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LONG-TERM CHANGES IN DEPOLARIZATION AND REPOLARIZATION AFTER KAWASAKI DISEASE

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To assess myocardial electric potentials late after coronary involvement secondary to Kawasaki disease (KD) we measured signal-averaged electrocardiography (SAECG) and QT dispersion parameters. Study population included 13 patients (group I) with persistent coronary aneurysm (AN), 12 patients (group II) with AN resolution beyond 3 months of the acute illness (9.2±9 months), and 13 patients (group III) with AN resolution within 3 months of the acute illness (1.3±0.9 months). Measurements were obtained 7.9±3.9, 6.7±3.9, and 7.2±3.6 years after the initial diagnosis of KD in group I, II, and III respectively (p=NS). In group I, myocardial infarction occurred in one patient, and coronary thrombosis in another during the acute illness. All except two patients had giant AN (n=8) and / or coronary artery stenosis (n=7). No short or long-term compications were observed in groups II or III. Depolarization was evaluated by SAECG, and repolarization was evaluated by QT dispersion measurements. At 40Hz high-pass filter SAECG, noise level was 0.39±0.07μV in group I, 0.46±0.14μV in group II, and 0.43±0.14μV in group III (p=NS). Terminal 40-msec root mean square amplitude (RMS40) was significantly lower in group I in comparison to groups II and III (64.1±40.8μV, 79.9±47.2μV, and 115±65.4μV respectively; $p<0.05$), and low-amplitude signal (<40μV) duration (LASd) showed no significant difference (19.7±7msec, 20.9±8.5msec, and 18.6±7.4msec respectively) (p=NS). Twelve-lead QT dispersion was significantly greater in group I (52±11msec) compared to group III (37±11msec) ($p<0.05$), but not in comparison to group II (45±13msec). The trend was present for rate-corrected QT dispersion, without reaching statistical significance (84±34, 71±31, and 61±23 respectively; p=0.18). In conclusion, both depolarization and repolarization parameters are altered in patients with persistent coronary AN long-term after KD. These findings may represent risk factors for developing ventricular arrhythmia in a growing population of KD patients. In this perspective, long-term follow-up studies are needed for this population.

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NAVIGATER-ECHO-BASED RETROSPECTIVE RESPIRATORY GATING THREE-DIMENSIONAL GADORINIUM ENHANCED CORONARY MR ANGIOGRAPHY TO DETECT THE THROMBUS IN THE GIANT CORONARY ANEURYSM

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Objectives and Background: In the giant aneurysm(g-AN), thrombus will be produced easily and will occlude coronary artery. But, it is difficult to detect the thrombus in the g-AN, because the slow and turbulent flow in the g-AN show the similar signal intensity with the thrombus. We assessed the diagnostic value of gadorinium (Gd-DTPA) enhanced 3D coronary MR angiography (3D-MRCA) with retrospective respiratory gating to detect the thrombus in the g-AN. Methods: 3 patients (1year-old girl, 11 year-old boy, 17 year-old male) with 6 g-ANs were examined. Only one g-AN in the LAD was occluded by thrombus. We used an ECG-gated 3D segmented turbo FLASH sequence. Images were obtained during free breathing used respiratory gating in which navigator echoes have been used to track the diaphragmatic motion. During scan we injected Gd-DTPA (0.02-o.o3 mmol/kg) manually. Result: The time to examine was 3 to 6 minute. All g-AN were imaged clearly. The signal intensity in g-ANs scanned without Gd-DTPA was low because of low signal blood flow by presaturationed pulses in the right lung to monitor the movement of the diaphragm, but one g-AN (occluded)in the LAD showed high signal intensity. The signal intensity in all of g-AN with Gd-DTPA was high.But in the occluded g-AN of the LAD, low signal area was surrounded with high signal narrow area. Conclusions: These results show that the signal intensity in the g-AN without trombus is low and that with thrombus is high by 3D-MRCA without Gd-MRCA. On the other hand, the signal intensity without thrombus is high and that with thrombus is low by Gd-DTPA enhancement. 3D-MRCA enhanced by Gd-DTPA is useful noninvasive method to detect the thrombus in the g-AN.

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QUANTITATIVE EVALUATION OF SEVERITY OF CORONARY ARTERY DAMAGE IN KAWASAKI DISEASE: ULTRASONIC TISSUE CHARACTERIZATION METHOD AND VASCULAR ENDOTHELIAL GROWTH FACTOR

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We evaluated the severity of coronary artery (CA) damage quantitatively by an ultrasonic tissue characterization (UTC) method and the plasma levels of vascular endothelial growth factor (VEGF) in patients (pts) with Kawasaki disease (KD), and determined the relationship between the incidence of coronary artery lesion (CAL) and those results. Forty pts with KD, (median age 2.8 years), 10 afebrile and 10 febrile controls, were studied. The 40 KD pts comprised 2 groups: Group A; 32 pts with no CAL, Group; 8 pts with CAL. The UTC of left CA wall was performed to measure the absolute echo-intensity (AEI) value. The AEI value of CA in subacute phase (SAP) (34± 3.2 dB) was significantly higher than acute (AP; 31± 1.7 dB) and convalescent phase (CP;32± 2.6dB). Kinetics of plasma VEGF levels showed similar trend, VEGF levels peaked in the SAP of KD (AP: 197± 60, SAP: 599± 411, CP: 271± 201 pg/ml, $p < 0.05$). The AEI values and plasma VEGF levels in KD pts in AP, before intravenous immune globulin (IVIG) treatment, were significantly higher than those in febrile (AEI: 18± 2.4dB, VEGF: 104± 36 pg/ml) and afebrile controls (AEI: 17± 1.5dB, VEGF 63± 33pg/ml, $p < 0.05$). Both AEI values and VEGF levels in AP in pts with CAL (Group B, AEI: 33± 2.0 dB, VEGF: 253± 35 pg/ml) were significantly higher than patients in Group A (AEI: 31± 1.4dB, VEGF: 184± 57 pg/ml, $p < 0.05$). The AEI value and VEGF levels peaked at the just before the developing of CAL. A significant correlation was found between AEI value and VEGF levels ($r = 0.78$, $p < 0.05$). Conclusion The UTC method and plasma VEGF levels may have potential as a predictor of incidence of CAL in pts with KD.

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UP TO DATE RESULTS OF SURGICAL REVASCULARIZATION FOR KAWASAKI DISEASE

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Coronary revascularization surgery for the sequelae of Kawasaki disease is effective in improving cardiac function during exercise and probably in preventing sudden deaths and myocardial infarction in children. This operation is now established as a treatment for severe inflammatory coronary obstructive disease due to Kawasaki disease. Results of the surgery and long-term prognosis are favorable, and the postoperative quality of life is satisfactory in our series of over 100 patients.

The internal thoracic artery graft is not only excellent in its long-term patency but also is capable of growing with the child and meeting the perfusion demand of the myocardium. Thus, it is an ideal graft material for coronary artery reconstruction in children. Use of the bilateral internal thoracic artery is also safe. Moreover, right gastroepiploic artery grafts are useful in patients with distal coronary artery lesions. The merits of surgical treatment for coronary artery lesions due to Kawasaki disease have now been recognized not only in Japan but in all over the world. PTCA may be required and is proved to be useful for anastomotic stricture of the graft.

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MID-TERM RESULTS OF HEPARIN AND EXERCISE THERAPY FOR PATIENTS WITH MYOCARDIAL ISCHEMIA AFTER KAWASAKI DISEASE

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Background : We previously reported the short-term efficacy of heparin and exercise (HE) therapy on the alleviation of myocardial ischemia in the collateral-dependent area after Kawasaki Disease (KD). **Purpose** : We studied mid-term efficacy o f this therapy for KD patients. **Methods** : Six patients, aged 9 to 20 years, who received HE therapy between 1997 and 1999 were studied. All patients had total obstruction in left or right coronary artery system. Dipyridamole-loading 99m technetiu m-tetrofos min single photon emission computed tomography (SPECT) had documented improved myocardial perfusion in all patients within 1 week after HE therapy. Two of the 6 patients received additional HE therapy within 1 year because they still had high SPECT defect scores after initial HE therapy. In all patients, dipyridamole-loading SPECT was performed at 1.5 year after initial HE therapy. Follow-up coronary angiography was performed in 3 of the 6 patients. All patients have been maintained on anti-p latelet therapy. **Results** : None developed anginal attack during follow-up. Follow-up dipyridamole-loading SPECT documented that total defect scores remained unchanged (n=1) or decreased (n=5) compared with those at baseline, and also remained unc h anged (n=1), increased (n=1) or decreased (n=4) compared with those within 1 week after initial HE therapy. Coronary angiography documented the development of collateral vessels in 2 of 3 patients studied. **Conclusions** : The present study sugges t ed that the HE therapy might have a favorable mid-term effect on alleviation of myocardial ischemia in patients with total coronary obstruction.

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LONG-TERM OUTCOME OF CATHETER INTERVENTION IN KAWASAKI DISEASE -MULTI CENTER STUDY-

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Background: Catheter intervention has become one of the promising therapeutic strategies in the treatment of patients with coronary stenosis due to Kawasaki disease. However, long-term follow-up data has not been clarified. Patients and Method: We reviewed multi institutional experiences of this procedure. From 8 institutions, 65 procedures in 55 patients were reported. The procedures included percutaneous transluminal coronary angioplasty (PTCA; n=28), percutaneous transluminal coronary rotational ablation (PTCRA; n=25), and stent implantation (n=12). The immediate success rate was 86% in the PTCA, 96% in the PTCRA, and 90% in the stent. Age at intervention ranged from 1.9 to 22 years (median 14.5 years) and interval from the onset of disease to intervention was 1.7 to 17 years (median 8.7 years). Follow-up coronary angiographies or myocardial perfusion scan were performed 3 months to 4 years after the procedure. Final follow-up period ranged from 4 months to 6 years (median 3.6 years). Results: During this follow-up period, re-stenosis was detected by follow-up coronary angiography in 8 cases of PTCA (29%), in 1 case of stent implantation (8%) and 7 cases of PTCRA (28%). Although progression of neoaneurysm was not observed, resolution of those aneurysms was not also confirmed. Eight patients were transferred to the coronary bypass surgery. Conclusion: Initial result of catheter intervention in this disease is excellent, however, re-stenosis is not rare during the follow-up period. Care should be paid for long-term patency and collaboration with coronary bypass surgery is essential.