

Pediatric Acute Respiratory Distress Syndrome in COVID-19 Pandemic: Is it the Puzzle of the Century?

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The world is currently facing one of the century's greatest challenges due to the pandemic caused by the novel coronavirus disease-2019 (COVID-19). Since inception, illness due to this virus varied globally in its severity. Initially, the virus caused diseases mainly in adult populations. However, children affected presented with milder clinical presentations.¹ A recent retrospective study on 12,306 pediatric COVID-19 patients, hospitalization frequency was found as 5.3%, with 17.6% required critical care services and 4.1% of patients required mechanical ventilation support.² Compared to the adult population, the mortality was significantly low in children requiring mechanical ventilation due to COVID-19.³ The differential expression of ACE2 receptors on alveolar epithelial cells compared to adults, competition with other common respiratory viruses, and differential T-cell expressions helping the immunity are some hypotheses behind the lesser severity of pediatric COVID-19 pneumonia.^{4,5} Multisystem inflammatory syndrome associated with COVID-19 (MIS-C) in children was another spectrum of this illness noted since April 2020, reported from various countries. Most patients with this syndrome had fever but gastrointestinal manifestations, like diarrhea, hematological, cardio-respiratory symptoms, and neurological involvement, appeared to be responsible for disease severity.

Pediatric acute respiratory distress syndrome (PARDS) is one of the most complex pathologies to manage in pediatric critical care medicine. Pediatric Acute Respiratory Distress Syndrome Incidence and Epidemiology (PARDIE) study found 3.2% of 23,280 patients were admitted to pediatric intensive care unit (PICU) suffered from PARDS and 6.1% among those required mechanical ventilation.⁶ The authors also found the mortality rates between 17 and 32%. The primary management of PARDS is based on supportive care, mainly focused on protecting the lungs from any further insults. However, pediatric intensivists face more significant challenges due to the overlap of several underlying diseases, especially malnutrition, chronic lung disease, congenital heart defects, and bronchiolitis. COVID-19 infections and associated ARDS are the new puzzle for the pediatric intensivists especially during the challenging period of pandemic.

In this issue of the *Indian Journal of Critical Care Medicine*, Sarkar et al. elegantly researched the clinical course of children with COVID-19 associated PARDS along with the predictors of severity.⁷ The authors must be admired for throwing light on this topic despite the hard time for the healthcare professionals. The understanding of COVID-19 associated with PARDS has a real practical benefit, especially in resource-limited settings where any disease outbreaks or pandemics pose immense challenges in managing sick patients. In this retrospective study, Sarkar et al.

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studied 128 pediatric COVID-19 patients requiring PICU care. Among the PICU-admitted cases, 18 (14%) developed ARDS, 6 (33.3%) had severe ARDS, and 3 (16.6%) succumbed to death. This study showed some minor deviation from other published literature, where 5–8% of pediatric COVID patients developed ARDS.^{8,9}

Identification of the predictive factors of severe ARDS and the risk factors of mortality was another vital aspect of the study by Sarkar et al.⁷ In line to index study underlying comorbid conditions, like obesity, chronic neurodevelopment disorders, asthma, malnutrition overcrowding are some other risk factors associated with severe ARDS were found in different pediatric population.^{10,11} Though the study was retrospective chart review done in a single-center, it may show the pathway to the future management of pediatric COVID-19 patients especially in the era where the dawn of pandemic is still unclear toward the scientists and clinicians.

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