

Successful surgical treatment of left main coronary stenosis with CABG and cardiac resynchronization therapy in a patient after the modified Bentall procedure: A case report

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Abstract

We present a case of an 82-year-old woman who developed sustained heart failure with left ventricular dyssynchrony after the modified Bentall procedure. Persistent circulatory instability and complete atrioventricular block suggested coronary artery stenosis. Multidetector computed tomography revealed stenosis of the grafted portion of the coronary artery. The patient was successfully treated by coronary artery bypass grafting with simultaneous epicardial cardiac resynchronization therapy system implantation.

Keywords

Cardiac resynchronization therapy, coronary artery bypass grafting

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Introduction

Cardiac resynchronization therapy (CRT) is a reliable and effective treatment method for advanced heart failure and systolic dyssynchrony.¹ We report a case of a patient with stenosis of the grafted portion of the coronary artery after the modified Bentall procedure, who was successfully treated by coronary artery bypass grafting (CABG) and simultaneous CRT.

Case presentation

An 82-year-old woman underwent aortic root replacement for acute type A aortic dissection. Preoperative computed tomography (CT) showed dissection of the proximal thoracic aorta, absence of blood in the pericardium, and normal left ventricular function with an ejection fraction (EF) of 76%. The ascending aorta and aortic valve were replaced with a 26-mm valve–Valsalva graft conduit according to the modified Bentall technique. The left main trunk was reconstructed by short graft interposition. Surgical glue was used to reinforce the coronary button and to facilitate effective hemostasis.

The postoperative course was complicated by low cardiac output syndrome, which was treated by intra-aortic balloon pumping and complete atrioventricular (AV) block by temporary left ventricular pacing (TLVP). Postoperative chest X-ray showed remarkable pulmonary congestion, and transthoracic echocardiography (TTE) showed low EF with left ventricular dyssynchrony under TLVP. Persistent circulatory instability indicated suspected coronary stenosis. Multidetector CT (MDCT) revealed stenosis of the grafted portion of the coronary artery (Figure 1). Nine days after the first operation, the patient underwent CABG and epicardial CRT system implantation. The venous graft was anastomosed with the left anterior descending coronary artery. The patient's postoperative course was uneventful, and she was discharged home on postoperative day 68. TTE at outpatient

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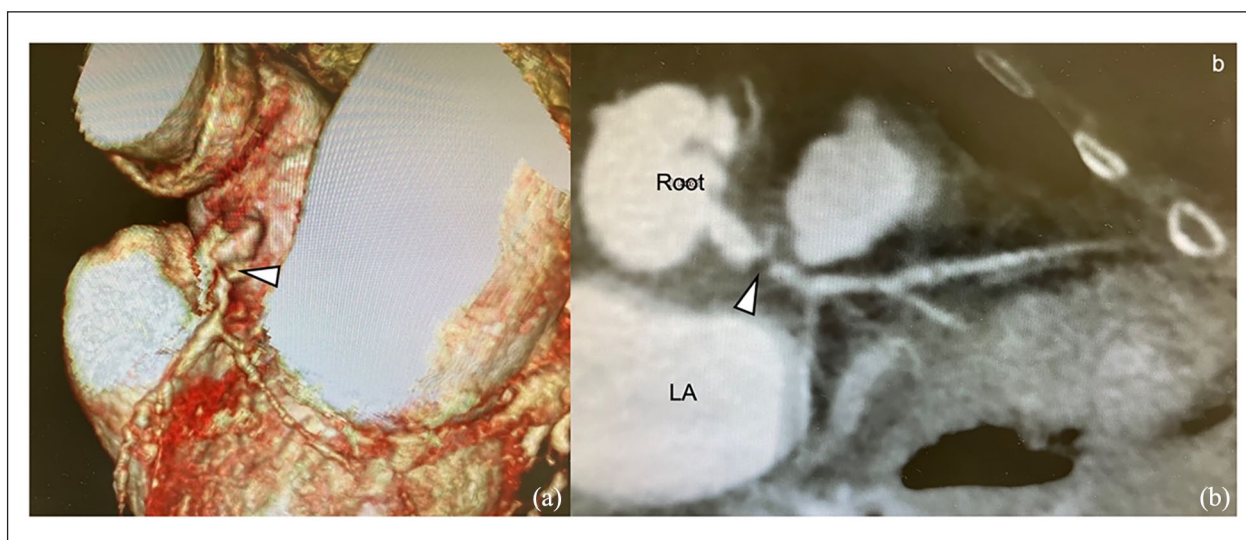


Figure 1. Multidetector computed tomography. (a and b) The white arrowhead indicates stenosis of the grafted portion of the coronary artery. LA indicates left atrium.

services showed synchronized left ventricular contraction with an EF of 44% under biventricular pacing. Although the brain natriuretic peptide level was 437.8 pg/ml, she was free from heart failure symptoms without readmission to the hospital after CABG with CRT system implantation.

Discussion

Coronary artery stenosis after the Bentall procedure can occur as a result of imperfect suture technique² or direct damage to the coronary ostia caused by technical issues, including twisting, tension, external packing, and trauma due to the instrumentation used for direct antegrade cardioplegia. Surgical glue used to treat coronary-button hemorrhaging can give rise to an intensive inflammatory and proliferative response, with subsequent extrinsic compression and narrowing of the coronary ostia.³ Spontaneous coronary-button dissection with retrograde propagation into the coronary artery may also lead to coronary artery stenosis.

The diagnosis of coronary ostial stenosis involves selective coronary angiography and MDCT. MDCT to evaluate the coronary tree is a promising noninvasive imaging technique that is effective for detecting and evaluating the degree of stenosis with high sensitivity. In our case, postoperative persistent circulatory instability and complete AV block indicated suspected coronary stenosis. MDCT disclosed stenosis of the grafted portion of the coronary artery.

The choice of treatment should always depend upon the patient's status and the nature of the lesion. The percutaneous coronary intervention of unprotected left main coronary artery lesion in patients with surgical high risk is reasonable, feasible, and effective, but negative results have been reported in the literature.⁴⁻⁶ At present, CABG is the treatment of choice for this particular type of coronary

stenosis. However, CABG alone cannot always correct left ventricular dyssynchrony, which leads to a worse prognosis.⁷ With CRT, simultaneous pacing of both the right and left ventricles is associated with improved cardiac contractile synchronization and remodeling with reduced mitral regurgitation, leading to symptom improvement and prolonged survival.⁸ In addition, Goscinska-Bis et al. demonstrated a significant decrease in heart failure symptoms and functional status improvement in patients who underwent concomitant CRT system implantation during CABG.⁹ On-pump CABG offers an optimal setting for total epicardial CRT system implantation. With excellent exposure of the heart, there are almost no anatomical limitations to the implantation of the left ventricular lead at the optimal site. Consequently, the potential risks associated with intravenous lead implantation are avoided. Furthermore, two procedures are performed simultaneously, thereby minimizing invasiveness. Epicardial implantation of the CRT system with CABG facilitated patient management in the early postoperative period, as well as improved left ventricular systolic function and quality of life.

Conclusion

In conclusion, we describe an 82-year-old woman with stenosis of the grafted portion of the coronary artery after the modified Bentall procedure, who was successfully treated with CABG with concomitant CRT. This strategy facilitated the patient's recovery from low left ventricular function with dyssynchrony in the postoperative period.

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Declaration of conflicting interests

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Ethics approval

Our institution does not require ethical approval for reporting individual cases or case series.

Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

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