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ARTYKUŁ ORYGINALNY / *ORIGINAL ARTICLE*

Cardiac complications in children with Kawasaki disease in our own experience

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Abstract

Background: Kawasaki disease is the most common cause of acquired heart disease in children in developed countries. The incidence of Kawasaki disease varies from 180 in Japan through 20 in United States to 5–8 in the European countries per 100,000 children younger than 5 years of age.

Aim: To evaluate cardiac complications in children hospitalised with Kawasaki disease.

Methods: Retrospective analysis of the medical records of patients hospitalised with Kawasaki disease in the Specialist Mother and Child Healthcare Facility in Poznan (Poland) in 2008–2014. The diagnosis was based on the American Heart Association criteria.

Results: Study group included 30 patients (25 boys and 5 girls). The mean age was 49 months; 21 (70%) children were younger than 5 years of age. All patients had oral mucosal lesions, while an elevated leukocyte count was observed in a minority of patients. Cardiac involvement was detected in 18 (60%) patients, aneurysms in 4 (13.3%) patients, coronary artery dilatation in 6 patients, pericarditis in 6 patients, mitral regurgitation in 3 patients, and aortic regurgitation in 2 patients. In 5 children, more than 1 cardiac abnormality was detected. During 12 months of follow-up, coronary artery dilatation resolved in 5 children, and 1 patient developed aneurysm.

Conclusions: Our findings suggest that Kawasaki disease should be considered in the differential diagnosis of children with prolonged fever. During the acute stage of the disease, children with Kawasaki disease require regular cardiac evaluation, and long-term care is needed when cardiovascular complications occur. A central case reporting system to monitor all cases of Kawasaki disease in the Polish paediatric population should be introduced.

Key words: Kawasaki disease, coronary artery aneurysm, fever

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INTRODUCTION

Kawasaki disease is a vasculitis involving small- and middle-size vessels that occurs in children. It is currently the most common cause of acquired cardiac disease in children in developed countries [1]. The incidence of Kawasaki disease varies from 180 in Japan through 20 in United States to 5–8 in the European countries per 100,000 children younger than 5 years of age [2–5]. Precise data on the incidence of Kawasaki disease in Poland are lacking. Several reports were published, describing experience of individual centres [5–7]. In many countries, the incidence of Kawasaki disease depends on the proportion of children of Asian descent in the general population.

The disease has an acute, self-limiting nature but its consequences may be long-term. The main presenting symptom is prolonged fever.

The diagnostic criteria according to the American Heart Association (AHA) include fever lasting at least 5 days and accompanied by 4 out of the following 5 findings:

— bilateral conjunctivitis;
— polymorphic rash;

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— cervical lymphadenopathy, including at least 1 lymph node > 15 mm;
— extremity changes — oedema, palmar erythema, skin desquamation;
— mucosal changes — strawberry tongue, pharyngeal erythema, cracked lips) [8].

Incomplete Kawasaki disease is defined as fever lasting 5 days but accompanied by less than 4 diagnostic signs [9]. Atypical Kawasaki disease is diagnosed in a patient who fulfils the diagnostic criteria if the overall clinical presentation is not typical for Kawasaki disease, e.g. with predominant signs of renal failure [9, 10]. In Japan, all 6 disease manifestations are considered equal and thus Kawasaki disease may be diagnosed even before 5 days of fever if all other 5 manifestations are present [11]. Such an approach is particularly valuable due to a high incidence of Kawasaki disease in that country.

The disease has 3 phases. The acute phase usually lasts 7–14 days and includes the pyretic period. This is followed by the subacute phase, lasting from resolution of symptoms until resolution of other clinical manifestations, usually for about 2 weeks. It is characterised by a typically elevated platelet count, palm and sole desquamation, and arthralgia. The third phase is the recovery phase, lasting until complete normalisation of inflammatory responses and the platelet count, which usually occurs at about 8 weeks after the symptom onset [12].

Kawasaki disease may only be diagnosed if other conditions with similar manifestations have been ruled out. The differential diagnosis includes streptococcal angina scarlet fever, infectious mononucleosis, Stevens-Johnson syndrome, enteroviral infections, roseola, serum sickness, and connective tissue diseases [1, 13].

The aim of the study was to evaluate the rate and evolution of coronary artery aneurysms as a complication of Kawasaki disease in hospitalised children.

METHODS

Study plan

We retrospectively analysed the medical records of patients hospitalised with Kawasaki disease in the Specialist Mother and Child Healthcare Facility in Poznan in 2008–2014. The diagnosis was based on the AHA criteria [8]. On admission, laboratory tests including complete blood count, C-reactive protein, potassium, sodium, and transaminase levels, urinalysis, and abdominal ultrasound were performed in all children. Blood and urine cultures were also performed. A suspicion of Kawasaki disease was raised after other causes of fever were excluded and no response to antibiotic therapy was seen. In the initial disease phase, children underwent cardiology consultation that included electrocardiogram (ECG) and echocardiography. Details of the diagnostic and therapeutic approach are shown in Table 1. Following the diagnosis, all children received immunoglobulins (2 g/kg body weight) and aspirin in a dose depending on the disease phase. Two children who were transferred from other centres following resolution of fever did not receive immunoglobulins.

Table 1. Diagnostic and therapeutic approach to patients with Kawasaki disease in the Specialist Mother and Child Healthcare Facility, Poznan, Poland

Diagnostic approach	Therapeutic approach
Suspicion of Kawasaki disease	
Complete blood count	
CRP, ESR, procalcitonin	
ALT, AST, GGTP	
Creatinine	
Total protein, albumin	
Sodium, potassium, chloride	
Immunoglobulins	
Lipid profile	
Urinalysis	
Blood culture	
Urine culture	
Strep test	
anti-EBV IgM IgG	
anti-CMV IgM IgG	
Electrocardiogram	
Chest radiography	
Abdominal ultrasound	
Echocardiography	
Diagnosis of Kawasaki disease	
	Intravenous immunoglobulins 2 g/kg over 24 h
	ASA 50–80 mg/kg body weight in 4 doses
2 weeks:	48 h after resolution of fever:
Echocardiography	ASA 3–5 mg/kg in one daily dose
Complete blood count	Discontinue ASA in case of
CRP	a febrile infection
	Vaccination against influenza
	Defer MMR and VZV vaccinations by 11 months
6 weeks:	Aneurysms still present — continue ASA at 3–5 mg/kg and further cardiac care
Echocardiography	
Complete blood count	
CRP	No aneurysms — discontinue ASA

ALT — alanine aminotransferase; ASA — acetylsalicylic acid; AST — aspartate aminotransferase; CRP — C-reactive protein; ESR — erythrocyte sedimentation rate; GGTP — gamma-glutamyl transpeptidase; MMR — mumps, measles, rubella; VZV — varicella zoster vaccine

Echocardiography

Echocardiographic parameter measurements were performed using a 2-dimensional (2D) echocardiography VIVID S 5 sys-

Table 2. Rates of specific symptoms and signs in children hospitalised due to Kawasaki disease

Symptom/sign	Number of patients	Percentage of the overall study population	Aneurysms	No aneurysms	P
Conjunctivitis	25	83%	3 (75%)	22 (85%)	NS
Mucosal changes	30	100%	4	26	NS
Extremity changes	20	67%	2 (50%)	18 (69%)	NS
Rash	28	93%	4	24 (92%)	NS
Lymphadenopathy	23	77%	4	19 (73%)	
Anaemia	18	60%	4	14 (54%)	NS
Elevated leukocyte count	7	23%	2 (50%)	5 (19%)	NS
Elevated platelet count	21	70%	3 (75%)	18 (69%)	NS
Elevated aminotransferase levels	19	63%	1 (25%)	18 (69%)	NS
Hyponatraemia	20	67%	2 (50%)	18 (69%)	NS
Hypoalbuminaemia	15	50%	3 (75%)	12 (46%)	NS
CRP > 30	25	83%	3 (75%)	23 (88%)	NS
ESR > 30	25	83%	2 (50%)	23 (88%)	NS
Sterile leukocyturia	18	60%	2 (50%)	16 (62%)	NS
ECG changes	9	30%	2 (50%)	7 (27%)	NS
Pericarditis	6	20%	1 (25%)	5 (19%)	NS
Pneumonia	7	23%	1 (25%)	6 (23%)	NS

CRP — C-reactive protein; ECG — electrocardiogram; ESR — erythrocyte sedimentation rate

tem with 6S and 3S sector probes in TM, 2D, Doppler, and colour Doppler modes.

Lumen diameter of the coronary arteries and their branches was measured, the presence of aneurysms was evaluated, and the Z-score was calculated for each coronary artery.

Coronary artery dilation was defined as the maximum coronary artery Z-score above 2. According to the AHA definition, coronary artery aneurysm was defined as a localised dilation of a vessel lumen with a diameter of more than 1.5 times the largest diameter of the given vessel elsewhere [8]. Aneurysms were categorised as small (diameter < 5 mm), medium (diameter 5–8 mm), and giant (diameter > 8 mm) [8].

Due to a retrospective nature of this analysis, an approval by the bioethics committee was not required.

Statistical analysis

Statistical analyses were performed using the STATISTICA PL software, version 1.0.

Quantitative variables were characterised by the following parameters: arithmetic mean, median, minimum, maximum, and standard deviation. Relations between two qualitative variables were verified using the χ^2 test. Comparison of quantitative variables between patients with or without aneurysms was performed by the Mann-Whitney U test. $P \leq 0.05$ was considered statistically significant.

RESULTS

The study group included 30 patients: 25 boys and 5 girls. The mean age was 49 months. Twenty-one (70%) children were below 5 years of age, including 10 (33%) below 2 years of age.

No seasonal variation of disease incidence was noted. The mean duration of fever was 9.26 days (range 5–28 days). The rates of specific symptoms are shown in Table 2.

Among the diagnostic symptoms, the most common ones were oral mucosal changes (seen in all patients) followed by polymorphic rash (in 93.33% of patients), while extremity changes were the least common (in 66.67% of patients).

Among laboratory test, elevated C-reactive protein (CRP) level was noted in 80% of patients. As suggested by the AHA, the threshold CRP level was set at 30 mg/L [8]. We did not find differences in peak values of laboratory inflammation markers between patients with and without coronary artery aneurysms. Among patients with coronary artery aneurysms, the mean CRP level was 103 mg/L, median 112 mg/L, and the range was 27–160 mg/L, and in the group without coronary artery aneurysms, these values were 109 mg/L, 91 mg/L, and 11–238 mg/L, respectively. Procalcitonin level was measured in 16 patients, including 7 with largely elevated values (≥ 2 ng/mL), 6 with moderately elevated values (0.5–1.99 ng/mL), and the remaining patients with normal values.

X-ray findings of pneumonia were found in 8 (27%) patients. In 1 child, Kawasaki disease developed 2 days after adenotomy.

Abnormal ECG was found in 9 (30%) patients, most commonly repolarisation abnormalities (in 6 [20%] patients) such as flat or negative T waves or ST segment elevation in the precordial leads.

Table 3. Detailed characteristics of patients with aneurysms

	Patient No. 1	Patient No. 2	Patient No. 3	Patient No. 4
Gender	Female	Male	Male	Male
Age [months]	13	67	10	62
Duration of fever [days]	7	8	28	9
CRP [mg/L]	161	27	69	155
Hypoalbuminaemia	NA	Yes	Yes	Yes
Hyponatraemia	Yes	No	No	Yes
Anaemia	Yes	Yes	Yes	Yes
Increased platelet count	Yes	No	Yes	Yes
Initial echocardiography	8th day	7th day	28th day	9th day
Aneurysm identification	7th day	7th day	28th day	3 months
Follow-up at 1 month	2 aneurysms: LCA 0.3 cm and 0.2 cm 3 SD and 2 SD	1 aneurysm: RCA 0.35 cm 3 SD	3 aneurysms: RCA 0.8 cm, LAD 0.6 cm, LCx 0.6 cm RCA > 3 SD	LCA dilatation
Follow-up at 6 months	2 aneurysms: LCA 0.3 cm and 0.2 cm	1 aneurysm: RCA 0.35 cm	3 aneurysms: RCA 0.8 cm, LAD 0.6 cm, LCx 0.6 cm	Fusiform aneurysm: LCA 0.5 cm > 3 SD
Follow-up at 12 months	2 aneurysms: LCA 0.3 cm and 0.2 cm	Normal artery	3 aneurysms: RCA 0.8 cm, LAD 0.6 cm, LCx 0.6 cm	Fusiform aneurysm: LCA 0.5 cm
Timing of immunoglobulin administration (days since the disease onset)	7	8	26	8
Response to immunoglobulins	No/positive to repeated administration	Yes	Yes	No/positive to repeated administration
Antibiotic therapy	3rd generation cephalosporin Clarithromycin	3rd generation cephalosporin Clarithromycin	3rd generation cephalosporin Vancomycin	3rd generation cephalosporin
Concomitant manifestations			Pneumonia	Otitis

Hypoalbuminaemia — albumin < 2.5 g/dL; hyponatraemia — Na < 135 mmol/L; anaemia — haemoglobin level below the reference range for age and gender; elevated platelet count — platelet count above the reference range for age and gender; elevated leukocyte count — leukocyte count above the reference range for age and gender; CRP — C-reactive protein; LAD — left anterior descending artery; LCA — left coronary artery; LCx — left circumflex artery; NA — not available; RCA — right coronary artery; SD — standard deviation

Echocardiography showed abnormal findings in 18 (60%) patients, including aneurysms in 4 (13%) patients, coronary artery dilatation in 6 patients, pericarditis in 6 patients, mitral regurgitation in 3 patients (grade 1/4 in 1 patient, and trace in 2 patients), and aortic regurgitation in 2 patients (for details see Table 3). More than one echocardiographic abnormality was found in 5 patients. Comparison of patient age distribution between children with and without aneurysms is presented on Figure 1. During 12 months of follow-up of children with identified coronary artery abnormalities, aneurysms found in the acute phase persisted in 2 children, while coronary artery abnormalities resolved at 12 months in 1 patient with an aneurysm found at baseline, and initial coronary artery dilatation progressed to an aneurysm in 1 patient. One patient with aneurysms found in the acute phase was followed up for 5 years, with no changes in regard to the observed coronary artery abnormalities.

In 3 out of 4 (75%) children with coronary artery aneurysms, immunoglobulins were administered between 7 and 10 days after the disease onset (defined as the onset of fever). Two of these children (50%) required repeated immunoglobulin administration due to recurrent fever. Among patients without coronary artery aneurysms, 81% received immunoglobulins by 10 days, and 2 did not receive immunoglobulins (patients transferred from another centre after resolution of fever). Detailed information regarding the timing of immunoglobulin administration is presented in Table 4.

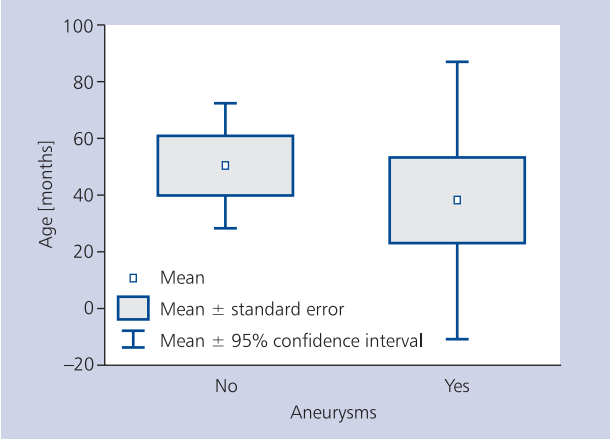

Figure 1. Comparison of patient age distribution between children with and without aneurysms

Table 4. Timing of immunoglobulin u administration in patients with and without aneurysms

Timing of immunoglobulin administration (days since the disease onset)	Patients without aneurysms	Patients with aneurysms
5	1	
6	3	
7	9	1
8	3	2
9	3	
10	2	
11	3	
26		1
No treatment	2	

Among the analysed children, coronary artery aneurysms were identified in the acute phase of the disease in 2 patients.

One of these patients was a 13-month-old girl with 2 and 3 mm aneurysms within the left coronary artery identified by echocardiography performed at 8 days. When indexed for body weight of the patient, these values corresponded to 2 and 3 standard deviations (SD) above the mean expected vessel diameter. The child received immunoglobulins twice due to recurrent fever associated with a repeated increase in CRP level and anaemia requiring transfusion of packed red blood cells. Coronary artery aneurysms persisted in a follow-up echocardiography 12 months later.

In another patient, a 67-month-old boy, echocardiography at 7 days of fever showed a 3.5 mm aneurysm within the right coronary artery, corresponding to 3 SD above the mean vessel diameter indexed for body area (0.73 m^2). The treatment was initiated at 8 days of fever. Coronary artery changes persisted in follow-up echocardiography at 1 and 6 months but resolved at 12 months.

The most severe complications developed in a child in whom the diagnosis was most delayed. Before admission to our unit, a 10-month-old boy was hospitalised twice in a community hospital where pneumonia was diagnosed and parenteral antibiotic therapy was initiated but fever did not resolve. Immunoglobulins were administered at 26 days after the symptom onset. Echocardiography performed at 4 weeks showed 3 aneurysms that persisted over 5 years of follow-up, with the vessel diameter in the affected segments corresponding to more than 3 SD above the reference vessel size.

In another boy (patient No. 4, Table 3), a 5 mm fusiform aneurysm (> 3 SD) was diagnosed 3 months after the disease onset, and the lesion persisted in follow-up echocardiographic examinations. This patients also received immunoglobulins twice and was treated with systemic glucocorticosteroids due to recurrent fever. Levels of acute phase proteins were elevated (CRP 155 mg/L, procalcitonin 24 ng/mL). Platelet count was initially low, followed by thrombocytosis in the second week. Follow-up evaluation at 12 months showed left ventricular hypertrophy and hypertension.

DISCUSSION

Myocardial and coronary artery involvement is the main reason for mortality in Kawasaki disease [14]. During the acute phase, as many as 50% of patients develop myocarditis manifesting with tachycardia, arrhythmia, conduction disturbances, and pericarditis but the most severe complication is coronary vasculitis leading to coronary artery wall damage [8, 10, 14]. Transient coronary artery dilatation is seen in nearly half of patients, and occurrence of such lesions increases the risk of thromboembolic complications [14–17].

Our analysis showed that cardiac complications are a significant problem in these patients. Transient abnormalities were identified by echocardiography in 60% of patients. A high proportion of cardiac complications in our study population compared to Japanese data may be explained by a small patient sample [17, 18]. As Kawasaki disease is common in the Japanese population, physicians are very experienced in diagnosing this disease. In Poland, due to a self-limiting nature of the disease, some less affected patients may not be diagnosed properly. On the other hand, the presence of coronary artery lesions strongly suggests Kawasaki disease. Thus, the diagnosis is easier in patients with a complicated course. To date, only few studies were published on Kawasaki disease in the Polish population [5–7]. In the 2013 study by Berdej-Szczot et al. [6], coronary artery involvement was identified in 10 (26%) of 38 patients but treatment was initiated beyond 10 days in most patients [6]. In our study group, we noted non-coronary changes such as mitral or aortic regurgitation already in the acute disease phase. However, we were not able to ascertain whether these changes developed

during Kawasaki disease or were present earlier as none of these children received previous cardiac care. In a multicentre study of 199 children with Kawasaki disease, Printz et al. [19] noted mitral regurgitation at the time of the diagnosis in 27% of patients. They also showed that these lesions were associated with the occurrence of coronary artery aneurysms and suggested a common inflammatory underlying mechanism.

Literature data indicate that coronary artery aneurysms develop in 25–30% of untreated patients and in 5% of patients treated according to the guidelines [1]. The most important established factor protecting from complications is an early initiation of immunoglobulin treatment before 7 and 10 days after the symptom onset [10, 14, 20, 21]. At 1 year, complications (i.e., aneurysms) were found in 3 (10%) children including 2 (7.7% of the overall study population) who were administered immunoglobulins before 7 and 10 days. Overall, coronary artery aneurysms developed in 4 patients, including 75% treated with immunoglobulins by 10 days. Among patients without coronary artery aneurysms, immunoglobulin treatment by 10 days was administered in 21 of 26 (81%) patients. These differences were not significant but definite conclusions cannot be drawn due to a very small number of patients with aneurysms. However, no effect of early immunoglobulin administration on the reduction of the aneurysm risk was shown. Of note, 50% of patients with aneurysms required repeated immunoglobulin administration due to recurrent fever, which was not observed among those without aneurysms.

Established adverse prognostic factors include age below 12 months or above 9 years, erythrocyte sedimentation rate (ESR) > 40 mm/h, male gender, and low platelet count at the time of the diagnosis [10, 21]. Due to a small study sample, we were unable to evaluate the prognostic value of specific parameters. Male gender was an adverse prognostic factor in the analysed group of patients with aneurysms. In the patient who was febrile for the longest duration of time, the diagnosis of pneumonia and outpatient treatment followed by admission to a community hospital might have contributed to a delayed diagnosis and treatment initiation only at 26 days after the symptom onset. Attributing fever to pulmonary changes may significantly delay the diagnosis

The mean age in our study group was slightly higher compared to other reports [4]. However, the proportion of children < 5 years of age was similar to reported in other studies [5, 6]. According to the literature data, as many as 73% of Kawasaki disease cases are diagnosed in children < 5 years of age, most commonly in those aged 6–24 months [6, 8]. The disease is significantly more common in boys and a marked male preponderance was also seen in our study group. Similarly to the study by Berdej-Szczot et al. [6], we found no seasonal variation of the disease incidence. Clearly, further multicentre analyses are required to explain this phenomenon, which is quite uncommon for Kawasaki disease [9, 18].

Outpatient oral antibiotic therapy was administered before admission in 26 (96%) children which made microbiological testing significantly more difficult. Associated leukocyturia may suggest a urinary tract infection, and a negative culture result during antibiotic therapy is difficult to interpret.

Parenteral antibiotic therapy was administered in all children in our study group. Kawasaki disease should be included in the differential diagnosis if fever does not resolve despite antibiotic therapy. While typical streptococcal angina is characterised by a significant clinical improvement following initiation of antibiotic therapy, fever may persist despite treatment in infectious mononucleosis. In such cases, investigations should include serological testing.

Elevated inflammatory markers such as CRP level and ESR are typical in the acute phase of Kawasaki disease [1, 22] but occur also in bacterial and viral infection. Procalcitonin is a more specific marker of bacterial infections. Studies showed that an elevated procalcitonin level suggests bacterial aetiology of an infection and guides evaluation of its severity, while low procalcitonin levels suggest a non-bacterial aetiology. Procalcitonin is a useful early diagnostic test for sepsis in critically ill patients.

Few studies evaluated procalcitonin level in patients with Kawasaki disease [23]. In our study group, elevated procalcitonin level in the acute phase of the disease was found in 81% of patients, and levels typical for a systemic infection were found in 44% of patients. As procalcitonin was not measured in all patients, we were unable to evaluate an association between procalcitonin level and the risk of cardiac complications.

A limitation of our study was a low number of patients with aneurysms.

CONCLUSIONS

1. Our findings suggest that Kawasaki disease should be considered in the differential diagnosis of children with prolonged fever.
2. During the acute stage of the disease, children with Kawasaki disease require regular cardiac evaluation, and long-term care is needed when cardiovascular complications occur.
3. A central case reporting system to monitor all cases of Kawasaki disease in the Polish paediatric population should be introduced.

Conflict of interest: *none declared*

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Powikłania kardiologiczne choroby Kawasaki u dzieci — doświadczenia własne

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Streszczenie

Wstęp: Choroba Kawasaki jest zapaleniem małych i średnich naczyń występującym u dzieci. Obecnie stanowi najczęstszą przyczynę nabytych chorób serca u dzieci w krajach rozwiniętych. Częstość występowania choroby Kawasaki wynosi od 180 przypadków w Japonii, poprzez 20 w Stanach Zjednoczonych, do 5–8 w krajach europejskich na 100 000 dzieci młodszych niż 5 lat.

Cel: Celem pracy była analiza występowania tętniaków tętnic wieńcowych jako powikłania choroby Kawasaki u hospitalizowanych dzieci.

Metody: Dokonano retrospektywnej analizy dokumentacji medycznej pacjentów hospitalizowanych w Specjalistycznym Zespole Opieki Zdrowotnej nad Matką i Dzieckiem w Poznaniu w latach 2008–2014 z diagnozą choroby Kawasaki, którą stawiano zgodnie z kryteriami *American Heart Association*.

Wyniki: Badana grupa obejmowała 30 pacjentów: 25 chłopców i 5 dziewczynek. Średnia wieku wyniosła 49 miesięcy, 21 (70%) dzieci było w wieku poniżej 5 lat. U wszystkich pacjentów stwierdzano zmiany w obrębie śluzówek jamy ustnej. Spośród opisywanych w literaturze nieprawidłowości w badaniach laboratoryjnych najrzadziej obserwowano leukocytozę. Zmiany w badaniu echokardiograficznym stwierdzono u 18 (60%) pacjentów, tętniaki u 4 (13.3%), poszerzenie tętnic wieńcowych u 6 dzieci, zapalenie osierdzia u 6, niedomykalność zastawki mitralnej u 3, niedomykalność zastawki aortalnej u 2 pacjentów. U 5 dzieci zanotowano więcej niż 1 nieprawidłowość w badaniu echokardiograficznym. W ciągu 12-miesięcznej obserwacji poszerzenie tętnic wieńcowych ustąpiło u 5 pacjentów, a u 1 dziecka rozwinął się tętniak.

Wnioski: Wyniki pracy wskazują na konieczność uwzględnienia choroby Kawasaki w diagnostyce różnicowej dzieci z przedłużającą się gorączką. 1. Dzieci z chorobą Kawasaki w pierwszych tygodniach od ustalenia rozpoznania wymagają regularnych kontroli kardiologicznych, a w przypadku wystąpienia powikłań sercowo-naczyniowych długotrwałej opieki kardiologicznej. 2. W celu poznania pełnego obrazu choroby Kawasaki w populacji polskich dzieci konieczne jest prowadzenie centralnego systemu raportowania o wszystkich przypadkach choroby Kawasaki.

Słowa kluczowe: choroba Kawasaki, tętniaki naczyń wieńcowych, gorączka

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