



CIGNA MEDICAL COVERAGE POLICY

The following Coverage Policy applies to all plans administered by CIGNA Companies including plans administered by Great-West Healthcare, which is now a part of CIGNA.

**Subject Transmyocardial
Revascularization (TMR) and
Percutaneous Myocardial
Revascularization (PMR)**

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Table of Contents

Coverage Policy	1
General Background	2
Coding/Billing Information	7
References	8
Policy History.....	11

Hyperlink to Related Coverage Policies

INSTRUCTIONS FOR USE

Coverage Policies are intended to provide guidance in interpreting certain **standard** CIGNA HealthCare benefit plans as well as benefit plans formerly administered by Great-West Healthcare. Please note, the terms of a participant's particular benefit plan document [Group Service Agreement (GSA), Evidence of Coverage, Certificate of Coverage, Summary Plan Description (SPD) or similar plan document] may differ significantly from the standard benefit plans upon which these Coverage Policies are based. For example, a participant's benefit plan document may contain a specific exclusion related to a topic addressed in a Coverage Policy. In the event of a conflict, a participant's benefit plan document **always supercedes** the information in the Coverage Policies. In the absence of a controlling federal or state coverage mandate, benefits are ultimately determined by the terms of the applicable benefit plan document. Coverage determinations in each specific instance require consideration of 1) the terms of the applicable group benefit plan document in effect on the date of service; 2) any applicable laws/regulations; 3) any relevant collateral source materials including Coverage Policies and; 4) the specific facts of the particular situation. Coverage Policies relate exclusively to the administration of health benefit plans. Coverage Policies are not recommendations for treatment and should never be used as treatment guidelines. Proprietary information of CIGNA. Copyright ©2010 CIGNA

Coverage Policy

CIGNA covers transmyocardial revascularization (TMR) as medically necessary as sole therapy for the treatment of ischemic heart disease when ALL of the following criteria are met:

- ejection fraction > 30%
- Canadian Cardiovascular Society (CCS) angina class III or IV angina (see appendix A) refractory to optimal medical therapy
- reversible ischemia of left ventricular free wall and coronary artery disease corresponding to regions of myocardial ischemia
- coronary disease not amenable to percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG)

CIGNA covers transmyocardial revascularization (TMR) as medically necessary as an adjunct to coronary artery bypass graft (CABG) for the treatment of ischemic heart disease when ALL of the following criteria are met:

- CCS angina class I-IV
- CABG is indicated as standard of care
- at least one accessible and viable ischemic region with demonstrable coronary artery disease that cannot be bypassed due to any of the following:

- severe diffuse disease
- lack of suitable targets for complete revascularization
- lack of suitable conduits for complete revascularization

CIGNA does not cover percutaneous myocardial revascularization (PMR) because it is considered experimental, investigational or unproven.

General Background

Ischemic heart disease develops when blood flow through one or more coronary arteries is reduced because of atherosclerotic plaques, clot formation, and arterial spasm, and myocardial perfusion becomes inadequate. Cardiac ischemia may cause angina pectoris or, if severe, infarction of a portion of myocardium. Angina has been described as crushing, vise-like, suffocating or squeezing, although in some patients the quality of the sensation is vague and described as a mild pressure or uncomfortable numb or burning sensation. Ischemia may be “silent,” with no identified angina. Some patients experience anginal “equivalents” (i.e., symptoms of myocardial ischemia other than angina), including dyspnea, faintness or fatigue. Ischemic heart disease treatment goals include prevention of myocardial infarction (MI) and death, as well as preservation of myocardial blood flow in order to reduce ischemia and symptoms of angina. Treatment may consist of administration of drugs (e.g., aspirin, beta blockers, nitrates, calcium channel blockers and lipid lowering agents) to reduce the workload of the heart, promote coronary dilation and peripheral arterial vasodilation, or reduce the likelihood of clot formation. Many patients with severe angina experience inadequate response to pharmacological approaches and require surgical treatment such as percutaneous coronary intervention (PCI) with or without stenting, or coronary artery bypass graft (CABG) surgery. Many patients with chronic, severe angina, however, are not candidates for PCI or CABG because of failed prior procedures, diffuse coronary artery disease, distal stenosis, or extremely small coronary arteries.

Transmyocardial Revascularization (TMR)

TMR was developed as an alternative treatment for patients with medically refractory ischemic heart disease whose anatomy is not amenable to PCI or conventional CABG. TMR uses a high-energy laser beam to create small channels or holes in the myocardium. These channels extend from the epicardium through the entire thickness of the myocardium to the endocardium. TMR was originally based on the theory that these channels would allow oxygenated left ventricular blood to directly perfuse the myocardium through sinusoidal spaces in order to alleviate ischemia in potentially viable myocardium, improve ventricular function, and relieve angina. Subsequent observations showing closure of the channels within hours or days despite relief of symptoms led to alternative explanations for the apparent clinical success of the procedure. It has been proposed that TMR improves perfusion by stimulation of angiogenesis, produces a placebo effect, or produces an anesthetic effect due to the destruction of sympathetic nerves carrying pain-sensitive afferent fibers. TMR is usually performed via thoracotomy on the beating heart without the need for cardiopulmonary bypass. TMR may also be performed using a thoracoscopic approach. Complications of TMR include myocardial infarction, arrhythmias, papillary muscle damage, left ventricular dysfunction, and cerebral microembolization (Libby: Braunwald’s Heart Disease, 2007; Bridges, 2006).

U.S. Food and Drug Administration (FDA): Two laser systems for TMR have received FDA approval through the Premarket Approval (PMA) process. The Heart Laser CO₂™ TMR System (PLC Systems, Inc., Milford, MA) was approved in August 1998 for use in the treatment of patients with stable angina (Canadian Cardiovascular Society [CCS] class III or IV) who are refractory to medical treatment secondary to objectively demonstrated coronary artery atherosclerosis not amenable to direct coronary revascularization.

In February 1999, the Eclipse TMR Holmium Laser System™ (Eclipse Surgical Technologies, Inc., Sunnyvale, CA) received FDA approval for treatment of patients with stable angina (i.e., CCS class IV) refractory to medical treatment secondary to objectively demonstrated coronary artery atherosclerosis. Eligible patients must have a region of the myocardium with reversible ischemia not amenable to direct coronary revascularization.

Most studies of TMR evaluate outcomes based on the CCS angina scoring system. This system, a modification of the NYHA functional classification that allows patients to be categorized in more specific terms, has gained widespread acceptance. A comparison of the NYHA and CCS classifications is listed in Appendix A.

Literature Review: Briones et al. (2009) conducted a Cochrane systematic review to assess the efficacy and safety of TMR vs. optimal medical therapy in alleviating the severity of angina and improving survivorship and heart function. Of 1137 participants in the seven included studies, 559 were randomized to TMR. Overall, 43.8% of patients in the treatment group decreased two angina classes, compared to 14.8% in the control group. Mortality analyzed on an intention-to-treat basis was similar in both groups at 30 days (4.0% in the TMR group vs. 3.5% in the control group) and at one year (12.2% in the TMR group vs. 11.9% in the control group). The 30-day mortality as treated, however, was 6.8% in the TMR group compared to 0.8% in the control group, a statistically significant difference. This was attributed mainly to the different mortality in crossover patients, showing the high risk of the procedure under certain circumstances. The authors stated that there is insufficient evidence to conclude that the clinical benefits of TMR outweigh the potential risks. The observed improvement in angina has not been measured using blinded methods and is therefore subject to significant bias, and there was no difference in survival. The authors stated that, on the basis of these unresolved issues, the clinical application of TMR should await unbiased and robust data which show true benefits.

A meta-analysis of survival and relief of angina after transmyocardial revascularization (TMR) (Liao, et al., 2005) evaluated seven randomized trials, including the Aaberge and Allen trials discussed below, that used TMR as sole therapy in 1053 patients. The authors stated that there is general consensus that TMR effectively relieves anginal symptoms, but the mechanism for this effect and the overall utility of TMR remains controversial. The proposed mechanisms of action are angiogenesis, cardiac denervation and placebo effect, although some have attributed long-term angina class improvement to the fact that patients with the most intractable angina were more likely to face procedure-related mortality. In this meta-analysis, the authors assessed this effect in a sensitivity analysis by including deaths as treatment failures. The results nevertheless were not substantially different from the results of the original studies. At one year, TMR produced a significant improvement in angina class but no improvement in survival.

Allen et al. (2004) conducted a multicenter, randomized controlled trial to evaluate five-year mortality and angina class in patients randomized to TMR (n=100) or continued medical management (n=112). All patients had class IV angina with diffuse coronary artery disease and were not candidates for traditional surgery. Follow-up included all-cause mortality and angina class assessment by blinded evaluators. The mean follow-up was 5.7 ± 0.8 years. The mean angina scores for TMR patients were 4.0 at baseline, $1.5 \pm$ at one year, and 1.2 ± 1.1 at a mean of five years. A significantly greater proportion of TMR patients than medical management patients experienced a two or more class improvement in angina—88% vs. 44%, respectively. Average annual mortality beyond one year was 9% in the TMR group compared to 13% in the medical management group. The authors concluded that five-year follow-up demonstrated significantly increased survival in patients randomized to TMR, and that the significant angina relief observed 12 months after sole TMR therapy was sustained and continued to be superior to that observed for patients maintained on continued medical management alone.

Horvath (2002) conducted a meta-analysis of four prospective, randomized controlled trials of TMR as sole therapy for patients with severe angina. A total of 837 patients enrolled in the four trials were randomized on a 1:1 basis to treatment with TMR or maximal medical therapy. Patients were followed for 12 months. The trials by Burkhoff et al. (1999) and Allen et al. (1999) used a Holmium YAG laser, while the trials by Schofield et al. (1999) and Frazier et al. (1999) employed a carbon dioxide (CO₂) laser. Significant symptomatic improvement was seen in patients treated with TMR vs. similar patients who continued on maximal medical therapy. These symptomatic improvements were measured by a reduction in two or more CCS angina classes and the Seattle Angina questionnaire, the SF-36 or the Duke Activity Status Index. Objective data to support these subjective findings was provided by results of myocardial perfusion and exercise tolerance tests. Although symptomatic improvement was seen regardless of the type of laser used, there were significant differences in the perfusion results based on laser wavelength. The CO₂ laser provided greater improvement in perfusion. The author proposed that the lack of documented improvement in perfusion with the Ho:YAG laser could be a reason that long-term results indicate a loss of angina relief in patients treated by Ho:YAG TMR.

Aaberge et al. (2002) published a follow-up of the Norwegian Randomized Trial with Transmyocardial Revascularization to assess late clinical outcome and left ventricular ejection fraction (LVEF) after TMR with CO₂ laser. Patients with refractory angina not eligible for conventional revascularization had been randomized to receive TMR (n=49) or medical treatment (n=50). Patients were evaluated at three, 12 and 43 (range: 32–60) months with end points of angina, hospitalizations due to acute MI or unstable angina, heart failure and LVEF. At a median follow-up of 43 months, total mortality was 23% and did not differ between the groups. A significant

improvement in angina symptoms was still present three to five years after TMR, and the TMR group had fewer hospitalizations due to unstable angina. Heart failure treatment, including increased use of diuretics and angiotensin-converting enzyme inhibitors, was higher in the TMR group than in the medical treatment group, but there was no significant difference in mortality, LVEF, or incidence of acute MI between the two groups.

National Institute for Health and Clinical Excellence (NICE) (United Kingdom)

NICE issued guidance on transmyocardial laser revascularization (TMR) and on percutaneous laser revascularization (PMR) in 2009. Guidance for these procedures was based on a systematic review that included 13 non-randomized studies (8 of TMR, 5 of PMR) and 16 randomized controlled trials (10 of TMR, 6 of PMR) (Campbell et al., 2008)

NICE guidance for TMR states, "Current evidence on transmyocardial laser revascularization for refractory angina pectoris shows no efficacy, based on objective measurements of myocardial function and survival. Current evidence on safety suggests that the procedure may pose unacceptable risk. Therefore, this procedure should not be used." According to the systematic review, twelve-month follow-up mortality rates did not differ between groups, and objective outcome measures (i.e., myocardial perfusion, left ventricular ejection fraction (LVEF) showed no difference between treatment and control groups or between baseline and final measurements. More subjective outcome measures showed a different pattern of effect, however, with Canadian Cardiovascular Society (CCS) angina score reduced significantly in the treatment groups. In terms of safety, the authors noted a statistically significant increase in the risk of perioperative death when TMR is compared to medically managed controls and thoracic sympathectomy.

NICE guidance for PMR states, "Current evidence on percutaneous laser revascularization for refractory angina pectoris shows no efficacy and suggests that the procedure may pose unacceptable safety risks. Therefore, this procedure should not be used." The systematic review states that there was no statistically significant difference in mortality rates between intervention and control groups, and no difference in LVEF between groups or between baseline and final values. There was a significant improvement at twelve months, however, in the number of patients who had improved their angina score by two or more classes. There was no difference in perioperative mortality between groups in the randomized controlled trials, but cardiovascular and vascular adverse effects (e.g., myocardial hematoma, bradycardia, bundle-branch block) were noted in a narrative analysis of non-randomized trials.

The systematic review concluded that TMR and PMR are interventions with a poorly understood mechanism of effect. Patients studied in these trials had severe angina symptoms and had exhausted all forms of conventional therapy, and likely were motivated to want a novel therapy that might provide symptom relief. For outcomes with an objective measure of heart function (e.g., LVEF, myocardial perfusion), no effect was seen with treatment. Patient-reported outcomes (e.g., exercise tolerance, angina score, quality of life) showed a statistically significant effect in favor of treatment, although this effect is lost or much reduced when patients are blinded. The authors further stated that the wider applicability of these findings must also be considered. Most trial participants were male and the majority of trials were undertaken in the United States. There is no evidence to assume that the subjective outcome measures would be the same in different patient populations.

Centers for Medicare & Medicaid Services (CMS): As of July 1, 1999, CMS began covering TMR as a late or last resort for patients with severe (CCS Class III or IV) angina (stable or unstable) that has been found refractory to standard medical therapy, including drug therapy, at the maximum tolerated or maximum safe dosages. The angina symptoms must be caused by areas of the heart not amenable to surgical therapies, such as percutaneous transluminal coronary angioplasty (PTCA), stenting, coronary atherectomy, or coronary bypass. Patients must also have an ejection fraction $\geq 25\%$, areas of viable ischemic myocardium that cannot be revascularized by direct coronary intervention; and must be stabilized or have had maximal efforts to stabilize acute conditions such as severe ventricular arrhythmias, decompensated congestive heart failure, or acute MI.

Percutaneous Myocardial Revascularization (PMR)

PMR, a modification of TMR, is a minimally invasive, catheter-based revascularization technique. In PMR, a fiberoptic catheter is passed from the femoral artery up into the heart. Laser energy is transmitted through the fiberoptic catheter to the endocardial surface of the heart to create partial-thickness myocardial channels. PMR utilizes a fiberoptic catheter inserted through a femoral artery to carry the laser energy to the endocardial surface. Channels made during PMR go through the endocardium into the myocardium but do not extend the

full distance to the epicardial surface as do the channels made with TMR. The procedure is performed in a cardiac catheterization lab using local anesthesia and conscious sedation.

Literature Review: McNab et al. (2006) conducted a randomized, open-label trial of spinal cord stimulation (SCS) vs. percutaneous myocardial revascularization (PMR) in patients with refractory angina. Patients with CCS class III-IV angina and reversible perfusion defects were randomized to SCS (n=34) or PMR (n=34). The primary outcome was total exercise time on a modified Bruce protocol exercise tolerance test (ETT) at 12 months. The mean total exercise time was 6.38 ± 3.45 minutes in the SCS group and 7.41 ± 3.68 minutes in the PMR group at baseline. Thirty patients in each group completed the 12-month follow-up, with a mean total exercise time of 7.08 ± 0.67 minutes in the SCS group and 7.12 ± 0.71 minutes in the PMR group ($p=0.466$). There were no differences in angina-free exercise capacity, CCS class, or quality of life between treatments. SCS patients had more adverse events in the first 12 months ($p=0.001$).

Leon et al. (2005) conducted a blinded, randomized placebo-controlled trial at 14 sites to compare percutaneous laser myocardial revascularization to placebo. A total of 298 patients with a history of coronary artery disease with refractory angina (CCS class III or IV), despite optimal medical therapy, were randomized to low-dose PMR (n=98), high-dose PMR (n=98) or placebo. The low-dose patients received an average of 21 ± 8 laser channels in an average of 1.4 ± 0.5 treatment zones. The high-dose patients received an average of 34 ± 11 laser channels in an average of 1.5 ± 0.5 treatment zones. The primary endpoint was the change in exercise duration from baseline measurements to those taken at six months. There was similar, significant improvement at the six-month follow-up for both the active and placebo patients, and this improvement was maintained at the 12-month follow-up. There was also no difference in the proportion of patients improving to better than CCS class III at six months. The primary safety end-point, 30-day major adverse cardiac events (MACE), occurred in 4.1% of the low-dose patients, 8.2% of the high-dose patients, and 2% of the placebo patients ($p=0.117$). MI (Q-wave or non-Q-wave) occurred in nine of the PMR patients and in none of the placebo patients ($p=0.026$ at 30 days). At six and twelve months after the procedure, there were no statistically significant differences in cumulative death, acute MI, or repeat revascularization among the three treatment groups.

Salem et al. (2004) conducted a double-blind, randomized controlled trial to evaluate the usefulness and safety of PMR for refractory angina pectoris. A total of 82 patients with CCS Class III or IV angina were randomized to PMR with optimal medical therapy (n=40) or to a sham procedure with optimal medical therapy (n=42). All patients, investigators and assessors except for one laser technician were blinded to treatment throughout the 12-month follow-up. The incidence of adverse events was similar in both groups. At 12 months, CCS angina scores improved by two or more classes in significantly more PMR-treated patients than sham-control patients (35% vs. 14%). Angina-specific quality of life measures were significantly higher in the PMR group at each follow-up, and medication usage was similar between the groups at 12 months. The authors concluded that PMR therapy is reasonably safe and effective for symptomatic improvement in patients who are refractory to medical therapy and that the clinical benefit is not attributable to placebo effect.

Stone et al. (2002) conducted a multicenter, randomized controlled trial to evaluate the safety and efficacy of PMR in patients with refractory angina. A total of 141 consecutive patients with CCS Class III or IV angina caused by one or more chronically occluded native coronary arteries in which a PCI had failed were randomized to PMR plus maximal medical therapy or to maximal medical therapy alone. Blinding was accomplished through heavy sedation and the concurrent performance of PCI. A median number of 20 laser channels were created in patients randomized to PMR. At six months, the anginal class improved by two or more classes in 49% of patients assigned to PMR and in 37% of patients assigned to maximal medical therapy. There were no differences in the six-month rates of death, MI or revascularization between the two groups.

There is insufficient evidence in the published medical literature to demonstrate the safety, efficacy and long-term outcomes of percutaneous myocardial revascularization (PMR) in the treatment of refractory angina.

ECRI: An ECRI evidence report, Transmyocardial Laser Revascularization (TMR)/Percutaneous Myocardial Laser Revascularization (PMR) for Treatment of Refractory Angina concluded that TMR appears to be effective at relieving angina symptoms without improving survival in patients who are not amenable to conventional revascularization. Although TMR does not appear to reduce overall hospitalization rates, it does significantly reduce hospitalizations for unstable angina. TMR may also improve exercise tolerance and quality of life, but more evidence is needed to confirm this. For patients eligible for TMR plus CABG, the authors concluded that this treatment appears to be more effective than CABG alone at improving one-year survival. Present evidence

does not suggest that TMR plus CABG reduces angina symptoms or increases exercise tolerance more than CABG alone, but the possibility that a small proportion of patients may receive a benefit by experiencing reduced angina symptoms has not been ruled out.

Regarding PMR, the ECRI report concluded that, in patients with Class III or IV angina, PMR plus medical therapy appears to be more effective at reducing angina symptoms and hospitalizations for unstable angina than medical therapy alone. PMR does not appear to significantly improve survival or exercise tolerance, but it does appear to improve quality of life. The authors stated that PMR may be reasonably safe for patients with medically refractory angina who are not candidates for conventional revascularization techniques. Early and overall mortality rates did not differ significantly between patients receiving PMR plus medical therapy and patients receiving medical therapy alone. The report notes the fact that no laser devices have received FDA approval for PMR (ECRI, 2004).

Professional Societies/Organizations: The American College of Cardiology (ACC)/American Heart Association (AHA) 2004 Guideline Update for Coronary Artery Bypass Graft Surgery (Eagle, et al., 2004) and the ACC/AHA 2002 guideline update for the management of patients with chronic stable angina (Gibbons, et al.) categorize recommendations as Class I, Class IIa, Class IIb, and Class III. Class I is assigned when there is evidence and/or general agreement that a given procedure or treatment is beneficial, useful and effective. Class II is assigned when there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure or treatment. With Class IIa, the weight of evidence/opinion is in favor of usefulness/efficacy, while Class IIb indicates the usefulness/efficacy is less well-established by evidence/opinion. Class III is assigned when there is evidence and/or general agreement that a procedure/treatment is not useful/effective and in some cases may be harmful.

Both of these ACC/AHA guidelines recommend TMR as a Class IIa procedure, stating that TMR alone or in combination with CABG is reasonable in patients with angina refractory to medical therapy who are not candidates for PCI or surgical revascularization. The guideline on chronic stable angina further states that percutaneous TMR technology has not been approved by the FDA and that this technology should still be considered an experimental therapy.

The Society of Thoracic Surgeons Practice Guideline on TMR (Bridges, et al., 2004) made recommendations for the appropriate therapeutic applications of TMR following the format of ACC/AHA guidelines. TMR as sole therapy is recommended by the Society of Thoracic Surgeons as a Class I indication for patients with an ejection fraction > 30% and CCS class III or IV angina refractory to maximal medical therapy. These patients should have reversible ischemia of the left ventricular free wall and coronary artery disease corresponding to the regions of myocardial ischemia. In all regions of the myocardium, the coronary disease must not be amenable to CABG or percutaneous transluminal angioplasty either as a result of severe diffuse disease or lack of suitable conduits for complete revascularization.

TMR as an adjunct to CABG is recommended by the Society of Thoracic Surgeons as a Class IIa indication for patients with angina (Class I–IV) in whom CABG is the standard of care and who also have: 1) at least one accessible and viable ischemic region with demonstrable coronary artery disease that cannot be bypassed because of severe diffuse disease; 2) lack of suitable targets for complete revascularization; or 3) lack of suitable conduits for complete revascularization.

Summary

Transmyocardial revascularization (TMR), performed via thoracotomy or thoracoscopy, has been explored as a treatment option for patients with medically refractory ischemic heart disease as an adjunct to coronary artery bypass graft (CABG) surgery, or as sole therapy for patients who are not candidates for percutaneous coronary intervention (PCI) or CABG. Although TMR has not been shown to provide improved survival or significant improvement in exercise tolerance, there is adequate evidence that TMR may provide durable improvement in anginal symptoms and improved quality of life in carefully selected patients, compared to medical treatment alone.

Percutaneous myocardial revascularization (PMR) is a less-invasive modification of TMR. There is insufficient evidence in the published medical literature to demonstrate the safety, efficacy, and long-term outcomes of percutaneous myocardial revascularization (PMR).

Appendix A
Comparison of New York Heart Association and Canadian Cardiovascular Society
Functional Classifications

Class	New York Heart Association Functional Classification	Canadian Cardiovascular Society Functional Classification
I	Patients with cardiac disease but without resulting limitations of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnea, or anginal pain.	Ordinary physical activity, such as walking and climbing stairs, does not cause angina. Angina with strenuous or rapid or prolonged exertion at work or recreation.
II	Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnea, or anginal pain.	Slight limitation of ordinary activity. Walking or climbing stairs rapidly, walking uphill, walking or stair climbing after meals, in cold, in wind, or when under emotional stress, or only during the few hours after awakening. Walking more than two blocks on the level and climbing more than one flight of ordinary stairs at a normal pace and in normal conditions.
III	Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary physical activity causes fatigue, palpitation, dyspnea, or anginal pain.	Marked limitation of ordinary physical activity. Walking one to two blocks on the level and climbing more than one flight in normal conditions.
IV	Patient with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of cardiac insufficiency or of the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.	Inability to carry on any physical activity without discomfort—anginal syndrome <i>may be present at rest.</i>

Coding/Billing Information

Note: This list of codes may not be all-inclusive.

Covered when medically necessary:

CPT[®]* Codes	Description
33140	Transmyocardial laser revascularization, by thoracotomy; (separate procedure)
33141	Transmyocardial laser revascularization, by thoracotomy; performed at the time of other open cardiac procedure(s)

ICD-9-CM Diagnosis Codes	Description
413.9	Other and unspecified angina pectoris
414.01	Coronary atherosclerosis of native coronary artery
414.3	Coronary atherosclerosis due to lipid rich plaque
414.8	Other specified forms of chronic ischemic heart disease

Experimental/Investigational/Unproven/Not Covered:

CPT [®] * Codes	Description
33999 [†]	Unlisted procedure, cardiac surgery

[†]Note: Experimental, investigational, unproven and not covered when used to report percutaneous myocardial revascularization (PMR).

ICD-9-CM Diagnosis Codes	Description
	All codes

*Current Procedural Terminology (CPT[®]) © 2010 American Medical Association: Chicago, IL.

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Policy History

Pre-Merger Organizations	Last Review Date	Policy Number	Title
CIGNA HealthCare	12/15/2007	0020	Transmyocardial Revascularization (TMR) and Percutaneous Myocardial Revascularization (PMR)
Great-West Healthcare	09/19/07	05.320.02	Transmyocardial Revascularization (TMR) and Percutaneous Myocardial Revascularization

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Connecticut General Life Insurance Company has acquired the business of Great-West Healthcare from Great-West Life & Annuity Insurance Company (GWLA). Certain products continue to be provided by GWLA (Life, Accident and Disability, and Excess Loss). GWLA is not licensed to do business in New York. In New York, these products are sold by GWLA’s subsidiary, First Great-West Life & Annuity Insurance Company, White Plains, N.Y.