



A Case of Septic Shock Developing Atypical Kawasaki

Septik Şok Gelişen Atipik Kawasaki Olgusu

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Abstract

A 5-year-old girl was admitted to our hospital with complaints of fever, rash and inability to step on her feet. During examination, the patient developed tendency to sleep, gallop rhythm, tachycardia, hepatomegaly, edema and hypotension. Electrocardiography showed ST-T changes. Echocardiography revealed mitral insufficiency, mild pericardial effusion, decreased left ventricular function, and mild pulmonary hypertension. During her hospitalization period, because of continuation of resistance to fever for a long time (> 5 days), body rashes, anemia, hypoalbuminemia, thrombocytopenia, and high bilirubin levels, atypical Kawasaki disease was considered and 2 g/kg intravenous immunoglobulin treatment was given. The general condition of the patient resolved completely on the fourth day of hospitalization, and her laboratory test results began to improve. On the sixth day of hospitalization, she was discharged with acetylsalicylic acid. It should be remembered that Kawasaki disease may transpire with a severe clinical course that progresses into septic shock.

Keywords: Atypical Kawasaki, septic shock, myocarditis

Öz

Beş yaşında kız hasta ateş, el-ayak ve kollarında döküntü, kusma, ayaklarının üzerine basamama şikayetiyle hastanemize başvurdu. Hasta ateş ve döküntünün izlemi planıyla yatırıldı. İzleminde uykuya eğilimi, gallop ritmi, taşikardi, hepatomegali, ödem ve hipotansiyon gelişen hasta yoğun bakımda izleme alındı. Elektrokardiyografide ST-T değişiklikleri görülen hastanın ekokardiyografisinde 1-2. derece mitral yetmezlik, hafif perikardiyal efüzyon, sol ventrikül fonksiyonlarında hafif azalma, hafif pulmoner hipertansiyon saptandı. İzleminde ateşinin dirençli, uzun süre (> 5 gün) devam etmesi, vücut döküntülerinin olması, anemi, hypoalbuminemi, trombositopeni, bilirubin yüksekliğinin gelişmesi nedeniyle atipik Kawasaki hastalığı düşünülerek 2 g/kg intravenöz immünglobulin tedavisi verildi. Hastanın genel durumu yatışının dördüncü gününde tamamen düzelerken laboratuvar tetkikleri de düzelmeye başladı. Yatışının altıncı gününde genel durumu iyi olan hasta asetilsalisilik asit ile taburcu edildi. Kawasaki hastalığının septik şoka ilerleyen ağır bir klinik ile ortaya çıkabileceği aklımıza gelmelidir.

Anahtar Kelimeler: Atipik Kawasaki, septik şok, miyokardit

Introduction

Kawasaki disease (KD) is a self-limiting vasculitis with acute, febrile multisystemic involvement affecting frequently infants and children. It is the second most commonly observed childhood vasculitis following Henöch-Schönlein Purpura (HSP) (1). Though etiologically epidemiologic and clinical findings are supportive of an infectious cause, the etiology of the disease is

still not fully known (2,3). The disease was defined by Tomisaki Kawasaki in children with signs and symptoms like fever, rash, peeling skin, swelling, conjunctivitis and lymphadenopathy on the neck (1,4).

Being a self-limiting disease, it can cause a heart disease due to coronary artery involvement in 15-30% of untreated patients (2,5). Coronary artery changes can manifest wide clinical findings such as asymptomatic coronary artery en-

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largement, thrombosed giant coronary artery aneurism, myocardial infarction and sudden death (2,6,7). It is important to establish early diagnosis and start intravenous immunoglobulin (IVIG) and high dose acetylsalicylic acid treatment in the early period (6).

Diagnosis of KD is made according to clinical criteria. However, clinical signs can be nonspecific at times and may show similarity with other infectious and non-infectious diseases. Early diagnosis and treatment become difficult when clinical findings supportive of the diagnosis are not present at the onset of the disease or develop later on.

This study aimed at presenting a case of KD with atypical prognosis that advanced into septic shock.

Case Report

A 5-year-old female patient presented with complaints including fever ongoing for four days, peeling of the skin on hands-feet and arms, vomiting, and not being able to stand on her feet. It was found out that she had been started on oral amoxicillin-clavulanic acid treatment with a diagnosis of tonsillitis two days prior. Prenatal, natal and postnatal history was uneventful. Physical examination of the patient revealed the following: patient's general medical condition was good, the patient was conscious, fever: 36°C, respiratory rate (RR): 36/min, peak heart rate (PHR): 100/min, blood pressure (BP): 90/65 mmHg, and oxygen saturation: 98%. The oropharynx and tonsils were hyperemic, there were white lesions on the tongue and peelings of the skin that faded with pressure on the palm, sole, ankle, knee and arms. Other system examinations were normal. Laboratory results were as follows: white blood cell: 5770/mm³, hemoglobin (Hb): 11.6 g/dL, Hct: %35.7, thrombocyte (Trb): 167.000/mm³; 75% neutrophil and 25% lymphocyte were present in peripheral smear, there was no toxic granulation and atypical cells were not observed. Erythrocyte sedimentation rate (ESR) was 61 mm/hour; C-reactive protein (CRP) was 219.6 mg/dL, and urinalysis showed protein: +++++, hemoglobin: +++, erythrocyte: 353, nitrite negative and 6 leucocytes. Biochemical test results were as such: urea: 30 mg/dL, creatinine (cre): 0.8 mg/dL, Na: 138 mEq/L, K: 4.3 mEq/L, aspartate aminotransferase (AST): 38 U/L, alanine aminotransferase (ALT): 92 U/L, total protein: 5.1 g/dL, albumin (alb): 3.2 g/dL. The patient was admitted to be monitored for fever and skin peeling. Blood culture was taken, but growth was not detected. Antihistaminic, antipyretic and intravenous liquid treatment was started. General medical condition of the patient on the second day of admission was moderate and the patient was seen to be inclined to sleep. Physical examination established gallop rhythm, tachycardia, edema on both feet, periorbital edema and a 1- cm hepatomegaly. Neck rigidity and meninx irritation were not present. The patient was ad-

mitted to the intensive care unit for close monitoring. Normal saline was started upon determining a blood pressure of 70/30 mmHg and PHR: 165/min.

Patient's cerebral tomography was taken due to being inclined to sleep and having a headache. Lumbar puncture was performed on the patient whose tomography was normal. Cerebrospinal fluid examination of the patient was normal. Control blood revealed urea as 54 mg/dL, rre: 1.07 mg/dL, Na: 135 mEq/L, K: 4.5 mEq/L, total protein: 4.6 g/dL, albumin: 2.6 g/dL, AST: 21 U/L, ALT: 49 U/L, gamma glutamic transferase (GGT): 97 U/L, total bilirubin: 3.23 mg/dL, direct bilirubin: 3.08 mg/dL, CRP: 275 mg/dL, ESH: 63 mm/hour, white blood cell: 4200/mm³, Hb: 9.6 g/dL, thrombocyte: 1.080.000/mm³; PT: 17.6 seconds, APTT: 62.8 seconds, D-dimer: 1920 (0.0-0.5) µL; hs-troponin T: 93.07 ng/mL, proBNP: 16842 ng/L, CK-MB: 4.8 (< 2.88) µg/L, arterial blood gas: normal, direct Coombs test: negative, and 8-9 thrombocyte clustering and hemolysis were detected in peripheral smear. Repeated urinalysis showed: bilirubin +, protein ++, nitrite: negative, 5 erythrocytes, 8 leucocytes, and ST-T changes were observed on electrocardiography. It was considered that the patient had developed myocarditis, and due to myocarditis-related septic shock and disseminated intravascular coagulation (DIC), the patient was started on ceftriaxone and given fresh frozen plasma. Among these, C3, C4, ASO, ANCA, ANA, Anti-ds DNA, anticardiolipin antibodies, and viral infection scans were found normal (Epstein-Barr virus, TORCH infections, hepatitis B, C infections). Due to findings such as prolonged but not resistant fever (> 5 days), white strawberry tongue, peeling of the skin, anemia, hypoalbuminemia, thrombocytopenia, and bilirubin elevation, the patient was considered to have atypical KD and was started on 2 g/kg IVIG treatment. Echocardiography (ECHO) detected mild mitral regurgitation, mild pericardial effusion, decrease in left ventricle functions, and pulmonary hypertension. On the third day of her admission, patient's general medical condition was moderate, blood pressure was normal, tachycardia was diminished, but the patient complained about diarrhea and her biochemical tests found Na as 127 mEq/L, urea as 39 mg/dL, cre as 0.7 mg/dL, alb as 2.46, white blood cell as 6300/mm³, Hb as 8.7 g/dL, thrombocyte as 139.000/mm³, and ferritin as 365.4 (14-124) µg/L. Acetylsalicylic acid (ASA) treatment was started with a dosage of 80 mg/kg/day. Patient's general condition completely ameliorated on the fourth day of admission. Moreover, her laboratory results began to improve. The patient, whose general condition was good on day five of admission, was discharged with ASA 5 mg/kg/day.

Discussion

KD is a systemic vasculitis mostly involving medium-sized and small-sized arteries in mainly male children under the age of 5 and is accepted as one of the most important causes of ac-

quired heart diseases in children. Diagnosis is made by detecting at least four of the following: fever lasting more than five days, changes in extremity periphery, polymorph exanthem, bilateral conjunctival congestion, changes in the oropharynx mucosa and cervical lymphadenopathy (1,2,8). The most frequently seen symptom in patients is the prolonged fever. Diagnosis can be considered when other symptoms are detected; however, there are "incomplete" and "atypical" KD cases in whom establishing a diagnosis is difficult (6-8). "Incomplete" cases are those that have fever, at least two of the other five criteria and coronary artery aneurism on ECHO. It is particularly seen in children under the age of 1 (6,7). "Atypical" cases are those that have fever and pulmonary and gastrointestinal involvement, which can be seen in KD but not found in diagnostic criteria. Atypical KD presentations have increased recently, but the main problem is that these cases are frequently misdiagnosed or receive diagnosis late and their treatment is thus delayed (8,9).

Apart from the symptoms frequently encountered and included in diagnostic criteria of the KD, pyuria, urethritis, hydrocele, uveitis, pericardial effusion, arthralgia, arthritis, diarrhea, hepatitis, gallbladder hydrops, pneumonia, and aseptic meningitis can also be seen (7,9). In a study retrospectively reviewing Kawasaki cases, it has been indicated that there is delay in KD cases in whom other symptoms like vomiting, diarrhea, arthralgia, meningismus and headache accompany the disease that do not fully fit to the diagnostic criteria (10). Various studies have reported that 7-10% of the KD is seen as atypical. Since the risk of coronary artery aneurism development is high in these patients, early diagnosis and treatment are of vital importance (10,11). Performing ECHO upon considering atypical KD in the patient plays an important role in early diagnosis (12).

There is no typical laboratory finding of KD. Leukocytosis ($> 15.000/mm^3$), normochromic normocytic anemia, thrombocytosis ($> 450.000/mm^3$), elevated CRP, ESH, ALT, AST, GGT, and ferritin levels, hypoalbuminemia (< 3 g/dL), and sterile pyuria can be seen during the course of the disease (13). Thrombocytopenia is known as an important risk factor in the development of coronary artery aneurism which is one of the most important complications (12). Thrombocytopenia not thrombocytosis developed in our patient; however, there was no coronary involvement. Thrombocytopenia development was considered to be linked to myocarditis and advancement of shock and DIC.

Except for coronary involvement, cardiac pathologies such as myocarditis, endocarditis, mild valve regurgitation, and pericardial effusion can also be seen in KD (12,13). It has been reported in recent studies that elevated proBNP can be an important parameter to be used in differentiating KD from other

febrile diseases (12). Our case presented with findings that did not fully suggest KD like fever, skin peeling in hands and feet and white strawberry tongue. Lymphadenopathy and conjunctivitis were not present. However, myocarditis-linked hypotension had developed later in the day and deterioration of the patient's general medical condition led us to consider septic shock and DIC. proBNP level was found high in the patient. Furthermore, the fact that ECHO revealed valve regurgitation and impairment in ventricle functions and the fact that the patient developed anemia, hyponatremia, hypoalbuminemia, ferritin elevation, bilirubin elevation and a gastroenteritis picture in addition to the high acute phase reactants and that the patient recovered in a very short time once IVIG treatment was started indicated to us that our atypical KD diagnosis was correct.

Cases though to have KD must be monitored in hospital and started on IVIG (2 g/kg) and ASA (80-100 mg/kg/day) treatment promptly. The purpose of acute treatment is to control acute inflammation, prevent long-term sequelae and most importantly prevent the inflammation on the coronary artery wall (1,6,12). When a reason explaining clinical findings cannot be found and in suspected KD cases, start of treatment is recommended in children. Especially in cases at high risk of coronary diseases development (aged 1 and under, systemic inflammation findings like anemia leukocytosis and shifting to the left and coagulopathy), empirical IVIG treatment is recommended (14). In our case, the patient was discharged on the sixth day of admission following the administration of a single-dose IVIG treatment that improved the patient's clinical and laboratory findings.

In conclusion, in the event of sudden hypotension, impaired consciousness and septic shock development in febrile patients that do not respond to antibiotics and have skin peeling. Myocarditis should be considered even though diagnostic criteria are not fully met and ECHO should be performed in the early period. It should be kept in mind that atypical KD can manifest with different clinical findings.

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References

1. Burns JC, Glode MP. Kawasaki syndrome. *Lancet* 2004;364:533-44. [\[CrossRef\]](#)
2. Yeom JS, Woo HO, Park JS, Park ES, Seo JH, Youn HS. Kawasaki disease in infants. *Korean J Pediatr* 2013;56:377-82. [\[CrossRef\]](#)
3. Kim JJ, Hong YM, Yun SW, Han MK, Lee KY, Song MS, et al. Korean Kawasaki Disease Genetics Consortium. Assessment of risk factors for Korean children with Kawasaki disease. *Pediatr Cardiol* 2012;33:513-20. [\[CrossRef\]](#)
4. Kawasaki T. Acute febrile mucocutaneous syndrome with lymphoid involvement with specific desquamation of the fingers and toes in children. *Arerugi* 1967;16:178-222. [\[CrossRef\]](#)
5. Bostan ÖM. Kawasaki disease. *J Pediatr Inf* 2011;5:46-50. [\[CrossRef\]](#)
6. Cho KH, Kang SJ. Clinically useful predictors of resistance to intravenous immunoglobulin and prognosis of coronary artery lesions in patients with incomplete Kawasaki disease. *Korean Circ J* 2014;44:328-35. [\[CrossRef\]](#)
7. Giannouli G, Tzoumaka-Bakoula C, Kopsidas I, Papadogeorgou P, Chrousos GP, Michos A. Epidemiology and risk factors for coronary artery abnormalities in children with complete and incomplete Kawasaki disease during a 10-year period. *Pediatr Cardiol* 2013;34:1476-81. [\[CrossRef\]](#)
8. Cimaz R, Sundel R. Atypical and incomplete Kawasaki disease. *Best Pract Res Clin Rheumatol* 2009;23:89-97. [\[CrossRef\]](#)
9. Erdoğan S, Boşnak M, Şahin D, Başpınar O. Atipik Kawasaki hastalığı: olgu sunumu. *Zeynep Kamil Tıp Bülteni* 2017;48:20-2. [\[CrossRef\]](#)
10. Stockheim JA, Innocentini N, Shulman ST. Kawasaki disease in older children and adolescents. *J Pediatr* 2000;137:250-2. [\[CrossRef\]](#)
11. Yakut K, Ecevit Z, Varan B, Erdoğan İ, Güngör S. Sıra dışı bulgularla seyreden Kawasaki hastalığı: iki olgu. *Türkiye Klinikleri J Pediatr* 2017;26:94-8. [\[CrossRef\]](#)
12. Newburger JW, Takahashi M, Gerber MA, Gewitz M. Diagnosis, treatment, and long-term management of kawasaki disease: a statement for health professionals from the Committee on Rheumatic Fever, Endocarditis, and Kawasaki Disease, Council on Cardiovascular Disease in the Young American Heart Association. *Pediatrics* 2004;114:1708-33. [\[CrossRef\]](#)
13. Kara SS, Güllü UU, Balaban İ. Kawasaki hastalığı: Erzurum ilinde izlenen çocuk hastaların değerlendirilmesi. *İzmir Dr. Behçet Uz Çocuk Hastanesi Dergisi* 2017;7:113-20. [\[CrossRef\]](#)
14. Beiser AS, Takahashi M, Baker AL, Sundel RP, Newburger JW. A predictive instrument for coronary artery aneurysms in Kawasaki disease. US Multicenter Kawasaki Disease Study Group. *Am J Cardiol* 1998; 81: 1116-20. [\[CrossRef\]](#)