INTRODUCTION

Kawasaki Disease (KD) is an acute febrile childhood disease capable of damaging the coronary arteries and causing aneurysms, which can then become complicated with thrombosis or coronary obstruction, leading to myocardial ischemia.1

METHODS

Between October 1988 and April 2004, we assessed 150 children with KD. The mean age was 44.8 months (range, 3-114); 56 were girls and 94 were boys. Patients with “typical” American Heart Association (AHA) criteria were included: prolonged fever (≥ 5 days) plus 4 of the following criteria: a) changes in extremities, b) polymorphic exanthem, c) bilateral conjunctivitis without exudate, d) changes in oral cavity, and e) cervical lymphadenopathy. “Atypical or incomplete” cases with fever ≥ 5 days and fewer than 4 criteria, but with coronary artery complications on echocardiography, were also included.4 Laboratory tests, including complete blood counts, erythrocyte sedimentation rate (ESR), and platelet count, were performed. The cardiac complications of KD were assessed by color Doppler echocardiography from the fifth day, except in three patients due to a late echocardiographic finding, a retrospective diagnosis of KD in one child with angina, and a postmortem diagnosis in 1 infant with prolonged fever. The presence of pancarditis was a predictor of a giant coronary artery aneurysm. Mortality was 3.7%. The aneurysms coronarios fueron las lesiones cardiacas predominantes. La edad menor de 27 meses, la fiebre durante más de 8 días, la velocidad de sedimentación globular > 70 mm y la pancarditis fueron factores de riesgo para aneurismas coronarios.

Key words: Kawasaki disease. Coronary aneurysm.

INTRODUCCIÓN

La Enfermedad de Kawasaki (KD) es una enfermedad febril de la infancia que puede causar lesiones en las arterias coronarias que pueden resultar en aneurismas, que a su vez pueden complicarse con trombosis o obstrucción coronaria, lo que conduce a isquemia miocárdica.2

MÉTODO

Entre octubre de 1988 y abril de 2004, evaluamos 150 niños con KD. La edad promedio fue 44.8 meses (rango, 3-114); 56 eran niñas y 94 eran niños. Los pacientes con “típica” American Heart Association (AHA) criterios fueron incluidos: fiebre prolongada (≥ 5 días) más 4 de los siguientes criterios: a) cambios en los miembros, b) exantema polimórfico, c) conjuntivitis bilateral sin exudado, d) cambios en la cavidad oral, y e) linfedema cervical. “Atípicas o incompletas” casos con fiebre ≥ 5 días y menos de 4 criterios, pero con complicaciones arteriales en la ecocardiografía, también fueron incluidos.4 Se realizaron pruebas laboratoriales, incluidas contabilidades de sangre completa, velocidad de sedimentación eritrocítica (ESR) y conteo plaquetario. Se realizaron estudios ecocardiográficos utilizando color Doppler en el quinto día, excepto en tres pacientes debido a una ecocardiografía tardía, un diagnóstico retrospectivo de KD en un niño con angina y un diagnóstico postmortem en un bebé con fiebre prolongada. La presencia de pancarditis fue predictora de aneurisma coronario gigante. La mortalidad fue del 3.7%. Los aneurismas coronarios fueron las lesiones cardiacas predominantes. La edad menor de 27 meses, la fiebre durante más de 8 días, la velocidad de sedimentación globular > 70 mm y la pancarditis fueron factores de riesgo para aneurismas coronarios.

Palabras clave: Enfermedad de Kawasaki. Aneurismas coronarios.
and degree of valvular, myocardial, and pericardial compromise were determined, as well as the presence and type of coronary lesions, which were classified as follows:

1. Diffuse ectasia or dilation (diameter greater than that expected for the body surface area).  
2. Coronary aneurysm (segmental dilation >1.5 times the adjacent segment); it was also indicated whether the aneurysm was single or multiple, small and/or medium-sized (up to 8 mm) or giant (over 8 mm).
3. Coronary stenosis.

Echocardiography was repeated in 4-6 weeks and at 1 year from the onset of symptoms in patients with no heart disease, every 6 months in those who had small to moderately sized aneurysms, and every 1-3 months in children with giant aneurysms. From 5 years of age, the patients were evaluated by a yearly stress test. Patients with residual moderate or giant coronary aneurysms also underwent perfusion myocardial testing (single photon emission computed tomography [SPECT]) at rest and with pharmacologic challenge every two years after 10 years of age. Coronary angiography was indicated in a child who consulted for angina and experienced an acute myocardial infarction (AMI).

The comparison of quantitative variables between patients who developed an aneurysm and those who did not was done by one-way analysis of variance in the case of parametric distributions and the Mann-Whitney/Wilcoxon test for 2 samples in the case of nonparametric distributions. The association between the qualitative characteristics and the development of aneurysms was assessed by a $\chi^2$ test using the Yates correction or by Fisher’s exact test.

**RESULTS**

A total of 27 patients (18%) experienced cardiac complications.

Mitril regurgitation was mild, transient, and uncommon (3.7%). Three male patients who developed an aneurysm and those who did not was done by one-way analysis of variance in the case of parametric distributions and the Mann-Whitney/Wilcoxon test for 2 samples in the case of nonparametric distributions. The association between the qualitative characteristics and the development of aneurysms was assessed by a $\chi^2$ test using the Yates correction or by Fisher’s exact test.

Mitril regurgitation was mild, transient, and uncommon (3.7%). Three male patients who developed giant coronary aneurysms presented pancarditis (Figure).

There were no cases of aortic valvulitis.

All had coronary lesions, which were classified as follows:

- Group 1: transient dilation (ectasia) in 11 patients.
- Group 2: single aneurysm of small or moderate size in 9 patients (group 2a) and multiple aneurysms of small or moderate size in 3 patients (group 2b).
- Group 3: giant coronary aneurysms in 3 patients.
- Group 4: coronary stenosis in 1 patient (Table 1).

Follow-up was from 1 to 16 years (mean, 8.5 years). In total, 147 children received treatment following the diagnosis: oral acetylsalicylic acid (ASA) (80 mg/kg/day) and intravenous gamma globulin (400 mg/kg) for 4

**TABLE 1. Classification of Patients With Coronary Aneurysms According to Severity and Risk**

<table>
<thead>
<tr>
<th>Risk Group</th>
<th>Patients, n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>11</td>
<td>40.7</td>
</tr>
<tr>
<td>2a</td>
<td>9</td>
<td>33.3</td>
</tr>
<tr>
<td>2b</td>
<td>3</td>
<td>11.1</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>11.1</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>3.7</td>
</tr>
</tbody>
</table>

Figure. Echocardiographic image (short axis of large vessels) showing coronary aneurysms. Ao indicates aorta; LAD, left anterior descending artery; LCA, left coronary artery; RCA, right coronary artery.
TABLE 2. Clinical Characteristics of Patients With Kawasaki Disease According to Whether or Not Coronary Aneurysms Developed

<table>
<thead>
<tr>
<th>Patient Type</th>
<th>Age, Median (months)</th>
<th>Sex</th>
<th>Days of Fever, Average (P&lt;.05)</th>
<th>ESR (P&lt;.05)</th>
<th>Complete Clinical Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>No aneurysms</td>
<td>43.5 months</td>
<td>Male, 60%</td>
<td>6 days</td>
<td>48 mm</td>
<td>28%</td>
</tr>
<tr>
<td>Aneurysms</td>
<td>27 months</td>
<td>Male, 66%</td>
<td>8 days</td>
<td>71 mm</td>
<td>44%</td>
</tr>
</tbody>
</table>

*ESR indicates erythrocyte sedimentation rate.

was always accompanied by giant aneurysms, which determined an adverse prognosis.11

Among children with coronary lesions, 56% presented an incomplete form of the disease, an incidence similar to that described in the literature.10 In our population, male sex, age <27 months, prolonged fever, ESR>70 mm, and pancarditis were factors associated with coronary abnormalities.12

Generalized microvasculitis is expressed in 30%-50% of the patients as coronary ectasia. In all of these patients the condition resolved within the first 45 days of the disease. Coronary aneurysms can regress or progress. All aneurysms in group 2a involuted, compared with only 66% in group 2b. Giant aneurysms accounted for 15% of the total. These aneurysms do not involute, but can lead to obstruction.

Stress testing and myocardial perfusion (SPECT) images were used to detect myocardial ischemia.8 Coronary angiography should be performed if the patient is symptomatic or the noninvasive studies indicate myocardial ischemia, in order to assess feasibility of myocardial revascularization surgery,13 as occurred in 1 patient in our series.

CONCLUSIONS

Coronary aneurysms were the predominant cardiac lesions in our series. The risk factors for coronary aneurysms were age <27 months, prolonged fever of more than 8 days, ESR>70 mm, and pancarditis.

REFERENCES