

# World Journal of *Clinical Cases*

*World J Clin Cases* 2022 October 6; 10(28): 9970-10390



## Contents

Thrice Monthly Volume 10 Number 28 October 6, 2022

## REVIEW

- 9970 COVID-19 and the heart

*Xanthopoulos A, Bourazana A, Giamouzis G, Skoularigki E, Dimos A, Zagouras A, Papamichalis M, Leventis I, Magouliotis DE, Triposkiadis F, Skoularigis J*

- 9985 Role of short chain fatty acids in gut health and possible therapeutic approaches in inflammatory bowel diseases

*Caetano MAF, Castelucci P*

## MINIREVIEWS

- 10004 Review of the pharmacological effects of astragaloside IV and its autophagic mechanism in association with inflammation

*Yang Y, Hong M, Lian WW, Chen Z*

## ORIGINAL ARTICLE

## Clinical and Translational Research

- 10017 Effects of targeted-edited oncogenic insulin-like growth factor-1 receptor with specific-sgRNA on biological behaviors of HepG2 cells

*Yao M, Cai Y, Wu ZJ, Zhou P, Sai WL, Wang DF, Wang L, Yao DF*

## Retrospective Study

- 10031 Analysis of the successful clinical treatment of 140 patients with parathyroid adenoma: A retrospective study

*Peng ZX, Qin Y, Bai J, Yin JS, Wei BJ*

- 10042 Efficacy of digital breast tomosynthesis combined with magnetic resonance imaging in the diagnosis of early breast cancer

*Ren Y, Zhang J, Zhang JD, Xu JZ*

- 10053 Prevention and management of adverse events following COVID-19 vaccination using traditional Korean medicine: An online survey of public health doctors

*Kang B, Chu H, Youn BY, Leem J*

- 10066 Clinical outcomes of targeted therapies in elderly patients aged
- $\geq 80$
- years with metastatic colorectal cancer

*Jang HR, Lee HY, Song SY, Lim KH*

- 10077 Endovascular treatment vs drug therapy alone in patients with mild ischemic stroke and large infarct cores

*Kou WH, Wang XQ, Yang JS, Qiao N, Nie XH, Yu AM, Song AX, Xue Q*

**Clinical Trials Study**

- 10085** One hundred and ninety-two weeks treatment of entecavir maleate for Chinese chronic hepatitis B predominantly genotyped B or C

*Xu JH, Wang S, Zhang DZ, Yu YY, Si CW, Zeng Z, Xu ZN, Li J, Mao Q, Tang H, Sheng JF, Chen XY, Ning Q, Shi GF, Xie Q, Zhang XQ, Dai J*

**Observational Study**

- 10097** Dementia-related contact experience, attitudes, and the level of knowledge in medical vocational college students

*Liu DM, Yan L, Wang L, Lin HH, Jiang XY*

**SYSTEMATIC REVIEWS**

- 10109** Link between COVID-19 vaccines and myocardial infarction

*Zafar U, Zafar H, Ahmed MS, Khattak M*

**CASE REPORT**

- 10120** Successful treatment of disseminated nocardiosis diagnosed by metagenomic next-generation sequencing: A case report and review of literature

*Li T, Chen YX, Lin JJ, Lin WX, Zhang WZ, Dong HM, Cai SX, Meng Y*

- 10130** Multiple primary malignancies – hepatocellular carcinoma combined with splenic lymphoma: A case report

*Wu FZ, Chen XX, Chen WY, Wu QH, Mao JT, Zhao ZW*

- 10136** Metastatic multifocal melanoma of multiple organ systems: A case report

*Maksimaityte V, Reivytyte R, Milaknyte G, Mickys U, Razanskiene G, Stundys D, Kazenaite E, Valantinas J, Stundiene I*

- 10146** Cavernous hemangioma of the ileum in a young man: A case report and review of literature

*Yao L, Li LW, Yu B, Meng XD, Liu SQ, Xie LH, Wei RF, Liang J, Ruan HQ, Zou J, Huang JA*

- 10155** Successful management of a breastfeeding mother with severe eczema of the nipple beginning from puberty: A case report

*Li R, Zhang LX, Tian C, Ma LK, Li Y*

- 10162** Short benign ileocolonic anastomotic strictures - management with bi-flanged metal stents: Six case reports and review of literature

*Kasapidis P, Mavrogenis G, Mandrekas D, Bazerbachi F*

- 10172** Simultaneous bilateral floating knee: A case report

*Wu CM, Liao HE, Lan SJ*

- 10180** Chemotherapy, transarterial chemoembolization, and nephrectomy combined treated one giant renal cell carcinoma (T3aN1M1) associated with Xp11.2/TFE3: A case report

*Wang P, Zhang X, Shao SH, Wu F, Du FZ, Zhang JF, Zuo ZW, Jiang R*

- 10186** Tislelizumab-related enteritis successfully treated with adalimumab: A case report

*Chen N, Qian MJ, Zhang RH, Gao QQ, He CC, Yao YK, Zhou JY, Zhou H*

- 10193** Treatment of refractory/relapsed extranodal NK/T cell lymphoma with decitabine plus anti-PD-1: A case report  
*Li LJ, Zhang JY*
- 10201** Clinical analysis of pipeline dredging agent poisoning: A case report  
*Li YQ, Yu GC, Shi LK, Zhao LW, Wen ZX, Kan BT, Jian XD*
- 10208** Follicular lymphoma with cardiac involvement in a 90-year-old patient: A case report  
*Sun YX, Wang J, Zhu JH, Yuan W, Wu L*
- 10214** Twin reversed arterial perfusion sequence-a rare and dangerous complication form of monochorionic twins: A case report  
*Anh ND, Thu Ha NT, Sim NT, Toan NK, Thuong PTH, Duc NM*
- 10220** Potential otogenic complications caused by cholesteatoma of the contralateral ear in patients with otogenic abscess secondary to middle ear cholesteatoma of one ear: A case report  
*Zhang L, Niu X, Zhang K, He T, Sun Y*
- 10227** Myeloid sarcoma with ulnar nerve entrapment: A case report  
*Li DP, Liu CZ, Jeremy M, Li X, Wang JC, Nath Varma S, Gai TT, Tian WQ, Zou Q, Wei YM, Wang HY, Long CJ, Zhou Y*
- 10236** Alpha-fetoprotein-producing hepatoid adenocarcinoma of the lung responsive to sorafenib after multiline treatment: A case report  
*Xu SZ, Zhang XC, Jiang Q, Chen M, He MY, Shen P*
- 10244** Acute mesenteric ischemia due to percutaneous coronary intervention: A case report  
*Ding P, Zhou Y, Long KL, Zhang S, Gao PY*
- 10252** Persistent diarrhea with petechial rash - unusual pattern of light chain amyloidosis deposition on skin and gastrointestinal biopsies: A case report  
*Bilton SE, Shah N, Dougherty D, Simpson S, Holliday A, Sahebjam F, Grider DJ*
- 10260** Solitary splenic tuberculosis: A case report  
*Guo HW, Liu XQ, Cheng YL*
- 10266** Coronary artery aneurysms caused by Kawasaki disease in an adult: A case report and literature review  
*He Y, Ji H, Xie JC, Zhou L*
- 10273** Double filtration plasmapheresis for pregnancy with hyperlipidemia in glycogen storage disease type Ia: A case report  
*Wang J, Zhao Y, Chang P, Liu B, Yao R*
- 10279** Treatment of primary tracheal schwannoma with endoscopic resection: A case report  
*Shen YS, Tian XD, Pan Y, Li H*
- 10286** Concrescence of maxillary second molar and impacted third molar: A case report  
*Su J, Shao LM, Wang LC, He LJ, Pu YL, Li YB, Zhang WY*

- 10293** Rare leptin in non-alcoholic fatty liver cirrhosis: A case report  
*Nong YB, Huang HN, Huang JJ, Du YQ, Song WX, Mao DW, Zhong YX, Zhu RH, Xiao XY, Zhong RX*
- 10301** One-stage resection of four genotypes of bilateral multiple primary lung adenocarcinoma: A case report  
*Zhang DY, Liu J, Zhang Y, Ye JY, Hu S, Zhang WX, Yu DL, Wei YP*
- 10310** Ectopic pregnancy and failed oocyte retrieval during *in vitro* fertilization stimulation: Two case reports  
*Zhou WJ, Xu BF, Niu ZH*
- 10317** Malignant peritoneal mesothelioma with massive ascites as the first symptom: A case report  
*Huang X, Hong Y, Xie SY, Liao HL, Huang HM, Liu JH, Long WJ*
- 10326** Subperiosteal orbital hematoma concomitant with abscess in a patient with sinusitis: A case report  
*Hu XH, Zhang C, Dong YK, Cong TC*
- 10332** Postpartum posterior reversible encephalopathy syndrome secondary to preeclampsia and cerebrospinal fluid leakage: A case report and literature review  
*Wang Y, Zhang Q*
- 10339** Sudden extramedullary and extranodal Philadelphia-positive anaplastic large-cell lymphoma transformation during imatinib treatment for CML: A case report  
*Wu Q, Kang Y, Xu J, Ye WC, Li ZJ, He WF, Song Y, Wang QM, Tang AP, Zhou T*
- 10346** Relationship of familial cytochrome P450 4V2 gene mutation with liver cirrhosis: A case report and review of the literature  
*Jiang JL, Qian JF, Xiao DH, Liu X, Zhu F, Wang J, Xing ZX, Xu DL, Xue Y, He YH*
- 10358** COVID-19-associated disseminated mucormycosis: An autopsy case report  
*Kyuno D, Kubo T, Tsujiwaki M, Sugita S, Hosaka M, Ito H, Harada K, Takasawa A, Kubota Y, Takasawa K, Ono Y, Magara K, Narimatsu E, Hasegawa T, Osanai M*
- 10366** Thalidomide combined with endoscopy in the treatment of Cronkhite-Canada syndrome: A case report  
*Rong JM, Shi ML, Niu JK, Luo J, Miao YL*
- 10375** Thoracolumbar surgery for degenerative spine diseases complicated with tethered cord syndrome: A case report  
*Wang YT, Mu GZ, Sun HL*

**LETTER TO THE EDITOR**

- 10384** Are pregnancy-associated hypertensive disorders so sweet?  
*Thomopoulos C, Ilias I*
- 10387** Tumor invasion front in oral squamous cell carcinoma  
*Cuevas-González JC, Cuevas-González MV, Espinosa-Cristobal LF, Donohue Cornejo A*

**ABOUT COVER**

Editorial Board Member of *World Journal of Clinical Cases*, Kaleem Ullah, FCPS, MBBS, Assistant Professor, Solid Organ Transplantation and Hepatobiliary Surgery, Pir Abdul Qadir Shah Jeelani Institute of Medical Sciences, Gambat 66070, Sindh, Pakistan. drkaleempk@gmail.com

**AIMS AND SCOPE**

The primary aim of *World Journal of Clinical Cases* (WJCC, *World J Clin Cases*) is to provide scholars and readers from various fields of clinical medicine with a platform to publish high-quality clinical research articles and communicate their research findings online.

WJCC mainly publishes articles reporting research results and findings obtained in the field of clinical medicine and covering a wide range of topics, including case control studies, retrospective cohort studies, retrospective studies, clinical trials studies, observational studies, prospective studies, randomized controlled trials, randomized clinical trials, systematic reviews, meta-analysis, and case reports.

**INDEXING/ABSTRACTING**

The WJCC is now abstracted and indexed in Science Citation Index Expanded (SCIE, also known as SciSearch®), Journal Citation Reports/Science Edition, Current Contents®/Clinical Medicine, PubMed, PubMed Central, Scopus, Reference Citation Analysis, China National Knowledge Infrastructure, China Science and Technology Journal Database, and Superstar Journals Database. The 2022 Edition of Journal Citation Reports® cites the 2021 impact factor (IF) for WJCC as 1.534; IF without journal self cites: 1.491; 5-year IF: 1.599; Journal Citation Indicator: 0.28; Ranking: 135 among 172 journals in medicine, general and internal; and Quartile category: Q4. The WJCC's CiteScore for 2021 is 1.2 and Scopus CiteScore rank 2021: General Medicine is 443/826.

**RESPONSIBLE EDITORS FOR THIS ISSUE**

Production Editor: *Xu Guo*; Production Department Director: *Xiang Li*; Editorial Office Director: *Jin-Lei Wang*.

**NAME OF JOURNAL**

*World Journal of Clinical Cases*

**ISSN**

ISSN 2307-8960 (online)

**LAUNCH DATE**

April 16, 2013

**FREQUENCY**

Thrice Monthly

**EDITORS-IN-CHIEF**

Bao-Gan Peng, Jerzy Tadeusz Chudek, George Kontogeorgos, Maurizio Serati, Ja Hyeon Ku

**EDITORIAL BOARD MEMBERS**

<https://www.wjgnet.com/2307-8960/editorialboard.htm>

**PUBLICATION DATE**

October 6, 2022

**COPYRIGHT**

© 2022 Baishideng Publishing Group Inc

**INSTRUCTIONS TO AUTHORS**

<https://www.wjgnet.com/bpg/gerinfo/204>

**GUIDELINES FOR ETHICS DOCUMENTS**

<https://www.wjgnet.com/bpg/GerInfo/287>

**GUIDELINES FOR NON-NATIVE SPEAKERS OF ENGLISH**

<https://www.wjgnet.com/bpg/gerinfo/240>

**PUBLICATION ETHICS**

<https://www.wjgnet.com/bpg/GerInfo/288>

**PUBLICATION MISCONDUCT**

<https://www.wjgnet.com/bpg/gerinfo/208>

**ARTICLE PROCESSING CHARGE**

<https://www.wjgnet.com/bpg/gerinfo/242>

**STEPS FOR SUBMITTING MANUSCRIPTS**

<https://www.wjgnet.com/bpg/GerInfo/239>

**ONLINE SUBMISSION**

<https://www.f6publishing.com>



## Coronary artery aneurysms caused by Kawasaki disease in an adult: A case report and literature review

Ying He, Hao Ji, Jian-Chang Xie, Liang Zhou

**Specialty type:** Cardiac and cardiovascular systems

**Provenance and peer review:** Unsolicited article; Externally peer reviewed.

**Peer-review model:** Single blind

**Peer-review report's scientific quality classification**

Grade A (Excellent): 0  
Grade B (Very good): B, B  
Grade C (Good): 0  
Grade D (Fair): 0  
Grade E (Poor): 0

**P-Reviewer:** Dauey K, Kazakhstan; Moretti A, Italy

**Received:** May 3, 2022

**Peer-review started:** May 3, 2022

**First decision:** June 7, 2022

**Revised:** June 13, 2022

**Accepted:** August 25, 2022

**Article in press:** August 25, 2022

**Published online:** October 6, 2022



**Ying He, Hao Ji,** The Fourth School of Clinical Medicine, Zhejiang Chinese Medical University, Hangzhou 310053, Zhejiang Province, China

**Jian-Chang Xie, Liang Zhou,** Department of Cardiology, Hangzhou First People's Hospital Affiliated to Zhejiang University School of Medicine, Hangzhou 310006, Zhejiang Province, China

**Corresponding author:** Liang Zhou, MM, Chief Physician, Department of Cardiology, Hangzhou First People's Hospital Affiliated to Zhejiang University School of Medicine, No. 261 Huansha Road, Shangcheng District, Hangzhou 310006, Zhejiang Province, China. [zl\\_hzsy@163.com](mailto:zl_hzsy@163.com)

### Abstract

#### BACKGROUND

Kawasaki disease (KD) is a self-limiting febrile illness and an acute vasculitis with an unknown origin. It predominantly affects children aged < 5 years. KD is the common cause of acquired heart disease in children. We here report a case of KD in an asymptomatic young female patient diagnosed with multiple coronary aneurysms with calcification.

#### CASE SUMMARY

A 29-year-old female patient admitted to Hangzhou First People's Hospital with coronary artery abnormality identified for 1 wk. The patient was asymptomatic; however, chest computed tomography occasionally revealed strip-like dense shadows in the coronal sulcus. After coronary angiography and Doppler echocardiography, the final diagnosis was coronary artery aneurysms (CAAs) caused by KD. Although the patient was asymptomatic with no history of KD in childhood, the definitive diagnosis was CAAs caused by KD. The patient was administered anticoagulant, and surgical treatment was recommended.

#### CONCLUSION

KD potentially causes CAAs in 25% of untreated cases, primarily occurring in the proximal portions of the coronary arteries.

**Key Words:** Kawasaki disease; Coronary artery aneurysms; Coronary vasculitis; Coronary angiography; Case report

©The Author(s) 2022. Published by Baishideng Publishing Group Inc. All rights reserved.

**Core Tip:** Kawasaki disease (KD) is the self-limited febrile illness and predominantly affects children < 5 years of age. Here, we report a case of KD in a young girl with coronary artery aneurysms, but with no symptoms. Coronary artery aneurysms occur primarily in the proximal portions of the major coronary arteries in KD, which may result in myocardial infarction. Patients should be diagnosed and treated immediately to obtain a favorable prognosis.

**Citation:** He Y, Ji H, Xie JC, Zhou L. Coronary artery aneurysms caused by Kawasaki disease in an adult: A case report and literature review. *World J Clin Cases* 2022; 10(28): 10266-10272

**URL:** <https://www.wjgnet.com/2307-8960/full/v10/i28/10266.htm>

**DOI:** <https://dx.doi.org/10.12998/wjcc.v10.i28.10266>

## INTRODUCTION

Kawasaki disease (KD) is an acute vasculitis with an unknown cause and predominantly affects children under five years[1]. More than 60 countries have reported cases of KD. Notably, KD has a significant ethnic variation. For instance, Asian/Pacific Islanders have the highest incidence of 29.8 in 100000 children under five years. Nevertheless, the incidence in white children is only 13.7 in 100000[2].

Moreover, according to a 2015 Japanese KD survey, the incidence rate of KD was 330.2 in 100000 children[3,4]. Typical clinical features of KD include fever persistence for five days or more, bilateral conjunctival congestion, changes in lips and oral cavity, polymorphous exanthema, the changes of peripheral extremities, as well as acute non-purulent cervical lymphadenopathy[5]. In the acute phase, erythema and edema manifest in the hands, whereas feet and periungual desquamation was remarkable [1]. Nonetheless, patients diagnosed in adulthood are asymptomatic with no history of KD in childhood. They instead present coronary disease without other findings. Coronary artery aneurysms (CAAs) are another KD complication, mostly occurring in the proximal coronary artery. Most KD patients with CAAs are symptomatic. We here report a rare case of KD in an asymptomatic young female with CAAs, and discuss the diagnosis and treatment of KD.

## CASE PRESENTATION

### Chief complaints

A 29-year-old female patient was admitted to our hospital on April 3, 2019, due to the presence of coronary artery abnormality for one week.

### History of present illness

When the patient had a medical check-up one week earlier, a computed tomography (CT) scan of the lungs revealed postoperative cardiac changes. The patient had no obvious discomfort. One day earlier, at the outpatient department of Hangzhou First People's Hospital, echocardiography was performed, and showed coronary artery changes associated with KD. The patient was hospitalized at the Department of Cardiology for further diagnosis and treatment.

### History of past illness

The patient reported no history of KD hypertension, diabetes, coronary heart disease, and neurodevelopmental disorders, no history of surgery, and no family history of related genetic disorders.

### Personal and family history

The patient had no relevant personal and family history.

### Physical examination

On examination, the patient had a temperature of 36.7°C, blood pressure of 131/70 mmHg (1 mmHg = 0.133 kPa), and heart rate of 73 beats/min. The heart rhythm was regular, the heart boundary was not enlarged, and there were no murmurs in each valve area. The whole abdomen was flat without rebound tenderness. Also, no edema was observed in both lower limbs.

### Laboratory examinations

Blood routine examination, and liver function, kidney function, coagulation function and autoantibody tests were normal.



### Imaging examinations

A CT scan of the lungs showed occasional strip-like dense shadows at the coronal sulcus. An electrocardiogram showed sinus arrhythmia and wandering heart rate in the sinoatrial node. Exercise treadmill test showed negative outcomes. To further establish the cause of coronary artery abnormality, the patient underwent Doppler echocardiography and coronary artery computed tomography angiography (CTA). Irregular widening and enhanced wall echo at the beginning of the coronary artery, and multiple CAAs with thrombogenesis were observed (Figure 1). The cause of coronary artery ectasia remained to be determined, and coronary artery changes were associated with KD. And then, CAG revealed CAAs in multiple branches of coronary arteries with thrombosis and calcification (Figure 2). Coronary artery ectasia was observed at the extremity of left main coronary artery. The vessels in the descending proximal left anterior were tortuous with thrombus. The distal vessels were in the myocardial bridge. Moreover, two hemangiomas were observed at the extremity of the left circumflex artery with calcification. In addition, a huge coronary artery aneurysm was in a proximal segment of the right coronary artery with an organized thrombus. The vascular wall was calcified with curved residual blood vessels. There was arteriosclerosis in the distal vessels, narrowing by 30%-40%.

### FINAL DIAGNOSIS

The final diagnosis was CAAs caused by KD based on coronary angiography and other examinations.

### TREATMENT

The patient was administered 0.1 g acetylsalicylic acid (ASA) and 75 mg Clopidogrel Hydrogen Sulphate Tablets daily to resist platelets. The patient was also administered Metoprolol Succinate Sustained-release Tablets to control ventricular rate. Further surgical treatment was recommended. However, the patient refused it. Post-discharge medication was adjusted to Rivaroxaban and Metoprolol Succinate Sustained-release Tablets.

### OUTCOME AND FOLLOW-UP

The patient was followed up for nearly three years. The patient was effectively improved without apparent discomfort. Doppler echocardiography was performed one year after discharge. The inner diameter of the left main coronary artery was 0.4 cm; the inner diameter of the aneurysm near the cross of vessels was 1.0 cm; the inner diameter of the right coronary artery was 0.56 cm (Figure 3). We found no significant changes in coronary arteries with an ejection fraction (EF) value of 0.69. Doppler echocardiography two years after discharge showed no significant changes in coronary arteries with an EF value of 0.64.

### DISCUSSION

KD is an acute vasculitis with unknown origin and predominantly affects children under five years, resulting in multi-system inflammatory syndrome[1]. It is also known as mucocutaneous lymph node syndrome. KD may be caused by pathogen infection, vaccination, environmental factors, inherited genetic susceptibility, and immune response[6]. The pathological vascular changes of KD are subdivided into three processes[7]. In the early stages of KD, coronary arteries undergo mixed inflammatory cell infiltration. The second is the primary stage of coronary artery injury and aneurysm formation. Fibrosis of blood vessels and myocardium is the third and final stage of coronary artery disease[6]. Over 60 countries have reported cases of KD. Typical clinical features include fever which persists for five days or more, bilateral conjunctival congestion, changes in lips and oral cavity, polymorphous exanthema, changes in peripheral extremities, and acute non-purulent cervical lymphadenopathy[5]. Table 1 shows a review of Clinical Characteristics, Management, and Outcome of Coronary Artery Aneurysm (CAAs) caused by KD; various symptoms were observed[8-20].

Nevertheless, a few patients are asymptomatic with no history of KD in childhood. We here report an asymptomatic 29-year-old female patient who had CAAs caused by KD. After carefully reviewing the coronary artery CTA and coronary angiography images, the cause of CAAs was KD. Therefore, attention should be paid to asymptomatic patients by conducting Doppler echocardiography and coronary angiography to confirm the KD diagnosis. CAAs caused by KD primarily occur in the proximal coronary artery. The diagnostic tests include Doppler echocardiography, magnetic resonance angiography, coronary artery CTA, and coronary arteriography. KD diagnostic indicators include a

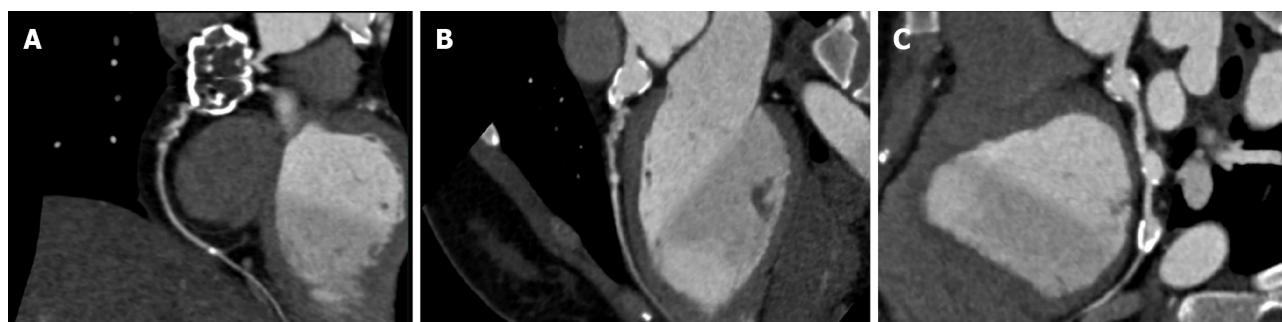
**Table 1 Review of clinical characteristics, management, and outcome of coronary artery aneurysm caused by Kawasaki Disease in the case report**

Ref.	Age (yr)	Sex	Indication	Sites	Sizes	FU	Operation	Antithrombotic therapy	Adjuvant drug	Outcome
Hu <i>et al</i> [8], 2014	8	Male	Ruptured coronary aneurysm	LAD/RCA	3.7 mm/5.2 mm	12 d	NO	ASA	IVIG (2 g/kg), ramipril	Dead
Sato <i>et al</i> [9], 2014	35	Male	AMI	LAD	2.3 mm × 2.0 mm	9 yr	PCI	NO	NO	Stable
Matsushita <i>et al</i> [10], 2014	32	Male	AMI	LAD/RCA	NA	30 yr	PCI	ASA	NO	Stable
Ekici <i>et al</i> [11], 2014	4 mo	NA	MI	LAD/RCA	6.5 mm/6.7 mm	51 d	NO	ASA, LMWH	IVIG (2 g/kg), acetylsalicylic acid	Dead
Luu <i>et al</i> [12], 2015	17	Male	MI	LAD/LCX/RCA	NA	18 mo	PCI	ASA, clopidogrel	Bisoprolol, ramipril	Stable
Chong <i>et al</i> [13], 2018	9	Female	Severe respiratory failure	LAD	7 mm	8 mo	NO	ASA, Enoxaparin, warfarin	IVIG (2 g/kg)	Stable
Takai <i>et al</i> [14], 2019	3	Male	Fever	RCA	8.3 mm	3 mo	NO	ASA, ticlopidine, warfarin,	IVIG (2 g/kg), urinastatin, infliximab, enalapril	Stable
Tsuda <i>et al</i> [15], 2020	58	Female	Palpitate	LAD	NA	NA	Implantable defibrillator, Implantation, radiofrequency catheter ablation	ASA	Beta-blocker, verapamil	Stable
Chen <i>et al</i> [16], 2020	22	Male	AMI	LMCA	18 - 20 mm	2 mo	Heart transplant	Rivaroxaban, clopidogrel	Metoprolol, rosuvastatin, spironolactone	Stable
Fujioka <i>et al</i> [17], 2021	33	Female	Postpartum	RCA	25 mm	5 mo	Resection, CABG	ASA, ticlopidine hydrochloride	NA	Stable
Wang <i>et al</i> [18], 2021	5 mo	Male	Cerebral infarction	LAD/RCA	11 mm × 9 mm/19 mm × 14 mm	15 mo	NA	ASA, clopidogrel	IVIG (2 g/kg)	Dead
Almeshary <i>et al</i> [19], 2021	4 mo	NA	Fever	LMCA/LAD/RCA	4.6 mm/3.8 mm/4.2 mm	1 mo	NA	ASA	IVIG (2 g/kg)	Stable
Toyoshima <i>et al</i> [20], 2022	14	Female	AMI	LMCA/LAD	7.2 mm/4.0 mm	1 yr	CABG	warfarin, clopidogrel	Carvedilol, enalapril	Stable

AMI: Acute myocardial infarction; ASA: Aspirin; CABG: Coronary artery bypass graft; FU: Follow-up period; LAD: Left anterior descending artery; LCX: Left circumflex artery; LMCA: Left main coronary artery; LMWH: Lowmolecular-weight heparin; NA: Not available; RCA: Right coronary artery.

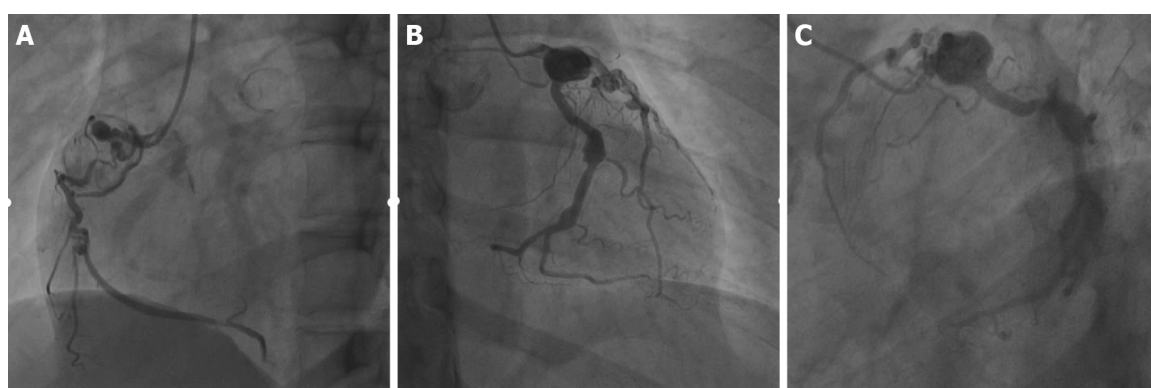
fever that persists for five days or more with at least 4 of the 5 principal clinical features[21]. These principal clinical features include bilateral conjunctival congestion, changes in lips and oral cavity, polymorphous exanthema, changes in peripheral extremities, and acute non-purulent cervical lymphadenopathy[5].

In addition, incomplete KD is evaluated in patients without complete clinical features of classic KD, and diagnosis is confirmed if coronary artery abnormalities are detected[21]. Thus, our patient conforms to the diagnosis of incomplete KD. Regular Doppler echocardiography is also important in the diagnosis. The coronary artery CTA and coronary arteriography show the location and extent of CAAs. We performed the coronary artery CTA and coronary arteriography and confirmed that KD caused CAAs. Noteworthy, CAAs and thrombus in the lumen are severe complications of KD. These complications result in myocardial infarction and ischemic heart disease. The diameter of CAAs greater than or equal to 5 mm has a higher risk of thrombosis[22]. The patient experienced no discomfort; however, CAAs had calcification and thrombosis.



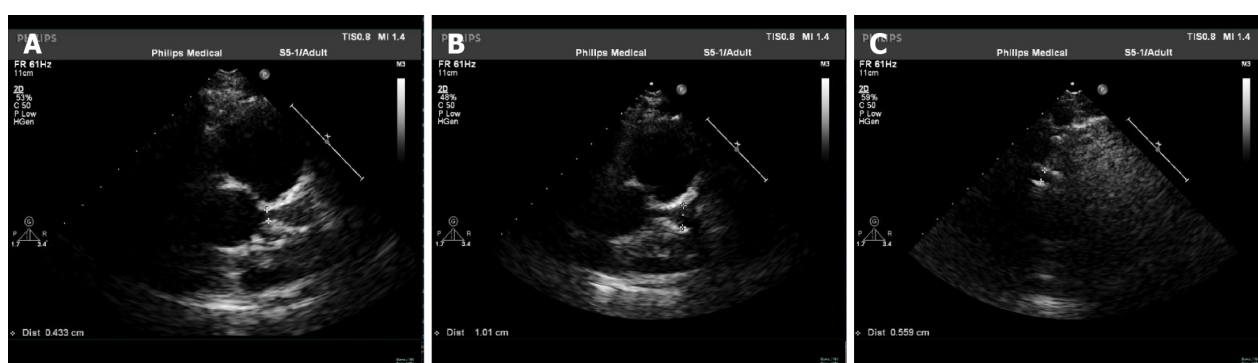
DOI: 10.12998/wjcc.v10.i28.10266 Copyright ©The Author(s) 2022.

**Figure 1** Coronary artery computed tomography angiography of the Kawasaki disease patient. A: Multiple coronary artery aneurysms, and multiple thrombi in the coronary artery ectasia of the proximal segment of the right coronary artery. B: The ectatic coronary artery were observed in the extremity of left main coronary artery. C: Two coronary artery aneurysms with vascular calcification were observed in the left circumflex artery.



DOI: 10.12998/wjcc.v10.i28.10266 Copyright ©The Author(s) 2022.

**Figure 2** Coronary angiography of the Kawasaki disease patient. A: Big coronary artery aneurysm was in a proximal segment of the right coronary artery with an organized thrombus; B: Two hemangiomas were observed at the extremity of the left circumflex artery with calcification; C: The vessels in the descending proximal left anterior were tortuous with thrombus, and the distal vessels were in the myocardial bridge.



DOI: 10.12998/wjcc.v10.i28.10266 Copyright ©The Author(s) 2022.

**Figure 3** Doppler echocardiography of the Kawasaki disease patient. A: The inner diameter of the left main coronary artery was 0.4 cm; B: The inner diameter of the aneurysm near the cross of vessels was 1.0 cm; C: The inner diameter of the right coronary artery was 0.56 cm.

Primary therapy includes intravenous immunoglobulin (IVIG) and ASA. The refractory cases require corticosteroids, tumor necrosis factor (TNF) inhibition, interleukin 1 inhibition, calcineurin inhibition, *etc*[1]. IVIG is most effective when used within 10 days of fever onset. Therefore, the risk of CAAs decreases from 20%-25% to 3%-5% in patients with appropriate treatment[23,24]. Additionally, ASA should be administered at a moderate dose (30-50 mg/kg/d)[25]. By early adjunctive corticosteroid therapy, patients with a higher risk of poor coronary outcomes can significantly benefit from corticosteroids[26,27]. TNF inhibitors, interleukin 1 inhibition, and calcineurin inhibition are uncommonly used. Primary prevention of thrombosis was fundamental in this patient. ASA and Clopidogrel Hydrogen Sulphate Tablets were administered to resist platelets. We adjusted post-discharge medication to

Rivaroxaban and Metoprolol Succinate Sustained-Release Tablet. Although this therapy did not yield a complete cure, it provided a reference for subsequent treatment strategies, i.e., heart bypass surgery.

In addition, the maximum Z score of proximal LCA or RCA (maximum Z of CA) can be used as an index for long-term follow-up to evaluate the ability of KD patients to achieve coronary perfusion during exercise[28]. Compared with normal children, KD children have a higher prevalence of epilepsy and Tourette's syndrome[29]. Other functional impairments have also been mentioned, such as facial paralysis, sensorineural hearing and visual loss, ataxia, and behavioral disorders[30].

## CONCLUSION

The most significant clinical outcome of KD is inflammation of the coronary arteries. KD can be classified into complete KD and incomplete KD. KD may lead to CAAs in 25% of untreated cases. CAAs occur primarily in the proximal portions of the major coronary arteries in KD, which further results in myocardial infarction. Patients should be diagnosed and treated immediately to obtain a favorable prognosis. More research attention should be paid to asymptomatic KD patients.

## FOOTNOTES

**Author contributions:** The main contributor is He Y; He Y wrote the manuscript; Ji H and Xie JC were the treating physicians and were responsible for revising the manuscript; Zhou L provided assistance during the diagnosis and treatment; Zhou L performed surgery, and Ji H helped analyze the imaging data; all authors read and endorsed the final draft.

**Supported by** Scientific Research Fund of Zhejiang Provincial Education Department, No. Y202145971.

**Informed consent statement:** Informed written consent was obtained from the patient for publication of this report and any accompanying images.

**Conflict-of-interest statement:** All the authors declare that they have no conflicts of interest.

**CARE Checklist (2016) statement:** The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

**Open-Access:** This article is an open-access article that was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution NonCommercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <https://creativecommons.org/licenses/by-nc/4.0/>

**Country/Territory of origin:** China

**ORCID number:** Liang Zhou 0000-0003-1996-3088.

**S-Editor:** Liu JH

**L-Editor:** Ma JY

**P-Editor:** Liu JH

## REFERENCES

- 1 Rife E, Gedalia A. Kawasaki Disease: an Update. *Curr Rheumatol Rep* 2020; **22**: 75 [PMID: 32924089 DOI: 10.1007/s11926-020-00941-4]
- 2 Holman RC, Shahriari A, Effler PV, Belay ED, Schonberger LB. Kawasaki syndrome hospitalizations among children in Hawaii and Connecticut. *Arch Pediatr Adolesc Med* 2000; **154**: 804-808 [PMID: 10922277 DOI: 10.1001/archpedi.154.8.804]
- 3 Makino N, Nakamura Y, Yashiro M, Kosami K, Matsubara Y, Ae R, Aoyama Y, Yanagawa H. Nationwide epidemiologic survey of Kawasaki disease in Japan, 2015-2016. *Pediatr Int* 2019; **61**: 397-403 [PMID: 30786118 DOI: 10.1111/ped.13809]
- 4 Makino N, Nakamura Y, Yashiro M, Ae R, Tsuboi S, Aoyama Y, Kojima T, Uehara R, Kotani K, Yanagawa H. Descriptive epidemiology of Kawasaki disease in Japan, 2011-2012: from the results of the 22nd nationwide survey. *J Epidemiol* 2015; **25**: 239-245 [PMID: 25716368 DOI: 10.2188/jea.20140089]
- 5 Haider KH, Alshoabi SA, Qurashi AA, Hamid AM. Incidentally discovered Kawasaki disease in an adult man. *Pak J Med Sci* 2021; **37**: 2032-2034 [PMID: 34912440 DOI: 10.12669/pjms.37.7.4199]
- 6 Yuan F, Li Y, Xiao X, Yinfei Z, Xiaohui Gong. Advances in etiology of kawasaki disease and injury mechanism of

- coronary artery, *Molecular Cardiology of China*, 2021; 21: 4365-4370 [DOI: [10.1016/j.ppedcard.2004.08.011](https://doi.org/10.1016/j.ppedcard.2004.08.011)]
- 7 **Takahashi K**, Oharaseki T, Yokouchi Y. Histopathological aspects of cardiovascular lesions in Kawasaki disease. *Int J Rheum Dis* 2018; **21**: 31-35 [PMID: [29105353](https://pubmed.ncbi.nlm.nih.gov/29105353/) DOI: [10.1111/1756-185X.13207](https://doi.org/10.1111/1756-185X.13207)]
- 8 **Hu P**, Wang J, Fan XC, Hu B, Lu L. Hypertension triggers the rupture of coronary artery aneurysm in an 8-year-old boy with Kawasaki disease. *J Clin Hypertens (Greenwich)* 2014; **16**: 766-767 [PMID: [25132100](https://pubmed.ncbi.nlm.nih.gov/25132100/) DOI: [10.1111/jch.12394](https://doi.org/10.1111/jch.12394)]
- 9 **Sato K**, Latib A, Costopoulos C, Panoulas VF, Naganuma T, Miyazaki T, Colombo A. A case of Kawasaki's disease with extensive calcifications needing rotational atherectomy with a 2.5mm burr. *Cardiovasc Revasc Med* 2014; **15**: 248-251 [PMID: [24565607](https://pubmed.ncbi.nlm.nih.gov/24565607/) DOI: [10.1016/j.carrev.2014.01.010](https://doi.org/10.1016/j.carrev.2014.01.010)]
- 10 **Matsushita K**, Tamura T, Nishiga M, Kaitani K, Izumi C, Nakagawa Y. Acute myocardial infarction and 30-year coronary aneurysm follow-up by serial angiography in a young adult with Kawasaki disease. *Cardiovasc Interv Ther* 2015; **30**: 142-146 [PMID: [24729026](https://pubmed.ncbi.nlm.nih.gov/24729026/) DOI: [10.1007/s12928-014-0262-8](https://doi.org/10.1007/s12928-014-0262-8)]
- 11 **Ekici F**, Varan B, Kocabaş A, Erdoğan İ, Eminoğlu S, Aktaş D. Multiple giant aneurysms and stenoses of the coronary and systemic arteries in an infant with kawasaki disease at the early stage of convalescent period. *Echocardiography* 2014; **31**: E147-E150 [PMID: [24528198](https://pubmed.ncbi.nlm.nih.gov/24528198/) DOI: [10.1111/echo.12535](https://doi.org/10.1111/echo.12535)]
- 12 **Luu B**, Esmaeili A, Schranz D, Fichtlscherer S. Bioresorbable Vascular Scaffold Implantation for Successful Treatment of a Symptomatic Coronary Lesion in a 17-Year-Old Boy After Kawasaki Disease. *Pediatr Cardiol* 2015; **36**: 1539-1541 [PMID: [26063383](https://pubmed.ncbi.nlm.nih.gov/26063383/) DOI: [10.1007/s00246-015-1215-4](https://doi.org/10.1007/s00246-015-1215-4)]
- 13 **Chong CH**, Lee SJ, Bullock A, Harris L, Loh R, Knight G, Rueter K. Kawasaki disease: An ongoing challenge. *J Paediatr Child Health* 2018; **54**: 323-326 [PMID: [29143467](https://pubmed.ncbi.nlm.nih.gov/29143467/) DOI: [10.1111/jpc.13751](https://doi.org/10.1111/jpc.13751)]
- 14 **Takai S**, Takasawa K, Doi S. Atypical coronary artery aneurysms due to Kawasaki disease in Noonan syndrome with a novel PTPN11 mutation. *Cardiol Young* 2019; **29**: 228-230 [PMID: [30511597](https://pubmed.ncbi.nlm.nih.gov/30511597/) DOI: [10.1017/S1047951118001877](https://doi.org/10.1017/S1047951118001877)]
- 15 **Tsuda E**, Noda T, Noguchi T. Two females with coronary artery occlusion caused by presumed Kawasaki disease would have delivered without recognition of ischaemic heart disease. *Cardiol Young* 2020; **30**: 785-789 [PMID: [32383412](https://pubmed.ncbi.nlm.nih.gov/32383412/) DOI: [10.1017/S1047951120001043](https://doi.org/10.1017/S1047951120001043)]
- 16 **Chen T**, Li J, Xu Q, Li X, Lv Q, Wu H. Antithrombotic Therapy of a Young Adult with Giant Left Main Coronary Artery Aneurysm. *Int Heart J* 2020; **61**: 601-605 [PMID: [32350203](https://pubmed.ncbi.nlm.nih.gov/32350203/) DOI: [10.1536/ihj.19-451](https://doi.org/10.1536/ihj.19-451)]
- 17 **Fujioka T**, Asakawa N, Suzuki T, Kobayashi J, Takahashi K, Tsuchiya K. Giant coronary artery aneurysm associated with Kawasaki disease showing progressive dilation over 30 years. *J Cardiol Cases* 2021; **23**: 281-284 [PMID: [34093908](https://pubmed.ncbi.nlm.nih.gov/34093908/) DOI: [10.1016/j.jccase.2021.01.011](https://doi.org/10.1016/j.jccase.2021.01.011)]
- 18 **Wang L**, Duan H, Zhou K, Hua Y, Liu X, Wang C. Kawasaki Disease Complicated by Late-Onset Fatal Cerebral Infarction: A Case Report and Literature Review. *Front Pediatr* 2021; **9**: 598867 [PMID: [34095019](https://pubmed.ncbi.nlm.nih.gov/34095019/) DOI: [10.3389/fped.2021.598867](https://doi.org/10.3389/fped.2021.598867)]
- 19 **Almeshary MZ**, Alanazi SA, Almoosa KM, Bassrawi RK. Kawasaki disease in an infant after administration of hexavalent vaccine. *Saudi Med J* 2021; **42**: 790-792 [PMID: [34187924](https://pubmed.ncbi.nlm.nih.gov/34187924/) DOI: [10.15537/smj.2021.42.7.20210061](https://doi.org/10.15537/smj.2021.42.7.20210061)]
- 20 **Toyoshima Y**, Tsuda E, Kato Y, Iwasa T, Sakaguchi H, Shimahara Y, Tabata S, Ikeda T, Shiraishi I, Kurosaki K. Coronary artery aneurysms of unknown origin in a 14-year-old girl. *J Cardiol Cases* 2022; **25**: 106-109 [PMID: [35079310](https://pubmed.ncbi.nlm.nih.gov/35079310/) DOI: [10.1016/j.jccase.2021.07.011](https://doi.org/10.1016/j.jccase.2021.07.011)]
- 21 Correction to: Diagnosis, Treatment, and Long-Term Management of Kawasaki Disease: A Scientific Statement for Health Professionals From the American Heart Association. *Circulation* 2019; **140**: e181-e184 [PMID: [31356128](https://pubmed.ncbi.nlm.nih.gov/31356128/) DOI: [10.1161/CIR.0000000000000703](https://doi.org/10.1161/CIR.0000000000000703)]
- 22 **Minich LL**, Tani LY, Pagotto LT, Young PC, Etheridge SP, Shaddy RE. Usefulness of echocardiography for detection of coronary artery thrombi in patients with Kawasaki disease. *Am J Cardiol* 1998; **82**: 1143-1146, A10 [PMID: [9817502](https://pubmed.ncbi.nlm.nih.gov/9817502/) DOI: [10.1016/s0002-9149\(98\)00577-3](https://doi.org/10.1016/s0002-9149(98)00577-3)]
- 23 **Wu MH**, Chen HC, Yeh SJ, Lin MT, Huang SC, Huang SK. Prevalence and the long-term coronary risks of patients with Kawasaki disease in a general population <40 years: a national database study. *Circ Cardiovasc Qual Outcomes* 2012; **5**: 566-570 [PMID: [22589296](https://pubmed.ncbi.nlm.nih.gov/22589296/) DOI: [10.1161/CIRCOUTCOMES.112.965194](https://doi.org/10.1161/CIRCOUTCOMES.112.965194)]
- 24 **Newburger JW**, Takahashi M, Burns JC, Beiser AS, Chung KJ, Duffy CE, Glode MP, Mason WH, Reddy V, Sanders SP. The treatment of Kawasaki syndrome with intravenous gamma globulin. *N Engl J Med* 1986; **315**: 341-347 [PMID: [2426590](https://pubmed.ncbi.nlm.nih.gov/2426590/) DOI: [10.1056/NEJM198608073150601](https://doi.org/10.1056/NEJM198608073150601)]
- 25 **Zheng X**, Yue P, Liu L, Tang C, Ma F, Zhang Y, Wang C, Duan H, Zhou K, Hua Y, Wu G, Li Y. Efficacy between low and high dose aspirin for the initial treatment of Kawasaki disease: Current evidence based on a meta-analysis. *PLoS One* 2019; **14**: e0217274 [PMID: [31117119](https://pubmed.ncbi.nlm.nih.gov/31117119/) DOI: [10.1371/journal.pone.0217274](https://doi.org/10.1371/journal.pone.0217274)]
- 26 **Wardle AJ**, Connolly GM, Seager MJ, Tulloh RM. Corticosteroids for the treatment of Kawasaki disease in children. *Cochrane Database Syst Rev* 2017; **1**: CD011188 [DOI: [10.1002/14651858.cd011188.pub2](https://doi.org/10.1002/14651858.cd011188.pub2)]
- 27 **Kimura M**, Harazaki M, Fukuoka T, Asakura I, Sakai H, Kamimaki T, Ohkawara I, Akiyama N, Tsurui S, Iwashima S, Shimomura M, Morishita H, Meguro T, Seto S. Targeted use of prednisolone with the second IVIG dose for refractory Kawasaki disease. *Pediatr Int* 2017; **59**: 397-403 [PMID: [27743415](https://pubmed.ncbi.nlm.nih.gov/27743415/) DOI: [10.1111/ped.13190](https://doi.org/10.1111/ped.13190)]
- 28 **Tuan SH**, Li MH, Hsu MJ, Tsai YJ, Chen YH, Liao TY, Lin KL. Cardiopulmonary Function, Exercise Capacity, and Echocardiography Finding of Pediatric Patients With Kawasaki Disease: An Observational Study. *Medicine (Baltimore)* 2016; **95**: e2444 [PMID: [26765431](https://pubmed.ncbi.nlm.nih.gov/26765431/) DOI: [10.1097/MD.0000000000002444](https://doi.org/10.1097/MD.0000000000002444)]
- 29 **Lin CH**, Lin WD, Chou IC, Lee IC, Hong SY. Heterogeneous neurodevelopmental disorders in children with Kawasaki disease: what is new today? *BMC Pediatr* 2019; **19**: 406 [PMID: [31684911](https://pubmed.ncbi.nlm.nih.gov/31684911/) DOI: [10.1186/s12887-019-1786-y](https://doi.org/10.1186/s12887-019-1786-y)]
- 30 **Moretti A**. Are TNF- $\alpha$  blockers effective and safe for Kawasaki disease in children? *Int J Rheum Dis* 2020; **23**: 1252-1254 [PMID: [32761848](https://pubmed.ncbi.nlm.nih.gov/32761848/) DOI: [10.1111/1756-185X.13884](https://doi.org/10.1111/1756-185X.13884)]





Published by **Baishideng Publishing Group Inc**  
7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA

**Telephone:** +1-925-3991568

**E-mail:** [bpgoffice@wjgnet.com](mailto:bpgoffice@wjgnet.com)

**Help Desk:** <https://www.f6publishing.com/helpdesk>

<https://www.wjgnet.com>

