

Left Main Coronary Ostial Stenosis after Aortic Valve Replacement: A Case Report

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ABSTRACT: Coronary ostial stenosis is a rare but potentially life-threatening complication of aortic valve replacement (AVR). It can present potential complications such as acute coronary syndrome, left ventricular failure, ventricular arrhythmias, or sudden death. Exact pathogenetic mechanism is not known, but a few hypotheses have been proposed. We present a case of left main coronary stenosis 11 months after AVR was done for symptomatic critical aortic stenosis. High index of clinical suspicion and timely coronary angiography helped to determine the exact etiology. A percutaneous coronary intervention was done emergently. The patient has done very well so far.

KEYWORDS: coronary ostial stenosis, aortic valve replacement, percutaneous coronary intervention

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Introduction

Surgical aortic valve replacement (AVR) remains the cornerstone of treatment for symptomatic critical aortic stenosis (AS). It is rewarding for most of the patients, but it can have several associated complications. Coronary ostial stenosis is a rare but potentially serious complication of AVR. It was first described by Roberts and Morrow in 1967.¹ It is estimated to occur in about 1–5% of all AVR procedures.^{2–6} The exact cause of coronary ostial stenosis is still undetermined, but few hypotheses have been proposed.⁵ Symptoms are severe and generally appear within 1–6 months postoperatively. Coronary artery bypass grafting (CABG) is the typical treatment, but percutaneous coronary intervention (PCI) has also yielded favorable outcomes.^{7–11} We present a case of left main coronary ostial stenosis 11 months after AVR was done for symptomatic critical AS, which was successfully managed with primary stent placement.

Case Report

In June 2015, a 67-year-old female with a long-standing history of asymptomatic critical AS was referred for AVR after new onset of shortness of breath. A preoperative transesophageal echocardiogram showed aortic valve area of 0.6 cm² with 2+ mitral regurgitation. Cardiac catheterization revealed no significant coronary artery disease and well-preserved left ventricular ejection fraction. She underwent insertion of a

19-mm St Jude Biocor bioprosthetic aortic valve. The patient did well postoperatively. She was started on warfarin and discharged home. In May 2016, the patient experienced shortness of breath with moderate exertion, which was new. She underwent a stress cardiolite test, which was abnormal (Figs. 1–3). Repeat coronary angiography revealed 99% narrowing of left main coronary artery (LMCA) (Fig. 4). The left anterior descending artery, left circumflex, and right coronary artery (RCA) did not reveal any discrete stenosis. After consultation with the cardiac surgeon and the family, the patient underwent urgent primary stent deployment of LMCA (Fig. 5). A successful placement of intra-aortic balloon pump was also done

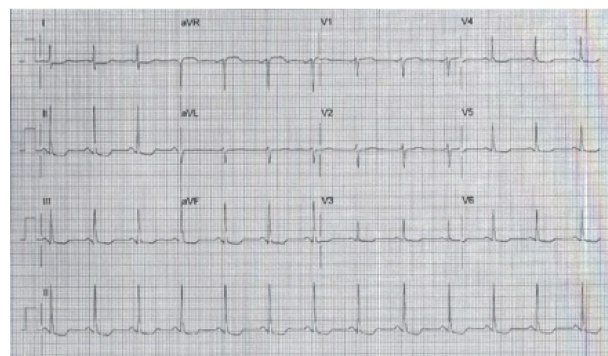


Figure 1. EKG during rest phase of stress test.

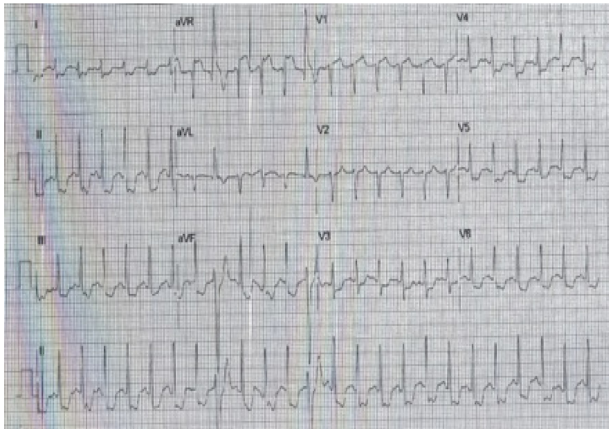


Figure 2. A 3-mm ST depression in Lead II in recovery phase of stress test.

in the left femoral artery since this was a high-risk procedure. The patient recovered very well and antiplatelet therapy was recommended for 12 months.

Discussion

Coronary ostial stenosis after AVR occurs most commonly in the LMCA, but RCA can also be affected.³⁻⁵ Exact pathophysiologic mechanism of coronary ostial stenosis has not been determined. Various theories have been proposed. Roberts and Morrow¹ discovered AVR fibrous thickening in the aortic root and proximal coronary artery in autopsy subjects. No evidence of atherosclerosis was seen on histological examination.⁵ Intimal thickening and fibrosis near the aortic root have been proposed to be due to turbulent flow around the prosthetic valve leading to obstruction of the coronary ostia.¹

There may be microinjury and local hyperplastic reaction due to cardioplegic fluid and over dilation of the vessel by the tip of the catheter during AVR, and Tukiji et al.¹² have suggested immunologic reaction to the bioprosthesis.¹³

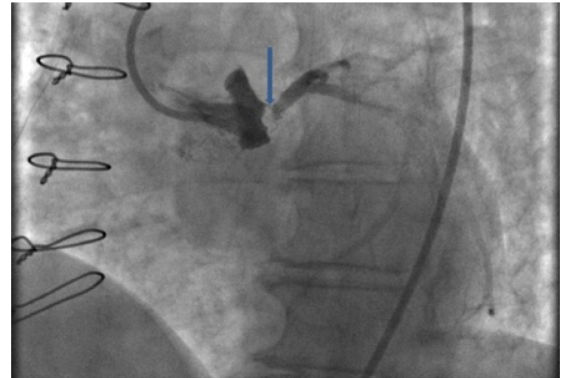


Figure 4. Ostial left main stenosis (arrow).

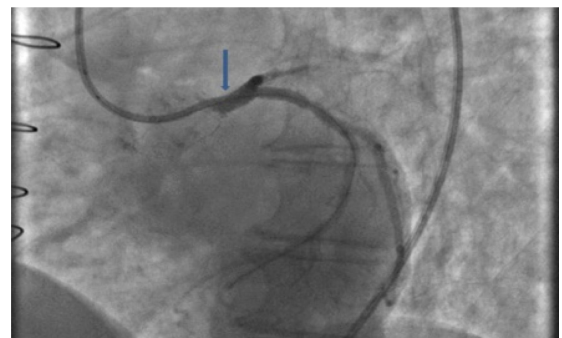


Figure 5. Ostial left main post stent placement (arrow).

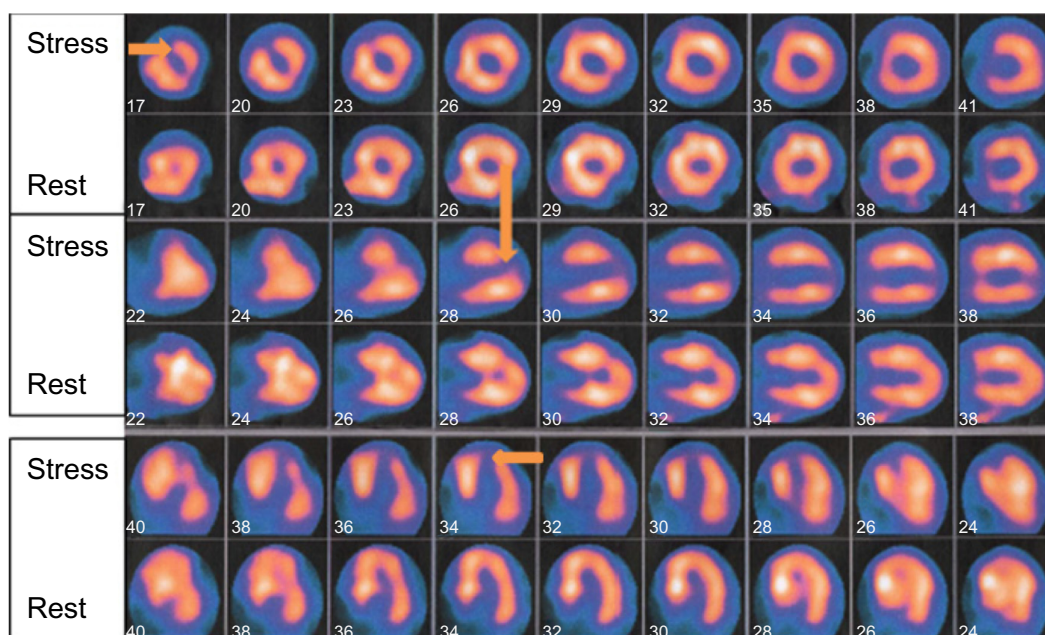


Figure 3. Apical ischemia with left ventricular cavity dilatation (arrow) on cardiolute imaging.

Coronary ostial stenosis after AVR generally presents as unstable angina, left ventricular heart failure, ventricular arrhythmias, or sudden death.⁷ High clinical suspicion is crucial. Prompt coronary angiography and emergent reperfusion strategies are vital for management. CABG may not always be a safe option, mainly due to the proximity of the graft site to the area of prior operation.⁷ High incidence of perioperative infarction, increased mortality, and poor long-term outcome have been reported with CABG.^{2,3} Several reports have shown good early and late outcomes with PCI and stent implantation.^{5,6,12,13}

Conclusion

Though rare, coronary ostial stenosis after AVR should be suspected in patients presenting with new relevant symptoms. Mostly, such cases have been reported to occur within 1–6 months after AVR, but it can manifest even later, as evident by our case. Thorough history and physical examination and timely coronary angiography should be performed if suspicion of coronary ostial stenosis is high. It can be fatal due to potential complications of acute coronary syndrome, left ventricular heart failure, or ventricular arrhythmias. Immediate reperfusion strategies are crucial in management. Although CABG is considered to be the typical treatment, PCI has shown to have good short-term results.

Author Contributions

Conceived and designed the experiments: MS, DM. Analyzed the data: MS, DM. Wrote the first draft of the manuscript: MS, DM. Contributed to the writing of the manuscript: MS, DM. Agree with manuscript results and conclusions: MS,

DM. Jointly developed the structure and arguments for the paper: MS, DM. Made critical revisions and approved final version: MS, DM. Both authors reviewed and approved of the final manuscript.

REFERENCES

1. Roberts WC, Morrow AG. Late postoperative pathological findings after cardiac valve replacement. *Circulation*. 1967;35(4 suppl):I48–62.
2. Lesage CH Jr, Vogel JH, Blount SG Jr. Iatrogenic coronary occlusive disease in patients with prosthetic heart valves. *Am J Cardiol*. 1970;26:123–9.
3. Sethi GK, Scott SM, Takaro T. Iatrogenic coronary artery stenosis following aortic valve replacement. *J Thorac Cardiovasc Surg*. 1979;77:760–7.
4. Pande AK, Gosselin G. Iatrogenic left main coronary artery stenosis. *J Invasive Cardiol*. 1995;7:183–7.
5. Ziakas AG, Economou FI, Charokopos NA, et al. Coronary ostial stenosis after aortic valve replacement. Treatment of 2 patients with drug-cluting stents. *Tex Heart Inst J*. 2010;37:465–8.
6. Thomopoulou S, Sfirakis P, Spargias K. Angioplasty, stenting and thrombectomy to correct left main coronary stem obstruction by bioprosthetic aortic valve. *J Invasive Cardiol*. 2008;20:E124–5.
7. Placci A, Balducci M, Casanova R, Maresta A. Percutaneous treatment of the left main coronary artery ostial obstruction following aortic valve replacement. *Ital Heart J*. 2005;6(9):77.
8. Hadjimiltiades S, Harokopos N, Apadopoulos C, Gourassas I, Spanos P, Louridas G. Left main coronary artery stenosis after aortic valve replacement. *Hellenic J Cardiol*. 2005;46(4):306–9.
9. Marti V, Auge JM, Garcia Picart J, Guiteras P, Ballester M, Obrador D. Percutaneous transluminal coronary angioplasty as alternative treatment to coronary artery bypass surgery in iatrogenic stenosis of the left main coronary artery. *J Interv Cardiol*. 1995;8(3):229–31.
10. Balbi M, Olivotti L, Scarano F, et al. Percutaneous treatment of left main coronary stenosis as a late complication of Bentall operation for acute aortic dissection. *Catheter Cardiovasc Interv*. 2004;62(3):343–5.
11. Funada A, Mizuno S, Ohsato K, et al. Three cases of iatrogenic coronary ostial stenosis after aortic valve replacement. *Circ J*. 2006;70(10):1312–7.
12. Tukiiji M, Akasaka T, Wada N, et al. Bilateral coronary ostial stenosis after aortic valve replacement with freestyle stentless bioprosthesis: a case report. *J Cardiol*. 2004;44:207–13.
13. An Y, Tamita K, Furukawa Y. Iatrogenic coronary artery stenosis at the ostium of left anterior descending artery after aortic valve replacement: a case report with imaging and histological findings. *J Invasive Cardiol*. 2010;22:E206–8.