
**Clinical and laboratory symptoms of Kawasaki Disease in patients admitted to Bandar Abbas Children Hospital during 2012-2015**

Kambiz Ghasemi¹∗, Mehran Ahmadi², Fatemeh Keshavarz³

1. Assistant professor of paediatric nephrology, Clinical Research Development Center of Children Hospital, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.  
2. Assistant professor of paediatric infectious diseases, Clinical Research Development Center of Children Hospital, Hormozgan University of Medical Sciences, Bandar Abbas, Iran.  
3. M.D. Infectious and Tropical Diseases Research Center, Hormozgan Health Institute, Hormozgan University of Medical Sciences, Bandar Abbas

**Type of article: Original**

**Abstract**

**Introduction:** Kawasaki disease is an acute vesiculitis that involves medium-sized vessels. The disease affects children and adolescents predominantly. Considering the importance of this disease and the prevalence of it in Bandar Abbas, the aim of this retrospective descriptive study was to compare the clinical and laboratory symptoms of Kawasaki patients admitted to Bandar Abbas Children Hospital during 2012-2015. **Methods:** The data was collected using a researcher-made checklist. The checklist had two parts; the first part was non-specialized information such as age, sex, season of illness, and the second part contained specialized information such as clinical and paraclinical manifestations. **Results:** The minimum age was two months and the maximum age was 144 months. The highest incidence was between 24-36 months in 7 cases (25%) and the lowest was between 12-24 months in 2 cases (7.1%). In terms of clinical manifestations, 22 cases (78.6%) of conjunctivitis, 23 cases (82.1%) of rash, 21 (75%) cases of lymphopoenitis, and 27 (96.4%) cases of oral cavity complication were observed. Increased ESR in 17 patients (60.7%), leukocytosis in 5 patients (17.9%), anemia in 9 patients (32.1%), thrombocytosis in 8 patients (28.6%), and thrombocytopenia in 2 patients

**Corresponding author:**  
Kambiz Ghasemi, Clinical Research Development Center of Children Hospital, Hormozgan University of Medical Sciences, Bandar Abbas, Iran Tel: +989390537514. Email: kambizghasemi@yahoo.com  
PUBLISHED: December 2017.  
© 2017 The Authors. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.
1. Introduction

1.1 Background
Kawasaki disease is an acute vesiculitis that involves medium-sized vessels (1). The disease affects children and adolescents predominantly (2). Kawasaki disease or acute mucocutaneous lymph node syndrome (3) was first reported by professor Tomisaku Kawasaki in 1967 (2).

The classic diagnostic criteria of Kawasaki disease involves a fever of 39 degrees or more that lasts for more than 5 days, along with 4 cases out of the following: 1- polymorphic rash 2- bilateral nonexudative conjunctivitis 3- Changes in the organs in the form of redness, scaling, edema 4- Changes in the oral cavity and lips in the form of redness, ulcers, strawberry language 5- Cervical lymphadenopathy larger than 1.5 cm and usually one-sided If the illness lasts more than 5 days, with less than 4 of the above criteria, it is considered as incomplete Kawasaki Disease which is more common in neonates (4).

1.2 Statement of the problem
The incidence of this disease is high in northeast Asia, especially Japan and Korea, and this is an evidence that genetics may be involved in the disease (5). It has been shown that Human Class Leukocyte Antigen (HLA) alleles of a Japanese people is different from Caucasian race (6). Although the exact cause of the disease is unknown, one of the possible causes is the immune system's response to infections (7) including the following microbial agents: Adenovirus infection (8), parvovirus (9), Staphylococcus aureus (10), Epstein-Barr virus (11), Chlamydia pneumoniae (12), and Mycoplasma species (13).
Epidemiologic studies have shown that the incidence of Kawasaki disease in other children of Japanese families with a child with a disease is 10-15 times higher than others. There is also a higher likelihood of recurrence in these families (14, 15). The incidence of the disease was also reported in males and between the ages of six months to four years (5, 16). The incidence of this disease varies in different seasons and regions. Therefore, seasonal changes are a factor in the incidence of Kawasaki disease. For example, in Korea, the highest prevalence of this disease has been reported in the summer while in the United Kingdom, the highest number of cases have been reported in the spring and winter (3, 17, 18). Among the differential diagnosis of the disease are measles, drug reactions, Stevens-Johnson syndrome, Toxic shock syndrome, and Staphylococcal scalded skin syndrome (19). The goal of Kawasaki disease treatment is to prevent cardiovascular damage by reducing coronary artery inflammation and myocardial infarction, for which IVIG (Intravenous Gamma Globulin) and aspirin are used in the first 10 days of the disease in acute states. The effect of IVIG on the prevention of coronary artery damage was first reported by the Japanese researchers (19,20). In resistant forms of the disease, since it is a systemic vesiculitis, corticosteroids are used along with other treatments (21).

Due to the complication of Kawasaki disease, which is a coronary artery disease, and since it has no certain diagnosis test, early diagnosis and treatment of it prevents cardiovascular complications. Based on the previous studies, if treatment is not performed ten days after the diagnosis, the risk of coronary artery disease will be high (3, 22).
1.3 Objectives

Considering the importance of this disease and the prevalence of it in Bandar Abbas, the aim of this study was to compare the clinical and laboratory symptoms of Kawasaki disease in patients admitted to Bandar Abbas Children Hospital during 2012-2015.

2. Method

2.1 Study design and setting

This retrospective descriptive study was conducted in Bandar Abbas Children Hospital in 2016. The target population were Kawasaki patients admitted to the Bandar Abbas Children Hospital from 2012 to 2015.

2.2 Sample size and sample calculation

The sampling method was census. According to the data obtained from the Medical Center's Pediatric Data Center, the sample size was 28 which were all the patients diagnosed with Kawasaki disease from begining of 2012 to the end of 2016 and were hospitalized in Bandar Abbas Children Hospital.

2.3 Measurement tool

The data was collected using a researcher-made checklist. The checklist had two parts; the first part was non-specialized information such as age, sex, season of illness, and the second part contained specialized information such as clinical and paraclinical manifestations. The data were collected by referring to the medical statistics center. The inclusion criteria were patients diagnosed with Kawasaki who had been admitted during the mentioned period. Exclusion criterion was the lack of patient records.
2.4 Ethical issues

Relevant authorities granted permission for accessing the information. They were also ensured that the data would be used only for research purposes.

2.5 Study statistics

After collecting data, they were entered into the SPSS 21.0 software and were evaluated using descriptive tests (frequency, mean, etc.).

3. Results

3.1 Demographics

The minimum age was two months and the maximum age was 144 months. The highest incidence was between 24-36 months in 7 cases (25%) and the lowest was between 12-24 months in 2 cases (7.1%). The prevalence in males was 71.4% and 28.6% in females. In this region, the highest prevalence of this disease was in the spring (42.9%) and the lowest was in the autumn (7.1%).

3.2 Main results

In terms of clinical manifestations, 22 cases (78.6%) of conjunctivitis, 23 cases (82.1%) of rash, 21 (75%) cases of lymphopoenitis, and 27 (96.4%) cases of oral cavity complication were observed. The most common form of complication was strawberry tongue which was seen in 12 cases (42.8%). The limb involvement was observed in 25 cases (82.3%) and the most common form of it was scaling which was seen in 15 cases (53.5%). 10 cases (35.7%) had cardiovascular complications and the most involved vessel was right coronary artery in 6 cases (21.4%) with brightness and dilatation characterization.
AST increase in 17 cases (60.7%), and increase in ALT in 15 cases (53.5%) were observed. Increased ESR in 17 patients (60.7%), leukocytosis in 5 patients (17.9%), anemia in 9 patients (32.1%), thrombocytosis in 8 patients (28.6%), and thrombocytopenia in 2 patients (7.1%) were observed. Hypoalbuminemia was not seen in any of the patients, and pyuria was recorded in 3 cases (10.7%).

4. Discussion
In the study of epidemiology of Kawasaki disease in South Korea and Japan, the highest incidence was among 7-12 months and 6-11 months age groups and male subjects. In the present study, the highest incidence was observed in the age group of 24-36 months and males. The incidence of the disease varies according to the different seasons of the year, as in Finland, winter and autumn, in Canada, only winter, and in Japan, winter and spring are reported. However, there was little change in the Hawaiian region due to tropical climates (23,24,25). In this study, most complications were reported during spring.

In a study by Manlhiot and his colleagues in Toronto, the most commonly reported organs affected among American society were oral cavity and lips (26). In the present study, the highest clinical manifestation was oral cavity involvement and the highest form of involvement was reported as strawberry tongue.

In the study of Bratinesak et al., on cardiovascular complications in Kawasaki disease, LCA involvement (19.8%) was higher than that of RCA (9.6%) (27). However, in our study, RCA involvement (6 cases) (21.4%) was higher than LCA (4 cases) (14.3%).

In a five-year study by Eladawy and colleagues at the Metropolitan Denver Children's Hospital, Colorado, on liver function in Kawasaki patients, 45.4% of the patients were impaired by Liver Function Test (LFT), and the degree of treatment resistance in this
group was higher in IVIG (28). In this study, increase in AST and ALT were seen in 17 cases (60.7%) and 15 cases (53.5%) respectively.

In a six-year study by Beken B et al. on hematologic findings and coronary artery complications on 37 Kawasaki patients, 18 (48.6%) had thrombocytosis and 2 (5.4%) had thrombocytopenia. The last group (2 cases) had aslo coronary artery aneurysm. Also, in patients with aneurysm, leukocytosis and anemia were reported more than the group without aneurysm (29). In this study, anemia in 9 patients (32.1%), thrombocytosis in 8 patients (28.6%), and thrombocytopenia in 2 (7.1%) patients were reported.

In a study by KUO et al. regarding the relationship between serum albumin levels and IVIG treatment, it was concluded that patients with ALB of higher than 2.9 had a higher probability of resistance to treatment with IVIG than those who did not have hypoalbuminemia (30). In this study, hypoalbuminemia was not seen in any of the patients. In this study, strawberry tongue was the most common complication found (82.3%), among patients and thrombocytopenia was the least one (7.1%) observed.

5. Conclusion

Knowledge about the sign and symptoms and laboratory abnormalities in Kawasaki disease is important for early diagnosis and treatment of it. It is recommended that physicians be familiar with sign and symptoms of Kawasaki disease.

Acknowledgment

The paper is extracted from the results of thesis by Fatemeh Keshavarz for obtaining M.D degree. The authors want to thank to Hormozgan University of Medical Sciences directors for their support.
Conflict of interest

There is no conflict of interest to declare.

References