CHOC Children's Nursing Research

CHOC Children's Hospital
Best Evidence and Recommendations

Post-Intensive Care Syndrome: Surviving the Pediatric ICU

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PICO: In the pediatric population, what are best nursing practices in identifying and reducing the risk of post-intensive care syndrome (PICS)?

P (Population/problem): In the pediatric population
I (Intervention/issue): what are best nursing practices
C (Comparison): compared to current practice
O (Outcome): in identifying and reducing the risk of post-intensive care syndrome?

Background:
Medical advances over the past few decades have led to an overall decrease in patient mortality for those experiencing a traumatic health challenge. Research on long-term health outcomes post-traumatic illness has shown there is an increase and worsening of functional morbidity resulting from the critical illnesses and associated therapies and treatments experienced by patients. Pollack et al. (2014) estimates morbidity (the rate of ongoing clinical health challenges) to be as high as 4.8%, twice the rate of mortality. Preventing or reducing mortality is no longer the sole outcome measure for effectiveness of critical care interventions (Herrup et al., 2017). Rather, ensuring optimal long-term health outcomes post-trauma are a major focus of current healthcare interventions in the intensive care unit (ICU).

Post-intensive care syndrome (PICS) has been defined as a collection of health disorders that are common among patients who survive critical illness and intensive care and includes new or worsening impairments in physical, cognitive and/or mental health status. PICS can occur not just in patients but in their family members (called PICS-F) as well, and may persist after discharge. It is estimated that at least one-third of ICU patients and their families experience PICS or PICS-F. Incidence is as high as 50% among patients diagnosed with sepsis or acute respiratory distress syndrome or patients on a mechanical ventilator for more than 5 days (Davidson, Harvey & Schuller, 2013). As a result, the Society of Critical Care Medicine (SCCM) launched a quality improvement initiative (the ABDEF bundle) that aims to mitigate PICS. The ABCDEF bundle stands for: Assess, Prevent and Manage Pain; Both Spontaneous Awakening Trials and Spontaneous Breathing Trials; Choice of Analgesia and Sedation; Delirium: Assess, Prevent and Manage; Early Mobility and Exercise; and Family Engagement and Empowerment.

PICS is well-defined in adult literature, yet there is a paucity of literature on its impact in the pediatric population. During the 2010 SCCM two-day conference pediatric critical care patients have been identified as an at-risk population in need of further research related to PICS

(Needman et al., 2012). Consistent with the literature, the identification and mitigation of PICS and PICS-F has been identified as an opportunity for improvement at CHOC Children's. The pediatric intensive care unit (PICU) has implemented elements of the ABCDEF bundle but there is a lack of consistency in the team approach to apply the bundle as well as a lack of awareness, among all disciplines, regarding the complexity of PICS and its contributing factors.

The purpose of this evidence-based practice project was to conduct a comprehensive review of the literature to explore what morbidities affect the post-PICU population in the three domains of PICS. The goal was to identify the best nursing practices in recognizing and reducing the risk of PICS.

Search Strategies and Databases Reviewed:

- Databases searched for this review included: PubMed, CINAHL, Cochrane Reviews, American Association of Critical-Care Nurses website and Society of Critical Care Medicine website. Search terms included the words/phrases: Post intensive care syndrome, Pediatric Intensive Care, Intensive care, critical care, Post-traumatic stress disorder, ICU diaries, cognitive impairment, and mental health. A total of 12 articles from 2006-2017 were included in this review.

Synthesis of the Evidence:

Physical morbidity

- A systematic review by Herrup et al. (2017) determined that a minority of PICU survivors had reported physical morbidities. In one study approximately 10% of patients had a decline in mobility a year after PICU discharge. Another study showed 49% of 150 critically ill children had affected mobility just prior to admission and 89% of these patients had improving or unchanged mobility at 1 year.
- Knoester et al. (2008) evaluated previously healthy PICU patients at 3 and 9 months after discharge from their illness and found both patients and parents reported worse mobility at 3 months but not at 9 months.
- Namachivayam et al. (2010) compared three decades of PICU survivors and found that the proportion of children with moderate to severe disability at long-term follow up was 8% of 700 children in 1982 and 18% of 717 children in 2006 which is an increase of 112%.
- With increasing survival rates for ICU patients, the recommendation is to increase early mobilization and acute rehabilitation to decrease ICU acquired weakness (Herrup et al., 2017).

Cognitive morbidity

- Herrup et al (2017) showed that in a PICU population with average IQ compared to a healthy control group, PICU survivors scored significantly lower in measures of verbal and visual recall and recognition memory, spatial working memory capacity, and visual sustained attention. In academic questionnaires completed by teachers. PICU survivor population showed academic deterioration, difficulty with schoolwork and attention problems.
- In an study of 821 ICU adult patients at 3 months, 40% of the surviving patients had global cognition scores that were 1.5 SD below the population mean similar to those with moderate traumatic brain injury. In this study 74% developed delirium during hospital stay and longer duration of delirium was associated with worse global cognition and executive function scores at 3 and 12 months (Pandharipande et al., 2013).

Psychosocial morbidity

- Colville et al. (2008) evaluated 102 children post PICU, with 32% reported experiencing delusional memories. The delusional memories were highly disturbing and all but 2 cases originated in the PICU. 28% of the patients at 3 months after discharge scored above the cut off of recognized probable post-traumatic stress disorder and linear regression models were used to assess the association and showed high correlation between PTSD and delusional memories. There was also a strong association between duration of sedation/ analgesia and presence of delusion memories.
- In Herrup et al. (2017) the prevalence of PTSD found was 17%-29%. Studies that investigated two time points after PICU discharge found that PTSD symptoms increased over time. In addition, those with higher severity of illness and high number of invasive procedures had a higher prevalence of PTSD (2017).
- Nikayin et al. (2016) summarized that 1/3 of ICU patients experience anxiety symptoms. Psychiatric symptoms during admission and delusional memories were associated with post-ICU anxiety. Physical rehab and ICU diaries merit investigation as possible interventions .
- Jones et al. randomized controlled trial of 352 patients showed less incidences of PTSD in intervention group which received an ICU diary vs the controlled group (2010).

Practice Recommendations:

- Use a standardized screening tool to identify patients with symptoms of PTSD. Once the patient is flagged as at risk they can schedule an appointment for definitive diagnosis and intervention.
    - the Children's Impact of Events Scale was used in the study conducted by Colville et al (2008) and had an 80% reliability.
    - In Kenardy et al. (2006) the use of Child Trauma Screening Questionnaire was effective in predicting at risk patients for PTSD sooner than the one-month post discharge standard.
- Early mobility is known to minimize both physical problems and delirium in ICU patients. Although more research is needed to verify which interventions can improve patient outcomes, evidence suggests clinicians use the ABCDEF bundle strategies to minimize the negative effects of hospital stays (Davidson, Harvey & Schuller, 2013).
- Compliance with ABCDEF bundle have been associated with better patient outcomes. In a study of 6,064 patients with every 10% increase in compliance with the ABCDEF bundle there was a predicted 15% higher chance of survival, and that the patient would be delirium and coma free the next day (Barnes-Daly, Phillips & Ely, 2017).
- Provide annual staff education on PICS and on early progressive mobility, sedation protocol and delirium screening and treatment.
- The strongest evidence to date supports that, for families of ICU patients, communication and information help minimize adverse outcomes. What caregivers say, how they say it, how soon, how often, and how it's perceived by patients and families are factors that have been studied and seem to affect long-term consequences of critical illness (Davidson, Harvey & Schuller, 2013).
- Initiation of ICU diaries for patients that are expected to be on sedation for greater than 48 hours due to the increase in delusional memories and incidences of delirium that have high correlation with PTSD

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