5-2022

Concurrent COVID19 pneumonia and systemic inflammatory syndrome in a two-week-old requiring ECMO

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Neonatal COVID: Concurrent COVID19 pneumonia and systemic inflammatory syndrome in a two week old requiring ECMO

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Objectives

We present a case of a 2-week-old previously healthy preterm, twin, male infant who developed severe COVID-19 pneumonia, subsequent acute respiratory distress syndrome (ARDS), and an inflammatory syndrome requiring VA-ECMO support for 22 days.

Methods

A retrospective chart review was performed. Parental permission for a case report was obtained in compliance with institutional standards.

Clinical History

- 2-week-old male presented to an outside emergency department for lethargy and abnormal breathing.
- Chest x-ray showed diffuse bilateral non-specific infiltrates (Table 1).
- The mother was negative for SARS-CoV-2 at the time of delivery and was unvaccinated. Family denied any sick contacts.
- On HD 6 his twin brother was admitted for increased work of breathing, nasal congestion, and apnea. The brother's SARS-CoV-2 real time polymerase chain reaction (RT-PCR) was positive.
- Infant declined precipitously over the next several days ultimately requiring ECMO support.
- Chest CT was obtained showing extensive confluent consolidation throughout both lungs, greater on the left, most compatible with pneumonia (Table 2 and 3).

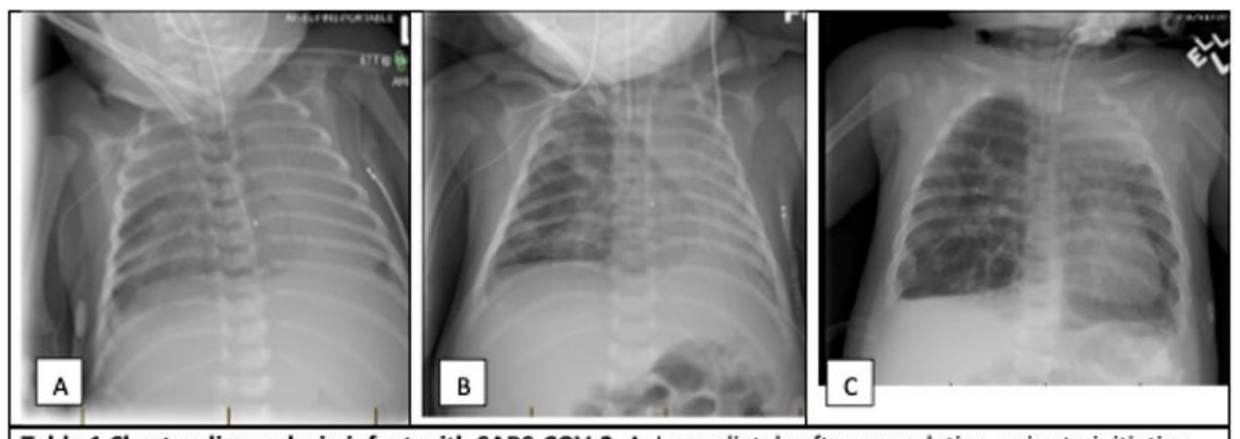

Table 1 Chest radiographs in infant with SARS-COV-2. A. Immediately after cannulation, prior to initiation of rest ventilator settings. B. Immediately prior to decannulation after bronchoscopy and aggressive pulmonary toilet. C. Most recent film as of Jan 2022 with tracheostomy in place.

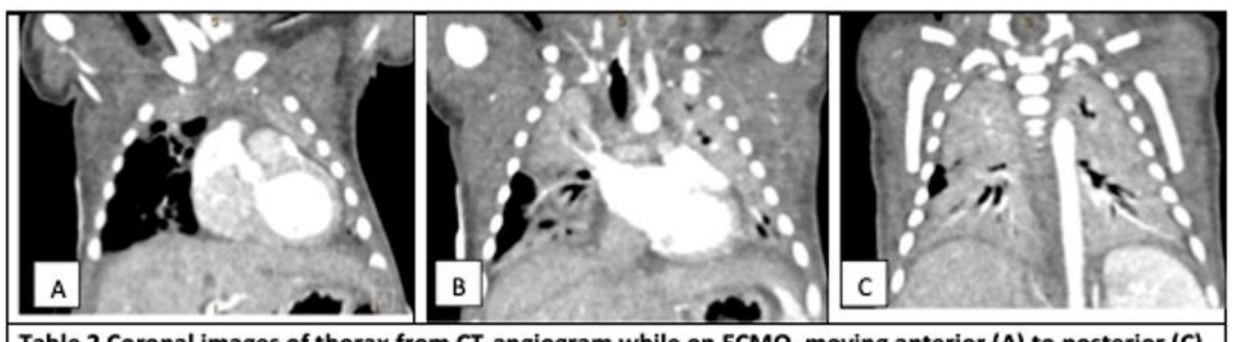

Table 2 Coronal images of thorax from CT-angiogram while on ECMO, moving anterior (A) to posterior (C) while on multiple level of PEEP. Extensive consolidation noted throughout the entire left lung, with focal consolidation in the superior and posterior right lung. Presences of multiple air bronchograms confirms consolidation rather than atelectasis.

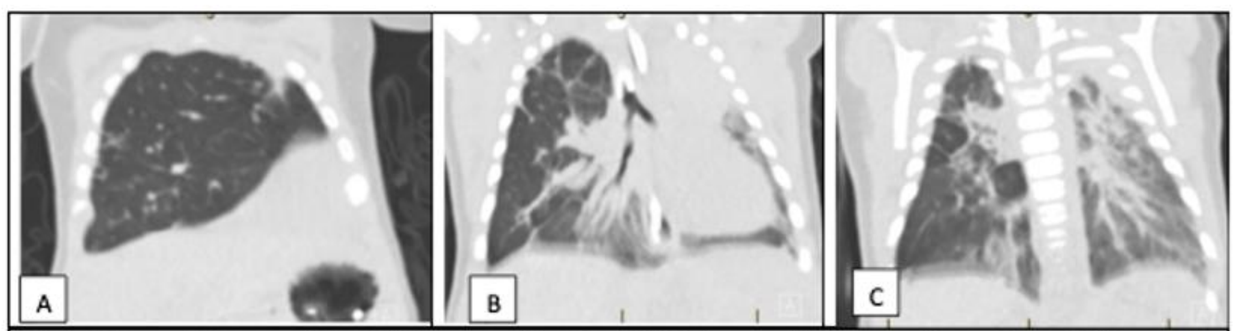

Table 3 Coronal Images of chest CT two months after ECMO decannulation, scrolling anterior (A) to posterior (C). Severe hyperinflation of the right lung, with expansion across midline of the chest anteriorly. Loss of lung architecture is seen with extensive air trapping.

Table 4. Drugs used to treat suspected MIS-C in an infant with COVID-19 pneumonia

Drug	Dose	Duration
Dexamethasone	0.15mg/kg/dose BID	12 days
Anakinra	1mg/kg/dose BID	3 days
IVIg	2g/kg/dose once daily	3 days
Methylprednisolone	1mg/kg/dose once daily	7 days

- A bronchoscopy was performed and revealed no structural abnormalities. Inflammatory markers (ESR, CPR, LDH) were significantly elevated.
- By day 9 of ECMO he began to have some improved aeration of his right lung on chest x-ray and inflammatory markers and viral cycle threshold started to improve.
- Clinical seizures were noted on day 17 of ECMO, confirmed with EEG, concerning for possible stroke.
- The infant was then placed on HFOV to optimize his ventilation and oxygenation in preparation for decannulation. After 22 days on ECMO the infant was decannulated.

Management

- At the time of this case there was paucity of clinical practice guidelines for neonates.
- Multiple centers were contacted for additionally opinions including: CHOA, CHOP, SCH, and Neurmors.
- Multisystem inflammatory syndrome (MIS) was suspected and we began treatment with several agents (Table 4).
- Due to concern for possible stroke we separated the infant from ECMO support as he had improved enough and had adequate oxygenation and ventilation.
- He was successfully decannulated on HFOV with vasoactive support, which he required for several more days.
- Ultimately, he underwent tracheostomy placement and is undergoing home ventilator trials. His twin never became seriously ill and remained on NC support during his illness.

Conclusions

- Infants who develop severe COVID-19 can be successfully managed on ECMO.
- Our infant did not classically meet the criteria for MIS-C, but did noticeably begin to improve after initiation of anti-inflammatory agents.
- Concurrent MIS-C presents additional management challenges, but use of immunomodulating agents should be considered in infants with severe COVID pneumonia.

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