



Original Research Article

Observational study on clinical profile and outcome of COVID 19 in pediatric age group in COVID dedicated hospital at Patna

Ravindra Kumar^{1,*}, Saroj Kumar²

¹Dept. of paediatrics, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India

²Dept. of Pediatrics, Nalanda Medical College & Hospital, Patna, Bihar, India



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ABSTRACT

Objective: COVID-19 is an extremely infectious disease. Few studies have focused on the clinical profile and outcome of pediatric COVID-19. This study conducted a retrospective review of the clinical features of COVID-19 in 100 children (age group 6 month -14 years) at NMCH, Patna and the objective was to assess clinical profiles of children infected with the 2019 novel coronavirus, SARS-CoV-2 (COVID-19) and their outcomes.

Materials and Methods : A retrospective study was conducted on children admitted with a definite diagnosis of COVID-19 in Bihar using RT-PCR using nasopharyngeal swab. Records of patients were examined and data were analyzed to draw conclusions which will help in better management and prognostication of future cases.

Results : Hundred children aged 6 months to 14 years were included. All of them were RT-PCR confirmed cases. Asymptomatic cases accounted for - 20 %, of which 30% had abnormal chest radiologic findings. A majority of pediatric COVID-19 cases showed mild to moderate clinical features, and only a few developed severe diseases (10 % of total). Two patients died, both of which had co- morbidities. Besides respiratory symptoms, gastrointestinal and atypical features such as neurological symptoms and multisystem inflammation are also reported. Younger infants and those with co-morbidities (like leukemia and chronic kidney disease) were found to be at risk of severe illness. It is possible to manage the children with mild disease at home, with strict infection prevention control measures; severely affected require respiratory support and intensive care management. Fever (77.9%) and cough (32.4%) were the predominant presenting symptoms of pediatric COVID-19. The pediatric patients had fewer underlying diseases and complications than adults. The treatment modalities for pediatric COVID-19 patients were not as complex as those of adult COVID-19 patients. The overall prognosis of pediatric COVID-19 was good with a better recovery. The average time from onset to cure was 14 days.

Conclusions : Compared to adults, COVID-19 in children has distinct features of epidemiology and clinical manifestations. The outcome and prognosis in children was better as compared to adults and elderly patients admitted in that hospital .The findings from this study might help to guide the development of measures to better prevent and manage this ongoing global pandemic.

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1. Introduction

The 2019 corona virus outbreak in Wuhan (Hubei Province of China) has been attributed to severe acute respiratory syndrome corona virus -2 (SARS-CoV-2).¹ Termed corona

virus disease 2019 (COVID-19) by the World Health Organization (WHO), it has been designated a Public Health Emergency of International Concern (PHEIC).² At present, there are more than hundred countries affected.³ Data have shown that adult patients with COVID-19 present with fever, dry cough, dyspnea, fatigue, and lymphopenia. Serious pneumonia may also ensue, more often in elderly

* Corresponding author.

E-mail address: raviaryan@gmail.com (R. Kumar).

adult men and those with chronic co-morbidities, posing greater risk of severe acute respiratory syndrome and even death.

Although all humans are susceptible to SARS-CoV-2, it does appear that COVID-19 occurs less and is less severe in children than in adults.⁴ There are some reports of pediatric vulnerability,⁵ without comprehensive analysis or conclusive proof. To help address this issue and to determine whether the outcome of children is different from adults, we went retrospectively through clinical data of our patients. Our findings conclude to some distinctive differences, which may help in better managing children hereafter.

The data from various parts of the world shows that the percentage of children amongst the total number of COVID-19-affected patients was quite small and most of them developed milder form of illness.⁶ One study from China has reported that children aged below 10 yr have the same susceptibility as adults to get infected, but unlikely to develop severe disease.⁷ Another study from China⁸ supports the concept that children are less susceptible to COVID-19 compared to adults. Our study is showing the age group-wise distribution of cases, course of disease in different age groups, treatment given and outcome.

2. Materials and Methods

This retrospective study was carried out in Nalanda Medical College and Hospital, Bihar (a tertiary care hospital of Bihar dedicated to COVID). We took data of patients aged between 6 months to 14 years admitted with RT-PCR confirmed COVID-19 in the pediatric department from June 2020 to Oct 2020. A total of 100 patients were admitted during this period. Data collected on patients included: age, sex, duration of hospital stay, presence of comorbidities, clinical presentation, lab findings, treatment given and outcome.

Table 1: Demographic features and outcome.

Variables	Numbers
Admissions	100
Age 6 month -5 years	63
Age 5-10 years	35
Age >10 years	12
male	67
females	33
Duration of hospital stay	10-14 days
Presence of co-morbidities	10
Mortality	2

3. Results

Among 100 patients admitted during above time period, 67 were males and 33 were females. Majority of the children were less than 10 years of age (mostly less than 5 years

of age). The clinical presentation was most commonly in form of fever and cough. The duration of hospital stay was between 10 -14 days. 10 patients were having pre-existing co-morbidities like chronic kidney disease, leukemia, obesity, nephrotic syndrome, SLE, ITP, etc. Treatment given to them according to the severity of symptoms, vital parameters, lab findings and presence of complications. Two of them succumbed to the complications and rest were discharged with follow-up advice.

Table 2: Clinical symptoms of children.

Symptoms	Numbers
Cough	50
Fever	46
Rhinorrhoea	9
Gastrointestinal symptoms	15
Sore throat	35
Loss of smell and taste	10
asymptomatic	20

Table 3: Laboratory findings

Lab findings	Numbers
Lung consolidation	53
Ground glass opacities	20
lymphocytopenia	31
thrombocytopenia	30
Raised D-Dimer	10
Raised procalcitonin	17
Raised CKMB	31
Raised LDH	12
Liver enzymes raised	1

In COVID-19 patients, abnormalities are noted in routine laboratory tests as well, which may be helpful in clinical assessment and prognostication. In general, leucopenia, lymphopaenia and thrombocytopenia are noted in both adults and children. Increased blood levels of lactate dehydrogenase, procalcitonin and D-dimer are seen in severe disease. In our study of 100 COVID-19-affected children, increased creatine kinase MB (31%), lymphocytopenia (31%), leucopenia (19%) and increased procalcitonin levels (17%) were the typical findings observed. Variables significantly associated with severe disease were increased levels of D-dimer, procalcitonin and creatine kinase MB and decreased lymphocytes. D-dimer levels may be useful to estimate the severity of COVID-19. Increased procalcitonin values may lead to about five-fold increased risk of severe disease. Liver enzymes were typically not found to be raised in children in contrast to adults. A study has reported elevated procalcitonin levels and consolidation with surrounding halo sign in the chest CT scan as characteristic features in children.

Due to benign course in most affected children, supportive care, oxygen therapy, and azithromycin, zinc and

multivitamins were adequate in treating them. According to disease staging, antivirals may be beneficial at the beginning of the disease, but they are not routinely recommended in children and should be used in severe cases along with corticosteroids, high flow oxygen and ventilatory support. In our study of 100 children, intensive care was needed in patients having co –morbidity.

4. Discussion

The most common symptoms in children are cough and/or fever.⁹ A recent systematic review estimated that 16% of children with SARS-CoV-2 infection are asymptomatic,¹⁰ but evidence suggests that as many as half of pediatric infections may be asymptomatic. The signs and symptoms of COVID-19 in children are similar to those of other infections like influenza, streptococcal pharyngitis, and allergic rhinitis. The lack of specificity of signs or symptoms and the significant proportion of asymptomatic infections make symptom-based screening for identification of SARS-CoV-2 in children particularly challenging.¹¹

Children with COVID -19 are less likely to develop severe illness compared to adults, but are still at risk of developing complications from COVID-19 especially those with comorbidities. Current evidence suggests that children with certain underlying medical conditions and infants (age <1 year) might be at increased risk for severe illness from SARS-CoV-2 infection.¹¹ Of the children who developed severe illness from COVID-19, most have had underlying medical conditions.¹²

1. There is evidence to suggest that pediatric patients having some medical conditions (like genetic, neurologic, metabolic), or with congenital heart disease are likely to be at high risk for severe illness from COVID-19. Similar to adults, children with obesity, diabetes, and chronic lung disease, sickle cell disease, or immune-suppression might also be at increased risk for severe illness and complications from COVID-19.
2. Studies have shown that obesity was the most common underlying condition.¹² Similar to adults, children with severe COVID-19 may develop complications like respiratory failure, myocarditis, shock, acute renal failure, coagulopathy, and multi-organ system failure. Some children with COVID-19 have developed other serious problems like intussusception or diabetic ketoacidosis.¹³ Children infected with SARS-CoV-2 are also at risk for developing Multisystem Inflammatory Syndrome in Children (MIS-C).¹⁴

Real time RT-PCR test is the method of choice for diagnosis of COVID-19. Nasopharyngeal or throat swabs are the preferred specimens, and viral nucleic acid amplification test (NAAT) employing real-time RT-PCR is performed. A sample is considered positive if any of the target genes

are amplified from an area with known SARS-CoV-2 circulation. Another nucleic acid assay for the detection of SARS-CoV-2 under development is reverse-transcription loop-mediated isothermal amplification (LAMP).¹⁵ This is a rapid and cost-effective assay as it requires only heating and visual inspection. This test is shown to be effective in detecting SARS-CoV-2 viral RNA and may be used as an alternative tool for RT-PCR, however, needs validation for clinical application. Although real-time RT-PCR is the gold standard method, serological assays can be useful especially in resource-limited settings but needs more studies. IgM and IgG tests are available in ELISA and also as a rapid test format. Serological tests are not very useful for diagnosis in early phase of the disease because antibodies take time to develop.¹⁶ However, serological tests are recommended for epidemiologic research and disease surveillance. These are especially useful in retrospective identification of asymptomatic cases, and to identify and monitor individuals recovered from COVID-19 infection whose antibodies may be used to treat patients through convalescent plasma therapy. Utility of serological assays, alone or in combination with RT-PCR, needs to be explored in children as they may present late to healthcare facilities because of the milder nature of the disease.

Imaging tools such as X-ray and CT scan are useful for diagnosis as well as for assessment of progression of disease and follow up. The most commonly reported X-ray and CT findings of COVID-19 are lung consolidation and ground-glass opacities respectively. COVID-19 and other viral pneumonias generally show pulmonary opacities in more than one lobe, whereas community-acquired bacterial pneumonia is usually unilateral and involves a single lobe. Bilateral multifocal air-space disease with lower lung distribution on X-ray can be an important clue to COVID-19 pneumonia. Peripheral lung involvement is reported as a unique and to some extent a specific feature of COVID-19 pneumonia. Pleural effusions, cavitation in the lungs and pneumothorax are rare features.

CT scan is more sensitive in detecting COVID-19 pulmonary disease in comparison to X-Ray Chest. However, chest X-ray minimizes the risk of cross-infection, which can occur post-CT scan if proper decontamination is not done. X-ray, especially portable, offers several advantages in resource-limited settings. Role of X-ray for diagnosing COVID-19 where RT-PCR facilities are not available needs to be explored.

5. Conclusion

Clinical presentation of COVID-19 is non –specific mostly in the form of cough and fever. COVID -19 has better prognosis in children. Due to benign course in most affected children, it is believed that supportive care, oxygen therapy and multivitamins are adequate. Mortality rates and complications are lesser in pediatric age group.

6. Conflicts of Interest

All contributing authors declare no conflicts of interest.

7. Source of Funding

None.

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Author biography

Ravindra Kumar, Senior Resident

Saroj Kumar, Assistant Professor

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