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Kawasaki Disease

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ABSTRACT

Kawasaki disease (KD) is a type of acute inflammation of blood vessels, accompanied by a fever, for which the cause is yet unknown. It primarily affects children who are under the age of five. Kawasaki disease (KD) frequently results in the development of coronary artery lesions (CALs), which include dilated arteries, coronary artery aneurysms (CAAs), and potentially life-threatening myocardial infarction. under the age of five. Kawasaki disease (KD) frequently results in the development of coronary artery lesions (CALs). This case report aims to further explore the diagnosis and the management of KD. In this case report we discuss a 3-year-old male patient who was diagnosed with KD with the main complaints of fever, red eyes, rash, redness of lips with cracked and oral cavity. Patient's lab work showed hypoalbuminemia, increased D-Dimer, and increased Troponin I. Electrocardiography and echocardiography was performed to observe cardiac complication. Soon aspirin and IVIG and showed an improvement. The child was treated for 6 days and then controlled at the outpatient clinic.

Keywords: Kawasaki Disease, Pediatric, IVIG, Aspirin

INTRODUCTION

Kawasaki disease (KD) is a type of inflammation of blood vessels that mostly impacts youngsters and carries a possible danger of developing an abnormal widening of the coronary arteries known as coronary artery aneurysm. It is often regarded as the primary cause of acquired heart disease in Europe and North America. The cause of the illness has been extensively discussed and remains unknown; nevertheless, it is hypothesized that viral infections may act as possible triggers. Kawasaki disease (KD) is hypothesized to be an inflammatory condition that arises following an infection. The observed phenomena is characterized by the activation of neutrophils, monocytes, and lymphocytes, together with increased levels of cytokines. The participation of the IL-17 pathway is quite noticeable in this specific disease.[1,2]

In Japan, the incidence of Kawasaki Disease (KD) has been consistently increasing. The latest data shows that in 2014, there were 308 occurrences of KD per 100,000 persons under the age of 5. In 2010, a research done in Taiwan found that there were 82.8 occurrences of a certain condition per 100,000 children under the age of five. In Indonesia, it is estimated that there are over 5000 occurrences annually. Nevertheless, the annual count of instances that can be precisely diagnosed is fewer than 200.Three In paediatric populations, the occurrence of cutaneous rash and cervical lymphadenopathy as clinical symptoms of Kawasaki illness is more common. Children above the age of six are more susceptible to developing coronary artery anomalies in

relation to Kawasaki illness. Kawasaki disease (KD) frequently results in the development of coronary artery lesions (CALs), which include dilated arteries, coronary artery aneurysms (CAAs), and potentially life-threatening myocardial infarction.[3]

Following the diagnosis of Kawasaki disease (KD), all patients were administered intravenous immunoglobulin (IVIG) at a dose of 2 grammes per kilogramme of body weight (2 gr/kgBW) during a 12-hour infusion. In addition, patients were given aspirin at a dose of 30-50 mg per kilogramme of body weight per day throughout the acute period. The administration of aspirin at a dose of 35 mg per kilogramme per day was maintained for a period of 68 weeks. The medication was continued until all signs of inflammation had totally disappeared or until the regression of CAL (coronary artery lesions) was established using a two-dimensional echocardiography.[4,5]

CASE PRESENTATION

A boy, aged 3 years, with chief complaint of fever since 7 days before admission. Red eyes since 7 days ago without secret or pruritus. Rash appeared since 7 days ago, beginning from the chest and abdomen spread to all over the body, with no pruritus and no pain. The rash is disappearing on the day of admission. Redness of lips with cracked and oral cavity since 7 days ago. The redness of lips with cracked is disappearing on the day of admission. Red eyes since 7 days ago without secret or pruritus. Rash appeared since 7 days ago, beginning from the chest and abdomen spread to all over the body, with no pruritus and no pain. Today the rash is disappearing. Redness of lips with cracked and oral cavity since 7 days ago. Today the redness of lips with cracked is disappearing.

The patient appeared moderately ill, fully conscious, blood pressure 116/70 mmHg, pulse 127 x/min, respiratory rate 26 x/min, body temperature 38.5oC. The patient's body weight (BW) was 15 kg and the body height (BH) was 102 cm. well-nourished status (weight/age -2 to 2 SD, height/age -2 to 2 SD, weight/ height -2 to 2 SD). There was no cyanotic or pale. The skin was warm, rash was present at trunk, both extremities, and back. There was an enlargement of lymph nodes on colli dextra size 6 cm x 5 cm x 5 cm, no terderness. The head was round and symmetrical in shape, head circumference of 50 cm (normocephal regarding Nellhaus standard). Non-exudative injection sinistra and dextra, periorbital swelling, conjunctiva was not pale, sclera was not icteric, pupil isochor 2/2 mm, light reflex positive. No abnormality was found in the nose and ear. Tonsil size T1-T1, not hyperemic, pharynx was not hyperemic. There was erythematous, dry, and craked lip, reddish discoloration of the oral cavity, no oral thrush, strawberry tongue. Heart ictus on 1 finger medial linea mid clavicula sinistra ICS V, with heart sound S1 and S2 was regular rhythm, no murmur. No abnormality in the lung. There was no abdominal distension. The liver was palpable 1/4 -1/4, sharp edge, soil chewy consistency, smooth flat on the surface. The spleen was not palpable. Bowel sound was within normal limits. Pubertal status was A1P1G1. The extremity was warm, with good perfusion. There was no erythema and no edema of the hands and feet.

Laboratory examination showed haemoglobin 10.0 g/dL, leucocytes 13,050/mm3, haematocrit 31%, platelets 527,000/mm3, reticulocytes 1.07% type count 0/3/1/80/12/4, Albumin 2.6 gr/dl, ureum <5 mg/dl, creatinine 0.3 mg/dl, Troponin I 7 ng/dl, D-Dimer 2366 ng/ml with an impression of hypoalbuminemia, increased D-Dimer, and increased Troponin I. The chest x-ray showed an impression of bronchopneumonia and electrocardiogram (ECG) result are sinus rhythm. Based on the results of history, physical examination and support, the patient was diagnosed with Kawasaki disease differential diagnosis of multisystem inflammatory syndrome in children and suspect submandibular abscess.

The patient was given aspirin 80 mg/kg/day divided into 4 doses (4x300 mg po), IVIG 2 g/kg, Cefotaxime 2x750 mg iv, paracetamol 3x150 mg iv liquid meal 6x150 cc, and scheduled for echocardiography. A-30-grams of IVIG given starting from 0,01 cc/kgBW/ minute and titrated every 30 minutes up to 0,06 cc/kgBW/minute then kept until 12 hours while monitored. The patient condition showed an improvement, fever was decreased, no breathlessness, and no chest pain although the red eyes and reddish on mouth still persist. At day 6 of hospitalization the echocardiography examination is performed and give an impression of situs solitus, AV-VA concordance, All PV to LA, VSD (-), ASD (-), PDA (-), minimal pericard effusion, LCA (2 mm), RCA (2 mm), EF 80%. Conclusion: situs solitus, normal intracardiac, good LV-RV function, minimal pericardial effusion. There is no reddish on the mouth, and other physical examination are within normal range. The patient was discharged and scheduled for follow-up at the outpatient clinic

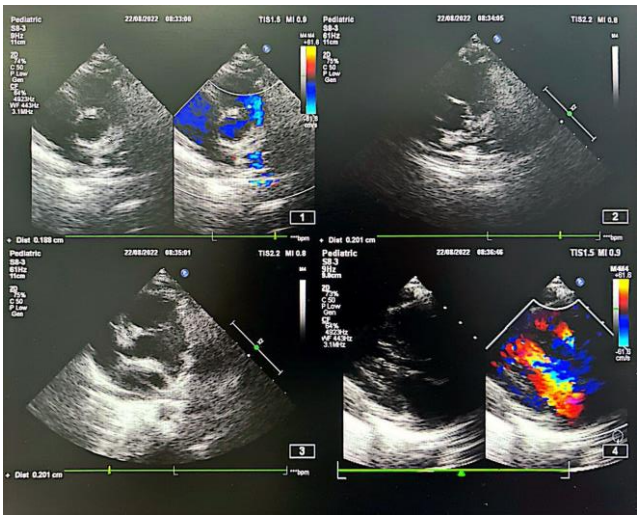

Figure 1. Echocardiography of the patient

DISCUSSION

The present case report documents the presentation of a 3-year and 2-month-old male patient diagnosed with Kawasaki Disease. The patient presented with symptoms including fever, generalized rash, erythema of the lips with associated fissuring, and dysphagia. Kawasaki disease (KD) is a sudden and intense feverish illness of unknown cause that mostly affects children who are younger than five years old. The disorder has an intrinsically self-restricting progression.[6,7] Zhu and Ang's 2021 study revealed that Kawasaki Disease (KD) predominantly affects males, with a male-to-female ratio of 1.5 to 1 in all nations. Moreover, the research suggests that young children are most vulnerable to KD, with around 80% of cases affecting children under the age of 5 and 50% affecting infants under the age of 2.[8]

The diagnosis of Kawasaki disease (KD) was determined using clinical criteria. According to the recommendations set by the American Heart Association (AHA), a diagnosis of classic or full Kawasaki disease (KD) is confirmed when the patient has a fever that lasts for more than 5 days and fits at least 4 out of the 5 clinical criteria for KD. The criteria consist of several mucosal abnormalities, including erythema and cracking of the lips, "Strawberry tongue" erythema, visible swelling of the fungiform papillae, and erythema of the oral and pharyngeal mucosa. (2) Conjunctivitis, also known as nonexudative conjunctival injection, is a condition that affects both eyes and is characterised by redness in the white part of the eyes. It often involves both

eyes equally and tends to spare the area around the cornea. (3) A polymorphous rash is a rash that displays several morphological characteristics, such as maculopapular lesions, widespread erythroderma, or a similarity to erythema multiforme. At times, people may have less frequent episodes of hives or small pustules on the skin, along with changes in the limbs (4). During the acute phase, patients may exhibit redness and swelling of the hands and feet, whereas the subacute phase is marked by the shedding of skin around the nails. The last requirement relates to (5) lymphadenopathy, namely acute, nonsuppurative, cervical lymphadenopathy with a diameter of at least 1.5 cm, often occurring on one side.[9,10] This case report describes the findings from the patient's physical examination, which revealed several dermatological manifestations. These included a skin rash, enlargement of lymph nodes on the right side of the neck measuring 6cm x 5cm x 5cm, non-exudative inflammation of the conjunctiva in both eyes, swelling around the eyes, redness and inflammation of the lips with dryness and cracking, reddish discoloration of the oral cavity, a strawberry-like appearance of the tongue, erythema (redness) of the palms and soles, edema (swelling) of the hands and feet, and peeling of the skin. The patient's examination results indicate that they satisfied all five diagnostic criteria for Kawasaki Disease.

In this case report, the laboratory analysis revealed elevated leukocyte and platelet counts, as well as hypoalbuminemia, increased D dimer levels, and elevated Troponin I levels. Osei et al (2021) similarly reported higher leukocyte counts in patients diagnosed with Kawasaki disease.[7] This was also in line with the laboratory criteria findings reported by Zhu and Ang in 2021, in which several indicators can be used to support the diagnosis of Kawasaki Disease. These indicators include anemia for age, a platelet count of 450,000 after the 7th day of fever, an albumin level of 3.0 g/dL, raised ALT levels, a white blood cell count of 15,000/mm3, and the presence of 10 white blood cells per high-power field in urine analysis.[8]

Patients with Kawasaki Disease demonstrate increased levels of D-Dimer. The use of D-dimer is essential in the diagnostic procedure for several clinical disorders, such as venous thromboembolism, disseminated intravascular coagulation, pulmonary embolism, aortic aneurysm, and coronary artery disease. Moreover, it possesses the capacity to function as a noteworthy biomarker in relation to coronary and carotid artery atherosclerosis, as well as aortic diseases. Recent study has found a connection between increased levels of D-dimer and the existence of D. Nevertheless, there is still a need for a thorough assessment of this correlation. Zhou et al.'s study found that D-dimer is a major risk factor in the development of coronary artery lesions (CAL) in Kawasaki disease (KD).[11]

In this case report, an elevation in Troponin I levels was also observed. The superiority of serum cardiac troponins in diagnosing myocardial damage in myocarditis has been proven, compared to creatine kinase (CK) MB. During the acute phase of Kawasaki disease (KD), around 33% of children display elevated levels of cardiac troponin. Pilania et al. showed that the observed rise in cardiac troponin I levels in individuals with KD did not achieve statistical significance. In addition, their research revealed a lack of significant correlation between increased levels of cardiac troponin I and the presence of coronary artery anomalies (CAAs).[12]

This case report entails an examination of serum transaminase levels, revealing that the obtained results fell within the range of normal values Unlike the study done by Ren et al. in 2021, it was shown that a substantial percentage of patients with Kawasaki disease (KD) displayed elevated levels of serum transaminases or gamma-glutamyl transpeptidase, ranging from 40% to 60%. Although occurrences of significantly elevated transaminase levels

are rare, they might cause diagnostic ambiguity and delay the prompt commencement of therapy. Reports indicate that increased levels of alanine aminotransferase (ALT) and gamma-glutamyl transferase (GGT) during the first stage of an illness are linked to a lack of response to intravenous immunoglobulin (IVIG) therapy.[13]

The patient's electrocardiography (ECG) examination revealed no discernible abnormalities. Electrocardiography (ECG) has the capability to display various indicators that may signal myocardial injury and repolarization problems, including a prolonged PR interval, deep Q waves, low voltage, ST-T alterations, and arrhythmias.[14]

The patient's echocardiography examination revealed minimal pericardial effusion. Schexnayder et al (2021) showed the frequency of pericardial effusion in children with KD has been reported to be anywhere between 3% and 15%. However, the impact of pericardial effusion on outcomes has not been studied as rigorously as that of coronary aneurysms. Pericardial effusion was associated with longer hospital length of stay and risk of readmission at 30 days.[15] Microvascular hyperpermeability is one of the important events in the pathophysiology of KD. For example, peripheral edema of the extremities is often seen in affected patients within the first 5 days of illness. Pericardial effusion is also related to microvascular hyperpermeability and is a relatively common complication in KD patients.[16]

The patient received intravenous administration of the antibiotic Cefotaxime at a dosage of 2x750 mg. Additionally, intravenous administration of paracetamol was given at a dosage of 3x150 mg to address fever. Aspirin was administered orally at a dosage of 80 mg/kgBW/day, divided into four doses of 4x300 mg. Intravenous immunoglobulin (IVIG) was administered at a dosage of 2 grams/kgBW. The main goal of targeted therapy in the acute phase of Kawasaki disease (KD) is to reduce inflammation and arterial dysfunction, as well as to avoid thrombocytosis in the case of coronary artery abnormalities. Intravenous immunoglobulin (IVIG) is the primary therapy method used for individuals with Kawasaki disease (KD). In the field of medical therapy, intravenous immunoglobulin (IVIG) is frequently used as a therapeutic intervention for various rheumatologic and autoimmune disorders. Several mechanisms have been proposed to explain the anti-inflammatory effects of intravenous immunoglobulin (IVIG). These strategies improve the elimination of autoantibodies by binding to neonatal Fc receptors (FcRn) in a competitive manner, preventing the activation of inhibitory Fc receptor FccRIIB on macrophages, and obstructing adhesion molecules.[9]

The timing of medicine administration is crucial for achieving best outcomes. Administering intravenous immunoglobulin (IVIG) during the acute phase of Kawasaki disease (KD) has been demonstrated to reduce the incidence of coronary anomalies. To reduce the risk of coronary issues, it is advisable to provide Intravenous Immunoglobulin (IVIG) early, namely during the first ten days after the fever begins, if the diagnosis of Kawasaki Disease (KD) has been confirmed. In this particular case report, the use of aspirin and intravenous immunoglobulin (IVIG) was carried out. Agustina et al's (2021) study shown that administering IVIG in combination with aspirin effectively reduces the incidence of coronary artery lesions (CAL) in individuals diagnosed with Kawasaki disease (KD). Following the therapy, there is a significant reduction in the occurrence of CAL, with the proportion decreasing from 25% to 4%. For patients with Kawasaki disease in the acute phase of illness, it is advised to provide aspirin at a dosage of 80 to 100 mg/kg/day, split into four doses, along with intravenous immunoglobulin (IVIG). Acetylsalicylic acid (ASA) demonstrates anti-inflammatory effects when given in high levels of 80 to 100 mg/kg/day. In contrast, when

administered at lower levels ranging from 30 to 50 mg/kg/day, ASA has antiplatelet activity. It is incapable of mitigating the progression of coronary issues.[9]

CONCLUSION

The manifestation of vasculitis in Kawasaki Disease is challenging as the findings could lead onto a potential risk of coronary artery aneurysm development. Prompt treatment for the patient and monitoring is the key to achieve an improvement of the patient's condition.

Declaration by Authors

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