Case Report

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A Rare Manifestation of Kawasaki Disease: Bloody Diarrhea Association with Acute Clinical Myocarditis

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ABSTRACT

Kawasaki disease (KD) is a systemic vasculitis of small and medium-sized vessels that mainly influences children under five. In the classic diagnostic criteria of KD, there is no Gastrointestinal involvement. Myocarditis is one of the unusual cardiovascular complications of KD, and there is only a very minority of patients have symptoms suggestive of clinical myocarditis. Case Presentation: We reported a 7-year-old boy admitted with a high fever and bloody diarrhea. The stool exam revealed many white blood cells (WBCs) and red blood cells (RBCs). On the 5th day of admission, we found bilateral cervical lymphadenopathy, bilateral nonexudative conjunctivitis, cracked lips, and maculopapular rashes over the extremities. Echocardiography revealed severe mitral regurgitation (MR) with reduced ejection fraction (EF). We treated the patients with oral high-dose aspirin (100 mg/kg/d) plus intravenous immunoglobulin (IVIG 2 gr/kg). Cardiovascular complications such as acute clinical myocarditis should be highly suspected in any patient KD with persistent bloody diarrhea.

Introduction

For the first time, Dr. Tomisaku Kawasaki described Kawasaki disease (KD) in 1967. At this time, KD is considered one of the common causes of acquired heart disease in children less than 5-year-old. Today it is clear that opportune diagnosis and treatment reduce the risk of coronary artery complications [1, 2].

KD is a systemic vasculitis of small and medium-sized vessels in children. Typical classic KD is confirmed with a fever of at least five days and four or five principal clinical features: bilateral non-exudative bulbar conjunctivitis, erythema of oral and pharyngeal mucosa, extremity

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changes, polymorphous rash, and cervical lymphadenopathy. Incomplete Kawasaki should be considered if there is a fever lasting at least five days but less than four of the five clinical criteria. Laboratory tests and echocardiographic reports can be a leading point in diagnosing incomplete KD. KD may have an unusual clinical presentation, making it difficult for physicians to diagnose it properly.

The most common cardiovascular complications of KD are Coronary Artery Aneurysms (CAA). Other cardiovascular complications include vasculitis, endocarditis, myocarditis, and pericarditis. Signs and symptoms of myocarditis include tachycardia, gallop rhythm, hyperdynamic precordium, increased cardiothoracic ratio on chest X-ray, electrocardiogram (ECG) abnormality, and decreased fractional shortening. However, myocarditis is mainly subclinical [1].

Gastrointestinal complications include intestinal pseudo-obstruction, gallbladder hydrops, pancreatitis, duodenitis, duodenal perforation, and appendicitis [3, 4]. Acute cholestasis, ischemic strictures of the small bowel, and facial nerve palsy are rare presentations of KD, which are not included in classic criteria [5]. Gastrointestinal symptoms, including diarrhea and vomiting, are uncommon findings. Furthermore, acute bloody diarrhea associated with acute clinical myocarditis is the rare manifestation of KD reported so far.

We report a 7-year-old boy presenting both acute bloody diarrhea and unresponsive to antibiotics associated with acute clinical myocarditis who was finally diagnosed with KD.

Case Report

A 7-year-old boy was admitted due to high-grade fever and bloody diarrhea. The onset of fever began 2 days before admission, and bloody diarrhea manifested a few hours after the beginning of the fever. The stool exam revealed many white blood cells (WBCs) and red blood cells (RBCs). The patient was admitted with suspicion of infectious enteritis. Intravenous ceftriaxone (50 mg/kg/d) and crystalloid serum were administered.

Two days after admission, no progression in fever and diarrhea were seen. Maculopapular rashes appeared on the trunk and limbs and swelling fingers and toes. Physical examination revealed tachycardia without arrhythmia and blood pressure of 60.45 mmHg. Axillary temperature was 39.5 centigrade. Eye examination showed bilateral bulbar conjunctival injection, bilateral nonexudative conjunctivitis, erythematous tympanic membrane, strawberry tongue, and dry, cracked lips. His hands and feet were swollen. Desquamation on the tips of fingers and toes was not seen.

On the first day of hospitalization, hematological findings were as follows: white blood cell count, 9700/mm3 (81% neutrophils, 16% lymphocytes, and 3% mixed); hemoglobin, 11.7 g/dl; red blood cell count, 4710000/mm3; mean corpuscular volume, 78 fL; and platelet count, 406000/mm3. The evaluation of Erythrocyte sedimentation rate (ESR) and C -reactive protein (CRP) level determined 46 mm/h and +3, respectively. Urine analysis and urine culture were performed, and sterile pyuria was found (25-30 WBCs/high-power field (HPF), 10-15 RBCs/hpf, and negative culture). Stool culture was negative for both Shigellosis and E. coli. On the seventh day, erythrocyte sedimentation rate (ESR) elevated to 81 mm/h, and CRP level was +3 mg/dl. Platelet count and troponin levels were 680000/mm3 and 121 ng/ml, respectively. Other Laboratory findings showed normal liver transaminases and serum albumin. Serum sodium (Na) was 137 mEq/l.

Chest X-ray revealed increased transparency in the bilateral hilar and mild cardiac enlargement (cardiothoracic ratio more than 50%). Abdominal ultrasonography (US) showed normal gallbladder and bile ducts. Ascites were not detected. ECG abnormalities in our patients were low-amplitude T wave and nonspecific ST-segment changes with normal PR interval and corrected QT interval (QTc).

According to clinical and laboratory findings, KD was approved, and therefore, echocardiography was done to evaluate the possibility of complications, cardiac function, and myocarditis. A transthoracic Doppler echocardiogram showed tricuspid and mitral regurgitation and an ejection fraction (EF) of 40%. There weren't any signs of coronary involvement or any other cardiac complications. Elevated serum cTnI concentrations normalized in the late stage. Acute myocarditis was treated with fluid resuscitation captopril, furosemide, and IVIG.

Entirely resolved clinical symptoms and cardiac changes occurred after the patient's treatment with IVIG (2gr/kg/24 hours) and ASA (100mg/kg/day) within 2 weeks. The patient was referred to the pediatric cardiologist for further treatments. Diarrhea stopped, and stool exam became normal.

Our patient has been followed-up within one, six, and twelve months after treatment. Echocardiography

which was performed again for him showed no signs of acute myocarditis. His disease clinically improved. Blood testing revealed the following: white blood cell count, 7300/mm; hemoglobin, 13.7 g/dl; and platelet count, 321000/mm^3. ESR was 12 mm/h.

Discussion

KD is an acute, systemic vasculitis that mainly affects patients under 5-year-old. It is considered the most prominent cause of acquired coronary artery disease in children [1].

Classic (typical) KD is diagnosed based on the presence of fever lasting five or more days, accompanied by four out of five following findings: bilateral conjunctival injection; oral changes such as cracked, erythematous lips and strawberry tongue; cervical lymphadenopathy; extremity changes such as erythema of the palms and soles and desquamation of the fingers and toes; and polymorphous rash.

KD is a systemic vasculitis, so that can involve multiple organs. Enteritis association with Myocarditis manifestations is rarely reported in KD patients. We report a case of classic KD, which initially presented with both diarrhea and then association with acute clinical myocarditis.

Gastrointestinal involvement is not relevant as one of the classic diagnostic criteria of KD, but it has sometimes associated with KD. Although hydrops of the gallbladder is a significant complication and elevation of liver transaminases occurs in KD, acute clinical colitis diarrhea is extremely rare.

GI manifestations such as paralytic ileus, appendicular vasculitis, and hemorrhagic duodenitis have been described (4), but occasional acute clinical bloody diarrhea (3). To our knowledge, this is the first report of a patient with KD with the presentation of both bloody diarrhea and clinical myocarditis at the same time.

Cardiovascular complications are a major cause of morbidity. A serious cardiac complication happens, such as CAA, in 15%-25% of untreated children, usually in the sub-acute phase. There wasn't any sign of CAA in our patient [6, 7].

Myocarditis is a common finding in the acute phase of KD. While some patients have no symptoms, others suffer from ventricular dysfunction. Diagnosis of myocarditis in the acute phase requires serum markers, echocardiography, and magnetic resonance. Additional investigations include pathology, biopsy, and nuclear imaging. Although most research has shown that myocardial function improves with treatment, there is still evidence of long-term abnormal myocardial function. Since there is no definite study into late adulthood, it is best to be cautious in evaluating the consequences of myocarditis [1].

Myocarditis, pericarditis, and endocarditis such as valvulitis can be present in the acute phase. The most cardiovascular complication of KD is CAA, myocarditis, myocardial infarction, valvular disease, and pericarditis with or without pericardial effusion. Other vascular complications are systemic arterial aneurysms and mild aortic root dilatation [6-8].

Pericarditis with pericardial effusion and Subclinical Myocarditis is a non-coronary complications in 25% and 50%-70% of patients in the acute phase, respectively (6, 7, 9). Mitral regurgitation occurred in about 1% of patients, resulting from papillary muscle dysfunction or secondary to rupture of the chordae tendinea, myocardial infarction, or valvulitis [9, 10]. In the acute phase, Mild aortic root dilatation is uncommon and may be associated with aortic regurgitation [11].

Another study showed that the distribution of demographic characteristics is not similar to reports from other countries, such as clinical findings, age, and gender distribution, laboratory findings, and complications in other organs. The incidence of typical and atypical KD may differ in different regions, especially cardiac and gastrointestinal complications [8, 12].

Based on Ghandi et al.'s study, incomplete KD that didn't meet all criteria for KD was diagnosed in children with coronary artery complications. The echocardiographic results covered aneurysms, perivascular edema, pericardial effusion, myocarditis, and MR in 1, 2, 1 and 4 patients. CAA was seen in one patient, 2% of all cases [8].

ECG abnormalities showed in 40% of patients with KD [13]. ECG abnormalities include prolonged PR interval, prolonged QTc, low amplitude R wave, low amplitude T wave, and ST-segment changes [1]. In our case, the ECG finding was abnormal but nonspecific. The myocarditis often improves after the acute phase. One study identifies LV contractility dysfunction at diagnosis and after treatment; 57% and 35.7% of those normalized within 24 hours to 6 months, respectively [14].

In our patient, cardiac functions totally improved along with the desirable outcome and follow up. Some patients in the acute phase of KD show subclinical myocarditis, which manifests with subtle electrocardiographic changes or mild symptoms. In one clinical study, an audible gallop was heard on auscultation in 13% of patients with KD within the first 20 days of disease. Additional findings were tachycardia (out of proportion to fever) and hyperdynamic precordium [15].

Although recovery from acute myocarditis occurs typically after the acute phase, long-term effects of the initial complication in the pathology of myocardium reveal monocyte drop and fibrosis. These findings are not related to the coronary artery and are not precisely described. Different studies also showed that myocarditis and myocardial fibrosis could be the major cause of systolic or diastolic dysfunction in patients with KD. Hideki Yoshikawa et al. reported 4 patients with KS who suffered from myocarditis [16].

All four patients showed severe left ventricular (LV) dysfunction. Three patients were older than 5 years old, and two cases had encephalopathy as a complication of KD. There were coronary abnormalities in all 4 instances during convalescence. Only one of the cases had left ventricular dilation due to the severe prolonged inflammation. Indeed, the three remaining cases had normal EF before starting IVIG treatment. However, decreased EF and increased CRP were seen after administration of IVIG. Catecholamine improved the wall motion of LV in all four cases [17].

Fortunately, there was no coronary artery dilation in our case, but other studies showed that viral myocarditis could cause coronary artery dilation during the acute phase of the disease. In addition, coronary artery dilation and acute myocarditis may present with similar features [17, 18].

Physicians often face challenges in the timely diagnosis of KD. For example, Clinical manifestation with gastrointestinal signs such as bloody diarrhea makes the diagnosis more complex, especially in patients who do not meet the criteria for KD. Our case is the rare report of KD presenting as bloody diarrhea and acute clinical myocarditis. This reporting may help pediatricians with the timely diagnosis and appropriate management.

Cardiovascular complications such as acute clinical myocarditis should be highly suspected in any patient KD with persistent bloody diarrhea.

Ethical Considerations

Compliance with ethical guidelines

All ethical principles are considered in this article. Informed consent was obtained from the patient.

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Conflict of interest

The authors declared no conflict of interest.

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