Case Report

J Nepal Health Res Counc 2020 Oct-Dec;18(49): 789-91

DOI: https://doi.org/10.33314/jnhrc.v18i4.3281

Kawasaki Disease like Multisystem Inflammatory Syndrome in a Toddler during SARS-CoV-2 Pandemic in Nepal

Ajit Rayamajhi,[1,2] Manisha Sharma,[2] Mukund Kumar Deo,[1] Sanjeet Shrestha,[1] Krishna Prasad Bista,[1] Krishna Prasad Paudel[1,2]

[1]Department of Pediatrics, Kanti Children's Hospital, Kathmandu, Nepal, [2]Department of Pediatrics, National Academy Medical Sciences, Kathmandu, Nepal.

ABSTRACT

Multisystem inflammatory syndrome in children is a new childhood inflammatory disorder associated with respiratory syndrome coronavirus 2 (SARS-CoV-2). This illness of elevated inflammatory markers and multiple organ involvement similar to Kawasaki disease is not commonly reported from Asia. A 17-month-old boy presented with acute onset fever, rash, non-exudative conjunctivitis and swellings of hands and legs. In x-ray chest there was infiltration on the right lower lobe and echocardiography showed evidence of coronary arteritis. The diagnosis of multisystem inflammatory syndrome in children was confirmed on the basis of characteristic clinical features and laboratory parameters fulfilling standard case definition for multisystem inflammatory syndrome in children. The child responded to treatment with intravenous immunoglobulin and high dose aspirin. Hence, amidst SARS-CoV-2 pandemic, multisystem inflammatory syndrome in children should be suspected and effectively treated even in a country like Nepal.

Keywords: Kawasaki disease; multiple inflammatory syndrome in children; Nepal; respiratory syndrome coronavirus 2

INTRODUCTION

Ever since the outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was reported from Wuhan, China in January 2020, a total of 126137 cases and 715 deaths have been noted in Nepal. This includes 13,719 confirmed cases below 20 years of age according to the Ministry of Health and Population of Nepal on 16th October, 2020.[1] Majority of the children have been found to be either asymptomatic or have mild symptoms such as fever, upper respiratory tract infections, myalgias and arthralgias. [2] However, around 5% have been reported to have presented with severe illness such as diarrhea, severe pneumonia, acute respiratory failure and shock. Recently, SARS-COV-2 has been reported to cause multisystem inflammatory syndrome in children (MIS-C) with features resembling those of Kawasaki Disease (KD), toxic shock syndrome, and macrophage activation syndrome causing adverse outcomes.[3]

CASE REPORT

A previously healthy 17 month-old-boy presented to Kanti Children's Hospital in Kathmandu on September 19, 2020, with acute onset high grade fever (maximum 40^{0}C) for 7 days. He had developed maculopapular rash on face and trunk, bilateral non-exudative bulbar conjunctivitis and swelling of both hands and legs on the fourth day of fever (Figure 1). There was no history of seizure, altered sensorium, cough, ear discharge, yellowish discoloration of eyes and body, diarrhea, abdominal or joint pain or straining during micturition. He lived with both his father and mother who had tested positive for SARS-CoV-2 on reverse transcription polymerase chain reaction (RT-PCR) on nasopharyngeal swab examination 35 days prior to presentation. However, he had tested negative.

On admission, his respiratory rate was 32/minute, heart rate 112/minute, blood pressure 90/50 mm Hg, temperature 38.3^{0}C and oxygen saturation 98% in room air. There was no lymphadenopathy, strawberry tongue, cracked lips or organomegaly. Chest radiograph showed infiltration on the right lower lung field (Figure 2).

Correspondence: Dr Ajit Rayamajhi, Department of Pediatrics, Kanti children's Hospital, Maharajgunj, Kathmandu, Nepal. Email: ajitrnp@yahoo.com, Phone: +9779851055305.

Figure 1. Generalised polymorphous rash seen in the face.

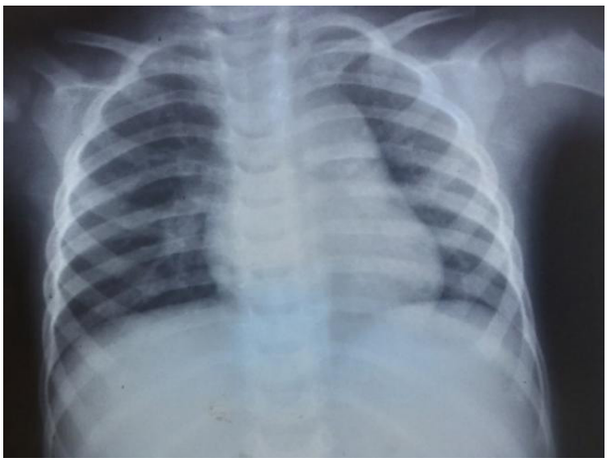

Figure 2. X-Ray chest on admission showing infiltration in right lower zone.

On cardiovascular examination, heart sounds were muffled. Blood investigations showed hemoglobin 87g/L, total leucocyte count 15.4×10^9/L (neutrophil 58%, lymphocyte 39%), platelet count 210×10^9/L, C-reactive protein(CRP) 90.4 mg/L, erythrocyte sedimentation rate(ESR) 60 mm/hour, albumin 27 g/L, lactate dehydrogenase(LDH) 542 U/L, triglyceride 4.2 mmol/L and D-Dimer 21 µg/ml. Bacterial culture of blood did not grow any organism. Both renal and liver functions were normal. RT-PCR assays for influenza A and B viruses were negative. Latex agglutination test for evidence of Salmonella typhi and paratyphi and Brucella were also negative. Further, lateral flow chromatographic immunoassay(LFCI) for immunoglobulin M(IgM) and immunoglobulin G(IgG) against dengue viruses, Leishmania donovani, Leptospira interrogans and Orientia tsutsugamushi were also negative. Although, his nasopharyngeal swab for SARS-CoV-2 by RT-PCR at admission was negative, he and his three years old sister's anti-SARS-CoV-2 IgG serology was positive. Echocardiography showed ectasia and non-tapering of coronary arteries, minimal pericardial effusion, normal left ventricular function and no aneurysm (Figure 3).

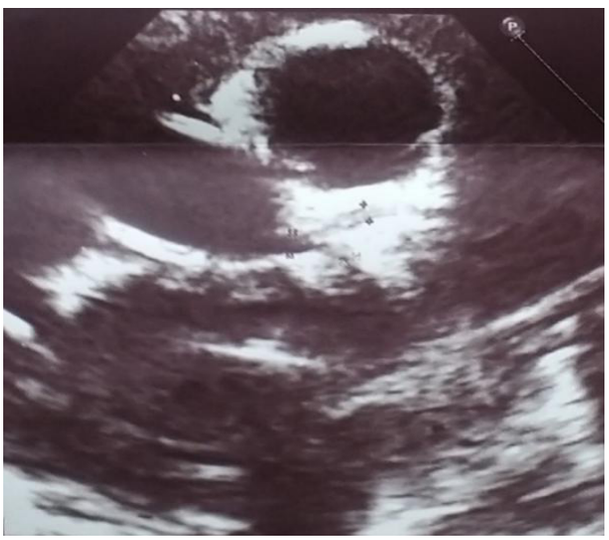

Figure 3. Two dimensional echocardiogram showing ectasia and non-tapering of main left coronary artery (left main coronary artery was 2.0 mm, left anterior descending artery 1.7 mm, right coronary artery 1.8 mm).

He was initially treated with intravenous ceftrioxone and oral paracetamol for fever. With unrelenting fever and characteristic clinical features (polymorphous rash, bilateral non-exudative conjunctivitis, swelling of hands and feet), laboratory findings (raised CRP, raised ESR, anemia, leucocytosis, hypoalbuminemia) and echocardiographic evidence of coronary arteritis, he had incomplete Kawasaki Disease (KD).[4] A diagnosis of MIS-C, was made on the basis of age below 21 years, characteristic fever, involvement of skin and cardiovascular system, elevated D-Dimer, elevated LDH, hypoalbuminemia, raised CRP, raised ESR, SARS-CoV-2 exposure, positive SARS-CoV-2 serology and without alternative plausible diagnoses.[3] He also had presence of antibody for SARS-CoV-2 infection with features of incomplete KD. He was then administered intravenous immunoglobulin(IVIG) 2g/kg over 12 hours and anti-inflammatory dose of aspirin (45 mg/kg/day). He became afebrile within 24 hours of IVIG infusion. The dose of aspirin was then reduced to 5 mg/kg/day after 48 hours of absence of fever. He was discharged on oral aspirin(5 mg/kg/day) and advised for follow-up after 2 weeks with a repeat echocardiography.

DISCUSSION

SARS-CoV-2 was first reported in Nepal, in a student, who had returned from Wuhan, China on January, 2020.[5] Although there is paucity of information on first pediatric case, first pediatric death was of a 2 years old girl who returned to Nepal with her parents from India on May 31, 2020.[6] MIS-C is a rare complication of SARS-CoV-2 in children with a global incidence rate of below 2 per 100,000 in less than 21 year olds.[7] It was first reported in the United Kingdom.[5] Although, it is less reported from Asia, we probably diagnose and report it for the first time in Nepal in a peer reviewed publication. Occurrence of MIS-C after 2-4 weeks of SARS-CoV-2 infection and presence of anti SARS-COV-2 IgG strongly suggests it to be the cause. Since many affected children are PCR negative and antibody positive, post infectious process of abnormal T or B-cell responses to SARS-CoV-2 is postulated. Presence of antibodies could increase the severity of the illness by triggering inflammation or causing multi organ damage. Since the pathophysiology, diagnostic modality and definite treatment is unknown, the treatment is based on drugs used in KD and other inflammatory disorders, such as high-dose IVIG and aspirin as initial therapy, corticosteroid as adjunctive therapy and Anakinra and Tocilizumab for refractory cases. Children of MIS-C are reported to have more inflammation and larger myocardial injury than KD. Our patient developed hyperinflammatory syndrome with multiorgan involvement as in KD. Unlike children described in previous studies[8,9] our patient did not develop shock or require respiratory support or ionotropic agents. Complete defervesce of clinical features subsequent to IVIG and high dose Aspirin has also been reported from North America.[10]

CONCLUSIONS

This report highlights that all children presenting with KD like symptoms should be suspected and investigated for MIS-C. As commonly thought, SARS-CoV-2 infection is not restricted to the respiratory system, but also affects other systems such as skin, blood vessels, brain, kidneys and heart. The similarity between KD and MIS-C suggest it is a post SARS-CoV-2 infection induced immune dysregulation. MIS-C should be reported to the concerned health authorities to be included in the total burden of SARS-CoV-2 infection.

ACKNOWLEDGEMENTS

We would like to acknowledge Dr Anup Bastola from Sukraraj Tropical Disease Hospital, Kathmandu for providing SARS-CoV-2 IgM and IgG kit. We are thankful to Dr Laxmi Gurung and Dr Prakreety Bhandari who were also involved in the care of the patient. We would also like to thank the parents for providing written consent for publishing this case report.

REFERENCES

1. Ministry of Health and Population Nepal. Total Data Kathmandu Nepal: Ministry of Health and Population, Nepal; 2020 [16/10/2020]. Available from: https://covid19.mohp.gov.np/
2. Wang E, Brar K. COVID-19 in Children: An Epidemiology Study from China. J Allergy Clin Immunol Pract. 2020;8(6):2118-20.[PMC]
3. Nakra NA, Blumberg DA, Herrera-Guerra A, Lakshminrusimha S. Multi-System Inflammatory Syndrome in Children and Proposed Management. Children (Basel). 2020;7(69):2–14.[Article]
4. Newburger JW, Takahashi M, Gerber MA, Gewitz MH, Tani LY, Burns JC, et al. Diagnosis, treatment, and long-term management of Kawasaki disease: A statement for health professionals from the Committee on Rheumatic Fever, Endocarditis and Kawasaki Disease, Council on Cardiovascular Disease in the Young, American Heart Association. Circulation. 2004;110(17):2747–71.[Article]
5. Bastola A, Sah R, Rodriguez-Morales AJ, Lal BK, Jha R, Ojha HC, et al. The first 2019 novel coronavirus case in Nepal. Lancet Infect Dis. 2020;20(3):279–80.[Article]
6. Prakash Singh The Himalyan Times. Deceased Bajura toddler tests positive for COVID-19, mother infected too Kathmandu, Nepal: The Himalayan Times; 31st may 2020 [17/10/2020]. Available from: https://thehimalayantimes.com/nepal/deceased-bajura-toddler-tests-positive-for-covid-19-mother-infected-too/
7. Levin M. Childhood Multisystem Inflammatory Syndrome — A New Challenge in the Pandemic. N Engl J Med. 2020;383(4):391–3.[Article]
8. Riphagen S, Gomez X, Gonzalez-Martinez C, Wilkinson N, Theocharis P. Hyperinflammatory shock in children during COVID-19 pandemic. Lancet. 2020;395(10237):1607–8. [Article]
9. Feldstein LR, Rose EB, Horwitz SM, Collins JP, Newhams MM, Son MBF, et al. Multisystem inflammatory syndrome in U.S. Children and adolescents. N Engl J Med. 2020;383(4):334–46.[Article]
10. Jones VG, Mills M, Suarez D, Hogan CA, Yeh D, Segal JB, et al. COVID-19 and Kawasaki disease: novel virus and novel case. Hospital Pediatrics. 2020 Jun 1;10(6):537-40. [Article]