Exploring Potential Mechanisms Behind the Respiratory Burden of Sickle Cell Disease in Children

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THE MOST COMMON OF ALL GENETIC, hematologic diseases, sickle cell disease affects millions of individuals worldwide with significant disparities in health access and outcomes. These disparities are highlighted in a recent paper by Wastnedge et al. linking outcomes and access to appropriate care.¹ They estimated 90% of children with sickle cell disease living in low and middle income countries die before their fifth birthday while in high income settings life expectancy is estimated between 45–55 years of age. While access to appropriate care is a critical element, there is still much to learn about the respiratory consequences and complications of sickle cell disease and their impact on health outcomes.

Respiratory complications significantly impact both morbidity and mortality in sickle cell disease. In this issue we highlight a translational research paper by Dr. De and colleagues.² This is a pilot study that analyzed differences in inflammatory markers, atopic sensitization, pulmonary function tests, and markers of hemolysis between a cohort of 15 patients with sickle cell disease and a history of asthma, airway obstruction or airway hyper-reactivity and a cohort of 15 controls with allergic asthma. The authors found that inflammatory markers involving the Th-1, Th-2 and monocytic pathways were higher in those with sickle cell disease and that the Th-1 measures correlated with deficits in lung function in this group. They suggest that individuals with sickle cell disease have a heightened inflammatory response and challenge the notion that airway inflammation in sickle cell disease is due to asthma. This work may indeed provide a platform for new insights into airway inflammation in sickle cell disease and prompt future research into the underlying mechanisms responsible for pulmonary involvement.

Acute chest syndrome is known to confer increased risks in both morbidity and mortality in children with sickle cell disease. This form of acute lung injury is estimated to occur at least once in more than 50% of children with HbSS before they reach 10 years of age. It has been associated with prolonged hospitalization and increased risk of respiratory failure. Recurrent episodes can lead to permanent respiratory disability. Drs Jain et al. presented a review of acute chest syndrome where they discussed risk factors, preventive strategies, early recognition, and management strategies that will be helpful for clinicians caring for children with this disease.³

Other recent articles focusing on respiratory issues in children with sickle cell disease include ones on asthma screening by Sadreameli et al.,⁴ extensive evaluation of pulmonary function abnormalities by different techniques by Arikoglu et al.,⁵ and interstitial lung disease as the primary presentation of mixed connective tissue disease in a child with sickle cell disease by Diaz-Gil and Popatia.⁶

In order to help increase our focus on this important genetic disease, September was chosen by the U.S. Congress as “National Sickle Cell Awareness Month”. At the present time screening for sickle cell disease is done in all newborns in the United States. However, this is not the case worldwide. Early identification of infants is critical as symptoms may begin within the first few months of life. As researchers and clinicians continue to work towards a greater understanding of the underlying mechanisms for sickle cell disease there is hope that their work will provide strategies to improve patient outcomes.

References

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