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Subject: Partial Left Ventriculectomy and Surgical Ventricular Restoration

THIS MEDICAL COVERAGE GUIDELINE IS NOT AN AUTHORIZATION, CERTIFICATION, EXPLANATION OF BENEFITS, OR A GUARANTEE OF PAYMENT, NOR DOES IT SUBSTITUTE FOR OR CONSTITUTE MEDICAL ADVICE. ALL MEDICAL DECISIONS ARE SOLELY THE RESPONSIBILITY OF THE PATIENT AND PHYSICIAN. BENEFITS ARE DETERMINED BY THE GROUP CONTRACT, MEMBER BENEFIT BOOKLET, AND/OR INDIVIDUAL SUBSCRIBER CERTIFICATE IN EFFECT AT THE TIME SERVICES WERE RENDERED. THIS MEDICAL COVERAGE GUIDELINE APPLIES TO ALL LINES OF BUSINESS UNLESS OTHERWISE NOTED IN THE PROGRAM EXCEPTIONS SECTION.

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DESCRIPTION:

Partial Left Ventriculectomy:

Partial left ventriculectomy (PLV) (also known as the Batista procedure, heart volume reduction surgery, cardio-reduction, left ventricular remodeling, ventricular reduction, or wedge resection of the heart) has been proposed as a surgical procedure to replace or postpone heart transplantation in individuals with dilated non-ischemic cardiomyopathy. During PLV, a viable portion of the enlarged left ventricle is performed, and the resulting mitral regurgitation is repaired with a valve ring. It attempts to improve the mechanical function of the left ventricle by restoring its chamber to optimal size. Often, PLV is accompanied by mitral valve repair. PLV has been investigated as either a “bridge” to transplantation or as an alternative to transplantation.

Surgical Ventricular Restoration:

Surgical ventricular restoration (SVR) is a procedure designed to restore or remodel the left ventricle to its normal, spherical shape and size in individuals with akinetic segments of the heart, secondary to ischemic dilated cardiomyopathy. The SVR procedure may also be referred to as ventricular remodeling, surgical anterior ventricular endocardial restoration (SAVER), or the Dor procedure. SVR is usually performed after coronary artery bypass grafting (CABG) and may precede or be followed by mitral valve repair or replacement and other procedures, such as endocardectomy and cryoablation for treatment of ventricular tachycardia. A key difference between SVR and ventriculectomy (i.e., for aneurysm removal)

is that in SVR, circular “purse string” suturing is used around the border of the aneurysmal scar tissue. Tightening of this suture is believed to isolate the akinetic or dyskinetic scar, bring the healthy portion of the ventricular walls together, and restore a more normal ventricular contour. If the defect is large (ie, an opening >3 cm), the ventricle may also be reconstructed using patches of autologous or artificial material to maintain the desired ventricular volume and contour during closure of the ventriculotomy. In addition, SVR is distinct from partial left ventriculectomy (ie, the Batista procedure), which does not attempt specifically to resect akinetic segments and restore ventricular contour.

The CorRestore™ Patch System is a device approved by the U.S. Food and Drug Administration (FDA) through the 510(k) process that is specifically labeled for use “as an intracardiac patch for cardiac reconstruction and repair.” The device consists of an oval tissue patch made from glutaraldehyde-fixed bovine pericardium. It is identical to other marketed bovine pericardial patches except that it incorporates an integral suture bolster in the shape of a ring that is used along with ventricular sizing devices to restore the normal ventricular contour.

POSITION STATEMENT:

Partial left ventriculectomy is considered **experimental or investigational**. Data in published medical literature are inadequate to permit scientific conclusions on long-term and net health outcomes.

Surgical ventricular restoration is considered **experimental or investigational**. The available clinical evidence is insufficient to permit conclusions on safety and net health outcomes.

BILLING/CODING INFORMATION:

CPT Coding:

33542	Myocardial resection (e.g., ventricular aneurysmectomy) (noncovered if used to report partial left ventriculectomy/Batista procedure)
33548	Surgical ventricular restoration procedure, includes prosthetic patch, when performed (e.g., ventricular remodeling, SVR, SAVER, DOR procedures) (investigational)

NOTE: There is no specific code for partial left ventriculectomy (Batista procedure). CPT 33542 is sometimes reported for this procedure.

REIMBURSEMENT INFORMATION:

Refer to section entitled [POSITION STATEMENT](#).

PROGRAM EXCEPTIONS:

Federal Employee Program (FEP): Follow FEP guidelines.

State Account Organization (SAO): Follow SAO guidelines.

Medicare Advantage products:

The following National Coverage Determination (NCD) was reviewed on the last guideline reviewed date: Partial Ventriculectomy,(20.26) located at cms.gov.

DEFINITIONS:

No guideline specific definitions apply.

RELATED GUIDELINES:

None applicable.

OTHER:

None applicable.

REFERENCES:

1. Blue Cross and Blue Shield Association Medical Policy Reference Manual – 7.01.66 Partial Left Ventriculectomy (Archived 08/09/12).
2. Blue Cross and Blue Shield Association. Medical Policy Reference Manual. 7.01.103 Surgical Ventricular Restoration. (February 2018).
3. Blue Cross and Blue Shield Association Technology Evaluation Center (TEC). Partial Left Ventriculectomy. TEC Assessments 1998, Tab 4.
4. Bockeria LA, Gorodkov AJ, Dorofeev AV, Alshibaya MD; RESTORE Group. Left ventricular geometry reconstruction in ischemic cardiomyopathy patients with predominantly hypokinetic left ventricle. *Eur J Cardiothorac Surg*. 2006 Apr;29 Suppl 1:S251-8. Epub 2006 Mar 29.
5. Bolooki H, DeMarchena E, Mallon SM, Katariya K, Barron M, Bolooki HM, Thurer RJ, Novak S, Duncan RC. Factors affecting late survival after surgical remodeling of left ventricular aneurysms. *J Thorac Cardiovasc Surg*. 2003 Aug;126(2):374-83; discussion 383-5.
6. Buckberg GD. Questions and answers about the STICH trial: a different perspective. *J Thorac Cardiovasc Surg*. 2005 Aug;130(2): 245-9.
7. Centers for Medicare and Medicaid Services (CMS). National Coverage Determination (NCD) for Partial VENTRICULECTOMY (20.26) (04/15/97).
8. Di Donato M, Sabatier M, Dor V, Gensini GF, Toso A, Maioli M, Stanley AW, Athanasuleas C, Buckberg G. Effects of the Dor procedure on left ventricular dimension and shape and geometric correlates of mitral regurgitation one year after surgery. *J Thorac Cardiovasc Surg*. 2001 Jan; 121(1): 91-6.
9. Di Donato M, Toso A, Maioli M, Sabatier M, Stanley AW Jr, Dor V; RESTORE Group. Intermediate survival and predictors of death after surgical ventricular restoration. *Semin Thorac Cardiovasc Surg*. 2001 Oct; 13(4): 468-75. Erratum in: *Semin Thorac Cardiovasc Surg*. 2004 Spring; 16(1): 113.
10. Dickstein K, Cohen-Solal A, Filippatos G, McMurray JJ, Ponikowski P, Poole-Wilson PA, Stromberg A, van Veldhuisen DJ, Atar D, Hoes AW, Keren A, Mebazaa A, Nieminen M, Priori SG, Swedberg K, ESC Committee for Practice Guidelines (CPG), Vahanian A, Camm J, De Caterina R, Dean V, Dickstein K, Filippatos G, Funck-Brentano C, Hellemans I, Kristensen SD, McGregor K, Sechtem U, Silber S, Tendera M, Widimsky P, Zamorano JL, Document Reviewers, Tendera M, Auricchio A, Bax J, Bohm M, Corra U, Della Bella P, Elliott PM, Follath F, Gheorghide M, Hasin Y, Hernborg A, Jaarsma T, Komajda M, Kornowski R, Piepoli M, Prendergast B, Tavazzi L, Vachieri JL, Verheugt FW, Zamorano JL, Zannad F. ESC guidelines for the diagnosis and treatment of acute and chronic heart failure 2008: the Task Force [trunc]. *Eur Heart J* 2008 Oct;29(19):2388-442.

11. Doenst T, Velazquez EJ, Beyersdorf F, Michler R, Menicanti L, Di Donato M, Gradinac S, Sun B, Rao V; STICH investigators. To STICH or not to STICH: we know the answer, but do we understand the question? *J Thorac Cardiovasc Surg.* 2005 Feb; 129(2): 246-9. Review.
12. Domingues JS, et al. Partial Left Ventriculectomy: Have Well-Succeeded Cases and Innovations in the Procedure Been Observed in the Last 12 Years? *Braz J Cardiovasc Surg.* 2015 Sep-Oct;30(5):579-85.
13. ECRI Health Technology Assessment Information Services – Target Fact Sheet “Heart Volume Reduction Surgery” (08/98).
14. ECRI Health Technology Forecast 2002.
15. Hayes, Inc. Hayes Medical Technology Directory. Ventricular Reduction Surgery. Lansdale, PA: Hayes, Inc.; August 2003. Update performed 01/06/08.
16. Heart Failure Society of America, Lindenfeld J, Albert NM, Boehmer JP, Collins SP, Ezekowitz JA, Givertz MM, Katz SD, Klapholz M, Moser DK, Rogers JG, Starling RC, Stevenson WG, Tang WH, Teerlink JR, Walsh MN. Surgical approaches to the treatment of heart failure: HFSA 2010 comprehensive heart failure practice guideline. *J Card Fail* 2010 Jun;16(6):e122-5.]
17. Hunt SA, Abraham WT, Chin MH, Feldman AM, Francis GS, Ganiats TG, Jessup M, Konstam MA, Mancini DM, Michl K, Oates JA, Rahko PS, Silver MA, Stevenson LW, Yancy CW, Antman EM, Smith SC Jr, Adams CD, Anderson JL, Faxon DP, Fuster V, Halperin JL, Hiratzka LF, Jacobs AK, Nishimura R, Ornato JP, Page RL, Riegel B; American College of Cardiology; American Heart Association Task Force on Practice Guidelines; American College of Chest Physicians; International Society for Heart and Lung Transplantation; Heart Rhythm Society. ACC/AHA 2005 Guideline Update for the Diagnosis and Management of Chronic Heart Failure in the Adult: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Update the 2001 Guidelines for the Evaluation and Management of Heart Failure): developed in collaboration with the American College of Chest Physicians and the International Society for Heart and Lung Transplantation: endorsed by the Heart Rhythm Society. *J Am Coll Cardiol.* 2005 Sep 20; 46(6): e1-82.
18. Hunt SA, Abraham WT, Chin MH, Feldman AM, Francis GS, Ganiats TG, Jessup M, Konstam MA, Mancini DM, Michl K, Oates JA, Rahko PS, Silver MA, Stevenson LW, Yancy CW, American College of Cardiology Foundation, American Heart Association. 2009 focused update incorporated into the ACC/AHA 2005 guidelines for the diagnosis and management of heart failure in adults [trunc]. *J Am Coll Cardiol* 2009 Apr 14;53(15):e1-e90.
19. Isomura T, Horii T, Suma H, Buckberg GD; RESTORE Group. Septal anterior ventricular exclusion operation (Pacopexy) for ischemic dilated cardiomyopathy: treat form not disease. *Eur J Cardiothorac Surg.* 2006 Apr;29 Suppl 1: S245-50. Epub 2006 Mar 29.
20. Matsukuma S, Eishi K, Hayashi T, Yamachika S, Hazama S, Ariyoshi T, Takai H, Odate T, Onohara D, Yanatori M. Partial left ventriculectomy for end-stage cardiomyopathy: report of a case. *Ann Thorac Cardiovasc Surg.* 2004 Oct; 10(5): 307-10.
21. Menicanti L, Di Donato M, Frigiola A, Buckberg G, Santambrogio C, Ranucci M, Santo D; RESTORE Group. Ischemic mitral regurgitation: intraventricular papillary muscle imbrication without mitral ring during left ventricular restoration. *J Thorac Cardiovasc Surg.* 2002 Jun; 123(6): 1041-50.
22. National Institute for Clinical Excellence. Partial left ventriculectomy (the Batista procedure). London, UK: National Institute for Clinical Excellence (NICE), 2004:2.
23. Nomura F, Isomura T, Horii T, Irie H, Hoshino J, Makinae H, Suma H. Efficacy of left ventricular restoration with mitral valve surgery for endstage ischemic cardiomyopathy. *Interact Cardiovasc Thorac Surg.* 2006 Apr; 5(2): 179-82. Epub 2006 Feb 1.
24. Pantoja JL, et al. Residual Stress Impairs Pump Function After Surgical Ventricular Remodeling: A Finite Element Analysis. *Ann Thorac Surg.* 2015 Dec;100(6):2198-205.

25. Raman J, Dixit A, Bolotin G, Jeevanandam V. Failure modes of left ventricular reconstruction or the Dor procedure: a multi-institutional perspective. *Eur J Cardiothorac Surg.* 2006 Aug; 30(2): 347-52. Epub 2006 Jul 7.
26. Ribeiro GA, da Costa CE, Lopes MM, Albuquerque AN, Antoniali F, Reinert GA, Franchini KG. Left ventricular reconstruction benefits patients with ischemic cardiomyopathy and non-viable myocardium. *Eur J Cardiothorac Surg.* 2006 Feb; 29(2): 196-201. Epub 2006 Jan 4.
27. Sartipy U, Albåge A, Lindblom D. Risk factors for mortality and hospital re-admission after surgical ventricular restoration. *Eur J Cardiothorac Surg.* 2006 Nov; 30(5): 762-9. Epub 2006 Oct 5.
28. Sartipy U, Albåge A. Versatility of the endoventricular patch technique in repair of postinfarction left ventricular rupture. *Singapore Med J.* 2008 May; 49(5): e134-6.
29. Shipulin VM, Kazakov VA, Suhodolo IV, Krivoshekov EV, Lezhnev AA, Kozlov BN, Vaizov VCh, Miller AA. Causes of repeated remodeling of left ventricle after Dor procedure. *Interact Cardiovasc Thorac Surg.* 2007 Dec; 6(6): 772-7. Epub 2007 Sep 20.
30. Subramanian H, Kunadian B, Dunning J. Is it worth performing surgical ventricular restoration in patients with ischemic cardiomyopathy and akinetic but non-aneurysmal segments in the left ventricle? *Interact Cardiovasc Thorac Surg.* 2008 Aug; 7(4): 702-7. Epub 2008 May 21.
31. Task Force for Diagnosis and Treatment of Acute and Chronic Heart Failure 2008 of European Society of Cardiology, Dickstein K, Cohen-Solal A, Filippatos G, McMurray JJ, Ponikowski P, Poole-Wilson PA, Strömberg A, van Veldhuisen DJ, Atar D, Hoes AW, Keren A, Mebazaa A, Nieminen M, Priori SG, Swedberg K; ESC Committee for Practice Guidelines, Vahanian A, Camm J, De Caterina R, Dean V, Dickstein K, Filippatos G, Funck-Brentano C, Hellemans I, Kristensen SD, McGregor K, Sechtem U, Silber S, Tendera M, Widimsky P, Zamorano JL. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2008: the Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2008 of the European Society of Cardiology. Developed in collaboration with the Heart Failure Association of the ESC (HFA) and endorsed by the European Society of Intensive Care Medicine (ESICM). *Eur Heart J.* 2008 Oct; 29(19): 2388-442.
32. Ueno T, Sakata R, Iguro Y, Yamamoto H, Ueno M, Ueno T, Matsumoto K. Mid-term changes of left ventricular geometry and function after Dor, SAVE, and Overlapping procedures. *Eur J Cardiothorac Surg.* 2007 Jul; 32(1): 52-7. Epub 2007 Mar 29.
33. Velazquez EJ, Lee KL, O'Connor CM, Oh JK, Bonow RO, Pohost GM, Feldman AM, Mark DB, Panza JA, Sopko G, Rouleau JL, Jones RH; STICH Investigators. The rationale and design of the Surgical Treatment for Ischemic Heart Failure (STICH) trial. *J Thorac Cardiovasc Surg.* 2007 Dec; 134(6): 1540-7.
34. Wang Y, et al. Effects of Surgical Ventricular Restoration on Left Ventricular Shape, Size, and Function for Left Ventricular Anterior Aneurysm. *Chin Med J (Engl).* 2017 Jun 20;130(12):1429-1434.

COMMITTEE APPROVAL:

This Medical Coverage Guideline (MCG) was approved by the Florida Blue Medical Policy & Coverage Committee on 08/23/18.

GUIDELINE UPDATE INFORMATION:

12/15/02	Reformat, review & revision of original Medical Coverage Guideline (11/96).
12/15/03	Review and revision of guideline; consisting of updated references and maintaining investigational status.

12/15/04	Review and revision of guideline; consisting of updated references and maintaining investigational status.
01/01/06	Review and revision of guideline; consisting of updated references. Annual HCPCS coding update consisting of the addition of 33548.
11/15/06	Review and revision of guideline consisting of updated references and maintaining investigational status.
07/15/07	Review and revision of guideline consisting of updated references and reformatted guideline.
11/15/08	Review and revision of guideline consisting of updated references and changing name of MCG from "Partial Left Ventriculectomy" to "Partial Left Ventriculectomy and Surgical Ventricular Restoration".
11/15/09	Scheduled review; position statement unchanged, and updated references.
11/15/11	Scheduled review; position statement unchanged; coding section updated; references updated.
01/15/13	Annual review; position statement for partial left ventriculectomy revised; references updated.
05/11/14	Revision: Program Exceptions section updated.
09/15/18	Scheduled review. Revised description section, Maintain position statement. Updated program exceptions and references.