

Surgical Ventricular Restoration

Policy # 00184

Original Effective Date: 01/26/2006

Current Effective Date: 06/01/2026

Applies to all products administered or underwritten by Blue Cross and Blue Shield of Louisiana and its subsidiary, HMO Louisiana, Inc. (collectively referred to as the "Company"), unless otherwise provided in the applicable contract. Medical technology is constantly evolving, and we reserve the right to review and update Medical Policy periodically.

Investigational or experimental services are not covered. This includes any drug, device, procedure, or service provided under the investigational arm of a clinical trial or clinical study. These services are excluded from coverage under benefits.

Services Are Considered Investigational

Coverage is not available for investigational medical treatments or procedures, drugs, devices or biological products.

Based on review of available data the Company considers surgical ventricular restoration (SVR) for the treatment of ischemic dilated cardiomyopathy to be **investigational**.*

Policy Guidelines

Surgical ventricular restoration involves increased physician work compared with standard ventriculectomy. For example, the procedure includes evaluation of the ventricular septum and reshaping of the geometry of the heart. Surgical ventricular restoration is described as a global treatment of left ventricular failure, while conventional left ventricular aneurysmectomy represents a local treatment of a transmural infarct.

Background/Overview

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Surgical ventricular restoration (SVR) is also known as surgical anterior ventricular endocardial restoration, left ventricular reconstructive surgery, endoventricular circular plasty, or the Dor procedure. Named after the surgeon who pioneered the expansion of techniques for ventricular reconstruction and is credited with treating heart failure individuals with SVR and coronary artery bypass grafting (CABG).

Surgical ventricular restoration is usually performed after coronary artery bypass grafting 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 (ie, 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

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is distinct from partial left ventriculectomy (ie, the Batista procedure), which does not attempt specifically to resect akinetic segments and restore ventricular contour.

FDA or Other Governmental Regulatory Approval

U.S. Food and Drug Administration (FDA)

The U.S. Food and Drug Administration (FDA) regulates the marketing of devices used as intracardiac patches through the 510(k) clearance process. These devices are Class II and are identified as apolypropylene, polyethylene terephthalate, or polytetrafluoroethylene patch or pledget placed in the heart that is used to repair septal defects, for patch grafting, to repair tissue, and to buttress sutures. Biological tissue may also be a component of the patches. In 2004, the CorRestore[™] ‡ Patch System (Somanetics; acquired by Medtronic) was cleared for marketing by the FDA 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. FDA product code: DXZ.

In 2020, Ancora Heart announced that it received an FDA investigational device exemption for its AccuCinch^{®‡} ventricular restoration system. This exemption allows Ancora Heart to proceed with an initial efficacy and safety study in patients with heart failure and reduced ejection fraction. In 2022, the FDA granted Breakthrough Device Designation to the AccuCinch^{®‡} ventricular restoration system.

In 2025, BioVentrix announced that the first patient to be enrolled in its pivotal RELIVE (Randomized Evaluation of Less Invasive Ventricular Enhancement) trial had completed treatment with the Revivent System. This system is designed to restore left ventricular function in heart failure patients with reduced ejection fraction and extensive left ventricular scarring from a prior myocardial infarction. The Revivent System was originally granted FDA Breakthrough Device Designation in 2019.

Rationale/Source

This medical policy was developed through consideration of peer-reviewed medical literature generally recognized by the relevant medical community, U.S. Food and Drug Administration approval status, nationally accepted standards of medical practice and accepted standards of medical practice in this community, technology evaluation centers, reference to regulations, other plan medical policies, and accredited national guidelines.

Surgical ventricular restoration is 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.

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Summary of Evidence

For individuals who have ischemic dilated cardiomyopathy who receive surgical ventricular restoration (SVR) as an adjunct to coronary artery bypass grafting (CABG), the evidence includes a large randomized controlled trial (RCT) (another RCT reported results, but most trial enrollees overlapped with those in the larger trial) and uncontrolled studies. Relevant outcomes are overall survival, symptoms, quality of life, hospitalizations, resource utilization, and treatment-related morbidity. The RCT, the Surgical Treatment of Ischemic Heart Failure trial, did not report significant improvements in quality of life outcomes for patients undergoing SVR as an adjunct to standard CABG surgery. Several uncontrolled studies have suggested that SVR can improve hemodynamic functioning in selected patients with ischemic cardiomyopathy; however, these studies are considered lower quality evidence. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Supplemental Information

Practice Guidelines and Position Statement

Guidelines or position statements will be considered for inclusion in 'Supplemental Information' if they were issued by, or jointly by, a US professional society, an international society with US representation, or National Institute for Health and Care Excellence (NICE). Priority will be given to guidelines that are informed by a systematic review, include strength of evidence ratings, and include a description of management of conflict of interest.

American Association for Thoracic Surgery

The American Association for Thoracic Surgery published an expert consensus document on coronary artery bypass grafting (CABG) in patients with ischemic cardiomyopathy and heart failure in 2021. The document notes that tenets of surgical ventricular restoration (SVR) at the time of CABG that may "confer the most benefit to patients include resection of scarred myocardium, reducing ventricular size, and restoring an anatomically elliptical shape"; however, the document notes that "it remains uncertain which patients should receive [SVR] as part of the CABG operation and what the impact is on long-term survival and functional outcome." The American Association for Thoracic Surgery does state that "concomitant SVR should be considered for patients with a true left ventricular aneurysm" (class of recommendation: IIa; level of evidence: B-R).

U.S. Preventive Services Task Force Recommendations

Not applicable.

Medicare National Coverage

There is no national coverage determination. In the absence of a national coverage determination, coverage decisions are left to the discretion of local Medicare carriers.

Ongoing and Unpublished Clinical Trials

Some currently ongoing trials that might influence this review are listed in Table 1.

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Table 1. Summary of Key Trials

NCT No.	Trial Name	Planned Enrollment	Completion Date
<i>Ongoing</i>			
NCT06813820 ^a	RELIVE (Randomized Evaluation of Less Invasive Ventricular Enhancement) Trial	135	Aug 2032
NCT03183895 ^a	Safety and Performance Evaluation of the AccuCinch [®] † Ventricular Repair System for the Treatment of Heart Failure with or Without Functional Mitral Regurgitation Due to Dilated Ischemic or Non-Ischemic Cardiomyopathy - The CorCinch-EU Study	132	Dec 2027
NCT04331769 ^a	Randomized Clinical Evaluation of the AccuCinch [®] † Ventricular Restoration System in Patients Who Present with Symptomatic Heart Failure with Reduced Ejection Fraction (HFrEF): The CORCINCH-HF Study	400	Dec 2030
<i>Unpublished</i>			
NCT04489355	Assessment of Risks and Outcomes of Surgical Intervention in Patients with Ischemic Cardiomyopathy in the Early and Long-Term Postoperative Period, Selection of Optimal Surgical Treatment	260	May 2024

^aDenotes industry-sponsored or cosponsored trial

References

1. Jones RH, Velazquez EJ, Michler RE, et al. Coronary bypass surgery with or without surgical ventricular reconstruction. N Engl J Med. Apr 23 2009; 360(17): 1705-17. PMID 19329820
2. Holly TA, Bonow RO, Arnold JM, et al. Myocardial viability and impact of surgical ventricular reconstruction on outcomes of patients with severe left ventricular dysfunction undergoing coronary artery bypass surgery: results of the Surgical Treatment for Ischemic Heart Failure trial. J Thorac Cardiovasc Surg. Dec 2014; 148(6): 2677-84.e1. PMID 25152476
3. Oh JK, Velazquez EJ, Menicanti L, et al. Influence of baseline left ventricular function on the clinical outcome of surgical ventricular reconstruction in patients with ischaemic cardiomyopathy. Eur Heart J. Jan 2013; 34(1): 39-47. PMID 22584648
4. Michler RE, Rouleau JL, Al-Khalidi HR, et al. Insights from the STICH trial: change in left ventricular size after coronary artery bypass grafting with and without surgical ventricular reconstruction. J Thorac Cardiovasc Surg. Nov 2013; 146(5): 1139-1145.e6. PMID 23111018
5. Kukulski T, She L, Racine N, et al. Implication of right ventricular dysfunction on long-term outcome in patients with ischemic cardiomyopathy undergoing coronary artery bypass grafting

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- with or without surgical ventricular reconstruction. *J Thorac Cardiovasc Surg.* May 2015; 149(5): 1312-21. PMID 25451487
6. Prior DL, Stevens SR, Holly TA, et al. Regional left ventricular function does not predict survival in ischaemic cardiomyopathy after cardiac surgery. *Heart.* Sep 2017; 103(17): 1359-1367. PMID 28446548
 7. Piña IL, Zheng Q, She L, et al. Sex Difference in Patients With Ischemic Heart Failure Undergoing Surgical Revascularization: Results From the STICH Trial (Surgical Treatment for Ischemic Heart Failure). *Circulation.* Feb 20 2018; 137(8): 771-780. PMID 29459462
 8. Mark DB, Knight JD, Velazquez EJ, et al. Quality of life and economic outcomes with surgical ventricular reconstruction in ischemic heart failure: results from the Surgical Treatment for Ischemic Heart Failure trial. *Am Heart J.* May 2009; 157(5): 837-44, 844.e1-3. PMID 19376309
 9. Marchenko A, Chernyavsky A, Efendiev V, et al. Results of coronary artery bypass grafting alone and combined with surgical ventricular reconstruction for ischemic heart failure. *Interact Cardiovasc Thorac Surg.* Jul 2011; 13(1): 46-51. PMID 21402600
 10. Athanasuleas CL, Stanley AW, Buckberg GD, et al. Surgical anterior ventricular endocardial restoration (SAVER) for dilated ischemic cardiomyopathy. *Semin Thorac Cardiovasc Surg.* Oct 2001; 13(4): 448-58. PMID 11807740
 11. Athanasuleas CL, Stanley AW, Buckberg GD, et al. Surgical anterior ventricular endocardial restoration (SAVER) in the dilated remodeled ventricle after anterior myocardial infarction. RESTORE group. Reconstructive Endoventricular Surgery, returning Torsion Original Radius Elliptical Shape to the LV. *J Am Coll Cardiol.* Apr 2001; 37(5): 1199-209. PMID 11300423
 12. Mickleborough LL, Merchant N, Ivanov J, et al. Left ventricular reconstruction: Early and late results. *J Thorac Cardiovasc Surg.* Jul 2004; 128(1): 27-37. PMID 15224018
 13. Bolooki H, DeMarchena E, Mallon SM, et al. Factors affecting late survival after surgical remodeling of left ventricular aneurysms. *J Thorac Cardiovasc Surg.* Aug 2003; 126(2): 374-83; discussion 383-5. PMID 12928633
 14. Sartipy U, Albåge A, Lindblom D. The Dor procedure for left ventricular reconstruction. Ten-year clinical experience. *Eur J Cardiothorac Surg.* Jun 2005; 27(6): 1005-10. PMID 15896609
 15. Hernandez AF, Velazquez EJ, Dillum MK, et al. Contemporary performance of surgical ventricular restoration procedures: data from the Society of Thoracic Surgeons' National Cardiac Database. *Am Heart J.* Sep 2006; 152(3): 494-9. PMID 16923420
 16. Yang T, Yuan X, Li B, et al. Long-term outcomes after coronary artery bypass graft with or without surgical ventricular reconstruction in patients with severe left ventricular dysfunction. *J Thorac Dis.* Apr 28 2023; 15(4): 1627-1639. PMID 37197557
 17. Hamid N, Jorde UP, Reisman M, et al. Transcatheter Left Ventricular Restoration in Patients With Heart Failure. *J Card Fail.* Jul 2023; 29(7): 1046-1055. PMID 36958391
 18. Tulner SA, Bax JJ, Bleeker GB, et al. Beneficial hemodynamic and clinical effects of surgical ventricular restoration in patients with ischemic dilated cardiomyopathy. *Ann Thorac Surg.* Nov 2006; 82(5): 1721-7. PMID 17062236
 19. Tulner SA, Steendijk P, Klautz RJ, et al. Clinical efficacy of surgical heart failure therapy by ventricular restoration and restrictive mitral annuloplasty. *J Card Fail.* Apr 2007; 13(3): 178-83. PMID 17448414

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20. Williams JA, Weiss ES, Patel ND, et al. Outcomes following surgical ventricular restoration for patients with clinically advanced congestive heart failure (New York Heart Association Class IV). J Card Fail. Aug 2007; 13(6): 431-6. PMID 17675056
21. Dzemali O, Risteski P, Bakhtiary F, et al. Surgical left ventricular remodeling leads to better long-term survival and exercise tolerance than coronary artery bypass grafting alone in patients with moderate ischemic cardiomyopathy. J Thorac Cardiovasc Surg. Sep 2009; 138(3): 663-8. PMID 19698853
22. Ohira S, Yamazaki S, Numata S, et al. Ten-year experience of endocardial linear infarct exclusion technique for ischaemic cardiomyopathy. Eur J Cardiothorac Surg. Feb 01 2018; 53(2): 440-447. PMID 29029034
23. Bakaeen FG, Gaudino M, Whitman G, et al. 2021: The American Association for Thoracic Surgery Expert Consensus Document: Coronary artery bypass grafting in patients with ischemic cardiomyopathy and heart failure. J Thorac Cardiovasc Surg. Sep 2021; 162(3): 829-850.e1. PMID 34272070

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01/04/2006	Medical Director review
01/17/2006	Medical Policy Committee review
01/26/2006	Quality Care Advisory Council approval
07/07/2006	Format revision, including addition of FDA and or other governmental regulatory approval and rationale/source. Coverage eligibility unchanged.
01/10/2007	Medical Director review
01/17/2007	Medical Policy Committee approval
01/07/2009	Medical Director review
01/14/2009	Medical Policy Committee approval. No change to coverage.
01/07/2010	Medical Policy Committee approval
01/20/2010	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
01/06/2011	Medical Policy Committee review
01/19/2011	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
03/01/2012	Medical Policy Committee review
03/21/2012	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
03/07/2013	Medical Policy Committee review
03/20/2013	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
03/06/2014	Medical Policy Committee review
03/19/2014	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
03/05/2015	Medical Policy Committee review
03/20/2015	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
08/03/2015	Coding update: ICD10 Diagnosis code section added; ICD9 Procedure code section removed.
03/03/2016	Medical Policy Committee review
03/16/2016	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.

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01/01/2017	Coding update: Removing ICD-9 Diagnosis Codes
05/04/2017	Medical Policy Committee review
05/17/2017	Medical Policy Implementation Committee approval. Deleted “or postinfarction left ventricular aneurysm” from the policy statement.
05/03/2018	Medical Policy Committee review
05/16/2018	Medical Policy Implementation Committee approval. No change to coverage.
05/02/2019	Medical Policy Committee review
05/15/2019	Medical Policy Implementation Committee approval. No change to coverage.
05/07/2020	Medical Policy Committee review
05/13/2020	Medical Policy Implementation Committee approval. No change to coverage.
05/06/2021	Medical Policy Committee review
05/12/2021	Medical Policy Implementation Committee approval. No change to coverage.
05/05/2022	Medical Policy Committee review
05/11/2022	Medical Policy Implementation Committee approval. No change to coverage.
05/04/2023	Medical Policy Committee review
05/10/2023	Medical Policy Implementation Committee approval. No change to coverage.
05/02/2024	Medical Policy Committee review
05/08/2024	Medical Policy Implementation Committee approval. No change to coverage.
05/01/2025	Medical Policy Committee review
05/13/2025	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.
05/07/2026	Medical Policy Committee review
05/13/2026	Medical Policy Implementation Committee approval. Coverage eligibility unchanged.

Next Scheduled Review Date: 05/2027

Coding

The five character codes included in the Louisiana Blue Medical Policy Coverage Guidelines are obtained from Current Procedural Terminology (CPT®)†, copyright 2025 by the American Medical Association (AMA). CPT is developed by the AMA as a listing of descriptive terms and five character identifying codes and modifiers for reporting medical services and procedures performed by physician.

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contains the complete and most current listing of CPT codes and descriptive terms. Applicable FARS/DFARS apply.

CPT is a registered trademark of the American Medical Association.

Codes used to identify services associated with this policy may include (but may not be limited to) the following:

Code Type	Code
CPT	33548
HCPCS	No codes
ICD-10 Diagnosis	All Related Diagnoses

*Investigational – A medical treatment, procedure, drug, device, or biological product is Investigational if the effectiveness has not been clearly tested and it has not been incorporated into standard medical practice. Any determination we make that a medical treatment, procedure, drug, device, or biological product is Investigational will be based on a consideration of the following:

- A. Whether the medical treatment, procedure, drug, device, or biological product can be lawfully marketed without approval of the U.S. Food and Drug Administration (FDA) and whether such approval has been granted at the time the medical treatment, procedure, drug, device, or biological product is sought to be furnished; or
- B. Whether the medical treatment, procedure, drug, device, or biological product requires further studies or clinical trials to determine its maximum tolerated dose, toxicity, safety, effectiveness, or effectiveness as compared with the standard means of treatment or diagnosis, must improve health outcomes, according to the consensus of opinion among experts as shown by reliable evidence, including:
 1. Consultation with technology evaluation center(s);
 2. Credible scientific evidence published in peer-reviewed medical literature generally recognized by the relevant medical community; or
 3. Reference to federal regulations.

‡ Indicated trademarks are the registered trademarks of their respective owners.

NOTICE: If the Patient's health insurance contract contains language that differs from the BCBSLA Medical Policy definition noted above, the definition in the health insurance contract will be relied upon for specific coverage determinations.

NOTICE: Medical Policies are scientific based opinions, provided solely for coverage and informational purposes. Medical Policies should not be construed to suggest that the Company recommends, advocates, requires, encourages, or discourages any particular treatment, procedure, or service, or any particular course of treatment, procedure, or service.

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NOTICE: Federal and State law, as well as contract language, including definitions and specific contract provisions/exclusions, take precedence over Medical Policy and must be considered first in determining eligibility for coverage.

NOTICE: If an authorization for an ongoing course of treatment has been provided to a member and the member changes from one health plan to another health plan (e.g., a member moves from carrier A to Louisiana Blue), Louisiana Blue may honor the previous health plan's authorization for the same service under the same type of in-network benefit for a 90-day transition period. Documentation of the authorization for the ongoing course of treatment from the previous health plan must be provided to us by the member or their provider and the services provided for the course of treatment must otherwise be a covered service under the Louisiana Blue health plan. This provision does not apply to medications covered under the plan's pharmacy benefit.