Intestinal Involvement in Kawasaki Disease

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Objectives To describe a case of Kawasaki disease with intestinal involvement and to analyze other published reports to define clinical characteristics, diagnostic issues, and therapeutic approaches of gastrointestinal involvement in Kawasaki disease.

Study design A computerized search without language restriction was conducted using PubMed and SCOPUS. An article was considered eligible for inclusion in the systematic review if it reported data on patient(s) with intestinal involvement in Kawasaki disease. Our case was also included in the analysis.

Results Thirty-three articles reporting 48 cases of Kawasaki disease with intestinal involvement were considered. Fever, abdominal pain, and vomiting were the most frequent symptoms observed and typical Kawasaki disease signs and symptoms appeared after intestinal complaints in all cases. Plain radiographs, ultrasonography, and computed tomography showed pseudo-obstruction as the most frequent sign of gastrointestinal involvement; 25 patients underwent surgery. Cardiac involvement was documented in 21 cases. All but three patients received medical treatment with immunoglobulin intravenous or aspirin. The outcome was good in 28 patients; 7 patients showed persistence of coronary artery abnormalities; 1 patient developed cyanosis, and later, left hand and forefoot gangrene; 3 patients died.

Conclusions The diagnosis and treatment of Kawasaki disease might be delayed if intestinal symptoms appear before the characteristic clinical features of Kawasaki disease, thus, increasing the risk of cardiac complications. Furthermore, patients may undergo unnecessary invasive procedures. Pediatricians and pediatric surgeons, therefore, should consider Kawasaki disease among diagnoses in children with fever, abdominal symptoms, and radiologic findings of pseudo-obstruction. *(J Pediatr 2018;202:186-93).*

Kawasaki disease is a vasculitis of unknown origin of small and medium caliber blood vessels, especially involving coronary arteries. Coronary artery abnormalities (CAAs) occur approximately in 25% of untreated patients.[1]

In developed countries, Kawasaki disease represents the leading cause of acquired heart disease in childhood. It mainly affects children under 5 years of age and has a male:female of 1.5-1.7:1. Diagnosis is based on the presence of fever (lasting >5 days) and of 4 of the 5 classic diagnostic criteria (oropharyngeal changes, bilateral bulbar conjunctival injection without exudate, rash, change of the extremities, cervical lymphadenopathy ≥1.5 cm diameter). However, diagnosis can be made with incomplete features if fewer than 4 of the above-mentioned criteria are present.[1]

Severe intestinal involvement is a rare complication of Kawasaki disease, even if vomiting and diarrhea are frequently reported symptoms. Little is known collectively about the disease background, course, clinical characteristics, diagnostic issues, and short-/long-term therapeutic approaches in patients with intestinal involvement.

We report a case of Kawasaki disease with intestinal involvement and analyzed the medical literature to report the epidemiologic and clinical characteristics of cases of Kawasaki disease with intestinal involvement.

Methods

A computerized search was performed without language restriction using PubMed and Scopus, combining the terms "Kawasaki AND (intestinal or bowel)" with no filters. Furthermore, all references listed were hand-searched for other relevant articles, and a citation tracker was used to identify any other relevant literature. An article was considered eligible for inclusion if it reported cases with full clinical data consistent with intestinal involvement and Kawasaki disease diagnostic criteria. The following epidemiologic and clinical variables were evaluated for each case: sex, age, symptoms, cardiac and intestinal involvement, surgical procedures (laparotomy,

CAAs	Coronary artery abnormalities
CT	Computed tomography
IGIV	Immunoglobulin intravenous

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The authors declare no conflicts of interest.

https://doi.org10.1016/j.jpeds.2018.06.034

resection, colostomy), type of treatment, and outcome. Cardiac involvement was defined by the echocardiography-documented presence of pericardial effusion or CAAs or both. Obstruction and pseudo-obstruction characterized gastrointestinal involvement, with presence of abdominal pain or distension as well as the radiographic presence of dilated loops of bowel, gas and/or fluid level in the intestinal lumen, or wall stenosis. Outcome was considered good in patients responding to treatment and not presenting with sequelae.

Results

Our search retrieved 38 papers,[2-39] 5 of which were excluded from analysis because clinical and laboratory data were not complete.[35-39] Thirty-three articles reporting 48 cases of Kawasaki disease with intestinal involvement were included, dating from 1979 to 2017. Most articles are single case reports, two are case series of 310 and 219 children with Kawasaki disease, in which 7 and 10 cases with gastrointestinal involvement, respectively, were reported.[5,15] Data regarding the clinical and radiologic characteristics, therapy, and outcome of all patients (including the case from our clinical practice) are described in **Table I**. Clinical features are summarized in **Table II**. The mean age of the patients was 39.5 months (SD ±31,1) and median age was 36 months (IQR 3-54 months). In 10 cases, age was not available.

Fever, abdominal pain, and vomiting were the most frequently observed symptoms at Kawasaki disease onset in 40 (82%), 34 (69%), and 24 (49%) cases, respectively. Diarrhea and jaundice were present in 14 (29%) and 1 (2%) case, respectively. Other Kawasaki disease signs and symptoms always appeared after the intestinal ones, although in 14 cases (29%) Kawasaki disease diagnosis was incomplete because only abdominal symptoms were present. Plain radiograph, ultrasonography, and computed tomography (CT) showed pseudo-obstruction as the most frequent sign of gastrointestinal involvement (multiple dilated intestinal loops with multiple fluid and gas levels and/or concentric thickening of the intestinal wall) in 38 cases (77%).[2-6,8,9,12-17,19-23,27-33] However, pseudo-obstruction was accompanied by ischemic colitis in 1 case (2%),[4] hydrops of the gallbladder in 1 case (2%),[6] mesenteric and splenic ischemia[28] in 1 case (2%), hemorrhagic duodenitis[15] in 2 cases (4%), and appendicular involvement in 10 cases (20%).[15,21,25,27,28] Only 1 case showed mechanical obstruction with intussusception,[24] and 1 patient whose radiograph showed presence of free subdiaphragmatic intraperitoneal air developed a perforated ulcer in the descending duodenum.[29] Regarding surgical procedures, 25 (51%) patients underwent surgery, 5 (10%) underwent exploratory laparotomy,[2,8,15,29,30] 8 (16%) required resection of the restricted loop and temporary colostomy,[3,6,9,12,14,23,28,32] and 1 (2%) required enterolysis.[4] Endoscopy for hematemesis was performed in 2 cases (4%).[15,29]

Cardiac involvement was documented in 21 (43%) of the cases considered.[3-6,9,12-16,20-23,27,28,31,32]

All patients except 3[2,3] received medical treatment: 12 patients (25%) were administered immunoglobulin intravenous (IGIV) alone, and 18 patients (37%) were administered IGIV with aspirin.[2,5,13,16,17,20-22,24,33]

The outcome was good in 28 patients (57%, including the 3 patients who did not receive medical treatment).[4,6,12,17,19,21-24,27,29-34] Seven patients (14%) showed persistence of CAAs,[5,15,16,20,21] and 1 (2%) patient developed cyanosis, and later, left hand and forefoot gangrene.[3] Three patients (6%) died: in 1 case autopsy revealed massive liver necrosis and progressive duodenal infarction with systemic arteritis and periarteritis involving vessels of all sizes[3]; the second patient died 2 days after the exploratory laparotomy[2]; the third patient died because of *Pseudomonas* septic shock.[18]

One patient presented with a recurrence 3 years later.[15] No gastrointestinal sequelae were reported in survivors, although duration of follow-up was variable, or not reported.

Case Report

A 14-year-old boy admitted to our Infectious Disease Department for high fever (39°C) and abdominal pain of 2 days' duration. Upon admission, he had conjunctival and pharyngeal hyperemia, as well as cervical lymphadenopathy ≥1.5 cm in diameter. Blood tests revealed white blood cell 9.090/uL, (neutrophils 8500/uL lymphocytes 290/uL, platelets 196 000), serum transaminases (aspartate aminotransferase 24 U/L, alanine aminotransferase 40 U/L), hemoglobin 13.8 mg/dL, and C-reactive protein 177 mg/L. Abdominal CT performed on the day of hospitalization showed hepatosplenomegaly and fluid in the pelvic and mesocolic pouch, with no evidence of alteration of intestinal loops. The day after, a diffuse maculopapular rash appeared with rosette-shaped lesions involving the inferior limbs and the palms. Three days later, as fever was still high (39°C) and abdominal pain worsened, repeated abdominal CT scan was performed that showed wall stenosis and concentric thickening in the jejunal loops, as well as small and large intestine ectasia, ascitic effusion, and mesenteric lymph node enlargement (**Figure**).

The main infectious causes were ruled out (serologic tests for brucellosis, typhoid fever, rickettsiosis, measles; infection because of cytomegalovirus, Epstein-Barr virus, mycoplasma, leptospira; blood cultures, which were all negative).

The presence of maculopapular rash, conjunctival injection, high and persistent fever, changes in the peripheral extremities and pharyngeal mucosa, and cervical lymphadenopathy suggested the diagnosis of Kawasaki disease with possible intestinal involvement. Echocardiogram was normal. IGIV was administered (2 g/kg) with resolution of all symptoms during the following 48 hours. Treatment with high-dose aspirin also was started: 100 mg/kg/day for a total daily dose of 3 g, which was decreased to 5 mg/kg/24 hours (200 mg/24 hours) after stable disappearance of the fever. After approximately 2 weeks, desquamation of the toes and thrombocytosis (498 000/uL) were detected and magnetic resonance imaging showed complete resolution of the prior abdominal abnormalities. He was discharged and given salicylate therapy for 6 more weeks. An echocardiogram performed 6 months after discharge showed no cardiac alterations.

Table I. Clinical and radiologic characteristics, therapy, and outcome of the reported patients with intestinal involvement in Kawasaki disease

First author Year Country Number of patients	Age/sex	Clinical onset	Intestinal involvement (plain radiography or CT scan or ultrasonography)	Cardiac or main arteries involvement	Surgery	Outcome	Therapy
Franken 1979[2] US 2 pts	3 y/F 1.5 y/M	Fever (2), Vomiting (2)	Distended loops of small bowel (2)	None (2)	Laparotomy (1) None (1)	Death (1) Good (1)	None (2)
Mercer 1981[3] Canada 1 pt	NA	Fever, abdominal pain	Small bowel distension (1)	Right coronary artery arteritis (1)	Resection of necrotic bowel (1)	Death (1)	None
Fan 1986[4] China 1 pt	3 mo/M	Abdomen distension, fissured lips, conjunctival congestion, swollen red extremities, rash	Multiple fluid levels, ischemic colitis secondary to pseudo-obstruction	Bilateral coronary artery aneurysms	Enterolysis	Good	Aspirin
Miyake 1987[5] Japan 7 pts	NA	Fever (3) Vomiting (2) Abdominal pain (1) Abdominal distension (1) NA (4)	Dilatation of bowel with increased Volume of gas (3) NA (4)	CAAs (5) NA (2)	None (3) NA (4)	Persistence of CAAs (3) NA (4)	Aspirin + steroids (3) NA (4)
Murphy 1987[6] US 1 pt	8 mo/M	Fever, abdominal distension, vomiting, rash, conjunctivitis, pharyngitis, lymphadenopathy	Hydrops gallbladder, jejunal obstruction	Aneurysms of left and right subclavian arteries, of coronary artery, of brachiocephalic and axillary arteries	Jejunal resection, jejunojejunostomy	Good	Aspirin dipyridamole
Wheeler 1990[7] UK 2 pts	16 mo/M 4 y/F	Fever, abdominal distension, and bile-stained vomiting, rash, cervical lymphadenopathy, and conjunctivitis (2)	Distended bowel loops with fluid levels (2)	None (2)	None (2)	Good (2)	Intravenous fluids (1) High-dose aspirin (1)
Huang 1990[8] Taiwan 1 pt	6 mo/M	Fever, abdominal distension , jaundice, cervical lymphadenopathy, conjunctival congestion, fissured lips, rash	Dilatation of small bowel	NA	Laparotomy	NA	Aspirin
Mele 1996[9] Canada 1 pt	1 y/F	Fever, vomiting, conjunctivitis, neck stiffness	Incomplete midjejunal obstruction.	Dilatation of the right and left coronary arteries	Resection jejunojejunostomy	NA	IGIV Aspirin
Chung 1996[10] US 1 pt	4 y/M	Fever, abdominal pain, rash	Isolated left colon mucosal thickening	None	Laparotomy	Good	IGIV Aspirin
Chiba 1998[11] Japan 2 pts	6 y/M 4 y/M	Fever (2), abdominal pain (2), vomiting (1), rash (2), conjunctivitis (2), fissured lips (2)	Cecal ileus (2)	None	Appendectomy (2)	Good	IGIV (2)
Beiler 2001[12] Germany 1 pt	9 mo/F	Fever, vomiting, diarrhea, abdominal pain	Jejunal obstruction	Pericardial effusion, aneurysms of right and left anterior descending coronary	Resection obstructed segment and jejunojejunostomy	Good	IGIV Aspirin Steroids
Fang 2001[13] Taiwan 1 pt	1 y/M	Fever, fissured lips, vomiting, abdominal distension	Intestinal pseudo-obstruction	Coronary artery dilatation	None	NA	IGIV

(*continued*)

Table I. Continued

First author Year Country Number of patients	Age/sex	Clinical onset	Intestinal involvement (plain radiography or CT scan or ultrasonography)	Cardiac or main arteries involvement	Surgery	Outcome	Therapy
Krohn 2001[14] Germany 1 pt	3 mo/F	Fever, abdominal distension, vomiting, gangrene of left forehand and left forefoot	Jejunal obstruction	Coronary artery aneurism	Ileum resection jejunostomy	Amputation of left hand and forefoot	IGIV Aspirin Steroids
Zulian 2003[15] Italy 5 pts	2 pts: NA 1 pt: 5.4 y /M 1 pt: 5.1 y /M 1pt: 1.7 y/M	Fever (3) Abdominal pain (3) Diarrhea (1) Hematemesis (1) Rash (3), conjunctivitis (3) NA: 2	Paralytic ileus (3) Appendicitis (1) Hemorrhagic duodenitis (1)	CAAs (1)	Laparotomy (1) Appendectomy (1) Endoscopy(1)	Good (5)	IGIV (5)
Akikusa 2004[16] Canada 1 pt	3.5 y/M	Fever, vomiting, diarrhea, abdominal pain, swollen red lips with some mild, nonpurulent conjunctivitis, rash	Air-filled loops of small bowel	Right and left coronary artery ectasia, aneurysm of proximal right coronary artery	None	Persistent right coronary artery dilatation	IGIV Aspirin
Thabet 2004[18] France 1 pt	5 y, F	Fever, diarrhea, abdominal pain, rash	Multiple dilated intestinal loops with thickening of the wall	None	None	Death	IGIV
Yaniv 2005[17] Israel 1 pt	8 mo/F	Fever, diarrhea, bilious vomiting, injected conjunctiva, red dry lips, maculopapular rash involving the trunk, and erythema of the throat.	Diffuse widening of intestinal loops	None	None	Good	IGIV Aspirin
Pavone 2006[19] Italy 1 pt	18 mo/M	Vomiting, abdominal distension, scrotal swelling	Water and gas levels in ileum	NA	None	NA	IGIV
Tiao 2006[20] Taiwan 1 pt	2.5 y/M	Fever, vomiting, abdominal pain, peeling of the skin on fingers and toes	Dilated bowel loops with multiple air–fluid levels	Right and left coronary artery dilatation	None	Persistent right coronary artery dilatation	IGIV
Maurer 2008[21] Austria 2 pts	1 pt: 4 y/M 1 pt: 7 y/M	Fever (2), abdominal pain (2) Vomiting (1) Conjunctivitis (2) Swollen red lips (1) Pharyngitis (1) Rash (2) Lymphadenopathy (1)	Parietal stenosis and concentric thickening of the duodenal wall with pseudo-obstruction at the third part of the duodenum (2)	Left coronary artery dilatation (1) None (1)	Appendectomy (1) None (1)	Persistent coronary artery dilatation (1) Good (1)	IGIV Aspirin (2)
Kim 2008[22] Korea 1 pt	5 y/M	Fever, abdominal pain, vomiting, erythema and swelling of the hands and feet, and strawberry tongue	Circumferential enhanced wall thickening and edema in the distal descending and sigmoid colon	Pericardial effusion	None	Good	IGIV Aspirin
Lin 2010[23] Taiwan 1 pt	5 y/M	Fever, abdominal pain, diarrhea, lips, red eyes and a strawberry tongue	Multiple dilated intestinal loops	Pericardial effusion	Bowel decompression, loop colostomy	Good	Aspirin
Hussain 2010[24] UK 1 pt	3 y/M	Fever, vomiting, abdominal pain, jelly-like stools, rash	Intussusception	NA	None	Good	IGIV Aspirin

(*continued*)

Table I. Continued

First author Year Country Number of patients	Age/sex	Clinical onset	Intestinal involvement (plain radiography or CT scan or ultrasonography)	Cardiac or main arteries involvement	Surgery	Outcome	Therapy
Miyamoto 2013[25] Japan 1 pt	5 y/M	High fever, frequent diarrhea, and abdominal pain	Ileus of the small bowel and colonic mucosal thickening	Increased echo intensity in the coronary arterial wall and increased pericardial effusion	Appendectomy	Good	IGIV
Miyahara 2013[26] Japan 1 pt	4 y M	Fever and diarrhea, conjunctivitis, rash, periungueal desquamation	Left colon mucosal thickening consistent with acute colitis	None	None	Good	IGIV Aspirin
Garnett 2014[27] US 2 pts	1 pt: 3 y/M 1 pt: 7 y/F	Abdominal pain, nausea, vomiting, diarrhea, and fever, (2) Conjunctivitis (1)	Free fluid in the peritoneal cavity (2) Dilated loops of small bowel (1) Appendicitis (2)	Dilatation of the coronary arteries (2)	Appendectomy (2)	Good (2)	IGIV Aspirin
Godart 2014[28] France 1 pt	7mo/NA	Diarrhea, vomiting conjunctivitis	Small-bowel occlusion with superior mesenteric and splenic ischemia associated with abdominal effusion	Aneurysm with an origin from both coronary arteries and pericardial effusion	Resections of the small-bowel combined with gastrostomy, cholecystectomy, and appendectomy	After 2 years complete occlusion of the right coronary artery	Warfarin
Masoumi 2015[29] Iran 1 pt	2.5 y/M	Fever, melena, rash, conjunctivitis erythematous lips, edema, and erythema of palms and soles	X-ray: free subdiaphragmatic intraperitoneal air	None	Laparotomy: Perforated ulcer was seen in anterior portion of descending duodenum	Good	IGIV Aspirin
Garcia Munitis 2015[30] Argentina 1 pt	4 y/M	Fever, vomiting, diarrhea, abdominal pain, conjunctival injection	Dilatation of small bowel and mesenteric adenitis	None	Laparotomy	Good	IGIV Aspirin
Trapani 2016[31] Italy 1 pt	3 y/F	Fever abdominal pain, conjunctivitis, rash, hands and feet erythema, and cheilitis	Dilated loops and multiple water and gas levels in the ileum	Epi-pericardial effusion	Appendectomy	Good	IGIV Aspirin
Lone 2017[32] India 1 pt	2 y/M	Fever, abdominal pain, bleeding per rectum, cheilitis, and conjunctival erythema	Air fluid levels suggestive of intestinal obstruction	Coronary artery ectasia	Ileostomy	Good	IGIV Aspirin
Zhuang 2017[33] China 1 pt	1.7 y/F	Fever, cough, rash, fissured lips, bilateral conjunctivitis, edema extremities, vomiting, diarrhea	Intestinal dilatation (fluid/gas levels)	None	None	Good	IGIV Aspirin
Ohnishi 2017[34] Japan 1 pt	4 y M	Fever, abdominal pain, rash, swelling of both hands, strawberry tongue conjunctival hyperemia	Thickening of the wall localized to the sigmoid colon	None	None	Good	Aspirin
Present case 2018 Italy 1 pt	14 y/M	Fever, abdominal pain, arthralgia, lymphadenopathy conjunctival hyperemia	Parietal stenosis and concentric thickening in the jejunal loops	None	None	Good	IGIV Aspirin

F, female; *M*, male; *NA*, not available; *pt*, patient.
Number in parentheses indicates the number of patients of each article reporting the characteristic of the column header.

Table II. Clinical features of 49 reported patients with Kawasaki disease with intestinal involvement

Symptoms	Intestinal involvement	Cardiac involvement	Surgery	Therapy	Outcome
Fever 40/49 (82%) Abdominal pain 34/49 (69%) Vomiting 24/49 (49%) Diarrhea 14/49 (29%) Jaundice 1/49(2%)	Pseudo-obstruction 32/49 (65%) Pseudo-obstruction + idrope of gallbladder 1/49 (2%) Pseudo-obstruction + ischemic colitis 1/49 (2%) Pseudo-obstruction + hemorrhagic duodenitis 1/49 (2%) Pseudo-obstruction with mesenteric and splenic ischemia 1/49 (2%) Pseudo-obstruction + appendicitis 2/49 (4%) Intussusception 1/49 (2%) Hemorrhagic duodenitis 1/49 (2%) Appendicitis 8/49 (16%)	None 18/49 (37%) Pericardial effusion 3/49(6%) CAAs 21/49 (43%) NA: 12/49 (24%)	None 19/49 (39%) Resection + ostomy 8/49 (16%) Enterolisis 1/49 (2%) Cholecystectomy 1/49 (2%) Explorative laparotomy 5/49 (10%) Appendectomy 10/49 (20%) Minor invasive procedures 1/49 (2%) NA: 4/49 (8%)	Aspirin 4/49 (8%) Aspirin + dipyridamole 1/49 (2%) IGIV 12/49 (24%) Aspirin + steroid 3/49 (6%) Aspirin + IGIV 18/49 (37%) Warfarin 1/49 (2%) None 5/49 (10%) NA: 4/49 (8%)	Good 28/49 (57%) Persistence CAAs 7/49 (14%) Sequelae (amputation) 1/49(2%) Recurrence Kawasaki disease 1/49(2%) Death 3/49 (6%) NA: 4/49 (8%)

Discussion

The prevalence of gastrointestinal involvement in Kawasaki disease is unknown as available data can only be derived from single reports and few case series. Miyake et al in their retrospective case series of 310 children with Kawasaki disease reported gastrointestinal involvement in only 7 cases (2.3%)[5]; Zulian et al in their case series reported an incidence of atypical Kawasaki disease with a clinical onset characterized by acute surgical abdomen of 4.6%.[15] Abdominal symptoms in Kawasaki disease are more often due to hydrops of the gallbladder.[40,41] In Taiwan, a routine abdominal ultrasound showed hydrops of the gallbladder in 21% of patients with Kawasaki disease.[42] The most often suggested underlying mechanisms of hydrops are vasculitis and inflammation as well as distal duct obstruction caused by lymph nodes. The latter also may cause pancreatitis.[43]

In our review, we focused only on Kawasaki disease cases involving the intestinal tract. Abdominal pain and vomiting were the most frequently reported symptoms, followed by diarrhea. Gastrointestinal symptoms are relevant to a possible diagnosis of Kawasaki disease when there are fewer than typical diagnostic criteria for Kawasaki disease in the acute febrile phase. In such cases, the onset of signs and symptoms also may be dispersed over time as opposed to the close clustering of symptoms observed in the classical forms of Kawasaki disease.

Accordingly, the clinical onset of Kawasaki disease with gastrointestinal involvement often leads to diagnostic and therapeutic delays—a risk factor for the development of coronary complications.[1]

Despite efforts over 40 years, the etiology and pathophysiology of Kawasaki disease are still unknown. It is generally thought that Kawasaki disease results from a variety of infectious agents that evoke an abnormal immunologic response in genetically susceptible individuals. The results of immunology, microbiology, and molecular studies suggest that superantigen-producing agents may have a role in the etiology of Kawasaki disease.[44] The gastrointestinal tract has been proposed as a major site of entry of infectious agents that might act as superantigens, even though more recent studies have favored a canonical response to a conventional antigen.[1] Gastrointestinal involvement, therefore, may be due to the vasculitis and thrombosis of small submucosal arteries involving the intestine; moreover, the profound small-bowel dilatation detected in most patients is secondary to relative vascular insufficiency.[44-46]

The effects of bowel ischemia are multiple, but initial hypermotility followed by paralysis of the affected segment is frequent. In most cases, circumferential bowel wall thickening is associated with the inflammatory changes and vasculitis involving bowel vessels, in spite of the fact that the anatomic obstruction is not documented. In our case, abdominal complaints, as well as ultrasonography findings, promptly disappeared after initiation of therapy supporting the theory that intestinal vasculitis may be responsible for the abdominal symptoms in Kawasaki disease.

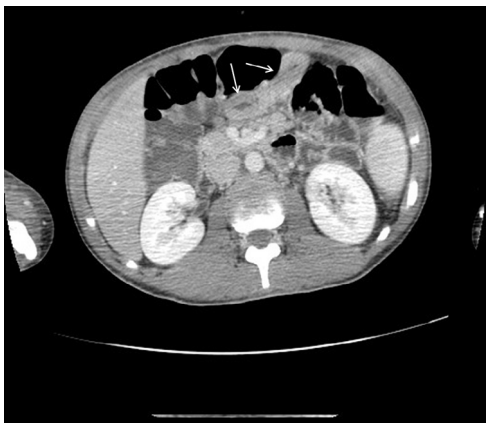

Figure. Abdominal CT of the present case showing wall stenosis and concentric thickening in the jejunal loops (*arrows*).

More severe cases might produce nodular areas or cause obstruction that can lead to surgical treatments.[21,22] The high incidence of CAAs observed in Kawasaki disease with gastrointestinal involvement should prompt the physician to search for the presence of coronary aneurysms. Indeed, in most reported cases, Kawasaki disease was diagnosed after at least an explorative laparotomy had been performed. However, we can assume that medical treatment is fundamental to avoid a further clinical progression of the mesenteric vasculitis; therefore, conservative management of such patients as for Kawasaki disease,[1,47] with high-dose IGIV plus aspirin, seems to be appropriate.

The diagnosis of Kawasaki disease should be considered in all children with fever, abdominal pain, and radiologic signs of pseudo-obstruction, even in the absence of typical symptoms and signs. A more comprehensive analysis including all clinical forms of Kawasaki disease would be useful to correlate intestinal involvement with worse outcomes for cardiac complications, as well as to clues to more rapid diagnosis and avoidance of unnecessary invasive procedures. ■

Submitted for publication Mar 3, 2018; last revision received Jun 4, 2018; accepted Jun 13, 2018

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50 Years Ago in *The Journal of Pediatrics*

Use of the Telephone by Low-Income Families

Heagarty MC, Robertson L, Kosa J, Alpert JJ. J Pediatr 1968;73:740-4

The first sentence of the study by Heagarty et al reads "particularly for pediatricians, the telephone represents an essential, if at times exasperating part of practice." It made me smile. Maybe technology has changed the world in the past 50 years, but we have not changed as much. Phone calls are still exasperating from time to time.

The study describes a program in which low-income families had 24/7 access to medical care via a telephone answering service. During 2 months in 1965 and another 2 months in 1967, the authors analyzed when and why patients called, how the doctor perceived them, and how it was resolved. The number of phone calls increased in those 2 years. Calls were more frequent during the day and during the week, not weekends. They called because of a fever, a respiratory illness, an accident, or a rash, but usually, parents wanted advice and not necessarily to see the doctor. And doctors overestimated the mother's anxiety when the reason for calling was that, indeed, the condition of a child had changed or deteriorated. All of this may resemble current practice.

The difference now is the variety of gadgets (telephones, mobile devices, personal computers) and platforms (texting services, social media, electronic health records) that allow us to communicate with our patients. This may differ depending on where you practice. The Health Insurance Portability and Accountability Act of 1996, for example, is much more stringent than laws in other countries. Personally, I engage and communicate with patients using Facebook and WhatsApp, which may seem unfathomable for pediatricians in the US. And not only patients reach us using technology, we too reach to them. We use communication technology to send reminders for healthcare appointments, to send results of tests, to promote good health behaviors (eg, to help quit smoking or to reduce risky sexual practices in patients with HIV) and adherence to medication, to increase vaccination rates, or to coordinate management of chronic conditions such as asthma.

But, in the end, nothing replaces a good old fashioned face-to-face patient–doctor encounter. At least, not in the next 50 years.

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