et al. identified an additional 10 reported cases of glenohumeral chondrolysis following shoulder arthroscopy in the English-language literature. Five of the 10 cases occurred after the use of gentian violet dye injection into the joint to identify a rotator cuff tear; this technique has since been abandoned. Of the remaining 5 reported cases, 4 involved the use of a thermal device during the procedure. An accompanying editorial by the journal's editors concluded that "…pending evidence to the contrary, shoulder thermal capsulorrhaphy is a procedure in which these and other reported risks outweigh any potential benefits." (55)

A 2010 review of shoulder instability in patients with joint hyperlaxity indicates that although initial results with thermal capsulorrhaphy seemed promising, subsequent studies with longer follow-up showed "…unacceptably high failure rates and postoperative complications…" including cases of postoperative axillary nerve palsy and transient deltoid weakness. (56) Abnormal capsular tissue has also been observed in the areas of previous thermal treatment, with either severe thickening or thin, friable deficient capsule. In a 2011 review, Virk and Kocher described thermal capsulorrhaphy as a failed new technology in sports medicine. (57)

In 2016, Chen et al. evaluated several studies in a meta-analysis to assess the effectiveness of arthroscopic vs open surgical techniques on the treatment of shoulder multidirectional instability. (63) Evidence from 36 studies were reviewed. The review noted recurrent instability rate was 9.

% (95 % CI 7.3-12.9 %) in open capsular shift (OCS) group and 6.0 % (95 % CI 3.7-8.9 %) in arthroscopic capsular plication (ACP) group, between which no difference was observed. The thermal capsular shrinkage (TCS) group had a recurrent instability rate of 23.9 % (95 % CI 16.6-32.2 %), significantly higher than the above two groups. In addition, OCS and ACP groups revealed low reoperation rates of approximately 5.2 % (95 % CI 2.7-8.5 %) and 4.8 % (95 % CI 2.3-8.0 %), respectively, lower than that in TCS group of 16.9 % (95 % CI 12.4-21.8 %). Conclusions reached by the reviewers were ACP and OCS techniques have similar primary outcomes, but the former causes less post-operative stiffness. It is suggestible to avoid TCS in the treatment of multidirectional instability.

Practice Guidelines and Position Statements

In 2010, the American Academy of Orthopaedic Surgeons published patient information on thermal capsular shrinkage. (58) The information provided stated that thermal capsular shrinkage was developed as a less invasive way to treat a shoulder that is loose and frequently dislocates. Early short-term results were promising and the procedure gained in popularity. However, more recent results over a longer follow-up period have shown a much higher failure rate and more complications than were first reported. As a result, the procedure is used less frequently.

Summary of Evidence for Thermal Capsulorrhaphy

The literature does not support use of thermal capsulorrhaphy. The few available comparative studies do not support that this procedure is an efficacious treatment for shoulder instability. The case series report a high rate of unsatisfactory results and complications, raising the potential for a net harm. Because of the lack of efficacy and potential for harm, this procedure is considered experimental, investigational and/or unproven.

Robotic Assisted Procedures

Wright and colleagues analyzed complications, transfusion, reoperation, length of stay, death and cost for women who underwent robotic hysterectomy compared with both abdominal and laparoscopic procedures, in a cohort study of 264,758 women who had a hysterectomy performed for benign gynecologic conditions at 441 hospitals in the United States from 2007 to 2010. The results noted included use of robotically assisted hysterectomy increased from 0.5% in 2007 to 9.5% of all hysterectomies in 2010. Three years after the first robotic procedure at hospitals where robotically assisted hysterectomy was performed, robotically assisted hysterectomy accounted for 22.4% of all hysterectomies. The authors also noted the following results: In a propensity score-matched analysis, overall complication rates were similar for robotic-assisted and laparoscopic hysterectomy (5.5% vs 5.3%; relative risk [RR], 1.03; 95% CI, 0.86-1.24). Although patients who underwent a robotic-assisted hysterectomy were less likely to have a length of stay longer than 2 days (19.6% vs 24.9%; RR, 0.78, 95% CI, 0.67-0.92), transfusion requirements (1.4% vs 1.8%; RR, 0.80; 95% CI, 0.55-1.16) and the rate of discharge to a nursing facility (0.2% vs 0.3%; RR, 0.79; 95% CI, 0.35-1.76) were similar. The authors also note in their conclusions that robotically assisted and laparoscopic

hysterectomy has similar morbidity profiles, but the use of robotic technology resulted in substantially more costs (60).

Magheli A. et al. examined the pathological and biochemical outcomes of patients who underwent robot-assisted radical prostatectomy (RARP), laparoscopic radical prostatectomy (LRP), and radical retropubic prostatectomy (RRP). Between 2003 and 2008, five hundred twenty-two consecutive patients who underwent RARP were matched by propensity scoring on the basis of patient age, race, biopsy Gleason score, preoperative prostate-specific antigen, and clinical stage with an equal number of patients who underwent LRP and RRP at a single institution. The authors reported the following in their results; overall positive surgical margin rates were lower among patients who underwent RRP (14.4%) and LRP (13.0%) compared to patients who underwent RARP (19.5%) (P= 0.010). There were no statistically significant differences in positive margin rates between the three surgical techniques for pT2 disease (P= 0.264). Kaplan-Meier analysis did not show any statistically significant differences with respect to biochemical recurrence for the three surgical groups. Conclusions noted by the authors included the following; RRP, LRP and RARP represent effective surgical approaches for the treatment for clinically localized prostate cancer. A higher overall positive SM rate was observed for the RARP group compared to RRP and LRP; however, there was no difference with respect to biochemical recurrence-free survival between groups. The authors also noted that further prospective studies are warranted to determine whether any particular technique is superior with regard to long-term clinical outcomes (61).

Broholm et al. (2016) evaluated the available evidence from randomized controlled trials comparing robot-assisted surgery with open and laparoscopic surgery regardless of surgical procedure. (64) The meta-analyses, which included 20 studies comprising 981 patients, found no significant differences between robot-assisted and laparoscopic surgery regarding blood loss, complication rates, and hospital stay. The reviewers noted in their results that open vs robot- assisted surgery was investigated in 3 studies. A lower blood loss and a longer operative time were found after robot-assisted surgery. No other difference was detected.

Practice Guidelines and Position Statements

The Society of Gynecologic Oncology has developed a consensus statement document regarding robotic-assisted surgery in gynecologic oncology. The document addresses several considerations regarding robotic surgery, including clinical impact, training impact, and quality of life. The authors noted “The need for randomized controlled trials to compare outcomes of robotic technology to other forms of minimally invasive surgery is a topic of debate. Robotics simply represents a new tool to accomplish a minimally invasive procedure. As with other tools for minimally invasive surgery, their broad-based use has been largely incorporated into standard surgical practice based on retrospective analysis and surgeon preference.” The authors’ concluded that current evidence supports equivalence of robotic surgery and laparoscopy in many perioperative outcome measures (62).

Summary of Evidence for Robotic Assisted Procedures

The literature does not support that robotic technology is superior to minimally invasive surgical approaches. It is a tool for minimally invasive surgery, subject to the surgeon's preference, therefore, robotic assistance as an adjunct to the primary procedure is considered not medically necessary

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Each benefit plan, summary plan description or contract defines which services are covered, which services are excluded, and which services are subject to dollar caps or other limitations, conditions or exclusions. Members and their providers have the responsibility for consulting the member's benefit plan, summary plan description or contract to determine if there are any exclusions or other benefit limitations applicable to this service or supply. **If there is a discrepancy between a Medical Policy and a member's benefit plan, summary plan description or contract, the benefit plan, summary plan description or contract will govern.**

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CODING:

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HCPCS Codes
S2300, S2900
ICD-9 Diagnosis Codes
Refer to the ICD-9-CM manual

ICD-9 Procedure Codes
Refer to the ICD-9-CM manual
ICD-10 Diagnosis Codes
Refer to the ICD-10-CM manual
ICD-10 Procedure Codes
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The Centers for Medicare and Medicaid Services (CMS) does have a national Medicare coverage position.

A national coverage position for Medicare may have been changed since this medical policy document was written. See Medicare's National Coverage at <http://www.cms.hhs.gov>.

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Policy History:

Date	Reason
7/1/2018	Document updated with literature review. Coverage unchanged. References 16, 17, 35, 63, and 64 were added.
4/15/2017	Reviewed. No changes.
8/1/2016	Document updated with literature review. Coverage unchanged. The Rationale section was substantially revised.
4/15/2015	Reviewed. No changes.
10/15/2014	Reviewed. The following coverage statement was removed: The following additional endoscopic, arthroscopic and laparoscopic procedures are considered experimental, investigational and unproven as the surgical technique differs significantly from the open surgical procedure: Laparoscopic or percutaneous myolysis of uterine fibroids. (Coverage has been changed.) This topic is now addressed on SUR701.033 Laparoscopic and Percutaneous Techniques for the Myolysis of Uterine Fibroids. CPT/HCPCS code(s) updated.

6/15/2013	Policy updated with literature review. The following was added: The example of “elbow” was added to the experimental, investigational and unproven coverage position for “Thermally-induced capsulorrhaphy”. CPT/HCPCS code(s) updated.
1/1/2011	Policy updated with literature review. The following was added: Bronchoscopic occlusion of a persistent bronchopleural fistula may be considered medically necessary for patients who are not surgical candidates. Updated and added new 2011 CPT codes.
3/1/2010	Policy updated with literature search. Policy statement changed: TEMS may be considered medically necessary for removal of rectal adenomas and selected T1 cancers.
1/1/2009	New CPT/HCPCS Codes
10/1/2008	Codes Revised. Coverage Revised
6/1/2008	Revised/Updated Entire Document
2/15/2007	Codes Revised/Added/Deleted
1/1/2007	Coverage Revised, Codes Revised/Added/Deleted
8/1/2006	Revised/Updated Entire Document
7/14/2005	Coverage Revised
7/1/2005	Codes Revised/Added/Deleted
6/16/2005	Coverage Revised
6/14/2005	Codes Revised/Added/Deleted
5/15/2005	Revised/Updated Entire Document. Codes Revised/Added/Deleted
3/1/2004	Codes Revised/Added/Deleted
12/1/2004	Revised/Updated Entire Document
2/1/2002	Revised/Updated Entire Document
11/1/2000	Revised/Updated Entire Document
1/1/2000	Revised/Updated Entire Document

11/1/1999 Revised/Updated Entire Document

9/1/1999 New Medical Document

Archived Document(s):

Title:	Effective Date:	End Date:
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	04-15-2017	06-30-2018
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	08-01-2016	04-14-2017
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	04-15-2015	07-31-2016
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	10-15-2014	04-14-2015
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	06-15-2013	10-14-2014
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	01-01-2011	06-14-2013
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	03-01-2010	12-31-2010
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	10-01-2008	02-28-2010
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	06-01-2008	09-30-2008
Endoscopic, Arthroscopic, Laparoscopic and Thoracoscopic Surgery	02-15-2008	05-31-2008
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	03-15-2007	02-14-2008
Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	02-15-2007	03-14-2007
Information on Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	08-01-2006	02-14-2007
Information on Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	11-15-2005	07-31-2006

Information on Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	07-14-2005	11-14-2005
Information on Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	06-16-2005	07-13-2005
Information on Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	05-15-2005	06-15-2005
Information on Endoscopic, Arthroscopic, Laparoscopic, and Thoracoscopic Surgery	12-01-2004	05-14-2005
Information on Endoscopic, Arthroscopic, Laparoscopic, Thoracoscopic Surgery	11-01-2000	11-30-2004