

A survey of the 3-decade outcome for patients with giant aneurysms caused by Kawasaki disease

Etsuko Tsuda, MD,^a Kenji Hamaoka, MD,^b Hiroyuki Suzuki, MD,^c Hisanori Sakazaki, MD,^d
Yosuke Murakami, MD,^e Masao Nakagawa, MD,^f Hisashi Takasugi, MD,^g and Muneo Yoshibayashi, MD^h
Osaka, Kyoto, Wakayama, Amagasaki, Shiga, Nankoku, and Nara, Japan

Background Our purpose was to determine the outcome in patients with a more-than-20-year history of giant coronary aneurysms (GAs) caused by Kawasaki disease (KD).

Methods Between 2010 and 2011, the incidence and outcome of cardiac events (CEs) in patients with GA was surveyed by questionnaire by the Kinki area Society of KD research. Death, acute myocardial infarction (AMI), coronary artery bypass grafting (CABG), percutaneous coronary catheter intervention, syncope, and ventricular tachycardia were considered as CEs. Survival rate and CE-free rate were analyzed by the Kaplan-Meier method.

Results We enrolled 245 patients (187 were male, 58 were female), 141 with bilateral GA and 104 with unilateral GA. The interval between the onset of acute KD to the time of survey ranged from 0.2 to 51 years, and the median was 20 years. Death, AMI, and CABG occurred in 15 (6%), 57 (23%), and 90 patients (37%), respectively. The CE-free rate and the survival rate at 30 years after KD were 36% (95% CI 28-45) and 90% (95% CI 84-94), respectively. The 30-year survival rate for bilateral GA was 87% (95% CI 78-93), and for unilateral GA, it was 96% (95% CI 85-96; hazard ratio 4.60, 95% CI 1.27-29.4, $P = .027$). The 30-year survival rate in patients with AMI was 49% (95% CI 27-71), and the 25-year survival rate in patients undergoing CABG was 92% (95% CI 81-98).

Conclusions The outcome differed significantly between bilateral GA and unilateral GA. The results focus attention on the need to preserve myocardial perfusion, especially in high-risk patients with bilateral GA. An understanding of the optimal CABG would be useful in bilateral GA. (Am Heart J 2014;167:249-58.)

Background

National surveys of Kawasaki disease (KD) in Japan have been performed every 2 years since 1976. Recently, about 10,000 patients with KD have been reported annually, and 1 month after the onset, giant coronary aneurysms (GAs) were present in less than 0.4% of patients. Until 2010, 272,749 patients had had acute KD, with 436 deaths. Although the mortality of KD exceeded 0.2% in the 1970

to 1984, it had decreased to less than 0.1% by the 1990s.¹ Most deaths occurred early after the acute illness and were attributable to the development of coronary aneurysms, especially giant lesions (GA).² Patients with GA often experienced cardiac events (CEs), such as acute myocardial infarction (AMI) or sudden death.³⁻⁵ In contrast, the long-term outcome after coronary artery bypass grafting (CABG) was good,⁶ and optimal coronary revascularization is believed to improve the prognosis for patients with GA. A previous report about patients with GA from a single institution suggested favorable results.⁷ Because the goal is to prevent death and improve the quality of life, we surveyed the long-term outcome in patients with GA caused by KD believing that the knowledge gained would help improve the future management of patients with GA.

Methods

Definitions

In this study, GA implies a coronary aneurysm due to KD with a diameter of more than or equal to 8 mm. In coronary artery lesions, localized stenosis (LS) means stenosis equal to or more than 25%, and occlusion means complete occlusion or segmental stenosis (SS) with new small vessels indicating

From the ^aDepartment of Pediatric Cardiology, National Cerebral and Cardiovascular Center, Osaka, Japan, ^bDepartment of Pediatric Cardiology and Nephrology, Graduate School of Medical Science, Kyoto Prefectural University of Medicine, Kyoto, Japan, ^cDepartment of Pediatrics, Wakayama Medical University, Wakayama, Japan, ^dDepartment of Pediatric Cardiology, Hyogo Prefectural Amagasaki Hospital, Amagasaki, Japan, ^eDepartment of Pediatric Cardiology, Osaka City General Hospital, Osaka, Japan, ^fDepartment of Pediatrics, Shiga Medical University, Shiga, Japan, ^gDepartment of Pediatrics, Kochi Medical University, Nankoku, Japan, and ^hDepartment of Pediatric Cardiology, Nara Hospital, Kinki University, Nara, Japan.

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Reprint requests: Etsuko Tsuda, MD, Department of Pediatric Cardiology, National Cerebral and Cardiovascular Center, 5-7-1 Fujishirodai, Suita-shi, Osaka 565-8565, Japan.

E-mail: etsuda@hsp.ncvc.go.jp

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Table I. Characteristics of patients with GA

GA	RCA	LCA	Bilateral	Total
n	48 (20%)	56 (23%)	141 (57%)	245
M/F	40/8	34/22	113/28	187/58
Onset (mo), median (range)	27 (0.7-110)	26 (2-244)	21 (1-251)	24 (0.7-251)
Acute treatment				
Aspirin	10 (19%)	13 (25%)	29 (56%)	52
Aspirin + IVIG	15 (22%)	14 (21%)	38 (57%)	67
Including steroid	7 (17%)	8 (19%)	37 (94%)	52
Medicine*				
Antiplatelets	28 (19%)	35 (24%)	82 (57%)	145
Antiplatelets + warfarin	14 (18%)	19 (25%)	43 (57%)	76
Warfarin	1 (20%)	1 (20%)	3 (60%)	5
None	1 (10%)	1 (10%)	8 (80%)	10
Unknown	3 (33%)	0	6 (67%)	9
CEs (+)	11 (9%)	18 (14%)	98 (77%)	127
CEs (-)	37 (31%)	38 (32%)	43 (37%)	118
CEs				
Death	1 (7%)	1 (7%)	13 (86%)	15
AMI				
1	6 (12%)	5 (11%)	36 (77%)	47
≤2	0	0	10	10
ICT				
Successful	1 (7%)	2 (14%)	11 (79%)	14
Failed	2 (13%)	0	13 (87%)	15
CABG				
PTCRA	0	1 (13%)	7 (87%)	8
PCBA	2 (100%)	0	0	2
NSVT				
VT	1 (7%)	2 (13%)	12 (80%)	15
	1 (25%)	0	3 (75%)	4

Abbreviations: IVIG, Intravenous immunoglobulin; ICT, intracoronary thrombolysis; PTCRA, percutaneous transluminal coronary rotational ablation; PCBA, percutaneous transluminal coronary balloon angioplasty.

*Antithrombotic agents immediately after acute KD.

recanalization.⁵ Stenotic lesions include LS, occlusion, and SS. Death, AMI, coronary revascularization procedures such as CABG and percutaneous coronary catheter intervention (PCI), syncope, and ventricular tachycardia (VT) were defined as CEs. Asymptomatic myocardial infarction was excluded from AMI. Patients who had not visited their hospital for 5 years were considered dropouts.

Our initial purpose was to define the clinical features, incidence of CE, and long-term outcome in patients with GA. About 2,000 cases of acute KD occur in the Kinki area each year, representing about one-fifth of the Japanese total. The Kinki area KD Research Society has a membership of about 250, and E. Tsuda recruited the members who participated in the study. Nine institutions including those of the authors participated. Between 2010 and 2011, the outcome for patients with GA in the 9 institutions was surveyed by a mail questionnaire.

The contents of the questionnaire are listed here: gender, date of birth, history of KD and its date of onset, acute-phase medication of KD (within 40 days of its onset) and medication immediately after the acute KD (>40 days after its onset), coronary arterial lesions at the initial selective coronary angiography (CAG) and its timing, aneurysm other than coronary; CE (AMI, CABG, PCI, syncope, VT, death), date of CE, coronary arterial lesions at the latest angiography and its timing, outcome, date of the latest clinic attendance, the latest clinical status (arrhythmia, New York Heart Association, delivery, left ventricular shortening fraction [LVSF], and left

ventricular diastolic dimension [LVDd] by 2-dimensional echocardiogram, and its timing), and medication at the latest clinic attendance.

We analyzed the characteristic features of the patients with GA from the results of the questionnaire, and these are listed in Table I. We then divided them into 3 groups based on the GA location, namely, right coronary artery (RCA), left coronary artery (LCA), or bilateral involvement. We calculated the incidence of stenotic lesions in the respective groups based on the time after KD and compared the incidence of stenotic lesions in the RCA, left anterior descending artery (LAD), and left circumflex (LCX). Furthermore, we analyzed LVSF and LVDd, the incidence of VT or nonsustained VT (NSVT), and the incidence of death in the 3 groups divided by the number of AMIs.

Survival rates and free rates for CE, AMI, and CABG were calculated, and the same values were compared between the unilateral GA group and the bilateral GA group. The unilateral GA group consists of patients with GA in the RCA or LCA, and bilateral GA means the patients with GA in both coronary arteries. Survival rates were also calculated in the respective groups based on CE or medication as a subgroup analysis.

Statistical analysis

The mean values are shown as mean ± SD. χ^2 Test was used to compare differences in incidence between groups. Turkey-

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