Medical Coverage Policy | Minimally Invasive Coronary Artery Bypass Graft Surgery

EFFECTIVE DATE: 12|07|2010
POLICY LAST UPDATED: 04|20|2022

OVERVIEW

This medical policy documents the coverage determination for minimally invasive coronary artery bypass graft surgery. There are currently variations on techniques that are classified as "minimally invasive" coronary artery bypass graft (CABG) surgery. The surgery can be done under direct vision, with a mini-sternotomy or a mini-thoracotomy approach. The surgery can also be performed endoscopically, whereby the internal structures are visualized on a video monitor, and the entire procedure is performed without direct visualization of the operative field.

MEDICAL CRITERIA

Not applicable

PRIOR AUTHORIZATION

Not applicable

POLICY STATEMENT

Medicare Advantage Plans and Commercial Products

Minimally invasive direct coronary artery bypass graft surgery (MIDCAB) may be considered medically necessary.

Other techniques for minimally invasive coronary artery bypass graft surgery, including but not limited to port access coronary artery bypass (PACAB), hybrid coronary artery bypass graft (hybrid CABG), or total endoscopic coronary artery bypass (TECAB) techniques, are considered not covered for Medicare Advantage Plans and not medically necessary for Commercial products, as there is insufficient evidence to determine whether outcomes have improved compared to conventional procedures.

COVERAGE

Benefits may vary between groups/contracts. Please refer to the appropriate Benefit Booklet, Evidence of Coverage, or Subscriber Agreement for limitations of benefits/coverage when services are not medically necessary.

BACKGROUND

There are currently variations on techniques that are classified as minimally invasive coronary artery bypass graft surgery. The surgery can be done under direct vision, with a mini-sternotomy or a mini-thoracotomy approach. These types of direct procedures have been termed minimally invasive direct coronary artery bypass. MIDCAB is performed without cardiopulmonary bypass by slowing the heart rate to 40 beats per minute to minimize motion in the surgical field. The performance of a coronary bypass on a beating heart increases the technical difficulty of the procedure, particularly in terms of the quality of the vessel anastomosis. In MIDCAB, the predominant re-anastomosis performed uses the native internal mammary artery to bypass the left anterior descending (LAD) coronary artery. Bypass of the right coronary artery may also be possible in patients with suitable anatomy.

The surgery can also be performed endoscopically, whereby the internal structures are visualized on a video monitor, and the entire procedure is performed without direct visualization of the operative field. Cardiopulmonary bypass may or may not be used with this technique. This variation of minimally invasive CABG is called port access coronary artery bypass or total endoscopic coronary artery bypass. Using this

approach, theoretically all sides of the heart can be approached. In many instances, only a single bypass of the LAD artery is performed, although multivessel bypass of the left and right coronary artery has been performed.

Minimally invasive CABG is a surgical procedure and, as such, is not subject to regulation by the U.S. Food & Drug Administration (FDA). The procedure can be performed with conventional instruments or instruments specifically designed for this purpose. Special instruments designed for these procedures are subject to FDA marketing clearance and several manufacturers have received 510(k) clearance to market devices intended for use in minimally invasive CABG. One such device for computer-assisted surgery or robotic technology is the da Vinci® system (Intuitive Surgical, Inc., Mountain View, CA). The da Vinci system received 510(k) marketing clearance from the FDA in 2004 for assisting in coronary artery bypass surgery.

Evidence is insufficient to determine whether PACAB, TECAB, and/or hybrid CABG improve outcomes compared to conventional procedures. Additional randomized comparative studies are needed that compare the relevant short and long-term outcomes from these new techniques with outcomes obtained using the current approaches.

CODING

Medicare Advantage Plans and Commercial Products

The following HCPCS codes are covered for minimally invasive direct coronary artery bypass graft surgery (MIDCAB):

S2205 Minimally invasive direct coronary artery bypass surgery involving mini-thoracotomy or mini- sternotomy surgery, performed under direct vision; using arterial graft(s), single coronary arterial graft

S2206 Minimally invasive direct coronary artery bypass surgery involving mini-thoracotomy or mini-sternotomy surgery, performed under direct vision; using arterial graft(s), two coronary arterial grafts

S2207 Minimally invasive direct coronary artery bypass surgery involving mini-thoracotomy or mini-sternotomy surgery, performed under direct vision; using venous graft only, single coronary venous graft

S2208 Minimally invasive direct coronary artery bypass surgery involving mini-thoracotomy or mini-sternotomy surgery, performed under direct vision; using single arterial and venous graft(s), single venous graft

S2209 Minimally invasive direct coronary artery bypass surgery involving mini-thoracotomy or mini-sternotomy surgery, performed under direct vision; using two arterial grafts and single venous graft

There are no specific CPT codes for other techniques for minimally invasive coronary artery bypass graft surgery. Therefore, use the code for the unlisted procedure, CPT code 33999**.**

RELATED POLICIES

Not applicable

PUBLISHED

Provider Update, June 2022
Provider Update, August 2021
Provider Update, May 2020
Provider Update, May 2019
Provider Update, March 2018

REFERENCES

1. Diegeler A, Thiele H, Falk V et al. Comparison of stenting with minimally invasive bypass surgery for stenosis of the left anterior descending coronary artery. N Engl J Med 2002; 347(8): 561-6.

2. Thiele H, Oettel S, Jacobs S et al. Comparison of bare-metal stenting with minimally invasive bypass surgery for stenosis of the left anterior descending artery; a five-year follow-up. Circulation 2005; 112(22):3445-50.
3. Drenth DJ, Winter JB, Veeger NJ et al. Minimally invasive coronary artery bypass grafting versus percutaneous transluminal coronary angioplasty with stenting in isolated high-grade stenosis of the proximal left anterior descending artery: six months' angiographic and clinical follow-up of a prospective randomized study. J Thorac Cardiovasc Surg 2002; 124(1):130-5.
4. Reeves BC, Angelini GD, Bryan AJ et al. A multi-centre randomised controlled trial of minimally invasive direct coronary bypass grafting versus percutaneous transluminal coronary angioplasty with stenting for proximal stenosis of the left anterior descending coronary artery. Health Technol Assess 2004; 8(16):1-43.
5. Kim JW, Lim DS, Sun K et al. Stenting or MIDCAB using ministernotomy for revascularization of proximal left anterior descending artery? Int J Cardiol 2005; 99(3):437-41.
6. Hong SJ, Lim D-S, Seo HS et al. Percutaneous coronary intervention with drug-eluting stent implantation vs. minimally invasive direct coronary artery bypass (MIDCAB) in patients with left anterior descending coronary artery stenosis. Catheter Cardiovasc Interv 2005; 64(1):75-81.
7. Cisowski M, Drzewiecki J, Drzewiecka-Gerber A et al. Primary stenting versus MIDCAB: preliminary report - comparison of two methods of revascularization in single left anterior descending coronary artery stenosis. Ann Thorac Surg 2002; 74(4):S1334-9.
8. Aziz O, Rao C, Panesar SS et al. Meta-analysis of minimally invasive internal thoracic artery bypass versus percutaneous revascularization for isolated lesions of the left anterior descending artery. BMJ 2007; 334(7594):617-24
9. Bainbridge D, Cheng D, Martin J et al. Does off-pump or minimally invasive coronary artery bypass reduce mortality, morbidity, and resource utilization when compared with percutaneous coronary intervention? A meta-analysis of randomized trials. J Thorac Cardiovasc Surg 2007; 133(3):623-31.
10. Jaffery Z, Kowalski M, Weaver WD et al. A meta-analysis of randomized control trials comparing minimally invasive direct coronary bypass grafting versus percutaneous coronary intervention for stenosis of the proximal left anterior descending artery. Eur J Cardiothorac Surg, 2007; 31(4):691-7.
11.Thiele H, Neumann-Schniedewind P, Jacobs S et al. Randomized comparison of minimally invasive direct coronary artery bypass surgery versus sirolimus-eluting stenting in isolated proximal left anterior descending coronary artery stenosis. J Am Coll Cardiol 2009; 53(25):2324-31
12. Kofidis T, Emmert MY, Paeschke HG et al. Long-term follow-up after minimal invasive direct coronary artery bypass grafting procedure: a multi-factorial retrospective analysis at 1000 patient-years. Interact Cardiovasc Thorac Surg 2009; 9(6):990-4.
13. Kettering K. Minimally invasive direct coronary artery bypass grafting" a meta-analysis. J Cardiovasc Surg (Torino) 2008; 49(6):793-800.
14. Dogan S, Graubitz K, Aybek T et al. How safe is the port access technique in minimally invasive coronary artery bypass grafting? Ann Thorac Surg 2002; 74(5):1537-43.
15. Mishra YK, Wasir H, Sharma KK. Totally endoscopic coronary artery bypass surgery. Asian Cardiovasc Thorac Ann 2006; 14(6):447-51.
16. de Canniere D, Wimmer-Greinecker G, Cichon R et al. Feasibility, safety, and efficacy of totally endoscopic coronary artery bypass grafting: multicenter European experience. J Thorac Cardiovasc Surg 2007; 134(3):710-6.
17. Argenziano M, Katz M, Bonatti J et al. Results of the prospective multicenter trial of robotically assisted totally endoscopic coronary artery bypass grafting. Ann Thorac Surg 2006; 81(5):1666-75.
18. Kappert U, Tugtekin SM, Cichon R et al. Robotic totally endoscopic coronary artery bypass: a word of caution implicated by a five-year follow-up. J Thorac Cardiovasc Surg 2008; 135(4):857-62.
19. Shroyer AL, Grover FL, Hattler B et al. On-pump versus off-pump coronary-artery bypass surgery. N Engl J Med 2009; 361(19):1827-37.
20. Puskas JD, Mack JM, Smith CR. Letter to the editor. On-pump versus off-pump CABG. N Engl J Med 2010; 362(9):851.

21. Bonatti J, Schachner T, Bonaros N et al. Simultaneous hybrid coronary revascularization using totally endoscopic left internal mammary artery bypass grafting and placement of rapamycin eluting stents in the same interventional session. The COMBINATION pilot study. Cardiology 2008; 110(2):92-5.