The aim of this study was to determine risk factors for coronary lesions, the type of heart lesion present, and long-term outcome in Kawasaki disease. We studied 150 children, aged 3 months to 9.5 years, who met the criteria for a diagnosis of Kawasaki disease. Of the 18% who were diagnosed with heart disease, 100% had coronary artery abnormalities, 11.1% had pancarditis, and 3.7%, mitral insufficiency. The coronary abnormalities were classified according severity as follows: diffuse ectasia in 40.7%; a small-to-medium-sized solitary coronary artery aneurysm in 33.3%; numerous small-to-medium-sized aneurysms in 11.1%; giant aneurysms in 11.1%; and coronary artery stenosis in 3.7%. The presence of pancarditis was a predictor of a giant coronary artery aneurysm. Mortality was 3.7%. Coronary aneurysm was the predominant heart lesion. The risk factors for coronary aneurysm in Kawasaki disease included age less than 27 months, fever lasting more than 8 days, erythrocyte sedimentation greater than 70 mm, and pancarditis.

Key words: Kawasaki disease. Coronary aneurysm.

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.

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.

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.
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).\(^5\)
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).\(^6\)
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.\(^8\) 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. Mitral 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.

**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>

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
In our population, 9
In our series, mitral
Our
and is predominantly
if the patient
as occurred in 1
P
389
6 days;

[disease (without statistical significance).
Presented typical KD and 56%, incomplete forms of the
Boys were affected more often in both groups, but only
under 2 years and in school-aged children (5-10 years).
Coronary compromise.
P
after the administration of gamma globulin.
Visualized on echocardiography. No new lesions occurred
aneurysms or until the aneurysms were no longer
complications.
Week from the onset of symptoms in patients with no
(5-10 years), had a higher incidence of cardiac
Reduced to 3-5 mg/kg/day, maintaining it until the sixth
Aneurysms 27 months Male, 66% 6 days 48 mm 28%

| Table 2. Clinical Characteristics of Patients With Kawasaki Disease According to Whether or Not Coronary Aneurysms Developed* |
|-----------------|-----------------|--------|-------|---------|-----------------|
| Patient Type    | Age, Median     | Sex    | Days of Fever, Average (P<.05) | ESR (P<.05) | Complete Clinical Evidence |
| No aneurysms    | 43.5 months    | Male, 60% | 6 days           | 48 mm       | 28%               |
| Aneurysms       | 27 months      | Male, 66% | 8 days           | 71 mm       | 44%               |

*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. 12 In our population,
males, 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
case. 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, 11 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.

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