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OPIS PRZYPADKU
CASE REPORT

Kawasaki disease in children: diagnosis, treatment, and therapeutic guidelines in light of a clinical case

Choroba Kawasakiego u dzieci: diagnoza, leczenie i wytyczne terapeutyczne w świetle przypadku klinicznego

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ABSTRACT

Kawasaki disease (KD) is an acute inflammation of small- and medium-sized arteries of unknown etiology. It most commonly affects children under the age of 5, with a peak incidence at 2 years of age. Because of its nonspecific symptoms, the diagnostic process is prolonged and challenging. The primary symptoms include a high fever persisting for more than 5 days, lymphadenopathy, and skin changes. Other symptoms may include mucosal redness and cracking, "strawberry tongue", conjunctivitis, swelling of the hands and feet with sheet-like peeling of the skin, and desquamation in the perineal area. This article presents the case of a 2-year-old boy admitted to the pediatric department of a hospital due to a high fever lasting several days, elevated inflammatory markers, and diarrhea. During hospitalization, new symptoms were observed, allowing the diagnosis of incomplete Kawasaki syndrome. The patient was treated according to European standards with a favorable therapeutic outcome and was monitored in a cardiology clinic. The boy was discharged in good condition without complications. This case highlights KD as both a diagnostic and therapeutic challenge, especially in its incomplete and atypical forms.

KEYWORDS

Kawasaki disease, immunoglobulin therapy, arteritis, echocardiography, cardiovascular complications, prolonged fever, atypical Kawasaki disease, cardiology follow-up

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STRESZCZENIE

Choroba Kawasakiego (*Kawasaki disease* – KD) to ostre zapalenie małych i średnich tętnic o nieustalonej etiologii. Najczęściej występuje u dzieci do 5 roku życia, ze szczytem zachorowań w 2 roku życia. Z uwagi na nieswoiste objawy diagnostyka jest długotrwała i utrudniona. Do głównych objawów należą wysoka gorączka utrzymująca się dłużej niż 5 dni, limfadenopatia oraz zmiany skórne. Mogą współwystępować przekrwienie oraz pękanie błon śluzowych, tzw. malinowy język, zapalenie spojówek, obrzęk rąk i stóp z płatowo złuszczającym się naskórkiem dłoni oraz okolicy krocza. W pracy opisano przypadek 2-letniego chłopca przyjętego na oddział pediatryczny szpitala z powodu wysokiej gorączki utrzymującej się od kilku dni, podwyższonych parametrów zapalnych oraz biegunki. W trakcie hospitalizacji zaobserwowano nowe objawy, które pozwoliły postawić rozpoznanie niepełnoobjawowego zespołu Kawasakiego. Pacjenta leczono zgodnie z europejskimi standardami z dobrym efektem terapeutycznym oraz kontrolowano w poradni kardiologicznej. Chłopiec wypisany w stanie dobrym bez powikłań. Przypadek przedstawia KD jako wyzwanie diagnostyczne i terapeutyczne, szczególnie w postaci niepełnoobjawowej i atypowej.

SŁOWA KLUCZOWE

choroba Kawasakiego, leczenie immunoglobulinami, zapalenie tętnic, echokardiografia, powikłania sercowo-naczyniowe, gorączka wielodniowa, atypowa choroba Kawasakiego, kontrola kardiologiczna

INTRODUCTION

Kawasaki disease (KD) is an acute systemic inflammation of small- and medium-sized arteries, with a particular predisposition for affecting the coronary arteries, potentially leading to structural damage and the development of aneurysms over time [1]. The etiology of the disease remains unclear, but it is suggested that genetic factors and past upper respiratory infections may play a role [2]. A new hypothesis proposes that oligoclonal IgA plasma cells play a key role in the induction of vasculitis [3]. Over several weeks, the ongoing inflammation leads to vascular remodeling, wall thickening, and the formation of coronary artery aneurysms, which can later result in vessel rupture, myocardial infarction, or arrhythmias caused by ischemia [4].

The disease is characterized by a sudden onset with fever lasting at least 5 days, which responds poorly to antipyretics and antibiotic therapy. The course of the disease includes an acute phase, a sub-acute phase, and a recovery period [4].

According to the criteria of the American Heart Association (AHA), the classical form of KD is diagnosed based on a fever lasting at least 5 days and the presence of at least four of the following symptoms: bilateral non-exudative conjunctivitis, redness and cracking of the lips, redness of the tongue ("strawberry tongue"), and/or redness of the oral and pharyngeal mucosa, cervical lymphadenopathy (≥ 1.5 cm in diameter), typically unilateral, polymorphic rash, redness and swelling of the hands and feet during the acute phase and/or periungual peeling of the skin during the subacute phase [4].

Diagnosis involves clinical evaluation, laboratory tests, electrocardiography (ECG), echocardiography (ECHO), chest X-rays (CXR), abdominal ultrasound (USG), and ophthalmologic consultation [4,5].

The characteristic findings include elevated inflammatory markers – C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) – during the acute phase of the disease and increased white blood cell (WBC) and platelet counts during the subacute phase. ECHO may reveal perivascular increased echogenicity, changes in the coronary arteries, signs of inflammation, or fluid indicating pericarditis.

Incomplete KD can be diagnosed in patients who do not meet the classic criteria by lacking four of the five characteristic symptoms. Clinicians should also consider less specific symptoms such as redness and swelling at the Bacillus Calmette-Guérin (BCG) vaccination site (in children under 12 years old), generalized cervical lymphadenopathy, and abnormal laboratory findings including anemia, elevated alanine aminotransferase activity, platelet count ≥ 450,000/μl after the 7th day of illness, WBC ≥ 15,000/μl, leukocyturia ≥ 10 WBCs/hpf, and serum albumin ≤ 3.0 g/dl in children aged 4 years and older [6].

Further diagnostic steps include detecting changes via ECHO and ruling out other possible causes of these abnormalities. In cases with an unclear clinical presentation and the need for thorough differential diagnosis, treatment is often delayed, increasing the risk of a more severe disease course owing to the development of significant arterial damage compared to the classic form of KD. This variant is more common in younger infants and older children [4].

Treatment is tailored to the patient's condition. During the acute phase, it includes intravenous immunoglobulins and acetylsalicylic acid (ASA). Once the body temperature normalizes and inflammatory markers decrease, therapy continues with a reduced dose of ASA (3–5 mg/kg body weight/day in a single dose) until follow-up ECHO, approximately two months after symptom resolution and the normalization of inflammatory markers. Regular cardiological follow-up is crucial for managing KD [7].

CASE REPORT

A 2-year-old boy was admitted to the Pediatric Ward due to a high fever persisting for six days, accompanied by diarrhea, abdominal pain, moderate dehydration, and vomiting. The day before hospitalization, the child developed eyelid swelling, red and cracked lips, in addition to a fine papular, non-itchy rash covering the trunk, and to a lesser extent, the limbs. On the second day of hospitalization, the patient exhibited swelling and redness of the hands and feet, along with conjunctival hyperemia and itching.

The laboratory tests revealed high markers of inflammation: CRP at 109.9 mg/L, procalcitonin (PCT) at 10.65 ng/L and elevated D-dimer levels at 1561.68 ng/mL. To determine the cause of the abnormal laboratory results, urine, blood, and stool cultures were collected. Due to the unclear clinical picture and suspicion of a systemic inflammatory response, third-generation cephalosporin was initiated. During the diagnostic process, infections with influenza viruses, hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), human immunodeficiency virus (HIV), Epstein-Barr virus (EBV), and cytomegalovirus (CMV) were ruled out, and the blood, urine, and stool cultures were negative. No antibodies against SARS-CoV-2 in IgG/IgM classes were detected. The following day, swelling in the feet was observed, and the fever persisted despite the start of treatment. Immunoglobulins and nonsteroidal anti--inflammatory drugs, including ASA and paracetamol, were added to the therapy.

After treatment, the fever resolved, along with changes in the conjunctiva, lips, and feet. In the subsequent days of hospitalization, the inflammatory markers significantly decreased (CRP 2.40 mg/L, PCT 0.19 ng/L, D-dimer 1319.72 ng/mL). The liver function tests revealed persistently high alanine aminotransferase (ALT) levels, but aspartate aminotransferase (AST) levels normalized. The blood, urine, and stool cultures remained negative, and the virologic stool tests were normal.

ECHO did not reveal any abnormalities in the main coronary artery segments; the heart anatomy, function, and ejection fraction were normal. The ECG showed no deviations from the norm. The child was discharged in good condition with recommendations for continued treatment and follow-up.

At the follow-up examination after discharge, no abnormalities were found during the physical examination. The blood counts during the hospital stay were normal, and a follow-up ECHO showed no clots in the heart or changes in the coronary vessels; both the structure and function were normal. A follow-up visit six months later, including ECHO, showed no abnormalities either.

DISCUSSION

KD most commonly occurs in children between the ages of 1 and 5, with a significantly higher incidence among children of Asian descent compared to those from Europe [8]. There is a slight predominance of cases among boys (the male-to-female ratio is 1.5:1) [8,9]. Boys are also more prone to complications and the risk of death [10]. KD is rarely diagnosed in children under 4 months of age, which may suggest a protective effect of maternal antibodies [10]. It has also been observed that the disease is more prevalent during the winter and spring months, with a markedly higher frequency among children from the Far East compared to those from Europe [4,10]. In the European population, the incidence is approximately 5–10 cases per 100,000 individuals [11].

The classic form of KD is characterized by a fever lasting at least 5 days and the presence of at least 4 out of 5 clinical features: changes in the extremities (erythema or swelling), a non-vesicular rash (mainly on the torso during the acute phase), bilateral conjunctivitis (non-purulent), changes in the lips and oral cavity (mucosal hyperemia, “strawberry tongue”, cracked shiny lips), and enlargement of the cervical lymph nodes (at least one node > 1.5 cm) [1,4,5].

An atypical form of KD may not meet all the diagnostic criteria, complicating the diagnosis and potentially delaying treatment [4,6]. In children with atypical KD, the fever phase often lasts longer than in the classic form and more commonly affects infants under 6 months old or children over 5 years old. These cases may also respond less effectively to treatment [12]. The AHA has developed a diagnostic algorithm for incomplete KD [4].

For children with a prolonged fever and elevated inflammatory markers (CRP and/or ESR), additional parameters should be assessed, such as anemia, platelet count > 450,000/mm³, serum albumin concentration < 3 g/dL, elevated ALT levels, total WBC > 15,000/mm³, and urine WBC > 10/hpf [4].

Imaging techniques, such as ECG and ECHO, play a crucial role in managing patients. These methods help rule out severe complications, such as aneurysms, and assess changes in the coronary vessels of the heart [5]. ECHO should be performed at the time of KD diagnosis and repeated later at two weeks and six to eight weeks after the onset of the disease if no complications are present [4].

Due to the unknown etiology of the disease, particular attention should be paid to the patient’s medical history, especially regarding prior respiratory infections and the patient’s age. Differential diagnosis should include various diseases such as measles, scarlet fever, infectious mononucleosis, rheumatic fever, or Stevens-Johnson syndrome, owing to the similar

symptoms (fever, rash, exanthema, and oral changes) [1].

The use of immunoglobulins and high doses of ASA as an anti-inflammatory agent is a key element of treatment since it prevents the development of severe complications [7]. In the presented patient, this treatment led to the resolution of fever and changes in the conjunctiva, lips, and feet. Post-hospitalization follow-up is an important aspect of preventing recurrences and monitoring for side effects of the therapy [1].

CONCLUSIONS

KD poses a diagnostic and therapeutic challenge, particularly in its incomplete and atypical forms, as well as because of its unclear etiology. ASA and immunoglobulins are the mainstays of treatment because they prevent complications such as myocardial ischemia and coronary artery aneurysms. Comprehensive differential diagnosis and close monitoring of the patient's condition using laboratory and imaging studies, such as ECHO, are crucial for proper treatment, as highlighted in the described case. Adherence to current guidelines through close observation and a comprehensive therapeutic approach allows improvement in the patient's health, confirming their effectiveness. Advancing therapeutic and diagnostic strategies for KD through research into its etiology and pathogenesis remains a priority.

Authors' contribution

Study design – E. Rychlicka, A. Kocjan, M. Heba, B. Żaczek
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Final approval of the version to be published – M. Heba, M. Czubaj-Kowal

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