Post-Intensive Care Syndrome in Pediatrics

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Post-intensive care syndrome in pediatrics (PICs-P) means that survivors of pediatric critical illness may experience a constellation of physical, emotional, cognitive, and social impairments. The spectrum of PICs-P manifestations within each domain are heterogeneous. This is attributed to the wide age and developmental diversity of children admitted to PICUs and the high prevalence of chronic complex conditions. PICs-P recovery follows variable trajectories based on numerous patient, family, and environmental factors. Those who improve tend to do so within less than a year of discharge. A small proportion, however, may actually worsen over time. There are many gaps in our current understanding of PICs-P. A unified approach to screening, preventing, and treating PICs-P-related morbidity has been hindered by disparate research methodology.

pediatric intensive care | pediatric critical illness | post-intensive care syndrome | outcomes | long-term outcomes

1. Introduction

In 2010, stakeholder meetings were held in North America with representatives from key professional organizations and groups, aiming to better define and address the lasting impairments experienced by adult intensive care unit (ICU) survivors [1]. One of the initial goals of these meetings was to establish a common nomenclature describing post-ICU morbidity to facilitate future collaboration, research, and education. It was recognized that many ICU survivors experienced co-morbidities affecting physical, cognitive, and psychiatric domains. This phenomenon was coined the “post-intensive care syndrome” (PICs) to identify the presence of one or more of these ICU-acquired sequelae [1]. The effect of intensive care hospitalization on family members was also recognized. The term “PICs-Family” emerged to recognize psychiatric sequelae such as post-traumatic stress disorder in relatives and caregivers [2].

To address emerging evidence of post-PICU morbidity in children, Manning et al. adapted the PICs conceptual framework to pediatrics (PICs-P) [3]. The pediatric model differs from that in adults in a number of ways. Residual morbidity in children following critical illness can affect four health domains: physical, cognitive, emotional, and social. These domains are influenced by the interplay of the child’s pre-morbid baseline status, the pediatric intensive care experience, and the caregiver or family unit. The social domain was added based on evidence that critical illness affects children’s post-discharge social functioning [4][5][6]. PICs may manifest differently in children due to dynamic states of growth and development, and the presence of pre-existing complex or chronic conditions.

Critically ill children may therefore experience more heterogeneous trajectories of recovery than what is seen in adults [7][8].

2. Management and Prevention of PICs-P

Prioritization of reversal of organ dysfunction and survival is of foundational importance in critical care but cannot be viewed in isolation if one is to take a holistic view of patient outcomes [9]. Recognizing the potential role of iatrogenic harm in contributing to post-intensive care morbidities across PICs domains, care bundles have been proposed to mitigate the risks that accompany life-saving treatments. The most widely accepted in recent years has been the ABCDEF bundle [10].

The ABCDEF bundle is a harm-reduction tool initially used in adults to promote ICU liberation and limit chronic morbidity ([11]. This bundle of interventions includes assessing, preventing, and managing pain, both spontaneous breathing and awakening trials, choice of analgesia and sedation, assessing preventing and managing delirium, early mobility and exercise, and family engagement and empowerment. In adults, implementation of this bundle has reduced early mortality, duration of mechanical ventilation, duration of coma, incidence of delirium, physical restraint use, ICU readmission, and has increased the percentage of patients that return to their home versus chronic treatment facilities [11]. In pediatrics, evidence for this bundle is accumulating, and several recent and ongoing studies evaluating early mobilization, delirium prevention, and sedation protocols reveal promising results [12][13]. This and other research evidence has prompted emerging practice recommendations for the routine assessment of pain, sedation, withdrawal, and delirium in the PICU [14][15].

Other promising interventions that have shown benefits in adults and are planned for study in children include the use of “PICU Diaries” [16]. This intervention involves partnering with families to provide a lay narrative, comprising daily entries, drawings, and/or photographs about their child’s condition and care while in the ICU [17]. Diaries fill in memory gaps, provide a means for coherent recall of events, and may help children to make meaning out of their experience. In adults, ICU diaries have been shown to improve HRQoL and decrease PTSD, anxiety, and depression following critical illness recovery [18]. New data show the feasibility and acceptance of this intervention among families of critically ill children, and it is ripe for further study [16][17].

Multidisciplinary follow-up clinics have been proposed as a way of testing for PICU-acquired morbidities and providing comprehensive support and intervention to high-risk patients. Ongoing support after PICU and hospital discharge has been shown to be an important protective factor in prevention of psychiatric morbidity of parents and children [19]. Parents of critically ill children have indicated support for such clinics; however, when given the opportunity, only 37% choose to attend [20]. Early efforts to provide outpatient follow-up after pediatric intensive care were collaborations between pediatric neurology and pediatric intensivists caring for neurocritical care survivors [21]. These clinics have expanded to include neuropsychiatric professionals and allied health professional support [20][22]. Currently, a minority of PICUs have these types of clinics [23]. Inadequate data exist to recommend specific timing, frequency, or specialty mix of these clinics, and the limited data available have yet to show

effectiveness as an intervention [20]. Additional research is needed to understand whether such care provides any significant protection or improved recovery for PICU-acquired co-morbidity.

3. Conclusions

The post-intensive care syndrome in pediatrics is marked by poor outcomes across multiple domains of health, functioning and HRQoL. Pediatric intensivist, acute care clinicians, outpatient physicians, and allied health professionals should be increasingly aware of critical illness sequelae and how they affect both patient and family. Clinicians need to be able to identify patients at risk early in their critical illness course and minimize the risk of PICU-acquired complications and institute early rehabilitation. Ward clinicians, subspecialists, rehabilitation specialists, and outpatient primary care physicians should be educated on how best to screen for PICs-p symptoms and ensure adequate ongoing rehabilitation and follow-up to optimize long-term outcomes and recovery.

The current legacy of pediatric critical care is one of great historical success in improving survival. The future of pediatric critical care is one of great promise of improving survivorship. Pediatric intensivists are looking toward a future where an increased understanding of outcomes epidemiology, risk factors, and interventions leads to reduction in PICs-P frequency and severity.

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