

Outcome of recent SARS-COV2 infection on the course and severity of Dengue among children admitted in Government tertiary care hospital of Kanyakumari district

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Abstract

SARS-COV2 pandemic along with the seasonal dengue epidemic has put India’s health care system under pressure. This study was aimed to evaluate recent SARS-COV2 infection on the course and outcomes of dengue fever in children admitted in Kanyakumari Government Medical College. We analyzed 5 patients who had evidence of SARS-COV2 infection by a positive RT-PCR test or COVID antibody titer along with dengue Ig-M positivity. The median age was 8 years. All patients had fever and cough as their primary symptom. 80% of the children had abdominal pain, hepatomegaly and vomiting followed by edema, acute respiratory distress, Irritability, confusion and seizures in 40% cases. 60% patients had dengue with warning signs, 40% patients had dengue without warning signs and

20% patients had compensated dengue shock syndrome and dengue hemorrhagic fever. All the patients had elevated CRP levels. 80% patients had thrombocytopenia with high ferritin levels. 60% of the patients had elevated transaminase levels, Leukopenia, and anemia. 20% of the patients had neutrophilia, hypoalbuminemia, elevated D-dimer and Pro-BNP levels. Abnormal USG abdomen and CXR was found in 60% and 40% of the patients respectively. No one needed mechanical ventilation. Fluid bolus was required in 20% patients and 20% cases needed oxygen through nasal canula and CPAP. Mean duration of hospital stay was 11 days with no mortality. In this study we found out that dengue fever might follow less severe course in children with recent SARS-COV2 infection but high

index of suspicion and recognition of warning signs are needed to prevent mortality.

Keywords: SARS-COV2, Dengue, COVID, Pandemic, Epidemic.

Introduction

Covid-19 Pandemic has created many challenges in the world. Initially it was thought that children affected with Covid-19 were asymptomatic or had mild illness.^[1] But around 2 to 6 weeks after Covid-19 peak, children started to show delayed immune activation to Covid-19 virus and started showing signs of multi-systemic involvement.^[2] In 2021, during the monsoon season in Tamilnadu, there was an increase in Dengue fever, an arboviral infection which is prevalent in South East Asia and significantly contributes to inpatient admissions.^[3] The peaks of SARS CoV2 infection and dengue fever overlapped during the pandemic which caused a significant stress in our health care systems. Several countries have reported cases of Dengue with SARS COV2 infection with variable outcomes. Both these viral infections can cause mild to severe diseases. In dengue infection, Antibody-Dependent Enhancement (ADE) can occur with a second different viral strain resulting in severe disease. The enhancement is believed to be due to FcgR mediated viral uptake.⁴ Thus, a recent SARS-CoV2 infection along with Dengue co-infection can promote ADE and result is severe disease. In this case series, we retrospectively analyze the clinico-

Table 1: Case details of children included in this study

Parameters	
Age (IQR-Median)	8 years
Sex	3:2
COVID serology positive	60%
SARS CoV2 RT PCR positive	40%
Dengue Ig-M positive	100%

demographic features, severity and outcomes of SARS-CoV2 infection with dengue.

Materials and Methods

The case series were collected from the Paediatric intensive care unit of Kanyakumari Government medical college hospital between July 2021 to December 2021. Institutional ethical board clearance and informed consent was obtained from parents before commencement of study. All Consecutive children aged less than 12 years who were diagnosed with Dengue fever by IgM dengue ELISA positivity along with evidence of recent SARS CoV2 was enrolled in this study. Children with Pre-existing immune-deficiency, inflammatory disorder, Malignancy or on immunosuppressants and who did not give consent were excluded from the study. Data collection included demographic information, clinical data, lab investigations, radiological findings, ECHO, treatment, duration of hospital stay and their outcome.

A total of 5 children who had dengue fever (Dengue IgM Positive) along with evidence of recent or acute SARS CoV2 infection (COVID serology/ RT-PCR positive) were analyzed.

Results

In our study, we found that the median age of study population was 8 years with male predominance. The case details are given in Table 1.

Table 2: Symptoms affected in study population:

GI symptoms	
Abdomen pain	80%
Vomiting	80%
Hepatomegaly	80%
Rectal bleed	20%
Muco-cutaneous symptoms	
Oedema	40%
Rash	20%
Lymphadenopathy	20%
CVS symptoms	
Shock	20%
Respiratory symptoms	
Cough	100%
Acute Respiratory distress	40%
Throat pain	20%
Pharyngitis	20%
Renal symptoms	
Oliguria	20%
Renal failure	20%
Neurological symptoms	
Irritability	40%
Confusion	40%
Seizures	40%

Table 3: Severity of Dengue in study population:

Dengue with warning signs	60%
Dengue without Warning signs	40%
Dengue shock syndrome (Compensated)	20%
Dengue hemorrhagic fever	20%
Dengue shock syndrome (decompensated)	0%

Table 4: Lab Parameters in study population:

Elevated CRP	100%
Thrombocytopenia	80%
High ferritin	80%
Elevated transaminase	60%
Abnormal USG abdomen	60%
Anemia	60%
Leukopenia	60%
Abnormal X-ray	40%
RT-PCR positive	40%
Neutrophilia	20%
Hypo-albuminemia	20%
Elevated D dimer	20%
Elevated PRO BNP	20%

Table 5: Management & Outcomes in study population:

PICU Admission	100%
Fluid bolus	20%
O2 via nasal canula	20%
CPAP	20%
Vasoactive support	0%
NIMV	0%
Mechanical ventilation	0%
Mortality	0%
Mean Duration of Hospital stay	11 days

In our study we found out that all patients had fever and cough as their primary symptom (100%) as seen in Table 2. 80% of the children had hepatomegaly, abdominal pain and vomiting. 40% of the patients had edema, acute respiratory distress, irritability, confusion and seizures. Rectal bleeding, rash, Lymphadenopathy, throat pain, pharyngitis, oliguria, renal failure was found in 20% cases. As seen in Table 3, 60% patients had dengue with warning signs, 40% patients had dengue without warning signs, and 20% patients had compensated dengue shock syndrome and dengue

hemorrhagic fever. As seen in table 4, all the patients had elevated CRP levels (100%) followed by thrombocytopenia and high ferritin levels in 80% cases. 60% of the patients had elevated transaminase levels, Leukopenia and anemia. 20% had elevated D-dimer, hypo-albuminemia, neutrophilia and elevated Pro BNP levels. 60% patients had abnormal USG abdomen followed by abnormal CXR in 40% cases. All patients were Dengue IgM Positive. 60% patients were COVID antibody positive, 40% were RT-PCR positive. 20% patients required Oxygen through nasal cannula and

CPAP. No one needed vasoactive support or mechanical ventilation. Fluid bolus was required in 20% patients. Mean duration of hospital stay was 11 days as seen in Table 5.

No children had myocarditis, heart failure, Coronary artery abnormality, acute respiratory failure or decompensated shock. All had normal ESR, serum Triglycerides, LDH, Coagulation profile, sodium levels and ECHO.

Discussion

A considerable overlap between COVID19 pandemic and seasonal dengue outbreak was noted during 2021 in India. There was an increase in dengue positive cases in Tamilnadu due to monsoon rains. On top of the COVID 19 pandemic, dengue put forth lots of challenges in the health care sector. Several studies from different parts of the world have reported a decline in the incidence of respiratory viral infections which can be explained by use of masks, limiting outdoor activities and closure of schools.^[5] The literature on evidence of SARS CoV2 infection on the course of Dengue infection is sparse. The clinical presentation, lab parameters and outcomes were atypical. Coinfections were severe in terms of morbidity but mortality was seen only if it was associated with septic shock, acute respiratory distress syndrome and multi organ failure. Hence this case series was aimed to find out the clinical presentation, severity and outcomes of SARS CoV2 infection in dengue infected children of Kanyakumari district.

In our study we found out that majority of the children had fever and cough as the primary symptoms (100%) followed by hepatomegaly, abdomen pain and vomiting (80%). In a study conducted by Namitha Ravikumar et al^[6], it was found that fever was the most common symptom followed by vomiting (78%), abdomen pain

(68%) and hepatomegaly (68%). In the same study it was reported that 65% children had severe dengue among which 45% had dengue shock and had mean duration of hospital stay as 5 days with 9% mortality but in our study, we found that 20% of children had dengue shock syndrome and dengue hemorrhagic fever with mean duration of hospital stay as 11 days and no mortality. In our study we found that 80 % of the children had thrombocytopenia. In a study conducted by Mejía-Parra JL^[7], it was found that 60% of the children had thrombocytopenia.

This discussion is subjected to limitations as fewer studies and case reports on Dengue severity in SARS CoV2 infected children have been reported to date.

Conclusion

Dengue in SARS CoV2 infected children can be unpredictable posing diagnostic and therapeutic challenges. To reduce double jeopardy, a high index of suspicion, early recognition of symptoms and warning signs are critical. In this present study we found out that dengue fever might follow a less severe course in children with evidence of recent SARS CoV2 infection with increased duration of hospital stay.

Abbreviations

SARS CoV2 – Severe Acute Respiratory Syndrome Coronavirus 2

CRP -C Reactive Protein

ESR- Erythrocyte Sedimentation Rate

USG abdomen- Ultrasound Abdomen

CXR- Chest X-Ray

RT-PCR- Reverse Transcriptase Polymerase Chain Reaction

Pro-BNP- Pro B Type Natriuretic Peptide

LDH- Lactate Dehydrogenase

CPAP- Continuous Positive Airway Pressure

NIMV- Non-Invasive Mechanical Ventilation

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