

Clinico -Epidemiological Profile and Outcome of Pediatric Covid Patient during third wave of Covid infection in Delhi, India

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Abstract

Introduction -

Covid 19 infection has emerged as serious health problem in the world since its emergence. The disease has affected worst to human race because of the unexpected virulence of the disease, lack of preparedness for the pandemic and severe contagious nature of the disease. World Health Organization declared Covid 19 as global pandemic on 11th march 2020. India is among most severely affected countries in this Covid - 19 pandemic with more than 4,58,000 deaths reported by November 2021. The disease spread around the world with 5.9% case fatality rate. Since then multiple peaks of disease has affected the health system and led to morbidity and mortality.

Methods-

It was a retrospective study. The objective of this study was to study the clinical and epidemiological profile and outcome of children during third wave of covid infection in Delhi. All children upto 12 year of age who tested positive for SARS -CoV 2 by RT-PCR from nasopharyngeal swab between 15th December 2022 to 28 February 2022 were enrolled in the study. Outcome of patients was evaluated in terms of mechanical ventilation, need of oxygen, discharge and death. The data collected in Microsoft Excel will be analyzed using IBM Statistical Package for Social Science (SPSS version 21). The summary statistics for categorical variables is done using frequency and percentage and continuous variables as mean (\pm SD).

Results-

Out of 100 children, 61 (61 %) were males. 56 (56%) of total patients were resident of Delhi while 44 (44%) were from adjoining states. Fever was most common (74%) symptoms followed by fast breathing (33%) and cough (28%). Respiratory system was most commonly (39 %) involved followed by Gastrointestinal tract system (16 %) and Central nervous system (15 %). Underlying co-morbidities were present in 22 patients, of these, 12 had underlying hematological problems, followed by Genito-urinary and Gastrointestinal illness in 4 and 3 patients respectively. Oxygen was required in 42 patients and mechanical ventilation in 23 patients. Mild, moderate and severe covid cases were seen in 35, 29 and 36 cases respectively.

Conclusions- In third wave Covid 19 infection in children mainly involved respiratory system. Favourable outcome was seen in children with hemato-oncological co-morbidity.

Key words – SARS CoV 2, Children, India.

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I. Introduction

Covid 19 infection has emerged as serious health problem in the world since its emergence. It has emerged as global pandemic affecting all age groups and causing serious consequences to health of an individual. The disease has affected worst to human race because of the unexpected virulence of the disease, lack of preparedness for the pandemic and severe contagious nature of the disease. Coronavirus disease-19

(COVID-19) is caused by severe acute respiratory syndrome- coronavirus – 2 (SARS-CoV-2), a beta coronavirus, mainly involving adults, and known to cause milder or asymptomatic infection in children as noted during the initial phase of the pandemic [1]. World Health Organisation declared Covid 19 as global pandemic on 11th March 2020 [2]. India is among most severely affected countries in this Covid - 19 pandemic with more than 4,58,000 deaths reported by November 2021 [3]. The disease spread around the world with 5.9% case fatality rate [4]. Since then multiple peaks of disease has affected the health system and led to morbidity and mortality.

The disease has affected humans in waves. First and second covid waves have already affected the health infrastructure with significant morbidity and mortality. The Covid 19 infection affect all age groups, the disease presentation is different in children compared to adults. The presentation in children varies from asymptomatic to serious life threatening illness. The disease has shown variable disease presentation and unpredictable severity of illness. Gaining knowledge on the clinico-epidemiological profile, investigations required, treatment modalities and outcome in children with Covid 19 infection will help in further management of children with covid 19 infection. So the study was planned to study the clinic-epidemiological profile and outcome of Covid 19 infected children in the recent peak.

II. Methods

The study was a retrospective study. The objective of this study was to study the clinical and epidemiological profile and outcome of children during third peak of covid infection in Delhi. The case record forms of all covid 19 infected children upto 12 year of age who presented to our hospital between 15th December 2022 to 28 February 2022 were evaluated after taking approval from the institutional ethics committee (IEC) (IECS. No.-IEC/VMMC/SJH/Project/2022-02/CC-231 dated 28.03.2022). Nasopharyngeal swab of all children were tested positive for SARS -CoV 2 by Reverse transcription -Polymerase Chain Reaction (RT-PCR) test. Age, sex, address, clinical features, laboratory investigations, management etc. during their stay in the hospital was noted in a pre-structured performa. Outcome of patients was evaluated in terms of mechanical ventilation, need of oxygen, discharge and death. The data collected in Microsoft Excel will be analyzed using IBM Statistical Package for Social Science (SPSS version 21). The summary statistics for categorical variables is done using frequency and percentage and continuous variables as mean (\pm SD).

III. Results

A total of 100 children with Covid 19 infection were admitted in our institute over the duration of two and half months. Age of children ranged from 3 days to 12 year of life with a mean age of 3.5 years. Of these, 61 (61 %) were males and 39 (39%) were females. 56 (56%) of total patients were resident of Delhi while 44 (44%) were from adjoining states. The age distribution of patients is shown in Table - 1.

Table – 1 Age distribution of patients (n = 100)

Age	Number of patients (N=100)
≤ 1 month	19
1 month to 1 year	22
1 to 5 years	29
>5 years	30

The clinical manifestations were varied in children with Covid 19 infection with more than one symptom/ sign occurring in same patient. Table - 2 shows the clinical characteristics and frequency of their occurrence (n= 100).

Table – 2 Clinical characteristics and frequency of their occurrence (n= 100).

Symptom/ Sign	Frequency of occurrence (N = 100)
Fever	74
Fast breathing	33
Cough	28
Lethargy	24
Altered sensorium	17
Seizures	13
Loose stool	13
Anemia	11
Shock	9
Presence of co-morbidities	22

Underlying co-morbidities were present in 22 patients, of these, 9 had underlying B cell Acute lymphoblastic leukemia(ALL), Genitourinary illness in 4 patients (Glomerulonephritis, Chronic kidney disease, Nephrotic syndrome) and one each had T-cell ALL, Ewing sarcoma, aplastic anemia, acute pancreatitis, chronic liver disease, neonatal cholestasis, rheumatic heart disease, Down syndrome and HIV infection.

A total of 39 patient (39 %) presented with respiratory system involvement which was the most common system involved in covid 19 infected children. Pneumonia was seen in 33 patients (84.6%), upper respiratory tract infection in 5 (12.8%) and pleural effusion in 1 patient (2.6 %). Gastrointestinal tract involvement was second most common system (16 patients; 16 %) involved, presenting with diarrhea in 11 (68.8%), liver abscess in 2 (12.5%), hepatic encephalopathy in 1 (6.2%), enteric hepatitis in 1(6.2%) and acute pancreatitis in 1 (6.2%) patient. Central nervous system manifestation was third most commonly involved (15 patients; 15 %) with presentation of meningitis in 9 (60%), acute meningo-encephalitis in 3 (20%) and seizures in 3 (20%) patients. Children with underlying hemato-oncological diseases(12 patients; 12 %) presented with febrile neutropenia in 10 (83.3 %) patients and diarrhea in 2 (16.7%) patients. Out of 100 patients, shock was present in 9 (9 %) patients.

Mean hemoglobin (Hb) was 10.1 gm/dl. Children with acute lymphoblastic leukemia (10 patients) had mean Hb of 6 gm/dl. 2 children had severe anemia with mean Hb of 4gm/dl requiring transfusion. One child had aplastic anemia with presenting Hb of 4.5gm/dl. Mean total lymphocyte count(TLC) was 8800/cu mm, most of patients had normal TLC values. Mean platelet count was 1.8 lac/cumm. Children with aplastic anemia and ALL had thrombocytopenia at presentation (mean 60,000/cumm). Semi quantitative CRP was raised in 82 patients with value more than 6mg/dl. 5 children had abnormal kidney function test, with 3 patient had septicemia, one patient had chronic kidney disease and acute glomerulonephritis each. Abnormal liver function test was seen in 3 patients with chronic liver disease with hepatic encephalopathy, acute hepatitis and neonatal cholestasis each.

All the patients were categorized and treated as per the ministry of health and family welfare, Govt. of India guidelines [5]. Oxygen was required in 42 patients and mechanical ventilation in 23 patients. Inotropes was given in 32 patients. Mild covid cases was seen in 35, moderate covid in 29 and severe covid infection was seen in 36 cases.

IV. Discussion

A total of 100 patients were admitted with covid 19 infection during this peak of infection in a tertiary care hospital in north India, where patient from all over Delhi and adjoining states are also referred. Covid 19 infected male patients (61%) were more in number than the females patients and severity of disease was also more in male patients. Slight male preponderance(53.2%) was also seen in previous wave in a study by Khaire et al[6]. More than half of patients were from Delhi, rest all were referred from adjacent states. Underlying illness was seen in 22 patients (22 %), almost similar to a study from south India where underlying co-morbidity was seen in 25%[7] while 19 % in a study conducted in August 2020 by Nallasamy K et al[8]. In our study most common co-morbidity was malignancy(leukemia), many previous studies also found malignancy as coexisting illness. However all patients with underlying malignancy had mild covid infection and were discharged. In previous wave of covid 19 infection, high mortality of 20 % was noted in children with underlying malignancies [9], probably over the time and effect of vaccination in adults have decreased the severity of illness in children also. However chronic neurological condition was found most commonly associated in a study by Sahana et al[7].

Fever (74 %) was most common symptom seen in this peak of covid 19 infection in children followed by fast breathing (38 %) and cough (28 %). Respiratory system was most commonly involved with cough was seen in 28% cases. In a review in USA in 2022, fever (42%) and cough(41%) were main symptoms of presentation in children[10]. We found fever more frequently during this peak of infection and fever along with cough had a very high probability of covid 19 infection. Gastrointestinal system was next most commonly involved. They presented with diarrhoea, hepatitis, hepatic encephalopathy etc. Diarrhea was main presentation in gastrointestinal system involvement. Most common GI clinical features in previous waves seen were nausea, vomiting, diarrhea, abdominal pain, anorexia and intussusception[11]. Next common manifestations were of neurological system, where children presented with acute meningitis, acute encephalitis and seizures. Most of these patients presented with new onset seizures. Previous studies have also shown new onset or recurrence of seizure in a previously seizure controlled child[12]. Atypical manifestations of neurological system was not seen in this covid peak in children, as was noted in previous studies[13] which may be explained by decreased virulence of virus over the period of time.

Acute kidney injury was seen in 6 patients (6%) in contrast to 11.8% in a study in 2021 by Basalely A et. al [14]. One patient had underlying chronic kidney disease and other had T cell ALL. Rest patients developed AKI during the course of illness and had poor outcome.

One patient presented with acute pancreatitis with no previous episode in past. Similar case reports have been documented in the past. In a retrospective study, point prevalence of 1.8% was seen compared to 0.14% in non-covid children[15]. Thus any child with covid 19 infection having severe abdominal pain should be investigated for acute pancreatitis.

Children with underlying hemato-oncological disorders (12 % of patients) had covid 19 infection. Children were diagnosed case of B cell and T cell leukemia, Ewing sarcoma and aplastic anemia. All had favorable outcome from covid 19 infection. During previous waves higher incidence of covid positivity was seen in children with underlying hemato-oncological malignancies that required modification of treatment also[16]. Patient in this peak of infection had a mean time of covid negativity of 8.2 days and did not require chemotherapy modification except in one patient where therapy was withheld till recovery.

Total leucocyte count was found to be in normal range in most of patients, values were affected later in course of illness to leukopenia or leucocytosis. C- reactive protein was raised in patients who had fever and in severe disease. CRP is a good marker for assessing the severity of disease, as also seen in previous studies [7]. CRP, D - dimer , Procalcitonin, Serum Ferritin were markedly raised in severe illness and correlated with the course of illness.

Mainstay of treatment was symptomatic management, supportive care, anti-inflammatory drugs, antimicrobial drugs and corticosteroids as indicated by ministry of health and family welfare, Govt. of India recommendations[5]. Antiviral drugs were not used as no evidence of their use in children less than 12 year of age. Overall survival of patients in our study was 77% .

During the previous phase of pandemic, irrespective of age, headache (62.2%) and fatigue (55.0%) were the two commonest presentations [17]. Contrary to the previous peaks, fever and upper respiratory tract symptoms were more common and none of our children complained about anosmia during the third peak. The study findings might be helpful for primary care physicians, pediatricians and parents for early identification, isolation and appropriate management of children.

V. Conclusion

Covid 19 infection in children mainly involved respiratory system in this peak. Most common symptom was fever (74 %) followed by fast breathing (33 %) and cough (28%). Favourable outcome was seen in children with hemato-oncological co-morbidity cases.

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