



# Aseptic Meningitis, As the First Manifestation of Kawasaki Disease: A Case Report

Zohreh Shalchi<sup>1</sup>, Niyousha Shirsalimi<sup>1</sup> and Iraj Sedighi<sup>1,\*</sup>

<sup>1</sup>Department of Pediatric, Faculty of Medicine, Hamadan University of Medical Sciences, Hamadan, IR Iran

\*Corresponding author: Department of Pediatric, Faculty of Medicine, Hamadan University of Medical Sciences, Hamadan, IR Iran. Tel: +98-8112640081, Fax: +98-8112640016, Email: sedighi@umsha.ac.ir

Received 2020 April 01; Accepted 2020 April 05.

## Abstract

Kawasaki disease (KD), a systemic inflammatory disorder with medium-sized vasculitis, mostly occurs among children < five years of age. The highest incidence of KD is among the Asian population. The primary treatment of KD is intravenous immunoglobulin (IVIG) administration. Extreme irritability is a common neurologic manifestation among infants, and central nervous system involvement is uncommon and occurs as a result of vasculitis or IVIG administration late in the treatment course. Here, we discussed an eight-year-old girl with a final diagnosis of atypical KD, who was primarily diagnosed as aseptic meningitis. The patient was admitted with a history of fever, headache, and vomiting and later developed strawberry tongue, coronary involvement, and fingertip desquamation during the follow-up period. Aseptic meningitis, as the first clinical manifestation, made the definitive diagnosis of the KD challenging.

**Keywords:** Kawasaki Disease, Meningitis, Fever

## 1. Introduction

Kawasaki disease (KD), also known as the mucocutaneous lymph node syndrome, is an acute febrile illness of childhood and medium-sized vasculitis that particularly affects the coronary arteries. KD is the leading cause of acquired heart disease in children, and approximately 20% of untreated cases develop coronary artery aneurysms (1). The KD often diagnoses in children aged between six months to five years, and typically occurs with remitting fever lasting for at least five days, polymorphous exanthema, bilateral non-exudative conjunctival injection, non-suppurative cervical lymphadenopathy, erythema of the oral mucosa with strawberry tongue and red lips, extremity erythema, and edema (2). The most effective treatment for KD in its acute phase is 2 g/kg of intravenous immunoglobulin (IVIG) as a single infusion and high-dose aspirin. Although extreme irritability is a common manifestation among infants, neurological involvement, such as aseptic meningitis, hemiplegia, cerebral infarction, ataxia, seizures, cranial nerve palsies, and focal encephalopathy, are late symptoms and are uncommon. Neurological manifestations usually occur as a result of vasculitis or IVIG administration (3). In the current study, we discussed an atypical case of KD with unusual onset, which primarily oc-

curred with aseptic meningitis.

## 2. Case Presentation

An eight-year-old girl was admitted to Besat Hospital complaining of fever since seven days ago. The patient had frequent vomiting and headache during the past three days. Past medical history was unremarkable. On physical examination, arterial blood pressure was 90/65 mmHg. The heart rate was 120 beat/min. The respiratory rate was 20/min, and the temperature (axillary) was 38°C. The heart, lungs, and abdominal examinations were normal. There was no cyanosis, mucosal erythema, tonsillar enlargement, neck rigidity, cervical lymphadenitis, edema, and limb movement limitation. Chest X-ray was routine, and the results of other initial laboratory investigations were as follow: urinalysis (U/A) was routine. Erythrocyte sedimentation rate (ESR) was 36 mm/h. C-reactive protein (CRP) was negative, and according to the complete blood count (CBC) hemoglobin, platelet, and white blood cells (WBC) were 13 g/dL, 263000/mm<sup>3</sup>, and 7100/mm<sup>3</sup> (70% neutrophil), respectively.

The fever, headache, and vomiting were indicating meningitis; therefore, lumbar puncture (LP) was performed. Besides, cerebral spinal fluid (CSF) analysis re-

vealed routine glucose and protein levels, and elevated white blood cells, the results were as follow: white blood cells were  $90/\text{mm}^3$  (41% PMN and 59 % Lymphocyte); glucose level was 67 mg/dL, and protein level was 60 mg/dL. To treat CSF pleocytosis, and elevated ESR, ceftriaxone, and vancomycin were administered. But, after 48 hours, no improvement was observed, and the CSF culture revealed a negative result. Hence, the patient considered as a case of aseptic meningitis, and antibiotics were discontinued. After two days, the patient developed a strawberry tongue as well as a bilateral mild conjunctival injection (Figure 1).



Figure 1. Strawberry tongue

According to the atypical Kawasaki algorithm published by the American Heart Association (AHA), complementary laboratory tests and echocardiography were performed, because the patient had two clinical signs of KD (4). Results of the second laboratory investigation were as follow: routine U/A; ESR was 47 mm/h; negative CRP; HB = 12.7 g/d; PLT =  $465000/\text{mm}^3$ ; WBC =  $11600/\text{mm}^3$  (86% neutrophil). Also, serum albumin, aspartate aminotransferase (ALT), alanine aminotransferase (AST) levels were within their normal ranges. The echocardiography revealed a dilated left coronary artery, and the second echocardiography after two days indicated coronary artery aneurysm. Aspirin and IVIG were administered regarding atypical KD diagnosis according to the AHA guide (4). After 24 hours, the fever vanished, and typical desquamation of the fingertips developed.

### 3. Discussion

The criteria to diagnose KD are published by the AHA or the Japanese Kawasaki Disease Research Committee (5, 6). Although accurate criteria are available, the diagnosis of the KD is still challenging, particularly among children

who do not fulfill the criteria and have atypical manifestations of KD. Atypical KD accounts for 15% - 20% of all KD cases, and occurs more among children aged > 5 years or < six months (7). Delayed diagnosis and treatment of patients increase the risk of coronary complications, particularly in the atypical form of KD, which makes the condition more challenging and more critical.

Extreme irritability is a common neurologic manifestation among infants. Other neurological symptoms of KD include aseptic meningitis, meningoencephalitis, subdural collection, ataxia, and sensorineural hearing loss. One percent of KD patients develop neurological complications, and five percent of them experience aseptic meningitis (8, 9). According to a study conducted by Sedighi et al. (10), neck stiffness occurs in less than five percent of Iranian children with KD. Ghandi et al. (11) reported that about four percent of Iranian patients develop aseptic meningitis. Aseptic meningitis mostly occurs during the acute phase of disease concurrent with other principal manifestation and usually is associated with increased intracranial pressure (ICP) (12). The case that is reported in the current study had a history of headache and vomiting, consistent with raised ICP. The patient's response to antibiotics was not satisfying. The CSF culture was negative, hence, the diagnosis of aseptic meningitis became more pronounced.

The CSF profile of patients with acute KD can be misdiagnosed with that of patients with viral meningitis. The CSF profile of viral meningitis vary greatly, and commonly is manifested as a mononuclear cell predominant pleocytosis, routine CSF glucose, and mildly elevated CSF protein. Interestingly, the elevated levels of CSF protein are less common in patients with KD (13). The CSF profile of the patients diagnosed with KD commonly includes increased WBC (lymphocyte-predominant), routine glucose, and normal protein. Similarly, the CSF profile of our patient indicated elevated levels of WBC with a predominance of lymphocytes, routine glucose, and routine protein. Strawberry tongue and bilateral mild conjunctival injection shifted our attention to the atypical KD with aseptic meningitis. However, aseptic meningitis is very unusual in patients with KD, and only a few cases are reported so far, including the case reported by Salameh and the one reported by Attia (14, 15).

### 3.1. Conclusions

Aseptic meningitis is an uncommon manifestation of KD that develops late in the disease course, so that the diagnosis of KD is based on other clinical symptoms. Also, aseptic meningitis can occur as a complication of IVIG administration. Our case was primarily admitted due to aseptic

meningitis, so the diagnosis of atypical KD was challenging. What makes this case interesting is aseptic meningitis as the first manifestation of the KD. Other symptoms, including strawberry tongue and coronary system ectasia, were developed following the treatment of the aseptic meningitis.

As the final conclusion in cases that patients with KD have patterns of aseptic meningitis in CSF analysis, but ESR or CRP are significantly high, and there is significant PMN dominant leukocytosis, clinicians should consider atypical KD with aseptic meningitis.

### Acknowledgments

The authors would like to acknowledge the Research and Technology Deputy of Hamadan University of Medical Sciences and the Clinical Research Development Center of Besat Hospital for supporting the current study. We also thank Fahimeh Molaee, head nurse of the pediatric ward, who devoted her time to the coordination of different parts of the study.

### Footnotes

**Authors' Contribution:** Conception and design: IS. Data collection: NS. Writing the article: IS, ZS, and NS. All authors read and approved the content of the manuscript.

**Conflict of Interests:** The authors declare that there is no conflict of interest regarding the publication of this article.

**Ethical Approval:** Not required for this case report.

**Funding/Support:** The authors declared that this study has received no financial support.

**Informed Consent:** The paper is a case report without personal information so there is no need for informed consent.

### References

- Rossi FDS, Silva MFC, Kozu KT, Camargo LFA, Rossi FFP, Silva CA, et al. Extensive cervical lymphadenitis mimicking bacterial adenitis as the first presentation of Kawasaki disease. *Einstein (São Paulo)*. 2015;**13**(3):426-9.
- Jun WY, Ann YK, Kim JY, Son JS, Kim S, Yang HS, et al. Kawasaki disease with fever and cervical lymphadenopathy as the sole initial presentation. *Korean circulation journal*. 2017;**47**(1):107-14.
- Zhang B, Hao Y, Zhang Y, Yang N, Li H, Liang J. Kawasaki disease manifesting as bilateral facial nerve palsy and meningitis: a case report and literature review. *Journal of International Medical Research*. 2019;**47**(8):4014-8.
- Son MBF, Newburger JW. Kawasaki Disease. In: Kliegman RM, editor. *Nelson Textbook of Pediatrics*. 1. Philadelphia: Elsevier; 2020. p. 1310-6.
- Council on Cardiovascular Disease in the Young. Diagnostic guidelines for Kawasaki disease. *Circulation*. 2001;**103**:335-6.
- Japan Kawasaki Disease Research Committee. Diagnostic guidelines of Kawasaki disease. *Tokyo: Japan Kawasaki Disease Research Committee*. 1984.
- Witt MT, Minich LL, Bohnsack JF, Young PC. Kawasaki disease: more patients are being diagnosed who do not meet American Heart Association criteria. *Pediatrics*. 1999;**104**(1):e10.
- Nadeau SE. Neurologic manifestations of systemic vasculitis. *Neurologic clinics*. 2002;**20**(1):123-50.
- Gogou M, Giannopoulos A. Involvement of Nervous System in Kawasaki Disease. *J Pediatr Neurol*. 2019;**17**(1):1-7. doi: [10.1055/s-0037-1606615](https://doi.org/10.1055/s-0037-1606615).
- Sedighi I, Biglari M, Olfat M, Yadollahi H, Tanasan A, Torabian S. Clinical Characteristics and Outcomes of Iranian Patients With Kawasaki Disease. *Journal of Comprehensive Pediatrics*. 2014;**5**. doi: [10.17795/compreped-13971](https://doi.org/10.17795/compreped-13971).
- Ghandi Y, Habibi D, Kahbazi M, Dorreh F, Lotfi M. Clinical Characteristics of Kawasaki Disease in Markazi Province, Iran. *J Compr Ped*. 2019;**11**(1). e85695. doi: [10.5812/compreped.85695](https://doi.org/10.5812/compreped.85695).
- Zhang Y, Wan H, Du M, Deng H, Fu J, Zhang Y, et al. Capillary leak syndrome and aseptic meningitis in a patient with Kawasaki disease: A case report. *Medicine*. 2018;**97**(23).
- Dengler LD, Capparelli EV, Bastian JF, Bradley DJ, Glode MP, Santa S, et al. Cerebrospinal fluid profile in patients with acute Kawasaki disease. *The Pediatric infectious disease journal*. 1998;**17**(6):478-81.
- Salameh K, Omer M, Hamad S, Kamal H. Atypical Kawasaki Disease in 2-Months Old Infant Presenting with Aseptic Meningitis. *Pediatrics & Therapeutics*. 2017;**7**. doi: [10.4172/2161-0665.1000307](https://doi.org/10.4172/2161-0665.1000307).
- Hamed T, Saeed MA, Fathalla D. Kawasaki Disease Presented with Meningitis in an Egyptian Adolescent. *Journal of Case Reports and Studies*. 2015;**3**. doi: [10.15744/2348-9820.3.602](https://doi.org/10.15744/2348-9820.3.602).