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COVID-19 in Children - A Case Series of severe and life-threatening SARS-Co V-2

[1]Dr. Surabhi H S, Department of Paediatrics, Raja Rajeswari Medical College and Hospital, Bangalore, Karnataka, India.

[2]Dr. Adarsh E, Department of Paediatrics, Raja Rajeswari Medical College and Hospital, Bangalore, Karnataka, India.

[3]Dr. Srinivas Mahesh Prasad, Department of Paediatrics, Raja Rajeswari Medical College and Hospital, Bangalore, Karnataka, India.

[4]Dr. Rakshitha P., Department of Paediatrics, Raja Rajeswari Medical College and Hospital, Bangalore, Karnataka, India.

Corresponding Author: Dr. Rakshitha P., Department of Paediatrics, Raja Rajeswari Medical College and Hospital, Bangalore, Karnataka, India.

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Abstract

Covid-19 typically affects adults, with children having a lesser incidence. We herein reviewed for symptoms, co-morbidities, the requirement for respiratory support, and radiological investigations of a total of 90 children admitted at RRMCH from July 2020 to August 2020. The clinical characteristics of five children, with severe and life-threatening COVID19 are reported in this case series.

Keywords: Covid-19 — Coronavirus disease 2019, Sars-Co V-2 — Severe Acute Respiratory Syndrome Coronavirus2, RT-PCR — Real Time Reverse Transcription Polymerase Chain Reaction, Who — World Health Organisation, RNA virus — Ribonucleic acid virus, m=Misc — Multisystem Inflammatory Syndrome in Children.

Introduction

The World Health Organization classified Coronavirus Disease 2019 (Covid-19), a disease caused by the severe acute respiratory syndrome coronavirus-2 (Sars-CoV-2), a pandemic on March 11, 2020[1].

Coronaviruses are non-segmented, enveloped, positive-sense RNA viruses belonging to the Corona viridae family resulting in acute respiratory syndrome symptoms [2]. Only 1-2 percent of coronavirus disease 2019 (Covid-19) cases occur in children over the world. Unlike other respiratory viruses, children appear to have a lower risk of infection than adults, and the vast majority of documented infections in children are mild or asymptomatic, with only a few mortalities attributable to Covid-19[1] and the major pattern of transmission was intrafamily or secondary transmission [3]

A preliminary case definition and case report form for multisystem inflammatory disorder in children and

adolescents have been developed by WHO. The preliminary case definition is based on clinical and laboratory findings in children who have been reported so far, and it is used to identify suspected or confirmed cases for treatment as well as provisional reporting and surveillance [1].

In accordance with WHO criteria, we report the clinical characteristics of Covid19 in a case series of five children referred to RRMCH, Bangalore, with laboratory confirmed Sars-CoV-2. A quantitative real-time reverse transcriptase polymerase chain reaction (RT-PCR) approach was used to confirm all of the cases.

Medical records were used to collect clinical and analytical data. The hospital's ethical committee gave their approval to this study.

Case Series

Case 1: A 3 and half-month-old male infant, second-order by birth born to a non-consanguineously married couple (NCM) with a birth weight of 2.9kg, presented to casualty with H/O fever for 1 day with the refusal of feeds and decreased activity. Mother had complaints of fever for 2 days and sought medical attention; following evaluation, she was tested Covid Positive. Hence mother and baby were referred to our Covid center for further management.

On examination, the baby presented with respiratory distress and hemodynamic shock; GCS- 9/15 and abdomen was soft with liver span of 9cm. Shock was managed immediately as per protocol and was mechanically ventilated in view of respiratory failure. Blood investigations revealed Haemoglobin-8.5gm%; Total Leukocyte Count (TLC)- 14,000 cells/cumm (Normal- 4000-11000cells/cumm), Lymphocytes-8%; ESR-30mm/hr (Normal- 0-10mm/hr) with CRP-24mg/L (Normal- <6mg/L), D-dimer-2mg/L (Normal-<0.5mg/L) and Serum ferritin-412ng/ml (Normal- 24-336ng/ml). Chest X-Ray revealed homogenous opacity of right upper and middle zone of lungs. RT-PCR for Covid-19 was Positive. Blood culture sensitivity isolated no organism. 2D Echo suggestive of Mild Pulmonary artery hypertension. IV antibiotics and oral antiviral were started; IV Sildinafil and IV Thiamine were added as a part of the management. In view of deranged coagulation profile and Endotracheal tube bleed, Fresh frozen plasma (FFP) was transfused, Packed red blood cell (PRBC) transfusion i/v/o Anemia. The child was pulsed with IV Methyl Prednisolone (10mg/kg/day for 3 days) in view of Misc.

3 days later, repeat chest X-ray showed added features of non-homogenous opacity involving right lower zone and left upper and middle zone. High resolution CT Thorax (Hrct Thorax) revealed features of multiple areas of ground glass opacity in right middle and lower lobe with lung consolidation and air bronchogram in right upper lobe and lower lobe suggestive of viral pneumonitis (Corad 5) and CT severity score of 7/25. The baby was initiated on tube feeds and gradually made full feeds.

7 days later, the baby had 2 episodes of convulsions, Non-contrast CT-Brain (NCCT-Brain) was done to rule out intracranial bleed, which showed benign enlargement of Subarachnoid space in the bilateral frontoparietal region with severe frontoparietal cerebral atrophy.

MRI-Brain showed widening of bifrontal and anterior Interhemispheric spaces with mild atrophy of bilateral frontoparietal region. Convulsions resolved after being treated with IV Anti-epileptic, Levetiracetam. The baby was discharged on day 20 of admission. He was diagnosed with Severe Covid-19 (Cat C) with pneumonitis, mild Pulmonary Artery Hypertension, MISC, and Seizures.

Case 2: A 3years old female child presented with h/o moderate-high grade fever since 1week, with rashes initially over back progressing to abdomen, face and limbs on day 2 of illness, loose stools of 5-6episodes/day and vomiting of 3-4episodes/day since day 4 of illness. Child and entire family had significant past H/o fever 3weeks back, none evaluated for Covid-19. The child is a 3rd order by birth to a NCM couple, delivered prematurely with birth weight of 1.9kgs and h/o NICU stay for 10days for VLBW and Apnea. On Examination, the child was drowsy with GCS-13/15. Head to toe Examination revealed Pallor, Facial puffiness with periorbital edema and healing rashes over body; Vitals- Heart rate-126bpm, Pulse volume-good, Capillary refill time-<3secs, Respiratory rate-40cpm, Blood pressure-90/64mmHg and Temperature-100F. On Abdominal examination, Abdomen was distended with girth of 47cms, Hepatomegaly was present- liver span of 10cms and Splenomegaly with span of 7cms. Other systems examination was unremarkable. Child tested negative for covid-19 RT-PCR. On investigation, Hb-8.3gm%, TLC-15700/ mcL, N-67% and Lymphocytes-25%, Platelet-28000/mcL and ESR-10; Deranged LFT with Total Bilirubin-1.1, Direct Bilirubin-0.4 and Albumin-2.2; Dyselectrolytemia with Sodium-127, Potassium-3 and Chloride-107; Deranged Coagulation profile PT-16.1, APTT-50.1 and INR-1.13 and elevated inflammatory markers with D-dimer-8mg/L, Serum ferritin-380ng/ml, Brain Natriuretic Peptide-29881pg/ml(Normal: 0-300pg/ml) and positive SARS CoV2 IgG and IgM antibodies >10 (>/=1.0- positive). Blood and urine cultures showed no growth. 2D ECHO revealed Right and Left atrial dilatation with mild Tricuspid regurgitation and Left Ventricular Ejection fraction of 30% with global hypokinesia. Chest Xray – B/L Mild Pleural effusion. USG revealed Hepatosplenomegaly with bilateral mild pleural effusion and mild ascites. The child treated with IV Antibiotics, Inj Lasix infusion, Pulse IV Methyl Prednisolone (10mg/kg/day for 3 days) and IV Immunoglobulin at 2gm/kg, for which she responded well. The child was discharged with the final diagnosis of MISC, Post-covid-19.

Case 3: A 11 months old male child born to a NCM couple, first order by birth. The child presented with H/o fever and 2 episodes of GTCS. On admission, the child was active, with normal vitals and normal CNS examination and other system examination. The child had episodes of loose stools on day-2 of admission with no signs of dehydration. He was tested RT-PCR Positive. Blood investigations showed Platelet-75000/ mcL, CRP-12mg/L, Electrolytes: Sodium-132meq/L, Potassium- 3.8meq/L, Chloride-102meq/L, Calcium-10mg/dl (Normal-9.5-11mg/dl) and blood culture showed no growth and elevated inflammatory markers with D-dimer-6mg/L and Serum ferritin-380ng/ml. CSF analysis was normal and showed no growth. The child was started on IV anti-epileptics, IV antibiotics and IV Methylprednisolone; and was discharged on day 10 of admission with the final diagnosis of Moderate covid-19 (Category B) and Atypical febrile seizures.

Case 4: A 11yrs, male patient presented with h/o fever on 6th day of illness, moderate to high grade associated with chills associated with diarrhea of 5 episodes and 2 episodes of vomiting. The child tested RT PCR positive for COVID-19. On admission, he was conscious, oriented, but febrile (temperature-102F). On examination had tachycardia with Heart rate-130bpm, Pulse volume-good, Capillary refill time-<3secs and Blood pressure-100/64mmHg. On Evaluation, Platelet-60,000/mcL; CRP-12mg/L, D-dimer-5mg/L and Serum ferritin-

380ng/ml. Blood cultures showed no growth. Furthermore, LFT was deranged, OT-98, PT-104, ALP-280 and PT-18, INR-1.2 was prolonged; the child was diagnosed to have DIC for which he was transfused with FFP at 15ml/kg/day till coagulation parameters normalized. Meantime, he was also started on IV Steroids for which he responded well; both by clinically and labs. He was discharged on day 8 of admission with the final diagnosis of Moderate COVID-19 (Category B) with MISC and DIC.

Case 5: A 12yrs old male child presented with fever, cough and cold since 15days; with loose stools, vomiting and pain abdomen since 3days. On admission, Saturation was 88% at room air. Head to toe examination showed pallor and Anasarca. On Examination- reduced bilateral air entry and tenderness in epigastric and right hypochondriac regions.

Blood investigations showed TLC-25000/mcL with N-90%, L-8% and Platelet- 500000/mcL; ESR- 20mm/hr, CRP- 24mg/L, and Mild azotemia with Creatinie-1.5mg/dl (Normal- 0.3-0.7mg/dl), Urea-50mg/dl (Normal-7-20mg/dl) and elevated inflammatory markers with D-dimer-10mg/L and Serum ferritin-480ng/ml. RT PCR done was positive with normal liver and renal function test. Chest X-ray revealed Right pleural effusion with consolidation. 2D ECHO suggested Left Ventricular dysfunction with global hypokinesia, Ejection fraction- 35%. The child was treated with emperic IV antibiotics and Anti-Hypertensives including a diuretic. Blood culture isolated no organism. In view of worsening of inflammatory markers, pulsed with IV Methyl Prednisolone for 3days and continued with tapering doses of oral steroids. The child was discharged after 17days of admission with the final diagnosis of Severe COVID-19 (Category C), MISC, with hypertensive emergency with Acute Kidney injury (Recovered) and Acute Left ventricular failure.

Discussion

SARS-CoV-2 infections have been reported around the world in the last six months, and our understanding of the disease and its epidemiologic and clinical characteristics is still evolving. Identification of clinical and laboratory characteristics in the pediatric population is critical to guide clinical management, identify disease severity, and determine prognosis in the phase of this rapidly growing novel virus.

The clinical, biochemical, and radiologic characteristics of COVID-19 in children were reported in our systematic review. Unlike adults, children rarely developed severe respiratory problems that necessitated hospitalization to an intensive care unit.

The causes for children's severity being lower than those of adults have been proposed [4]

1. Children's ACE 2 receptors have a reduced affinity for SARS-CoV 2 and a different distribution across the body, making it more difficult for it to enter cells.
2. Age-related differences in immune responses: a stronger innate immune response and a weaker adaptive immune response, resulting in less hyperinflation.
3. Recurrent and concurrent infections with other pathogens could aid in the fight against SARS-CoV 2.
4. Cross reactive coronavirus antibodies and T cells: In younger age groups, preexisting neutralising antibodies and T cell immunity to commonly circulating HCoV cross protect against SARS CoV2.
5. Microbiota: Microbial interactions and competition may limit SARS CoV2 colonisation and growth.
6. Melatonin inhibits calmodulin, increasing ACE 2 expression and retention on the cell surface.
7. BCG and other live vaccines influence innate and T

cell immunity by altering cytokine responses and epigenetic reprogramming of immune cells.

8. Another factor that may contribute to less severe disease in children is a lower intensity of viral exposure.

Serum inflammatory markers were consistently abnormal in the patients included in this review. In terms of imaging findings, we found out that majority of patients had abnormal chest x-rays. The most common finding on CT was diffuse bilateral ground-glass opacities at all stages of disease. Several studies have been conducted. Li Zhu MD and et al reported a 10-case series with Corona Virus in 1-18yrs patients and concluded that, when compared to adult patients, COVID-19 children present with less severe symptoms and have better outcomes [5]. Ansel Hoang et al studied COVID-19 in 7780 patients and found evidence that children with COVID-19 have an overall good prognosis [6].

Conclusion

The 90 COVID positive cases admitted to our hospital, all of which were successfully managed and discharged with no morbidity or mortality; with the exception of this case series, which required intensive care support. This case series demonstrates that children with covid-19 present with a variety of critical clinical manifestations, all of which were successfully treated.

References

1. World Health Organization. Laboratory diagnostics for novel coronavirus. 2020. https://www.who.int/health-topics/coronavirus/ laboratory-diagnostics- for-novel-coronavirus. Accessed February 6, 2020.Google Scholar

2. Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet. 2020; 395: 497- 506. Crossref CAS PubMed Web of Science® Google Scholar

3. Jasper Fuk-Woo Chan, Kelvin Kai-Wang To, Kwok-Yung Yuen. A case series of children with Coronavirus disease 2019- what have we learned? Clinical Infectious Diseases, Volume 71, Issue 6, 15 September 2020, Pages 1552–1553, https://doi.org/10.1093/cid/ ciaa469

4. Zimmermann P, Curtis N. Arch Dis Child 2021;106:429–439. doi:10.1136/archdischild-2020-320338

5. Li Zhu MD, Jian Wang MD, Rui Huang MD, et al. Clinical characteristics of a case series of children with coronary disease 2019 in Jiangsu province, China. https://doi.org/10.1002/ppul.24767 @Wiley online library

6. Ansel Hoang, Kevin Chorath, Axel Moreira, et al. COVID19 in 7780 paediatric patients: A systematic review VOLUME 24, 100433, JULY 01, 2020 https://doi.org/10.1016/j.eclinm. 2020.100433.