

## Interesting Cases

# COVID-19 Pneumonia in a 3-month-old Infant leading to Post-COVID-19 Interstitial Lung Disease

Farah Meraj Khanam<sup>1</sup>, Shikhar Garg<sup>2</sup>, Harish K Pemde<sup>3</sup>

<sup>1</sup>Senior Resident, <sup>2</sup>Postgraduate Resident, <sup>3</sup>Director, Professor, Department of Paediatrics, Lady Hardinge Medical College, Kalawati Saran Children's Hospital, New Delhi, India.

## I N F O

**Corresponding Author:**

Farah Meraj Khanam, Department of Paediatrics, Lady Hardinge Medical College, Kalawati Saran Children's Hospital, New Delhi, India.

**E-mail Id:**

farahmeraj108@gmail.com

**Orcid Id:**

<https://orcid.org/0000-0002-0193-1996>

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## A B S T R A C T

**Background:** COVID-19 disease is generally considered to be mild in infants and young children. Although there are reports of severe disease being caused due to COVID-19 infection, the incidence of interstitial lung disease post-COVID-19 is extremely rare in infants. We present to you a rare case report of post-COVID-19 interstitial lung disease in a male child of 15 months of age.

**Case Presentation:** A male child of 15 months, with chief complaints of fever since one week, and cough and fast breathing since two days, was admitted. The patient was a well-thriving child till 3 months of age after which the child was admitted twice for similar complaints. HRCT chest was done at three and a half months of age which was suggestive of COVID-19. At fifteen months of age, the child was admitted to our hospital with similar complaints. He was investigated for recurrent respiratory infections, and diseases like cystic fibrosis, primary immunodeficiency, tuberculosis etc. were ruled out. However, COVID-19 serology was positive and the child was diagnosed with post-COVID-19 interstitial lung disease.

**Conclusion:** In our knowledge, there has not been any case where COVID-19 pneumonia has led to chronic lung disease in a 15-month-old child. Also, in this case, the COVID-19 antibodies were persisting even after one year of active disease. However, the common consensus regarding the duration for which antibodies persist after COVID-19 disease is still lacking. After the occurrence of this pandemic, while making a diagnosis, emphasis should be given on the patient's history regarding infection and contact with COVID-19 positive individuals.

**Keywords:** COVID-19 Pandemic, Severe COVID, Infant, Post-COVID-19 Interstitial Lung Disease, COVID-19 Serology

**Introduction**

COVID-19 pandemic, caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), has affected all

age groups. It has caused severe morbidity and mortality worldwide. However, COVID-19 disease rarely manifests as severe lung disease in a previously healthy infant. Although

there are a few reports of COVID-19 manifesting as a severe disease in children, interstitial lung disease as a sequel of COVID-19 is quite rare.

We report a rare case of COVID-19 pneumonia sequelae, presenting as interstitial lung disease in a 15-months-old child.

### Case Presentation

A male child of 15 months, with chief complaints of fever since one week, and cough and fast breathing since two days, was admitted. Cough was associated with post-tussive vomiting. No h/o bluish discoloration of skin and mucous membrane, suck rest suck cycle, rash, and recurrent loose stools was found. The patient was a well-thriving child till 3 months of age, after which the child was admitted twice in the past. The first hospital admission was at the age of 3 months, for cough and fever, accompanied by loose stools. The child did not receive any nebulisation for respiratory symptoms during the first admission. The second admission was at 3<sup>1</sup>/<sub>2</sub> months of age, with complaints of cough and fast breathing. The child was diagnosed with pneumonia and was admitted to PICU for 3 days. Chest X-ray revealed b/l opacities which were persisting since previous admissions (Figures 1a and 1b). Therefore, HRCT (High-Resolution Computed Tomography) was done which was suggestive of right and left upper lobe ground-glass opacity, and a possibility of COVID-19 pneumonia. CT severity score was 10/25. In view of HRCT findings, COVID RT-PCR was done on day 10 of admission which came out to be negative.

However, after the second admission for pneumonia at 3<sup>1</sup>/<sub>2</sub> months of age, the child has been having recurrent LRTI/ URTI for which he had been taking medications on an OPD basis, which included bronchodilators, antibiotics, and anti-tussives. Antenatal history was uneventful. Family history was also not relevant.

### Course in the Hospital

At the time of admission in Flu emergency, the child was in respiratory distress, SpO<sub>2</sub> was 78% at room air, pulse rate was 140 per minute, and other vital parameters were within normal limits. General physical examination was normal and on anthropometric evaluation, the child was found to have Severe Acute Malnutrition. On examination of the chest, there were bilateral crepitations, ronchi, and decreased air entry on the right side. Per abdomen examination revealed hepatosplenomegaly. The child was being treated with nebulisation, oxygen support, and IV antibiotics. Oseltamivir was also added subsequently. Chest X-ray revealed opacity in b/l upper lobe which was present since the age of 3 months (Figure 1c). RT-PCR test was negative for COVID-19.

Since the previous HRCT chest done at 3<sup>1</sup>/<sub>2</sub> months of age was s/o COVID-19 pneumonia (Figure 2a), COVID-19

serology was sent, which came out to be positive. The child was investigated for various immunodeficiencies such as cystic fibrosis, PID, TB, and HIV. However, TB work-up and screening for cystic fibrosis by IRT, both were negative. Immunoglobulin levels were normal which ruled out primary immunodeficiency. Mother's HIV serology was non-reactive. Bronchoscopy was done which was also normal.

CECT chest revealed areas of collapse and consolidation in the right upper and lower lobes having b/l patchy ground-glass opacities, with relative sparing of right middle lobe and splenic infarcts with small peri-splenic collection (Figure 2b). At present, the child is on home oxygen support.

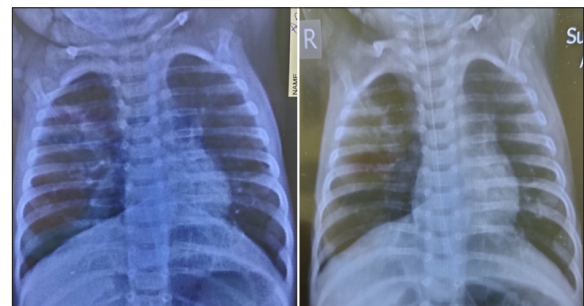


Figure 1(a).Chest X-ray at 3 Months of Age; b.Chest X-ray at 4 Months of Age



Figure 1(c).Chest X-ray at 15 Months of Age

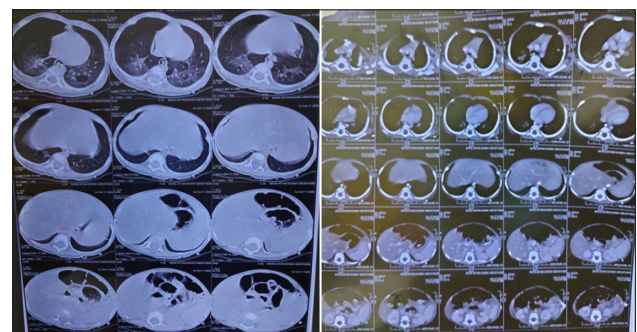


Figure 2.a.HRCT Chest at 3<sup>1</sup>/<sub>2</sub> Months of Age showing right and left upper lobe ground glass opacities; b.CECT Chest at 15 Months of Age

## Discussion

The association of COVID-19 pneumonia with interstitial lung disease has been established in this case. During the COVID-19 pandemic, there have been many case reports of residual lung damage post-COVID-19 infection in adults, however, there is not much data available on pulmonary complications of COVID-19 in children. Respiratory symptoms in children are usually mild; when present, they are similar to those caused by other coronavirus and influenza virus, although cough may be less prominent.<sup>1</sup> SARS-CoV-2 associated bronchiolitis has also been reported in infants.<sup>2</sup>

According to a cohort study in adult COVID-19 patients, they were found to have residual abnormalities in lungs like ground-glass opacification and interstitial thickening, fibrotic changes and honeycombing, bronchiectasis and reduced gas levels.<sup>3</sup> An epidemiological study in Africa showed that pre-existing disease in a child does not seem to be an important risk factor for severe COVID-19 disease.<sup>4</sup> There was a case series that included 41 children hospitalised for COVID-19. Among these, 11 presented with lung lesions that were suggestive of interstitial pneumonia.<sup>5</sup> The radiological findings of chest X-ray and CECT were consistent with COVID-19 pneumonia. The most common radiological trends seen in various patients are pleural effusion, peri-bronchial thickening, consolidation, and ground-glass opacities.<sup>6</sup> These radiological abnormalities have been found to have persisted in around 16% of the cases.<sup>6</sup> The CT findings seen typically in COVID-19 cases have been reported to be prominent vascular structures, thickening in the interlobular septa, and multiple foci of ground glass appearance located peripherally and beginning from the lower lobes.<sup>7</sup>

Also, there is a paucity of data about the longevity of COVID-19 antibody and cellular response after an acute infection in the paediatric population. According to a study conducted in China, in cases of severe respiratory disease, the immune memory response persisted for over a year after infection, which was a promising sign for the prevention of reinfection.<sup>8</sup>

## Conclusion

COVID-19 has had a devastating impact on millions of people worldwide. Although as we report this case, there are many ongoing research works on this virus and its implications on the human body, there is still a lot of work to be done. As per our knowledge, there has not been any case where COVID-19 pneumonia has led to chronic lung disease in a 15-months-old child. Also, in this case, the COVID-19 antibodies were persisting even after one year of active disease. However, the common consensus regarding the duration for which the antibodies persist after

COVID-19 disease is still lacking. After the occurrence of this pandemic, while making a diagnosis, emphasis should be given on the patient's history regarding infection and contact with COVID-19 positive individuals.

**Competing Interest:** None

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