

## Case Report

# Symptomatic COVID-19 re-infection in a child, three months after primary infection

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### ABSTRACT

The natural course of Coronavirus disease 2019 (COVID-19) is still not fully known. Re-infection with Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) in recovered children has not been reported till date. We describe a case of symptomatic COVID-19 re-infection in a child after an asymptomatic period of three months following an international travel. The child had RT-PCR positivity and systemic inflammation, but did not have multi organ dysfunction as in pediatric inflammatory multisystem syndrome.

**Keywords:** COVID-19, SARS- CoV-2, RT-PCR, Genexpert, PIMS, Re-infection

### INTRODUCTION

Children of all ages are affected by Coronavirus disease 2019 (COVID-19). While most of the children are asymptomatic or are only mildly symptomatic, a few become sick with severe symptoms. Even after more than six months of the world health organization declaring COVID-19 as a pandemic, we are still uncertain about the natural course of the disease. While a positive real time reverse transcriptase polymerase chain reaction (RT-PCR) test late in the course of Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) infection may be due to nonviable viral shedding, re-infection remains a possibility.<sup>1</sup>

Re-infection implies that antibodies produced by natural infections are short lasting. Pediatric inflammatory multisystem syndrome (PIMS) has recently been described in children who present with severe clinical illness. We report the case of a child with second symptomatic illness due to COVID-19 after an asymptomatic period of three months.

### CASE REPORT

Two years old, previously healthy child was diagnosed by RT-PCR test to have COVID-19 illness in May 2020 and became negative (RT-PCR) by June first week. The child remained asymptomatic afterwards. The child had an international travel to India in August and on day nine of arrival developed mild fever and loose stools. Local government health authorities gave home treatment as the family was in quarantine. RT-PCR sample taken on day 11 of arrival was negative. The child was brought to our emergency department as the symptoms worsened. On admission on day 13, genexpert for COVID-19 was positive for E (envelope small membrane protein) and N2 (nucleo capsid protein) gene. Clinical evaluation showed a dehydrated, febrile and lethargic child. Laboratory tests revealed hyponatremia, hypokalemia and high C-reactive protein (CRP 90 mg/l) and erythrocyte sedimentation rate (ESR 50 mm/hr). Other blood and urine tests were normal. A stool routine done showed 15-20/HPF pus cells. Dehydration and electrolyte imbalance was corrected with intravenous fluids. After taking samples for blood and stool cultures,

antibiotics were started. Keeping the possibility of late nonviable viral shedding detected by genexpert which is more sensitive than RT-PCR, another sample for RT-PCR was sent to National institute of virology (NIV), Alappuzha which came positive for E and RdRp (RNA dependent RNA polymerase) genes. As fever was high grade with gastrointestinal symptoms, markers of systemic Inflammatory syndrome like fibrinogen (300 mg/dl), ferritin (180 ng/ml), LDH (317 U/l), D dimer (>40,000 ng/ml) were done. Chest X-ray, electrocardiogram was normal. Blood and stool culture were negative.

The child became afebrile after three days and remained stable without any hypoxia, respiratory or cardiac symptoms. The child was monitored for evidence of thromboembolism. Echocardiogram showed normal cardiac function with normal coronary dimensions. Serial measurements of CRP and D dimer showed a downward trend. After a three day asymptomatic period (by day 10 of illness) her antigen test was negative and was sent for home isolation as per the state protocol and advised follow-up after one week.

## DISCUSSION

Many studies reviewed the possibility of re-infection following a primary COVID-19 infection and late shedding of inactive particles. The median duration of shedding is 12 to 20 days, although it may persist for up to 63 days after symptom onset.<sup>2-8</sup> The clearance of the virus after the infection was studied by serial nasopharyngeal swabs in these studies and all of these patients were asymptomatic even when the tests remained positive. A cohort study by Zheng et al confirmed the hypothesis that later peaks of viral shedding was seen in more severe cases.<sup>4</sup> An immunocompromised state can also prolong viral shedding.<sup>7</sup> Viral whole genome sequencing can be used to find out any mutated genes causing re-infections. A case report from Hong Kong showed that the viral genomes detected in an adult in two episodes of COVID-19 were from two different lineages/clades.<sup>9</sup>

A number of studies have reported pediatric inflammatory multisystem syndrome in children where they present with severe illness with high persistent fever, signs of inflammation and multi organ dysfunction. A case series involving 58 hospitalized children studied the clinical profile of children with PIMS and its temporal association with SARS-CoV-2 and have concluded that this syndrome differs from other pediatric inflammatory entities.<sup>10</sup> This syndrome is described in children with more than two organ involvement with no alternative diagnosis and these children had evidence of recent or current SARS-CoV-2 infection or had contact with a confirmed COVID-19 case at least four weeks prior to the onset of symptoms.

In the present case, the time gap between the primary COVID-19 infection and the current illness was more than three months. There were two documented negative RT-PCR reports for COVID-19 across the three month period. The child became symptomatic with signs of inflammation only after an international travel. Two different tests (RT-PCR and genexpert) for COVID-19 were positive after admission. Even though pediatric inflammatory multisystem syndrome (PIMS) was a possibility, this child did not have a severe clinical illness with multi organ involvement (more than two organs) as described in studies on PIMS. Considering all the above facts, this child was diagnosed to have COVID-19 re-infection.

## CONCLUSION

The current case report necessitates the need for prolonged follow up of COVID-19 patients including children. If re-infections are common, recovered patients will have to comply on social distancing and masking norms. Long term follow up and viral whole genome sequencing done in more patients, especially children, may help us find out the nature of immunity provided by natural infection and the ability of the virus to mutate. This will be important for future research on vaccines.

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