Case Report

Coronary Artery Bypass Grafting in an Adult Case with Kawasaki Disease

Nobuhiko Hayashida, MD, Eiki Tayama, MD, Hideki Teshima, MD, Takemi Kawara, MD, and Shigeaki Aoyagi, MD

Surgical revascularization for coronary artery lesions secondary to Kawasaki disease has been rarely reported in adult patients. We reported an adult case with few coronary risk factors but with multiple coronary artery aneurysms and obstructive lesions presumably secondary to Kawasaki disease who underwent coronary artery bypass grafting (CABG) with multiple arterial grafts. The postoperative course was uneventful. Because coronary artery sequelae of Kawasaki disease can be a cause of ischemic heart disease even in adults, heightened awareness of this possibility is required for young adults with coronary lesions but without coronary risk factors. (Ann Thorac Cardiovasc Surg 2002; 8: 47–50)

Key words: Kawasaki disease, adult patient, coronary artery bypass grafting, arterial graft

Introduction

It has been well documented that Kawasaki disease (mucocutaneous lymph-node syndrome) causes coronary artery disease, such as aneurysms and occlusive lesions, mostly in children.[1] In such pediatric patients with severe coronary artery occlusive disease, favorable long-term clinical results of coronary artery bypass grafting (CABG) using arterial grafts have been reported.[2,3] We also have previously reported successful revascularization with the internal mammary artery and gastroepiploic artery in an eight-year-old boy with coronary sequelae of Kawasaki disease.[4] However, surgical revascularization for adult survivors of childhood Kawasaki disease has been rarely reported.[5-7] We herein report an adult case with few coronary risk factors but with multiple coronary artery aneurysms and obstructive lesions presumably secondary to Kawasaki disease who underwent CABG with multiple arterial grafts.

Case Report

A 40-year-old man with an old myocardial infarction (antero-septal, and inferior) was referred for coronary revascularization because of worsening effort angina. The patient had no family history of atherosclerotic disease and associated risk factors other than a 10 year history of smoking. History of clinical signs consistent with Kawasaki disease, such as prolonged pyrexia, adenopathy, oropharyngeal lesions, or abnormal skin changes, were uncertain. His clinical activity was New York Heart Association (NYHA) class 3, limited by frequent anterior chest pain. An electrocardiogram showed abnormal Q waves in leads II, III, aVf and V1 through V4. Coronary angiography revealed aneurysms of the left main trunk, proximal portion of the left anterior descending artery (LAD), and the right coronary artery (RCA), and total occlusion of the LAD and the RCA (Fig. 1). The distal LAD and distal RCA branches were opacified by the collateral circulation from the circumflex system, which also had 75% stenosis. Left ventriculography showed an ejection fraction of 0.56 with antero-septal hypokinesis. At operation, large calcified aneurysms were noted at the RCA and the proximal LAD. The patient underwent triple CABG using a standard cardiopulmonary bypass and cardioplegic technique. The distal LAD and posterior descending branch of the RCA were revascularized with the left internal thoracic artery (LITA) and right gastroepiploic artery (RGEA), respectively. Radial artery was anastomosed to the obtuse marginal branch and its proximal side was anastomosed to the ascend-

From the Department of Surgery, Kurume University, Fukuoka, Japan

Received April 18, 2001; accepted for publication June 27, 2001.
Address reprint requests to Nobuhiko Hayashida MD: Department of Surgery, Kurume University, 67 Asahi-machi, Kurume 830-0011, Japan.

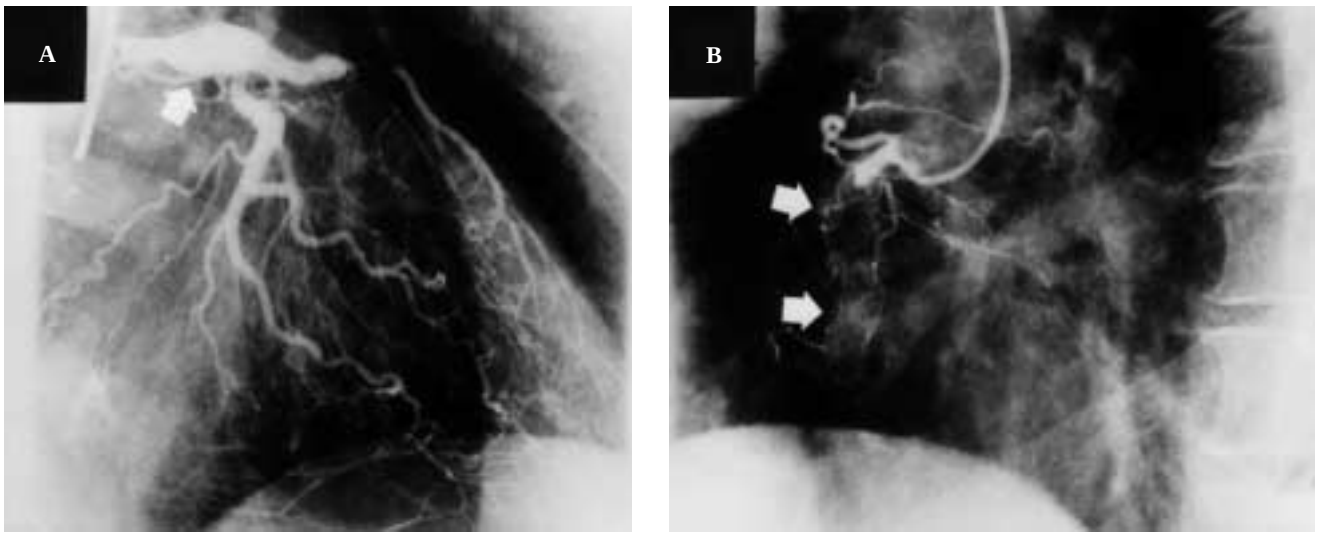

Fig. 1. Preoperative coronary angiography of the left coronary artery (A) and right coronary artery (B). A: the aneurysms (white arrow) of the left main trunk, proximal portion of the left anterior descending artery (LAD), and total occlusion of the LAD are noted. B: the calcified aneurysm (white arrows) of the right coronary artery (RCA) and total occlusion of the RCA are noted.

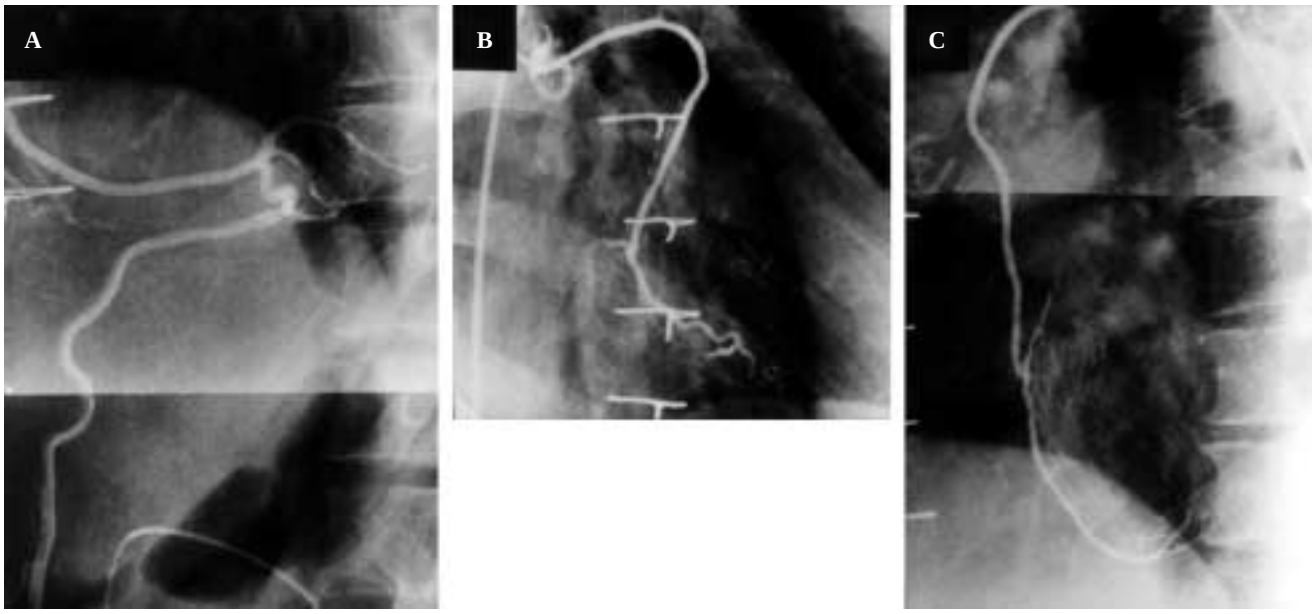

Fig. 2. Postoperative angiogram of the right gastroepiploic artery (RGEA, A), the radial artery (RA, B), and the left internal mammary artery (LITA, C). The posterior descending branch of the RCA was revascularized with the RGEA (A). The obtuse marginal branch was revascularized with the RA and its proximal side was anastomosed to the ascending aorta (B). The distal left anterior descending artery was revascularized with the LITA (C).

ing aorta. The postperative course was uneventful and postoperative angiogram at one month revealed that all grafts were patent (Fig. 2). Histological examination of samples from the ascending aorta, internal thoracic artery, radial artery, and right gastroepiploic artery revealed normal arterial walls in all specimens.

Comment

It has been documented that coronary aneurysms develops in 15% of patients with Kawasaki disease and about half of the lesions regress within a few years.[1)] Ischemic heart disease has been reported to develop in only 2.4% of all patients with Kawasaki disease.[1)] Therefore the in-

cidence of coronary artery sequelae of Kawasaki disease that require surgical revascularization seems to be considerably low. However, because fatal complications, such as acute thrombosis, asymptomatic dilated cardiomyopathy and sudden death, can occur even at a late phase of the disease, meticulous long-term follow-up and anticoagulant therapy are required for such patients. Moreover, the long-term consequences and the natural history of the disease still remain uncertain.

In pediatric patients with Kawasaki disease who underwent coronary artery revascularization, late follow-up studies have demonstrated a high occlusion rate of the saphenous vein graft, especially in children younger than seven years old.[2,3] Several reports have shown excellent clinical results of CABG using arterial conduits in pediatric patients with coronary sequela of Kawasaki disease.[2-4] In situ arterial grafts, such as internal mammary artery and gastroepiploic artery, may be advantageous because of their potential for adaptation and growth in such patients.[2,4]

In contrast to the well-known operative results in children, surgical revascularization for adult survivors of childhood Kawasaki disease is rarely reported.[5-7] Kato and colleagues[6] have surveyed adult patients with coronary artery disease throughout Japan and reported 21 adult survivors who had definite or suspected Kawasaki disease based on their history and coronary angiography. In the report, nine out of 21 patients received CABG. Apart from the literature, a review of the literature showed only few adult cases who underwent surgical revascularization.[5,7] Most of the cases were diagnosed as Kawasaki disease retrospectively based on their history and coronary angiographic findings. In our case, a history of clinical signs consistent with Kawasaki disease was uncertain. However, the fact that our case had no coronary risk factors except for short-term smoking and that calcified coronary aneurysms were revealed by coronary angiography strongly suggest that the coronary lesions are due to childhood Kawasaki disease. This is supported by the observations by Robinson and colleagues that the most common cause of coronary aneurysms and the most common etiology is Kawasaki disease.[8]

In our case, CABG with multiple arterial conduits was performed in order to obtain a good long-term patency because the patient was of a young age. In our previous experience of seven patients who underwent surgical revascularization for coronary artery sequelae of Kawasaki disease, it is noted that coronary artery lesions often extended to the distal portion of the coronary tree, especially in the RCA. Consequently, because of the problem in the length of the right internal mammary artery, posterior descending branches of the RCA were revascularized with the right gastroepiploic arteries in most of our previous patients, as performed in this case. We have previously reported that the right gastroepiploic artery is usually larger than the internal thoracic artery even in small patients.[9] Therefore, this conduit may be advantageous to small children because of its technical feasibility of anastomosis. The radial artery was also used as a third conduit to revascularize the circumflex system in this case. To our knowledge, the present case was the first to use this conduit for coronary revascularization in patients with Kawasaki disease. After revival of the technique, the radial artery has been used as a second or third conduit for surgical revascularization with increasing frequency in patients with atherosclerotic ischemic heart disease. A long-term follow-up study has shown that this graft provided excellent clinical and angiographic results in such patients.[10] Thus, it is conceivable that the use of this graft as an alternative may provide a further benefit also in patients with Kawasaki disease.

In conclusion, we reported an adult case with few coronary risk factors but with multiple coronary artery aneurysms and obstructive lesions presumably secondary to Kawasaki disease who underwent successful CABG with multiple arterial grafts. Because coronary artery sequelae of Kawasaki disease can be a cause of ischemic heart disease even in adults, heightened awareness of this possibility is required for young adults with coronary lesions but without coronary risk factor.

Acknowledgments

This work was supported in part by the Grant-in-Aid for Encouragement of Young Scientists (Grant A-11770753), and Grant-in-Aid for Scientific Research (Grant C-13671416), Japan Society for the Promotion of Science.

References

1. Kato H, Ichinose E, Yoshioka F, et al. Fate of coronary aneurysms in Kawasaki disease: serial coronary angiography and long-term follow-up study. *Am J Cardiol* 1982; **49**: 1758–66.
2. Kitamura S, Seki T, Kawachi K, et al. Excellent patency and growth potential of internal mammary artery grafts in pediatric coronary artery bypass surgery: new evidence for a “living” conduit. *Circulation* 1988; **78** (suppl I): 129–39.
3. Kitamura S, Kameda Y, Seki T, et al. Long-term out-

come of myocardial revascularization in patients with Kawasaki coronary artery disease: a multicenter cooperative study. *J Thorac Cardiovasc Surg* 1994; **107**: 663–74.
4. Isomura T, Hisatomi K, Asoh S, et al. Revascularization with the right gastroepiploic artery in Kawasaki disease. *J Thorac Cardiovasc Surg* 1990; **100**: 796–8.
5. Brevard SB, Smith VC. Presumed Kawasaki disease resulting in multiple coronary artery aneurysms in an adult. *Ann Thorac Surg* 1990; **50**: 291–3.
6. Kato H, Inoue O, Kawasaki T, Fujiwara H, Watanabe T, Toshima H. Adult coronary artery disease probably due to childhood Kawasaki disease. *Lancet* 1992; **340**: 1127–9.
7. Sato T, Isomura T, Hayashida N, Aoyagi S. Coronary artery revascularization in an adult with coronary aneurysms probably secondary to childhood Kawasaki disease. *Eur J Cardio-thorac Surg* 1997; **12**: 312–4.
8. Robinson FC. Aneurysms of the coronary arteries. *Am Heart J* 1985; **109**: 129–35.
9. Isomura T, Hisatomi K, Hirano A, Hayashida N, Ohishi K. Use of the right gastroepiploic artery as a pedicled arterial graft for coronary revascularization. *Eur J Cardio-thorac Surg* 1993; **7**: 38–41.
10. Acar C, Ramsheyi A, Pagny JY, et al. The radial artery for coronary artery bypass grafting: clinical and angiographic results at five years. *J Thorac Cardiovasc Surg* 1998; **116**: 981–9.