Percutaneous Transluminal Coronary Angioplasty in a Patient with Kawasaki Disease

A Case Report of an Unsuccessful Angioplasty

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SUMMARY

A 13-year-old boy with severe coronary stenosis due to Kawasaki disease underwent percutaneous transluminal coronary angioplasty (PTCA). The guide wire and the balloon catheter easily passed through the stenosis in the left anterior descending artery. However, effective dilatation could not be achieved even when the balloon size was increased to 2.5 mm in diameter. We discontinued further inflation of the balloon because serious resistance was encountered on withdrawal of the balloon catheter. In patients with Kawasaki disease, the value of PTCA as a treatment for coronary stenosis is questionable.

Key Words:

Percutaneous transluminal coronary angioplasty Kawasaki disease

KAWASAKI disease is a systemic vasculitis involving small and medium-sized arteries.^{1),2)} This disease is usually self-limited, but serious complications may occur in 17% of patients who develop coronary artery lesions.³⁾⁻⁵⁾ Coronary artery aneurysm may transform into stenotic lesions,⁶⁾ which lead to myocardial infarction or sudden death.⁷⁾ Treatment with percutaneous transluminal coronary angioplasty (PTCA) to release the stenosis of the coronary arteries due to Kawasaki disease has not yet been established. We report an unsuccessful attempt to relieve coronary vascular stenosis due to Kawasaki disease by elective PTCA.

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CASE REPORT

A 13-year-old boy, 157 cm in height and weighing 68 kg, was diagnosed with Kawasaki disease at 2 years of age. At that time, aneurysmal dilatation was observed in both the right coronary artery and the left anterior descending artery (Fig. 1). When the patient was 13 years old, angiography was repeated and revealed that the aneurysm in the right coronary artery was occluded and replaced by a network of small tortuous vessels. This vascular network may be dilated vasa vasorum forming collateral pathways to the peripheral region of the right coronary artery. The aneurysm of the left anterior descending artery had evolved into a severe and discrete stenosis (Fig. 2). The left ventricular wall motion was normal. Although the patient was asymptomatic and had no history of chest pain, the electrocardiogram showed small Q waves in leads II, III and aV_F. Treadmill testing revealed ST-segment depression of 1.5 to 2.0 mm in leads II, III, aV_F and V₄-V₆ at 7.6 Mets. Exercise stress 201-thallium myocardial scintigraphy revealed a perfusion defect in the anteroapical wall with redistribution.

We tried PTCA to correct the stenosis in the left anterior descending artery. An 8F guiding catheter (Softip JL 3.5, Schneider) was advanced to the left coronary ostium through the right femoral artery. A guide wire

PA

L-LAT

Fig. 1. Left ventriculogram at 2 years of age. Aneurysmal dilatation was observed in the proximal portion of the right coronary artery and the left anterior descending artery. Left panel: posterior-anterior view. Right panel: left lateral view.

(Hi-Torque Floppy 0.014 inch, ACS) easily passed the stenosis and a balloon catheter (Skinny, 1.5 mm, Scimed) was tracked over the guide wire and positioned at the target lesion. Thirty second balloon inflations of 7 and 9 atm, were performed twice and the balloon was changed to a 2.5 mm Skinny and third and fourth inflations with 6 and 8 atm were performed. However, the dumbbell shape of the balloon did not disappear during these inflations and an adequate dilatation was not obtained. Furthermore, serious resistance was encountered in withdrawing the balloon catheter after deflation. Further efforts to inflate the balloon were discontinued because of the risk that a larger balloon might be trapped at the stenosis. The percent stenosis measured by densitometry was 95.3% before PTCA and 90.4% after PTCA (Fig. 3). Angiographic evidence of successful PTCA could not be obtained. No significant improvement was observed in treadmill testing and exercise stress 201-thallium myocardial scintigraphy. Despite our strong recommendation for bypass surgery, the patient and his parents have refused consent.

Fig. 2. Coronary arteriogram at 13 years of age. The aneurysm of the right coronary artery was occluded and replaced by a network of small tortuous vessels (left panels). A severe and discrete stenosis was observed at the proximal portion of the left anterior descending artery (right panels). Upper panels: right anterior oblique view. Lower panels: posterior-anterior view.

Fig. 3. Coronary arteriogram before (left panels) and after (right panels) PTCA. The effect of PTCA was minimal.

DISCUSSION

Coronary artery aneurysm is the most serious complication of Kawasaki disease, and coronary bypass surgery has been performed in patients with severe coronary abnormalities. However, maintaining long-term graft patency and balancing the blood supply with the patient's growth remain difficult even when an arterial conduit is used.⁸⁾ In this case, we chose PTCA for the left anterior descending artery stenosis to postpone bypass surgery. Our attempt was unsuccessful because the stenosis was difficult to dilate with the balloon. The mechanism by which PTCA dilates atherosclerotic stenoses is thought to be disruption of the atheroma. On the other hand, the coronary artery stenosis of Kawasaki disease involves marked, diffuse and relatively homogeneous thickening of vessel wall.⁹⁾ This may be a result of the dilated cavity of the coronary aneurysm being replaced by fibrous thickening of intima, smooth muscle cell proliferation and organization of thrombus. This histological structure might be more resistant to the radial force of the balloon used to dilate the stenosis. Therefore, in patients with Kawasaki disease, it might be difficult to reproduce the excellent success rate of PTCA in atherosclerotic coronary stenosis in adults. This may explain our inability to dilate the lesion in this patient. Furthermore, in our opinion the use of a larger balloon and/or higher pressure would not

have provided further improvement in this case. New interventional technologies, such as laser coronary angioplasty or atherectomy, may prove to be more effective than conventional balloon angioplasty in treating stenosis due to Kawasaki disease.

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