Case Report

Interventional Bridging Therapy for Radical Cardiac Surgery in a Patient Seemed to be Inoperable Due to Very Poor Left Ventricular Function: A Case Report

Jeong ALee¹, Masahiro Tsutsui¹,*; Nobuhiro Mochizuki¹, Yuki Setogawa¹, Fumitaka Suzuki¹, Masahiko Narita¹, Aina Hirofujii¹, Shingo Kunioka¹, Tomonori Shirasaka¹, Natsuya Ishikawa¹, Sayaka Yuzawa², Hiroyuki Kamiya¹

¹Department of Cardiac Surgery, Asahikawa Medical University, 078-8510 Asahikawa, Hokkaido, Japan
²Department of Diagnostic Pathology, Asahikawa Medical University Hospital, 078-8510 Asahikawa, Hokkaido, Japan
*Correspondence: mtsutsui@asahikawa-med.ac.jp (Masahiro Tsutsui)

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Abstract

Cases that are inoperable owing to poor preoperative conditions are sometimes encountered. However, there are some cases that are led to radical treatment by performing bridge therapy. Here, we presented a case of a patient with complex cardiac disease in an inoperable state who underwent bridging therapy that led to successful surgical treatment. A 73-year-old male who received hemodialysis treatment and had severe aortic valve stenosis and coronary artery disease planned surgical treatment. However, he was deemed inoperable owing to his low cardiac function and hemodynamic instability. Therefore, to escape from a fatal condition, we first performed balloon aortic valvuloplasty and percutaneous coronary intervention as palliative procedures. Subsequently, his cardiac function and hemodynamic stability remarkably improved; therefore, after 1 month, we performed a successful radical surgical treatment. Even in inoperable patients, bridging therapy leading to radical treatment is possible.

Keywords

bridge therapy; balloon aortic valvuloplasty; low cardiac function

Introduction

Preoperative condition is related to surgical outcomes. Therefore, a surgical procedure is not performed in cases with very poor preoperative conditions in general. In those cases, palliative procedures can occasionally serve as a bridging therapy and can lead to radical surgery. Here, we present a case of a patient with an inoperable complex cardiac disease with chronic hemodialysis and low cardiac function who underwent bridging therapy leading to radical surgery.
using a 20-mm valvuloplasty balloon (CAMEL™; Goodman, Nagoya, Japan). At the time of the procedure, the temporary pacing lead were inserted through the right internal jugular vein and balloon dilation was performed under rapid pacing of 200 bpm at the BAV. Three dilation attempts were unsuccessful due to slippage, but the fourth attempt was successful and a fifth dilation was also successful. According to TTE measurements, the aortic valve area before and after BAV changed from 0.82 cm$^2$ to 1.26 cm$^2$.

PCI is a procedure that uses a catheter to improve blood flow in stenotic or occluded lesion in a coronary artery. In this case, the LAD lesion was evaluated with Optimal Coherence Tomography and pre dilation was performed using 2.0 × 15 mm non-compliant balloon (NC Kamui, Asahi Intecc, Aichi, Japan) and 3.0 × 15 mm non-compliant balloon (Hiryu plus, TERUMO, Tokyo, Japan) followed by placement 4.0 × 16 mm drug eluting stent (SYNERGY™ XD, Boston Scientific, Marlborough, MA, USA) and 3.0 × 12 mm drug eluting stent (XIENCE Skypoint™, Abbott, Chicago, IL, USA). No attempt has been made to open the chronic total occlusion lesion in the right coronary artery. ECMO was withdrawn without problems and no complications occurred during the procedure. One day postoperatively, his cardiac function remarkably improved, and the EF increased to 40%. His hemodynamics became stable, and hemodialysis could be performed without any problem. We determined that he was sufficiently healthy to tolerate the surgery and subsequently performed radical surgery 1 month following BAV and PCI.

We performed aortic valve replacement (AVR), coronary artery bypass grafting (CABG), right atrial tumor resection, and left atrial appendage closure. AVR was performed using a bioprosthetic valve (25 mm Inspiris; Edwards Lifesciences, Irvine, CA, USA). CABG is a procedure to create a bypass distal to a stenosed or occluded coronary artery using a graft such as internal thoracic artery or saphenous vein. The following was the graft design for CABG: left internal thoracic artery to LAD, aorta to diagonal branch to obtuse marginal branch to post descending artery. The great saphenous vein was used for aortocoro-
In our case, BAV was initially performed as a palliative treatment, but the left ventricular function improved markedly, leading to curative treatment. It may be premature not to use BAV as a palliative treatment because of poor outcome. CAT, which was first named by Reynolds et al. [12], is a relatively rare non-neoplastic cardiac mass. There have been several case reports but few large series on CAT. According to a systematic review by de Hemptinne et al. [13], the right atrium was the second most common site of CAT (21%), with the mitral valve or annulus being the most common (36%). The most frequent symptom was dyspnea (45%), followed by syncope (21%). Pulmonary and systemic emboli were reported in 31% cases. In this review, surgical resection was performed in most cases, and the prognosis was good [13]. In our case, no CAT-derived symptoms were noted. Preoperative diagnosis by CAT imaging is challenging, and the only way to diagnose the disease at present is by tissue diagnosis following resection.

**Conclusion**

Even in inoperable patients, bridging therapy leading to curative treatment is possible. Establishment of a treatment protocol incorporating bridging therapy will save more patients in the future, and we will continue to accumulate cases and consider appropriate timing and methods of bridging therapy. The CARE checklist was used when writing this case report (Supplementary Table 1).

**Author Contributions**

JL performed gather information on the case and manuscript writing. MT performed gather information on the case, data analysis, manuscript writing and coordination of the study. HK conceived of the study and reviewed the
manuscript. NM, YS, FS, MN, AH, SK, TS and NI helped gather information on the case. SY performed pathological analysis. HK reviewed the manuscript. All authors contributed to editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work to take public responsibility for appropriate portions of the content and agreed to be accountable for all aspects of the work in ensuring that questions related to its accuracy or integrity.

Ethics Approval and Consent to Participate

This case report was approved by the Institutional Review Board of Asahikawa Medical University. Approval Number: 19207. Informed consent was obtained from the patient for scientific activity, including publication of this case report.

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Conflict of Interest

The authors declare no conflict of interest.

Supplementary Material

Supplementary material associated with this article can be found, in the online version, at https://doi.org/10.59958/hsf.5779.

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