EDITORIAL

# Pediatric Acute Respiratory Distress Syndrome in India: Time for Collaborative Study?

Rekha Solomon

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Pediatric acute respiratory distress syndrome (ARDS), although rare, is a significant cause of mortality and morbidity. Over the years, mortality has reduced with advances in intensive care. There is limited contemporary data from India.

A retrospective study of children with ARDS between 2016 and 2020 was performed to study the clinical profile and outcome of pediatric ARDS.[1] Children with ARDS comprised 7.8% of total admissions. Nearly a third each of patients had mild (29%), moderate (36%), and severe (35%) ARDS. Direct lung injury due to pneumonia was observed in 59 children (66%) including 3 children with accidental paraquat ingestion and 2 with SARS-2-COVID pneumonia. The causes of indirect lung injury included sepsis (13.5%), dengue (11%), and rickettsial infection (8.9%). Concomitant septic shock was seen in 54 children. The commonest pulmonary trigger of pediatric ARDS is pneumonia, and for extrapulmonary ARDS, sepsis.[2,3] Extrapulmonary lung injury is associated with higher severity of illness at onset, less ventilator-free days, more organ failure, and higher mortality.[4] When children with pneumonia develop septic shock as in the study by Pujari et al., it may be difficult to classify strictly into pulmonary or extrapulmonary triggers.[1] Nearly a third of the patients received steroids for indications such as SARS-2-COVID ARDS, paraquat poisoning, and septic shock; there is no evidence currently of the benefit of steroids in ARDS apart from certain conditions such as miliary tuberculosis, SARS-2-COVID pneumonia, and *Pneumocystis jerovecci* pneumonia. It would be interesting to survey the use and indications of steroids in P-ARDS in our country.

The 30-day mortality was 33.7% overall; mortality in children with severe ARDS was 58%.[1] A recent meta-analysis showed decreasing mortality rates in pediatric ARDS over time: from 40% (95% CI: 24–59) before the year 2000 to 35% (95% CI: 21–51) during the time period 2001–2009, and to 18% (95% CI: 12–26) after the year 2001.[5] Similarly mortality rates from studies in India have decreased from 73 to 75%[6,7] before 2006 to less than 60% in recent studies.[8,9]

There is a considerable difference in mortality due to P-ARDS depending on location. A prospective cohort study of 308 children with ARDS from 5 pediatric intensive care units (PICUs) in the United States showed mortality of 15%.[10] A multicentric study from South East Asia showed mortality of 113/373 (30.3%).[3]

The Pediatric Acute Respiratory Distress Syndrome Incidence and Epidemiology (PARDIE) study, a multicentric prospective observational study over a 5-day period of 708 children from 145 PICUs from 27 countries found overall mortality of 17%. The mortality in middle-income countries was nearly double that of high-income countries (31% vs 15%).[11] The majority of cases of ARDS are due to pneumonia; in literature from high-income countries, viruses such as influenza and respiratory syncytial virus are commonly seen and may be life-threatening.[12] Contemporary epidemiological data from India is mainly in the form of retrospective data from single centers, apart from one prospective study, and shows mortality of 34–57%. A possible reason for higher mortality in India includes differing etiologies for ARDS such as rickettsial infection, dengue, tuberculosis, hydrocarbon ingestion, snake bite, and drowning.[1,6,8] The other causes may be limitations in resources and manpower and late recognition and referral/initiation of appropriate treatment.

High PRISM III score and higher oxygenation index (OI), as well as a rising OI, were associated with mortality in the study by Pujari et al.[1] Association of OI with mortality has been well described, although the timing of the most predictive OI varies among studies, whether at diagnosis, 6 hours or at 24 hours.[11,13]

It is increasingly being perceived that ARDS may be associated with systemic and not just pulmonary inflammation. However, studies on biomarkers have neither given consistent association with outcome nor yet shown promising targets for therapy. An ongoing prospective trial looking to study gene expression and plasma biomarkers (Linking Endotypes and Outcomes in Pediatric ARDS) may provide answers.[14]

Mortality and morbidity data are important and help in counseling families, stratifying severity for clinical studies, and when high resource interventions such as extracorporeal life support are considered. It is also being recognized that survivors of pediatric ARDS have new morbidity such as impaired pulmonary function tests. Moving forward, the focus on the following is needed:

- Collaborative data on PICU management and outcome in P-ARDS from the Indian subcontinent.

Department of Pediatric Intensive Care, Bai Jerbai Wadia Hospital for Children, Mumbai, Maharashtra, India

**Corresponding Author:** Rekha Solomon, Department of Pediatric Intensive Care, Bai Jerbai Wadia Hospital for Children, Mumbai, Maharashtra, India, Phone: +91 9820957669, e-mail: rekhasolomon1@gmail.com

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- Outcome measures such as PICU acquired weakness, nutritional status and growth, health-related quality of life, long-term neurological, pulmonary, and cognitive outcomes.

## Orcid

*Rekha Solomon* https://orcid.org/0000-0001-8611-9237

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