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CARDIOVASCULAR RISK FACTORS AND AMBULATORY BLOOD PRESSURE MONITORING AFTER KAWASAKI DISEASE

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Controversy persists as to whether patients who have had Kawasaki disease (KD) are at increased risk for premature atherosclerosis. Previous reports have suggested an increased tendency towards the metabolic syndrome and abnormal endothelial function. Purpose: We sought to determine cardiovascular risk factors in patients after KD. Methods: Complete cardiovascular risk assessment was performed in 43 patients (mean age 15.4±2.3 years; 60% males) at a mean of 9.5±3.2 years after typical KD, including 11% with persistent and 33% with regressed aneurysms, and 56% with ectasia or no coronary artery involvement. Results were related to a concurrent normal control group of 30 adolescents (mean age 15.9±2.5 years; 53% males). Results: There were no significant differences between cases vs. controls regarding body mass index, percent ideal weight for height or percentile of triceps skin fold thickness. There were no significant differences regarding amount of time spent in active and sedentary pursuits, family history of risk factors or cardiovascular disease, or smoking or smoke exposure. There were no significant differences regarding serum electrolytes, creatinine, fasting lipid profile, plasma free fatty acids, insulin and C-peptide levels, apolipoproteins, Lp(a), or urinary microalbumen clearance. From 24-hour ambulatory blood pressure monitoring, cases did not differ significantly from controls regarding mean total, daytime or nighttime systolic or diastolic blood pressure values, except cases had a tendency towards lower mean daytime systolic pressure (113±10 mmHg vs. 118±9 mmHg; p=0.06). However, cases had significantly lesser night-time fall (dipping) in both mean systolic (mean -5.1% vs. -8.4%; p=0.01) and diastolic (-9.6% vs. -12.8%; p=0.05) pressure. This difference dinimished (cases vs. control p=0.086 for systolic and p=0.13 for diastolic dipping) after adjustment for age, gender, BMI and mean daytime pressure measurements. Conclusion: Abnormalities of blood pressure regulation may represent an increased predisposition to hypertension in patients after KD

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HISTOPATHOLOGICAL STUDY ON NON-ANEURYSMAL CORONARY ARTERIES IN KAWASAKI DISEASE

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To evaluate coronary arterial changes found in most Kawasaki disease (KD) patients who recover without aneurysms, histopathologial observation was performed using autopsy KD patients. **Materials and Methods**: Fifteen KD autopsy patients without coronary artery aneurysms by macroscopical observation, ranged from 6 days to 14 years after the onset of illness, were used in this study. Coronary arteries were fixed in 10% formalin and embedded in paraffin. Hematoxylin and eosin, Elastica van Gieson and azan-Mallory stain were performed for routine histological examination. **Results**: Acute phase: In coronary arteries of the patients who died on 6th day after the onset, a few inflammatory cells were observed in the intima and adventitia. In coronary arteries of 9th to 13th illness day, histological findings varied from no inflammation unto marked panarteritis showing severe inflammatory cells infiltration and disruption of internal elastic lamina. After 17th day, inflammation became much milder than former lesions, and the lesions showed subsiding tendency. The causes of death of these patients were myocarditis, valvulitis or interstitial pneumonia. Remote phase: All patients died of causes other than sequelae of KD. In five of six patients, scarring of arteritis such as concentric intimal thickening and extension of internal elastic lamina was observed in coronary arteries. However, remarkable change was not seen in one patient. **Summary**: The degree of acute inflammation in coronary arteries varied in each patient. Especially, we must point out the existence of the patients having no inflammation at coronary arteries even in acute phase. In addition, there was a case without apparent arterial change also in remote phase. In this patient, it is suggested that no or very slight inflammation in coronary arteries had occurred at acute phase.

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A CASE OF KAWASAKI DISEASE WITH RE-DILATATION OF THE CORONARY ARTERY FIVE YEARS AFTER THE ONSET

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We experienced a case of Kawasaki disease with re-dilatation of coronary artery aneurysm five years after the onset. [Patient profile] The patient is a 12-year-old boy. He suffered from Kawasaki disease at the age of four years. Intravenous gamma-globulin (IVGG) therapy with 300 mg/kg/day was administered for 5 days, and additional IVGG with 1g/kg/day was administered furthermore. However, in spite of IVGG therapy, the aneurysms were developed on the both coronary arteries, which were confirmed by the cardiac catheterization one year later. (AHA Committee Report: Segment 2: two aneurysms; 4.8mm, 5.0mm in diameter, Segment 6: 4,3mm, Segment 11: 4.1mm). Thereafter, the coronary aneurysm on LAD regressed gradually. We depicted this regression of LAD aneurysm by the echocardiography at 4 years after the onset. (Segment 6: 2.4mm in diameter). However, further follow-up echocardiography revealed re-dilatation of the aneurysm on the same region of LAD one year later. (Segment 6: 7.4mm in diameter). We also confirmed this re-dilatation of the aneurysm without stenotic lesions by cardiac catheterization. [Discussion] There have been reported that the regressed aneurysms sometimes develop to the stenotic lesions late after the onset. However, there are a few reports in which a newly developed aneurysm emerged late after the onset of Kawasaki disease. [Conclusions] Re-dilatation of the regressed aneurysm is a very unique clinical course as a long-term Kawasaki disease. While the mechanism of the re-dilatation of this patient is still un-known, we must be careful to follow him up.

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LONG-TERM OUTCOME OF CORONARY ABNORMALITIES IN KAWASAKI DISEASE

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OBJECT To analyze long-term outcome of coronary abnormalities in patients with Kawasaki disease (KD). **SUBJECTS** The subjects of this study are 46 patients who underwent coronary angiography (CAG) twice or more times in our hospital for 20 years since 1981. The age of the first CAG was 5.2±3.3 years. Sixteen patients were referred from the affiliated hospitals. **RESULTS** The dilated lesions were revealed on the first CAG in 34 patients; large-sized aneurysms (ANl) in 8 patients, moderate-sized aneurysms (ANm) in 12 and dilation lesions (Dil) in 14, while the stenotic lesions were found in 11 patients; occlusion (OC) in 2 patients, segmental stenosis (SS) in 4 and local stenosis(LS) in 5. Coronary abnormalities improved in 7 patients, and were aggravated in 18. The smaller dilated lesions had a tendency to improve during follow-up period, compared with moderate-sized aneurysms on the initial CAG. Four among 14 the dilated lesions with diameter of 4-5mm were already aggravated on the second CAGs. ANl changed to OC and LS at the high rate(63%), while LS has a trend to be aggravated to further stenosis as well as obstruction(80%). Most of SS could be found 1 to 3 years after the onset of KD(75%), while OC and LS could be found in any time. Some of them were found over 10 years after the onset. During the follow-up period, one patient died due to ischemic heart disease. Four patients underwent bypass-grafting, and one had PTCA with a good result. Two patients are waiting for interventional treatment. Most of ANl appeared in acute phase. However, distal Dil in a patient among the subjects changed to LS 4 years later. **CONCLUSION** Even though coronary dilatation was revealed on the initial CAG and no treatment was required, the patients should be followed up carefully for a long time.

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FOLLOW-UP STUDY OF CORONARY ARTERY BYPASS GRAFTING IN PATIENTS WITH KAWASAKI DISEASE

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Background: The purpose of this study was to assess the long-term clinical outcome of coronary artery bypass grafting in pediatric patients with Kawasaki disease. Methods: Six patients (mean age, 9.3±1.6 years) underwent coronary artery bypass graft ing be tween September 1985 and December 1992. The number of bypass grafts placed was 1-2/patient(mean of 1.3±0.5). The left internal mammary artery (IMA) was used as a bypass graft in 3 patients, bilateral IMA in 1 and saphenous vein in 3. All pa t ients underw e nt postoperative evaluations after one month, and between 5 and 10 years.Results: Follow-up ranged between 9 and 16 years (mean,12.6±2.7 years). Stress myocardial scintigraphy identified two patients with transient ischemia, one o f w hom died suddenly a ft er 16 postoperative years. Coronary angiography demonstrated that the grafts of 5 patients were patent at both the short- and long-term follow-ups. However, in one patient, the IMA that was grafted to the diagonal artery was occ l ude d one month after su rgery. Five survivors are in good health without clinical angina. Conclusions: We consider that coronary revascularization using bilateral IMA grafts may provide a more favorable prognosis in patients with severe Kawasaki coronary artery disease. Stre ss myocardial scintigraphy and echocardiography can be used effectively to follow such patients.

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LATE STAGE CARDIAC ABNORMALITIES IN THE KAWASAKI DISEASE PATIENT WITHOUT CORONARY ARTERY LESION

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We examined whether Kawasaki disease (KD) patients without coronary artery lesion (CAL) would develop some cardiac abnormality at late stage. Methods. Study patients were 162 children of 335 Kawasaki Disease patients admitted to our hospital from 1982-1990 and started the treatment within 10th illness day. 272 out of 335 pts had no coronary artery lesion at acute stage. At both 5 yrs and 10 yrs after onset, three kinds of cardiac examinations (echocardiogram, treadmill exercise test, 24-h electrocardiogram) underwent in 162 out of 272 pts without CAL. They were 84 boys and 78 girls and their age at onset was average of 2.04-year-old (0.2-6.8). The patients with positive outcomes of three tests underwent myocardial perfusion imaging and/or coronary angiography as further investigation. Results. Abnormal cardiac findings consisted of left ventricular wall motion abnormality, mitral valve prolapse, ST segment depression with exercise, complex ventricular arrhythmia and sinus pause more than 2.5 seconds. The number of patients with positive outcome is 9 and 16 in the 5 yrs and 10 yrs after onset, respectively. The positive rate at 10 yrs after onset was significantly higher than that at 5 yrs ($p < 0.0001$). The age at onset of the patients with positive outcome was significantly higher than that of the others (2.99-year-old, 1.93-year-old, $p = 0.006$). The illness day started treatment, use of immunoglobulin and fever duration were no difference between the positive cases and the negative cases. Conclusions. This study clarified the presence and gradually increase of cardiac abnormalities in KD patients without CAL at late stage, moreover the necessity to follow up KD patients regardless of coronary status.