Coronary Stent Deployment in a Young Adult with Kawasaki Disease and Recurrent Myocardial Infarction

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Summary

A 19-year-old man developed a huge coronary aneurysm and stenosis in the right coronary artery as a sequela of Kawasaki disease (KD) that resulted in recurrent episodes of myocardial infarction. Coronary ischemic events were successfully prevented after balloon angioplasty followed by coronary stent implantation into the stenotic lesion. The stent deployment may have an advantage compared with balloon angioplasty and other new devices for the treatment for patients with KD showing stenotic lesions without dense calcification.

Key words: Kawasaki disease, coronary stenting, coronary aneurysm, coronary thrombosis, acute myocardial infarction

Introduction

Myocardial infarction is the most serious complication in both acute and delayed stages of Kawasaki disease (KD).¹ Coronary aneurysms often associated with localized stenosis are detected in 10 to 20% of patients with KD, and 4% of these patients eventually develop ischemic heart disease. Although catheter interventions including primary old balloon angioplasty and stent deployment have been performed successful-

ly in adult patients with atherosclerotic coronary lesions, the rationale of the application of these procedures has not been yet established for treating the coronary lesions as sequelae of KD; the effectiveness of balloon angioplasty for dilating stenotic lesions of KD was reported to be limited.^{2,3}

Case Report

The patient was a 19-year-old man who had a known history of KD at the age of 9 years. He suffered from the first episode of inferior non-Q-wave myocardial infarction (NQMI) at the age of 12 years and underwent conventional medical treatment. Long-acting nifedipine and isosorbide dinitrate were prescribed to him; aspirin was not given because of aspirin allergy. At the age of 19 years, he experienced the second episode of inferior NQMI. Coronary arteriograms (CAG) showed 99% stenosis accompanied by thrombus in the middle portion of a gigantic coronary aneurysm of the right coronary artery (RCA). Dense calcification was not detectable in the stenotic lesion by fluoroscopy. The patient underwent direct balloon angioplasty using a 4.0 mm balloon, resulting in a smooth dilatation with 3.02 mm of the minimum luminal diameter (MLD). However, even after additional intracoronary infusion of 3,200,000 IU tissue-type plasminogen activator (TPA), stagnation of the contrast media was observed in the aneurysm just proximal to the angioplasty site. One month later, in spite of the well-controlled antiplatelet and anticoagulation therapies using ticlopydine and warfarin, he had the third attack of inferior NQMI due to nearly total thrombotic occlusion, which was documented at the previous balloon angioplasty site (Fig. 1A). The distal segment of the RCA was partially visualized by collateral flow given from the left circumflex artery (Fig. 2). Direct balloon angioplasty (Figs. 1B and C) and the adjunctive stent implantation using a 4.5 mm intracoronary stent into the RCA lesion were performed, and postdilation using a 5.5 mm balloon resulted in 4.85 mm of the MLD. Stagnation in the proximal aneurysm almost disappeared, suggesting improved coronary flow across the lesion. After additional administration of 3,200,000 IU TPA into the

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FIG. 1 Selective right coronary arteriograms of a 19-year-old man who had a known history of Kawasaki disease and recurrent episodes of inferior myocardial infarction. (A) The control angiogram showed aneurysmal deformity and thrombotic occlusion of the proximal segment of the right coronary artery. (B) After balloon angioplasty, a residual stenosis was observed at the angioplasty site. (C) An adjunctive Wiktor stent placement was performed. (D) Postdilation followed by thrombolysis with 3,200,00 IU TPA resulted in successful smooth dilation. th=thrombus.

FIG. 2 Control selective left coronary arteriogram. A giant coronary aneurysm (an) was found in the proximal segment of the left anterior descending artery. The distal segment of the right coronary artery (arrow) was partially visualized by the collaterals (v) given from the left circumflex artery.

RCA, the mural thrombus in the giant aneurysm was decreased in size (Fig. 1D). During 24-month follow-up without any change in the medications, the patient had no recurrence of ischemic events, and CAG showed neither restenosis nor mural thrombus at the RCA lesion.

Discussion

Possible mechanisms of the development of coronary stenosis in KD include (1) formation of occlusive massive thrombi related to stagnant flow in the coronary aneurysm, and (2) progression of marked intimal thickening often associated with calcification.⁴ In the present case, it was apparent that thrombotic occlusion was the main cause of the repeated ischemic events. To reduce the stagnation in the aneurysm and subsequently the risk of coronary thrombosis, coronary flow should be improved by obtaining the initial MLD as large as possible. Therefore, stent deployment would be an effective

therapeutic tool since the procedure can give larger initial MLD than balloon angioplasty alone,^{5,6} or directional coronary atherectomy.⁷ Rotational ablation has been effective for severe KD coronary stenosis with dense calcification in children.⁸ However, when target lesions do not have dense calcification, stent implantation is considered to have an advantage compared with rotational ablation since the diameter of the largest ablation burr commercially available is 2.5 mm.

The stent deployment may have an advantage compared with balloon angioplasty and other new devices for the treatment for patients with KD showing stenotic lesions without dense calcification, in whom thrombotic occlusion related to stagnation in coronary aneurysms plays a role in the pathogenesis of ischemic events. A prospective randomized trial is needed to clarify whether stent deployment can prevent the recurrence of the ischemic event in patients with KD who have a history of coronary thrombosis. Furthermore, the rationale of prophylactic stenting in patients with KD with a high risk for coronary thrombosis who show huge coronary aneurysm accompanied by severe stagnant coronary flow should be also addressed in the future study.

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