The first pediatric intensive care unit (PICU) was established in Europe by Goran Haglund in 1955 at the Children’s Hospital of Goteburg in Sweden. However, there is considerable debate on where or when the first United States based PICU was established. In 1962, a three-bed newborn surgical intensive care area with dedicated nursing and respiratory caregivers was developed at the Children’s Hospital of Philadelphia. Soon thereafter, in 1965, a four-bed pediatric multispecialty intensive care unit was created at the Children’s Hospital of the District of Columbia. Subsequently, a six-bed, physician-directed multidisciplinary PICU was developed at the Children’s Hospital of Philadelphia and opened in 1967. Even in the earliest era, these new PICUs had meaningful positive impact on pediatric mortality and morbidity.

Pediatric critical care medicine is still a relatively young field. The Society of Critical Care Medicine recognized pediatric critical care as a discrete subspecialty and created the section of pediatric critical care in 1981. Around the same time, The American Academy of Pediatrics introduced its own section on critical care medicine. A sub-board in pediatric critical care medicine was ultimately established by the American Board of Pediatrics and the first certifying examination was offered in 1987. When pediatric critical care began, the major interventions were limited to endotracheal intubation, mechanical ventilation, volume resuscitation, and cardiac infusions. The primary outcome desired at that time was survival. As diagnostics, monitoring technology, and pharmaceutical options improved, along with our understanding of fundamental pediatric physiology, the focus of outcomes has evolved from survival alone to the functional status of survivors of critical illness. Although the US mortality rate for patients in the PICU has dropped from 11% in 1982 to 2.7% in 2015, the proportion of children with moderate to severe disability has increased dramatically. Pediatric critical care providers are now challenged to maintain outstanding survival rates but also to reduce the morbidities and long-term neurodevelopmental consequences of modern PICU care.

As advances have been made in pediatric medical and surgical care, more children are surviving extremely complex illnesses and surgical procedures. Improvements in outcomes are due to the remarkable care provided in the PICU by the now ubiquitous multidisciplinary team model that includes highly skilled nurses, respiratory and physical therapists, dieticians, critical care pharmacists, and pediatric intensivists. It is a privilege to present this issue of Pediatric Annals, which highlights and reviews several common conditions that challenge the modern pediatric critical care teams today.

In the first article, “Acute Respiratory Failure in Children,” Drs. Matthew L. Friedman and Mara E. Nitu present a detailed physiologic review of acute respiratory failure in pediatric patients. Mechanical ventilator technology has evolved from the negative pressure of whole body ventilation, “the iron lung,” to today’s ventilators that can integrate a patient’s own neurological control of breathing to the support provided; however, the fundamental pathophysiology contributing to pediatric acute respiratory failure persists. This practical review article provides a robust foundation for any clinician who wants to revisit the fundamentals of respiratory physiology in children.

Traumatic brain injury (TBI) is a leading cause of morbidity and mortality in children. In the US, approximately 475,000 children younger than age 14 years suffer from TBI annually accounting for more than $1 billion in total hospital charges each year. In the second article, “Traumatic Brain Injury in the Pediatric Intensive Care Unit,” Dr. Elora Hussain provides a review of current evidence-based management strategies for children with TBI in the PICU that are targeted at preventing secondary injury to the vulnerable pediatric brain. Recent guidelines have helped inform intensivists of best practices; however, there re-
remains a paucity of robust pediatric data in this area.

Patients with acquired cardiac disease rarely present to the general pediatrician with overt cardiac failure; however, many cardiac conditions are first recognized in the primary care setting. In the third article, “Acquired Cardiac Disease in the Pediatric Intensive Care Unit,” my colleagues Drs. Kieran Leong and Brian F. Joy and I concentrate on the recognition, evaluation, and stabilization of a variety of critical cardiac conditions. Although heterogeneous in pathology, each of these conditions can rapidly deteriorate to frank cardiac failure and require a high index of suspicion for the prompt recognition and appropriate initial stabilization to ensure optimal outcomes.

Acute kidney injury (AKI) causes increased morbidity in critically ill children and damage to the kidney, negatively affecting survival. The incidence of AKI in pediatrics is significant; however, many therapeutic interventions have failed to positively affect outcomes. Data reveal that patients are no longer dying with AKI but rather because of AKI. In the next article, “Acute Kidney Injury in Hospitalized Pediatric Patients,” by Dr. Rajit K. Basu, a new paradigm for understanding AKI is discussed.

Pediatric sepsis is a leading cause of morbidity, mortality, and health care costs in infants and children in the US. Although we have made major strides in reducing pediatric sepsis-related morbidity and mortality over the past decades, it continues to be a major health care concern. The estimated financial impact of pediatric sepsis is $4.8 billion dollars or about 16% of US health care costs for hospitalized children. In the final article, “Pediatric Sepsis: A Primer for the Pediatrician,” Dr. Edward E. Conway Jr. presents the latest recommendations for the recognition and management of pediatric sepsis, emphasizing the most recent American College of Critical Care Medicine pediatric sepsis guidelines.

REFERENCES


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