

To study clinical characteristics, laboratory diagnosis, treatment strategy and outcome of pediatric covid-19 infection in hadoti region of Rajasthan

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Abstract

Introduction: The earth is facing new challenges with COVID-19 disease caused by novel SARS-COV-2. Pediatric COVID-19 is considered to be mild but pediatric population is population that is least immunized and is on the risk for developing more severe COVID-19 in following waves. Therefore, local data related to epidemiology as well as clinical characteristics of COVID-19 among children.

Aim and objectives: To study clinical characteristics, laboratory diagnosis, treatment strategy and outcome of pediatric Covid-19 infection in Hadoti region of Rajasthan.

Materials and method: Descriptive cross-sectional study conducted in J K Lone hospital (Govt Medical College, Kota) from April 2020 to July 2020. A total of 35 children (24 Male & 11 Female) 0-19 years of age with confirmed diagnosis of COVID-19 using RT-PCR admitted in department of pediatrics or all symptomatic close contacts with COVID-19 patients.

Statistical Analysis: The student t test & Chi Squire test used to analyze the data.

Results: Among 35 patients admitted for Covid-19 positive infection whose age ranged between 0-19 yrs, mean age was 3.8074+-1.492, median was 1.5 with IQR 7. Fever found positive in 71.4% and cough in 57.1% were the most common clinical symptoms. RT-PCR was positive among 82.9% cases, D-Dimer was positive among 20.0% and CRP among 17.1% cases. There were 24 male children, among whom 12 needed oxygen support and 3 died. While in female children 2 needed oxygen support and no one died. Male sex was not a predictor of mortality (odds ratio=3.74, CI=0.17-79 and P VALUE=0.39). Oxygen support has significant effect on mortality (odds ratio=27.35, CI=0.32- 281.6, P VALUE=0.046).

Among all symptoms notified there were no significant differences between severe and milder cases, or between those who deceased and recovered. Laterality, ground-

glass opacity, and lung consolidation were the most common findings in chest computed tomography.

Conclusion: The findings demonstrate that the COVID-19 illness can manifest in a number of distinct ways in youngsters. Although the fact that there was a relatively low hospitalization rate but 8.6% mortality rate was quite alarming.

Keywords: Children, COVID-19, Outcomes, Severity.

Introduction

At the tail end of 2019, a rapid epidemic of the new severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was found in China, and it subsequently expanded throughout the rest of the world.[1]The World Health Organization (WHO) recognized this condition as a pandemic, naming it the COVID-19 sickness.[2]This was a severe respiratory illness that posed a significant risk to people's health all across the world.[3]Infection with the SARS-CoV-2 virus can occur in humans; however, the clinical manifestations of the disease and the results of treatment might vary greatly from patient to patient.[4]

Patients who already have a preexisting condition, such as diabetes, hypertension, cardiovascular disease, or chronic bronchitis, are more likely to pass away as a result of the disease and have a significantly higher case fatality rate.[5] The severity of COVID-19 is determined by a complex interplay between the virus, the host, and the environment, which results in various clinical courses and illness consequences.[6,7] It is essential to note that the illness burden that has been documented and the case fatality rates vary greatly between age groups.[8,9] In children, COVID-19 infection often results in a mild infectious illness; however, a small percentage of those infected go on to develop significant consequences such as the multisystem inflammatory syndrome (MIS-C).[10,11]

When compared with adults, children have a reduced infection incidence with COVID-19 around the globe, including in India, along with symptoms that are often less severe. [12-14] In addition to this, maximum children < 19 yrs. have not displayed any symptoms. Children admitted to the hospital with COVID-19 typically present with symptoms such as diarrhea, fever, nausea, and respiratory infections, including coughs. Higher incidences of these symptoms are typically observed in boys as opposed to girls, suggesting that biological factors may play a role. [13,14]

Rates of severe illness in children infected with COVID-19 are often lower than those found in adults. [13,15] This ranges from roughly 6 percent to 10 percent of infected children. Because of this, the primary concern of health authorities for children during the early stages of the pandemic was the prevention of other infectious diseases. This was especially the case given the concerns regarding the low vaccination rates that followed the implementation of lockdown procedures and the subsequent impact on future morbidity and mortality.[16] However, there are growing concerns with successive waves of COVID-19 where younger patients are being treated in India and across countries, with increasing mortality seen among younger patients. [12,13] These concerns are a result of the fact that younger patients are being treated in India and across countries. In addition, there are concerns that children are developing Kawasaki disease (KD) like symptoms or multisystem inflammatory syndromes. [14,17,18]

Furthermore, children who have COVID-19 are experiencing hyponatremia, hypoalbuminemia, gastrointestinal changes, leucopenia, and respiratory changes,[14] which could lead to an increase in admissions to intensive care units (ICU). This can be problematic because, in low- and middle-income

countries (LMICs), a lower percentage of children with severe symptoms are admitted to intensive care units (ICUs), but the mortality rate among hospitalized children is often greater.[14,15] This is demonstrated by the fact that mortality rates from COVID-19 among hospitalized children reached 13.3 percent at Dhaka Shishu (Children's) Hospital, Bangladesh, during the beginning of the pandemic; nevertheless, these rates were found to be reduced in later investigations.[14] At the outset of the pandemic, substantial fatality rates, reaching up to forty percent, were also been reported.[19]

Aim and Objective – To study clinical characteristics, laboratory diagnosis, treatment strategy and outcomes of paediatric COVID-19 infection in Hadoti region of Rajasthan.

Materials and method

Study design: Descriptive Cross-Sectional Study.

Study period: 4 months (April 2020 to July 2020).

Study place: Government Medical College, Kota.

Sample size: All cases admitted during study period.

Study procedure

Inclusion criteria – The study includes all symptomatic children (0-19 yrs) with confirmed diagnosis of covid-19 using RT-PCR admitted in department of paediatric, J K

Results

35 pediatric patients were taken, whose age ranged from 0 to 19 years, mean age was 3.8074+-1.492, median was 1.5 with IQR is 7. RTPCR was positive among 82.9% cases.

Table 1: According to Gender

	No of Patient
Male	24
Female	11

Table 2: According to Clinical Features

	Frequency	Percent
Fever	25	71.4%
Cough	20	57.1%
Respiratory Distress	14	40.0%

Lone Hospital, Kota. All symptomatic patients having history of close household contact with covid-19 positive patient.

Exclusion criteria: The study excluded all symptomatic children (0-19 yrs.) who tested negative for covid-19 using RT-PCR. No contact history found.

Data collected: All identifying data such as age & gender as well as admission and discharge dates were noted. Age, gender, prior co-morbidity and method of presentation were included. Clinical course and its specific characteristics, provision of respiratory support, adjunctive respiratory and other organ support recorded. Use of pharmacotherapy, survival rate, length of time spent in ICU, overall length of hospital stay was some clinical outcome that were measured.

Statistical analysis

SPSS version 25.0 analyzed the Excel data when it was loaded. Quantitative (numerical variables) data was given as mean and standard deviation, whereas qualitative (categorical variables) data was provided as frequency and percentage. The student t-test was used to compare the two groups' mean values, while the chi-square test analyzed their frequency differences. If p value 0.05, it was statistically significant.

There was Fever among 71.4%, Cough among 57.1% and Respiratory Distress among 40.0% cases.

Table 3: According to Laboratory Investigation

	Mean Value + - std dev	Frequency	Percent
RT-PCR		29	82.8%
D-DIMER	0.88+-0.591 mg/ml	7	20.0%
CRP	76.58+-56.88 mg/lt	6	17.1%

RT-PCR was positive among 82.8% cases' -DIMER was positive among 20.0% and CRP among 17.1% cases.

Table 4: According to Radiological Investigation

HRCT	Frequency	Percent
Not Done	31	88.6%
Corad (Covid-19 Reporting & Data System-3)	1	2.9%
Mild RT Pleural Effusion Mild Cardiomegaly	1	2.9%
Multiple Area of Consolidation With B/L Pneumonia Corad-4	1	2.9%
(Minimal To Mild) Corad-1	1	2.9%

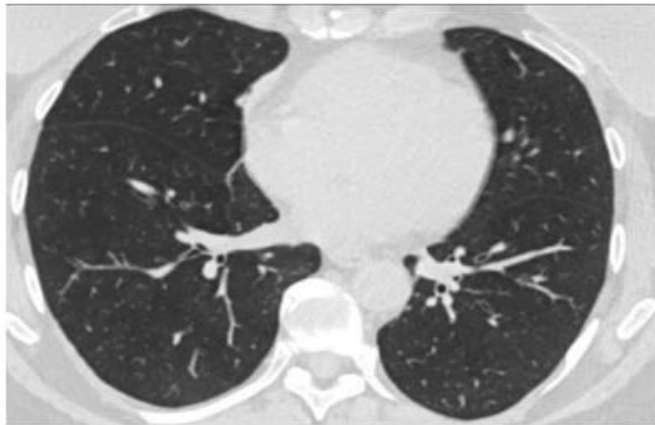


Figure 1: HRCT chest (COVID-19 Reporting and data system-3)

Table 5: According to Treatment

	Frequency	Percent
Oxygen	15	42.8%
Mechanical ventilator	3	8.6%
Antibiotic	35	100%
Steroids	19	54.3%
IV Ig	3	8.6%
Enoxaparin	10	28.6%

Table 6: Final Outcome

Diagnosis & Outcome	Frequency	Percent
Death	3	8.6%
Discharge	32	91.8%

Table 7: Predictors of Outcome in Paediatric Inpatients

	Death (3)	Discharge (32)	OR 95% CI	P value
MEAN AGE AT PRESENTATION	1.3 YEARS	4.1 YEARS	7.2 (0.14- 2.15)	0.83
MALE	3	21	3.74 (0.17-79)	0.001
FEMALE	0	11	4.52 (1.1-26.4)	0.0001
RESPIRATORY DISTRESS	3	11	13.08 (0.62-276)	0.024
RTPCR	3	26	1.7 (0.07-37.54)	0.002
D DIMER	0	7	.48 (0.022-10.49)	0.0001
OXYGEN SUPPORT	3	12	27.35(0.32- 281.6)	0.046
STEROIDS	3	16	7(0.33-146.45)	0.031

There were 24 male children, among whom 12 needed oxygen support and 3 died. While in female child 2 needed oxygen and no one died. Male sex was not a predictor of mortality (odds ratio=3.74, CI=0.17-79 and P VALUE=0.39). Oxygen support has significant effect on mortality (odds ratio=27.35, CI=0.32- 281.6, P VALUE=0.046).

Discussion

Comparison between few Indian studies and our study

Table 7

Author	Study Place	Design	Aim	Result & Conclusion
Jhuma Somkar (April 2020)	AIIMS New Delhi	Observational Study	Clinical approach & management in COVID-19 children	In this study most common clinical feature was cough 48.5% followed by fever 41.5%, respiratory distress 28.7%, diarrhoea 8.8% & RT-PCR positive 93%. In our study most common clinical feature is fever 71.4%, followed by fever cough 57.1%, respiratory distress 40% & RT-PCR positive 82.8%.

Table 8

Author	Study Place	Design	Aim	Result & Conclusion
Santosh Kumar et al.	Various hospitals of India	Point Prevalence study using report forms	Document current management of children with COVID-19 across	Study includes children aged 11 to 18 yrs (70%) similar to our study. Chief clinical feature was respiratory distress, breathing difficulties &

		among 30 hospitals	India	prolonged fever similar to our study. Antibiotics given to 75.3% whereas in study antibiotics given to 100%. 92.2% children fully recovered like in our study.
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Table 9

Author	Study Place	Design	Aim	Result & Conclusion
Prabha Khaire et al.	Govt Madical College and Hospital Aurangabad	Prospective Cross-Sectional Study	Clinical characteristics and outcome of children with COVID-19 infection	Study includes 94 children with median age 4 yrs like our study and age group from 3 days to 12 yrs. Most common symptom was fever 54.3% followed by cough 26.6% & cold 21.3% similar to our study. Amongst inflammatory marker CRP level found raised in 28.7% whereas in our study 17.1% has raised CRP. D-Dimer found raised in 38.3%, in our study 20% shows raised D-Dimer. 11 patients needed oxygen support, in our study 15 needed oxygen support. Mortality found 10.6% similar to our study in which mortality is 8.6%

Table 10

Author	Study Place	Design	Aim	Result & Conclusion
Ravindra Kumar (October 2020)	Patna (Bihar)	Observational study (Retrosproctive)	Clinical profile and outcome of COVID-19 in pediatric age group	Most common clinical symptom was cough 27% followed by fever 24% & sore throat 18%. Where as in our study cough is in 57.1% but fever found most common symptom in 71.4% patients.

The recovery rates of 92.2% are comparable to those observed in other countries, [14,18] with complete recovery being observed in 80% of the hospitals that participated in the study. This was a noticeably significant improvement in comparison to the high rates of death that were seen in Bangladesh and Indonesia at the beginning of the pandemic. [14,19] This may be a result of an improvement in understanding on the treatment of multisystem inflammatory disorders in children as well as updated recommendations from reputable organizations such as the WHO and the British Medical Journal. [5,14]

Only a very small number of children were admitted to hospitals with COVID-19 out of the total number of patients in the paediatric wards. This finding is consistent with previous recent studies. [14,27] In line with the findings of other research, there were significantly more boys than girls who tested positive for COVID-19. [13,14,20] The majority of the patients were older than 11 years old.

Among Children with COVID-19, there was significant prescribing of vitamin C and D as well as zinc, in line with recommendations. [14,21,22] respiratory diseases, including coughing as well as fever, were the most

common reasons for children to be admitted to the participating hospitals in India. This finding is consistent with other studies conducted in other countries. [14,15,20]

Nevertheless, there were quite a few causes for concern in several sectors. Antimicrobials were prescribed to a significant number of the hospitalised youngsters. These treatments comprised antibiotics, antimalarials, antivirals, and antiparasitic drugs. Antibiotics were recommended for 75.3% of children as a whole, mostly from the WHO Watch list (which was used by 76.77% of the participating institutions) and often based on empirical evidence (68.3 percent). Empiric prescription was used once again in Bangladesh, where a situation quite similar to this one was seen (87.4 percent of hospitalized children were given antibiotics), as shown in. [14]

As would be expected, most of these patients presented with respiratory symptoms which was similar to the findings by Shekerdemian et al. [23] This appears to be lower than in a recently published case series in critically sick adults from the region around Seattle, Washington,[24] where severe hypoxemic respiratory failure was evident in all of the patients who were brought to the intensive care units (ICUs).

Shekerdemian et al. [23] reported that Three patients were still being ventilated at the conclusion of the research period out of the total number of patients who required any form of respiratory support. Of the patients who required any form of respiratory support, 18 required either endotracheal or tracheostomy ventilation. Prone ventilation, which has in some centers become nearly standard in both intubated and nonintubated adults with respiratory failure, was utilized in two of the patients in this series. Prone ventilation was employed in both of these patients because they had respiratory failure. The progression of the patient's condition in the

PICU was compounded by the failure of additional organ systems in a significant proportion of individuals. Plasma exchange was performed on one patient who was suffering from multiple system organ failure (renal, circulatory, and hepatic). There was no patient who started receiving renal replacement treatment.

Najafinejad et al. [25] postulated that the three most prevalent findings in chest CT were lateralization, ground-glass opacity, and consolidation of the lungs. According to Serrano and colleagues' findings, ninety percent of paediatric patients exhibited ground-glass opacities.^[26]

In contrast to recent research that was conducted in the UK and revealed that there was no effusion.^[27] In light of the fact that children in the COVID-19 study exhibited very moderate clinical manifestations, the CT scan appears to be a more trustworthy approach than the chest X-ray. Because of the higher danger of radiation exposure during CT scans, alternative modalities of imaging are sometimes chosen to be used in youngsters. This is because of the worry about the increased risk. Utilization of imaging and CT data in an appropriate manner can enhance early diagnosis as well as clinical therapy at various stages of the disease.^[28] Chest CT scans are the most typical imaging procedure used in paediatric patients who have had COVID-19 verified as the cause of their pneumonia.

Limitations: Small sample size, short term follow up.

Conclusion

The global pandemic of COVID-19 is still active, and contrary to what was previously believed, an alarmingly high number of children have become infected and died as a result. Comorbidity was the primary risk factor for mortality from COVID-19 illness among the children who were hospitalised to our hospital in Rajasthan. As possible signs of a severe illness or a fatal end, we may

offer radiologically verified laterality, ground-glass opacity, and an increase of several biomarkers. Even though there were relatively few children who were taken to the hospital, the high fatality rate is cause for concern and ought to lead to additional in-depth research. It is possible that the rates of patient death and morbidity were inflated in our study due to the fact that we only included hospitalized cases and the number of patients was restricted.

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