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Original article

Comparative study of complete versus incomplete Kawasaki disease in 59 pediatric patients

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Abstract

Objectives: To compare the clinical and laboratory features and the rate of echocardiographic coronary artery abnormalities in patients with complete and incomplete forms of Kawasaki disease (KD) and to determine which additional clinical criteria might support a suspicion of KD.
Methods: We retrospectively reviewed the medical records of patients with KD who were admitted to the general pediatrics department of the Kremlin Bicêtre Teaching Hospital, France, between January 1995 and May 2006. We compared patients with a fever and four or five of the principal criteria (complete KD) to the other patients (incomplete KD). Clinical and laboratory features were abstracted from the records.
Results: We identified 63 patients with a mean age of 33 months (± 31). The male-to-female ratio was 2.47. Four patients were excluded. Of the remaining 59 patients, 39 had complete KD and 20 incomplete KD. The group with complete KD had significantly higher rates of changes in the extremities, conjunctival injection, exanthem, and enanthem; and a significantly lower rate of coronary artery dilation (48.7% vs. 90% in the incomplete KD group, $P = 0.002$). Serum levels of alanine aminotransferase and gamma glutamyl transferase were significantly higher in the complete KD group. No significant differences were found between the two groups regarding age, sex, blood cell counts, or laboratory markers for inflammation. Pyuria was found in 45.4% of patients with complete KD and in 30.8% of those with incomplete KD ($P = 0.17$). Of 14 patients who underwent ophthalmological evaluation, two had uveitis; both of them had complete KD.
Conclusion: Incomplete KD shares with complete KD a risk of coronary artery disease. The diagnosis of incomplete KD is challenging but can be supported by the presence of features other than the principal criteria, such as acute anterior uveitis or unexplained pyuria.
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Keywords: Kawasaki disease; Incomplete forms; Coronary aneurysm

1. Introduction

Kawasaki disease (KD) is an acute vasculitis of unknown etiology that predominantly affects pediatric patients, chiefly infants. The morbidity and mortality associated with KD are related primarily to the development of coronary artery dilations or aneurysms. A single intravenous infusion of human immune globulins in a dosage of 2 g/kg is currently the standard treatment for KD [1]. No specific laboratory markers have been identified to date, and the diagnosis consequently rests on the clinical findings. KD is diagnosed in patients who have a fever for at least five days and at least four of the five following principal criteria: changes in the extremities, exanthem, conjunctival injection, changes in the lips and oral cavity, and cervical lymphadenopathy with at least one node measuring 1.5 cm in diameter or more [1].

Some patients fail to meet all the criteria for KD but are nevertheless at risk for the development of coronary artery disease. These incomplete forms of KD are being increasingly reported, although no clear definition has been developed [1–8]. In patients with incomplete KD, the diagnosis is challenging and therapeutic decisions are difficult.

The primary objective of this study was to compare the clinical and laboratory features and the rate of coronary artery disease in patients with complete and incomplete KD. Our secondary

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Table 1
Rates of occurrence of the principal criteria in the groups with complete and incomplete Kawasaki disease.

Principal criteria	Total		Complete KD		Incomplete KD		*P* value
	n	%	*n*	%	*n*	%	
Changes in the extremities	44	74.6	38	97.4	6	30.0	<0.0001*
Exanthem	50	84.7	37	94.9	13	65.0	0.005*
Conjunctival injection	49	83.0	36	92.3	13	65.0	0.02*
Enanthem	52	88.1	39	100.0	13	65.0	0.0002*
Lymphadenopathy	21	35.6	15	38.5	6	30.0	0.52

KD: Kawasaki disease.
*The asterisks indicate significance differences $P < 0.05$.

objective was to determine whether clinical features not listed among the principal criteria might support a diagnosis of KD.

2. Methods

We retrospectively reviewed the medical records of patients with KD who were admitted to the general pediatrics department of the Kremlin Bicêtre Teaching Hospital (Le Kremlin Bicêtre, France) between January 1995 and May 2006. We identified 63 patients, whom we classified as having complete or incomplete KD. Complete KD was defined as a fever and at least four of the five principal criteria [1] and incomplete KD as a fever persisting at least five days and one to three principal criteria; however, among patients with fewer than four principal criteria, we included four patients who were treated on the fourth day of fever because their echocardiography results showed coronary artery disease. We subsequently excluded four patients from the incomplete KD group because they did not meet our inclusion criteria.

The first day of fever was taken as day 1. Coronary artery abnormalities were described in detail based on the echocardiography findings. They consisted of dilation, aneurysms, and hyperechogenicity. Most of the echocardiograms were performed by a single physician who defined coronary artery dilation as a diameter greater than 2 mm in patients younger than two years and greater than 2.5 mm in patients older than two years. Some of the other ultrasonographers used the criteria developed by the Japanese Health Ministry, and for some patients the criteria were not reported [1]. The time between polyvalent immune globulin therapy and echocardiography was not available. Some patients were referred from other hospitals because of unresponsiveness to immune globulin therapy. We were not able to obtain data on long-term cardiac outcomes.

The following laboratory tests were performed at admission and during the course of the disease: blood cell counts, reticulocyte and platelet counts, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), fibrinogen, liver function tests, serum sodium, and renal function tests. Pyuria at admission was recorded.

The statistical analysis relied on Student's *t* test and the chi-square test to compare the two groups; nonparametric tests were used when the sample sizes were small. *P* values smaller than 0.05 were considered significant.

3. Results

Of the 59 patients finally kept in the study, 39 had complete KD and 20 incomplete KD. No significant differences were found between these two groups regarding age, sex, or hospital stay duration. Mean age at disease onset was 33 months (range: 2–169 months; median: 21 months) and 25.4% of patients were aged one year or younger (30% in the incomplete KD group and 23% in the complete KD group, $P = 0.79$). Males predominated in both groups (male-to-female ratio: 2.47).

The cases of KD occurred chiefly in the winter and spring. Fever duration at the administration of polyvalent immune globulins was usually longer than five days. Mean fever duration at immune globulin administration was eight days in the incomplete KD group and six days in the complete KD group, a nonsignificant difference ($P = 0.07$). The complete KD group was characterized by significantly higher rates of changes in the extremities, conjunctival injection, exanthem, and enanthem; whereas no difference was noted for lymphadenopathy (Table 1). Coronary artery disease was significantly more common in the group with incomplete KD (90% vs. 48.7%, $P = 0.002$). The rate of pericardial effusion was not significantly different between the incomplete and complete KD groups (77% vs. 68%, $P = 0.49$) (Fig. 1).

A decline in general health was noted at admission in 71% of patients overall. No significant differences were found between the two groups regarding atypical manifestations of KD. The most common atypical manifestations were gastrointestinal symptoms (49.1% overall; vomiting: 28.9%; diarrhea: 18.6% and abdominal pain: 15.2%), organomegaly (13.6%), and clinical jaundice (3.4%). One patient presented with acute abdomen.

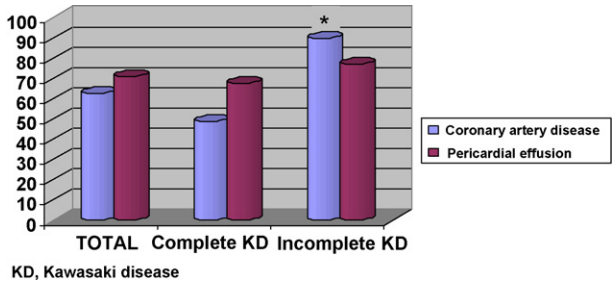

Fig. 1. Percentage of patients with coronary artery disease and pericardial effusion. The asterisks indicate significant differences ($P < 0.05$).

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