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Case Report

Incomplete Kawasaki Disease Mimicking Multisystem Inflammatory Syndrome in Children (MIS-C) with Subsequent Diagnosis of Early-Onset Crohn's Disease: A Case of Diagnostic Challenges in a Pediatric Patient

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Abstract

Kawasaki disease (KD) can lead to severe complications, including incomplete KD with significant organ dysfunction. This report describes a previously healthy 3-year-old boy who presented with a 5-day history of high fever, periumbilical abdominal pain, and mild conjunctival injection, without respiratory symptoms. Initial laboratory findings indicated severe leukocytosis, anemia, and elevated inflammatory markers, prompting treatment for suspected infectious enterocolitis. As symptoms persisted, the clinical picture evolved, and multisystem inflammatory syndrome in children was considered but ruled out due to negative SARS-CoV-2 tests. Incomplete KD was subsequently diagnosed, and the patient received intravenous immunoglobulin and corticosteroids, leading to initial improvement. However, a relapse occurred after tapering corticosteroids, marked by high fever, abdominal pain, and bloody stools. Further investigation revealed severe active enterocolitis, raising suspicion for inflammatory bowel disease. Stool calprotectin levels were significantly elevated, and endoscopy confirmed early-onset Crohn's disease. This case highlights the diagnostic challenges in differentiating incomplete KD from Crohn's disease, particularly in the setting of overlapping symptoms and systemic inflammation. Early-onset Crohn's disease should be considered in pediatric patients presenting with gastrointestinal and systemic symptoms refractory to standard treatment for incomplete KD.

Keywords: Kawasaki Disease; Mucocutaneous Lymph Node Syndrome; Abdominal Pain; Crohn's Disease; Inflammatory Bowel Disease; Relapse

Introduction

Kawasaki Disease (KD) is a pediatric vasculitis affecting coronary arteries, with prolonged fever and mucocutaneous symptoms. Incomplete KD is challenging to diagnose, especially when overlapping with other inflammatory conditions. Early-onset Crohn's Disease (EOCD), a rare inflammatory bowel disease (IBD) in children, shares markers such as leukocytosis, anemia, and elevated C-reactive protein (CRP), complicating diagnosis. This overlap between KD, multisystem inflammatory syndrome in children (MIS-C), and other systemic inflammatory disorders

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Ethics Approval
Research was conducted according to all ethical standards, and written informed consent was obtained from the legal representatives or parents.

complicates diagnoses. We discuss a 3-year-old boy initially diagnosed with incomplete KD, presenting with prolonged fever and severe abdominal pain. Recurring symptoms led to EOCD diagnosis, highlighting challenges in differentiating KD from IBD in young patients with overlapping symptoms. The case study was conducted after written informed consent was obtained from the parents.

Case

A healthy 3-year-old boy was admitted with a 5-day history of high fever and periumbilical abdominal pain. He had loose stools 1–2 times daily without respiratory symptoms. His height and body weight were below the 5th percentile. Physical examination showed mild bilateral conjunctival injection, but no other signs of KD.

Initial labs showed an elevated white blood cell (WBC) count of 56.14 × 10^3 /μL, with neutrophils accounting for 86.4%. Hemoglobin was 9.1 g/dL, indicating anemia. The platelet count was also elevated at 508 × 10^9 /L. Inflammatory markers were markedly raised, with an erythrocyte sedimentation rate (ESR) of 87 mm/hr (normal range 0–15 mm/hr) and a CRP level of 24.47 mg/dL (normal < 0.5 mg/dL). Additionally, the NT-proBNP level was 423 pg/mL, above the 95th percentile value of 289 pg/mL. Other tests showed hyponatremia (Na 132 mEq/L), normal liver enzymes, and slightly decreased albumin (3.7 g/dL).

Urinalysis was negative for nitrites, with a WBC count of 0–1 and red blood cell count of 2–4. Stool analysis was negative for WBC and positive for hemoglobin, and respiratory viral polymerase chain reaction (PCR) tests detected coronavirus NL63 and human metapneumovirus, but not SARS-CoV-2 or adenovirus. Echocardiography on admission showed no abnormalities.

On day 2 of hospitalization, despite cefotaxime, the fever and abdominal pain persisted. A bowel ultrasound revealed thickened bowel walls in the terminal ileum, ascending colon, and transverse colon, with increased pericolic fat echogenicity, suggesting infectious enterocolitis. Metronidazole and azithromycin were added.

By day 4 of admission (fever onset day 8), the patient still had a high fever, mild palmar and plantar erythema, and minor respiratory symptoms. A chest X-ray revealed new peribronchial consolidation and ground-glass opacities in both lungs, suggesting pneumonia or pulmonary edema. Laboratory tests showed a WBC of 30.58 × 10^9 /L and a hemoglobin level of 7.4 g/dL, indicating worsening anemia. The platelet count had decreased to 331 × 10^9 /L. The ESR was 41 mm/hr, and CRP remained elevated at 27.33 mg/dL. Additionally, the NT-proBNP level had significantly increased to 1,017 pg/mL.

A repeat echocardiography revealed mild mitral regurgitation. Blood and stool cultures, along with stool PCR tests for enteric pathogens, were all negative. The stool PCR panel included *Salmonella*, *Shigella* (including *Shigella dysenteriae*), *Enteroinvasive Escherichia coli*, *Vibrio*, *Campylobacter*, *Plesiomonas shigelloides*, *Yersinia enterocolitica*, *Enterotoxigenic E. coli*, and *Shiga toxin-producing E. coli*. Given the pancolitis observed on bowel ultrasound, anemia, and pneumonia with severe systemic inflammation, MIS-C was initially suspected.

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However, PCR and antibody tests for SARS-CoV-2 were negative, effectively ruling out MIS-C.

Incomplete KD was then considered based on conjunctival injection, erythema of the palms and soles, and abnormal lab findings with elevated inflammatory markers, leukocytosis, anemia and hypoalbuminemia (2.6 g/dL) at hospital day 4. According to the American Heart Association (AHA) guidelines, intravenous immunoglobulin (IVIG) (2 g/kg) and high-dose aspirin (30–50 mg/kg/day) were initiated. A Kobayashi score of 7, indicating a high risk for IVIG non-responsiveness, led to adding oral prednisolone (2 mg/kg). The fever and abdominal pain resolved but bloody loose stool remained. Two days after IVIG, CRP dropped to 5.06 mg/dL, and the patient was discharged on day 7. Outpatient follow-up after 5 days showed normalization of inflammatory markers, with no echocardiographic abnormalities or symptoms. Prednisolone was tapered over two weeks, with a plan to continue low-dose aspirin for 6 weeks after discharge.

However, the day after discontinuing prednisolone, the patient developed a fever (up to 38.8 ℃), abdominal pain, and 4–5 episodes of mucoid stool per day, with suspected traces of blood. The child was readmitted on the fourth day of fever, with lab results showing a WBC count of 29.85 × 10^9 /L, a hemoglobin level of 8.4 g/L, indicating ongoing anemia, and an elevated platelet count of 485 × 10^9 /L. The CRP level remained high at 13.38 mg/dL. Cefotaxime was re-administered, but symptoms persisted. Stool PCR, culture, and WBC tests remained negative. Tests for lactate dehydrogenase, ferritin, and fibrinogen were normal. On hospital day 4, a repeat bowel ultrasound revealed severe active enterocolitis in the terminal ileum and entire colon, along with paralytic ileus, and hepatosplenomegaly, raising suspicion of IBD despite the absence of visible anal fissures. Stool calprotectin was significantly elevated at 915.54 μg/g (normal < 50 μg/g), and anti-neutrophil cytoplasmic antibody (ANCA) was positive. The patient was transferred to another hospital for endoscopy, which confirmed EOCD, showing multiple erythema and ulcerative lesions in the ascending and transverse colon. Symptoms improved with steroid therapy. Further family history revealed that the patient's maternal grandfather was being treated for Crohn's disease.

Discussion

Diagnosing pediatric patients with systemic inflammatory symptoms is complex, particularly when KD, MIS-C, and EOCD overlap. The diseases share features such as fever, inflammation, and gastrointestinal manifestations, complicating early diagnosis [1–3]. Misdiagnoses of KD with other conditions, or vice versa, are common and delay appropriate treatment [4]. Since COVID-19, studies comparing MIS-C and KD have increased due to their clinical similarities [5,6]. Diagnosing incomplete KD, often lacking classic symptoms, remains challenging but crucial to prevent cardiovascular complications. Tools like echocardiography and inflammatory markers are valuable, though their effectiveness is limited in the presence of abdominal pain.

In this case, incomplete KD was initially suspected due to persistent fever, conjunctival

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injection, and elevated CRP and NT-proBNP levels. The symptoms resolved following IVIG, steroid, and aspirin but recurred after discontinuing prednisolone, prompting further investigation. Ultimately, endoscopy confirmed EOCD. Although gastrointestinal symptoms are not uncommon in KD, occurring in up to 20%–35% [7–9], they are often under-recognized. Gastrointestinal symptoms in KD, such as vomiting, diarrhea, and abdominal pain, are typically mild but may escalate in atypical cases, leading to conditions like pseudo-obstruction or segmental bowel wall thickening [7,8,10–12].

MIS-C shares features with KD but has more prominent gastrointestinal symptoms [5,6]. Notably, up to 80% of MIS-C cases involve severe symptoms such as vomiting, diarrhea, and significant abdominal pain, contrasting with the milder, self-limiting nature of KD [6,13,14]. Additionally, MIS-C frequently involves more extensive systemic involvement, including cardiac dysfunction, shock, and multi-organ failure [6,13,14]. In this case, MIS-C was initially suspected due to pancolitis and accompanying respiratory symptoms; however, negative SARS-CoV-2 PCR and antibody tests ruled out this diagnosis. The history of recent COVID-19 infection can serve as a critical differentiating factor in cases resembling MIS-C [14].

Crohn's disease presents markedly different clinical characteristics in terms of gastrointestinal involvement. Unlike KD or MIS-C, Crohn's disease is characterized by chronic, relapsing inflammation of the gastrointestinal tract, most commonly the ileum and colon [15,16]. The typical age of onset of the disease is between 20 and 30 years, but EOCD, diagnosed in individuals under 18, often presents with more extensive disease involvement and a higher likelihood of requiring immunosuppressive therapy compared to adult-onset cases [17]. In this case, the recurrent abdominal pain with mucoid and bloody stools, suggested a chronic inflammatory process, prompting further investigation and the eventual diagnosis of EOCD. The diagnosis was supported by significantly elevated stool calprotectin levels, positive ANCA, endoscopic findings, and the family history [18]. The genetic predisposition further distinguishes EOCD from other systemic inflammatory conditions in pediatric patients [18,19].

In patients with overlapping symptoms, distinguishing between KD, MIS-C, and EOCD is essential, as the treatment and management differ significantly. KD-related abdominal pain is generally mild and resolves with its treatment, while MIS-C often demands intensive treatment due to multi-organ involvement and cardiac risks. Testing for SARS-CoV-2 is crucial when MIS-C is suspected.

KD should be strongly considered in children under the age of five who present with prolonged fever and elevated inflammatory markers, even in the absence of classic KD symptoms. When these symptoms are accompanied by abdominal pain, the diagnosis of KD can easily be overlooked, as gastrointestinal symptoms often complicate the clinical picture. In a case reported by Ohnishi et al., the patient was initially misdiagnosed with sigmoid colitis due to prominent abdominal symptoms, leading to a delay in the correct diagnosis of KD [2]. Despite this, clinicians should remain vigilant for alternative diagnoses, even when gastrointestinal symptoms are present alongside other signs of KD. Gastrointestinal symptoms do not rule out KD, but it is important to consider other potential causes, especially when no clinical

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improvement is seen after initial KD treatment.

In conclusion, IBD, including EOCD, should be considered in the differential diagnosis for pediatric patients with persistent gastrointestinal and systemic symptoms, even after a diagnosis of incomplete KD has been made.

References

1. Kawamura Y, Miura H, Saito K, Kanno T, Yokoyama T, Aizawa Y, et al. An atypical case of Kawasaki disease with severe pneumonia in a neonate. BMC Pediatr. 2022;22:132.
2. Ohnishi Y, Mori K, Inoue M, Satake N, Yano M. A case of Kawasaki disease presenting as sigmoid colitis. J Med Ultrason. 2018;45:381-4.
3. Ren Y. An infant with Kawasaki disease: a case report and literature review. Cureus. 2024;16:e65221.
4. Kumar S, Vaidyanathan B, Gayathri S, Rajam L. Systemic onset juvenile idiopathic arthritis with macrophage activation syndrome misdiagnosed as Kawasaki disease: case report and literature review. Rheumatol Int. 2013;33:1065-9.
5. Toubiana J, Poirault C, Corsia A, Bajolle F, Fourgeaud J, Angoulvant F, et al. Kawasaki-like multisystem inflammatory syndrome in children during the covid-19 pandemic in Paris, France: prospective observational study. BMJ. 2020;369:m2094.
6. Whittaker E, Bamford A, Kenny J, Kaforou M, Jones CE, Shah P, et al. Clinical characteristics of 58 children with a pediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2. JAMA. 2020;324:259-69.
7. Colomba C, La Placa S, Saporito L, Corsello G, Ciccia F, Medaglia A, et al. Intestinal involvement in Kawasaki disease. J Pediatr. 2018;202:186-93.
8. Fabi M, Corinaldesi E, Pierantoni L, Mazzoni E, Landini C, Bigucci B, et al. Gastrointestinal presentation of Kawasaki disease: a red flag for severe disease? PLOS ONE. 2018;13:e0202658.
9. Kato H, Sugimura T, Akagi T, Sato N, Hashino K, Maeno Y, et al. Long-term consequences of Kawasaki disease: a 10- to 21-year follow-up study of 594 patients. Circulation. 1996;94:1379-85.
10. Bagrul D, Karadeniz EG, Koca S. Gastrointestinal involvement in Kawasaki disease: a case report. Cardiol Young. 2018;28:1070-3.
11. Kim MY, Noh JH. A case of Kawasaki disease with colonic edema. J Korean Med Sci. 2008;23:723-6.
12. Maurer K, Unsinn KM, Waltner-Romen M, Geiger R, Gassner I. Segmental bowel-wall thickening on abdominal ultrasonography: an additional diagnostic sign in Kawasaki disease. Pediatr Radiol. 2008;38:1013-6.
13. Lee S, Kim D, Kim BJ, Rhim JW, Lee SY, Jeong DC. Comparison of COVID-19-associated multisystem inflammatory syndrome in children (MIS-C) and Kawasaki disease shock syndrome: case reports and literature review. J Rheum Dis. 2023;30:272-7.
14. Takagi Y, Hamada H, Naganuma J, Kano Y, Yoshihara S. A case of multisystem inflammatory

syndrome in children diagnosed based on gastrointestinal symptoms despite not meeting the diagnostic criteria for Kawasaki disease. Dokkyo Med J. 2024;1:70-6.

15. Kugathasan S, Denson LA, Walters TD, Kim MO, Marigorta UM, Schirmer M, et al. Prediction of complicated disease course for children newly diagnosed with Crohn's disease: a multicentre inception cohort study. Lancet. 2017;389:1710-8.
16. Torres J, Mehandru S, Colombel JF, Peyrin-Biroulet L. Crohn's disease. Lancet. 2017;389: 1741-55.
17. Duricova D, Burisch J, Jess T, Gower-Rousseau C, Lakatos PL. Age-related differences in presentation and course of inflammatory bowel disease: an update on the population-based literature. J Crohns Colitis. 2014;8:1351-61.
18. Uhlig HH, Schwerd T, Koletzko S, Shah N, Kammermeier J, Elkadri A, et al. The diagnostic approach to monogenic very early onset inflammatory bowel disease. Gastroenterology. 2014;147:990-1007.E3.
19. van Rheenen PF, Van de Vijver E, Fidler V. Faecal calprotectin for screening of patients with suspected inflammatory bowel disease: diagnostic meta-analysis. BMJ. 2010;341:c3369.

https://doi.org/10.59492/kd.3.1.e5