Early Mobility in the Pediatric Intensive Care Unit: Can We Move On?

“It means a great deal...to be put on their own feet in a short time, rather than be confined to bed, having their weak backs and general debility increase rather than disappear after the operation which was to cure them.”—Dr Emil Ries, JAMA 1899

The concept of early mobilization is not new—it was introduced more than a century ago. An editorial in JAMA written 4 decades after Dr Ries’s first report discussed the benefits of “early rising” after surgery, including the “a more rapid return to normal strength and activity and a better outlook and morale in the patient.” As early as 1944, a controlled clinical trial to test the effectiveness of early mobilization after major surgery found less surgical and organ-specific complications in the group that sat in a chair and walked on the day after surgery compared with bedrest for 10-15 days. Early rising after major surgery became a popular dialogue in the 1940s, with “the evil sequelae” and “abuse” of bedrest being commonly discussed and documented, and even written 4 decades after Dr Ries’s first report discussed the benefits of “early rising” after surgery, including the “a more rapid return to normal strength and activity and a better outlook and morale in the patient.” As early as 1944, a controlled clinical trial to test the effectiveness of early mobilization after major surgery found less surgical and organ-specific complications in the group that sat in a chair and walked on the day after surgery compared with bedrest for 10-15 days. Early rising after major surgery became a popular dialogue in the 1940s, with “the evil sequelae” and “abuse” of bedrest being commonly discussed and documented, and even an entire conference dedicated to the topic.

In the intensive care unit (ICU), however, a primary focus on resuscitation and maintaining physiologic stability propagated the notion that bedrest could minimize metabolic demand and facilitate healing and recovery. That approach, compounded by the use of continuous sedative infusions and neuromuscular blockade to ensure patient safety and amnesia, led to an ICU culture of immobility. In 1998, Petty compared his rounds in the ICU with those at the start of his career in 1964 and was troubled by the patients who were “sedated and lying without motion, appearing to be dead, except for the monitors that tell me otherwise.”

Fast-forward 20 years and the pendulum is still swingimg. There is burgeoning research on the impact of early mobilization in critically ill adults, including strategies for decreasing the risk of post-intensive care syndrome. Although awareness about the benefits of early mobilization has increased, so too has the knowledge that optimizing mobility requires modifying our approach to other aspects of care, including choice of sedation, sleep hygiene, and recognition of delirium. As such, the Society of Critical Care Medicine (SCCM) has forged an “ICU Liberation” Collaborative, of which the core is the “ABCDDEF” bundle. This multifaceted approach to improving outcomes in survivors of critical illness incorporates these important elements into routine ICU care: “A,” Assessment of pain; “B,” Both spontaneous awakening and breathing trials; “C,” Choice of sedation and analgesia; “D,” Delirium monitoring and management; “E,” Early mobility and exercise; and “F,” Family engagement. Of specific interest to us in pediatrics, 10% of the 76 ICUs participating in the SCCM Collaborative were pediatric intensive care units (PICUs).

In this volume of The Journal, Cuello-Garcia et al report their systematic review of early mobilization in critically ill children.
After screening 1199 abstracts, the authors identified 11 studies and 1 clinical practice guideline focused on early mobilization in the PICU setting. The studies encompassed 2 pilot randomized controlled trials, with the remaining studies encompassing prospective studies, before–after studies, and retrospective cohort studies. The authors divided the review into 3 categories: (1) definition; (2) safety and feasibility; and (3) efficacy. With regard to defining early mobility, they found there was marked variability in the definition of both the terms “early” and “mobilization.” Contraindications to mobilization across studies often included cardiorespiratory instability; however, the threshold for what constituted “instability” was not consistently defined. Eleven of the studies demonstrated the common theme that early mobilization was safe with no increase in adverse events and was feasible when the appropriate resources and support from the care team were available. Across the board, the implementation of early-mobilization programs led to an increase in the frequency of rehabilitation consults and reduced time to mobilization. However, the authors report that efficacy outcomes, including duration of mechanical ventilation, length of stay, and morbidities, were most often chosen as secondary endpoints and that the certainty of this evidence was low. The authors conclude that current evidence suggests interdisciplinary collaboration to increase mobilization is feasible. However, they state the challenges of ongoing patient, family, and resource barriers in combination and a lack of efficacy outcomes as areas of needed attention.

Cuello-Garcia et al are to be congratulated for synthesizing the available data on an important and timely area in pediatric critical care. Particularly helpful is the comprehensive listing of excluded studies in the supplemental content, which provides the reader with an overview of the breadth of literature surrounding the topic of acute rehabilitation in children. The authors have included 4 abstracts in the 11 studies discussed, which highlights the limited amount of evidence available to meet the author’s criteria for inclusion. It is also notable that 5 of the 11 included studies were conducted by the senior author of the systematic review, suggesting that at the present time, research in PICU early mobilization is still in its infancy, with a small pool of engaged investigators. However, that pool is growing, with new publications focused on quality-improvement initiatives and establishment of medical criteria for PICU mobilization.15,16

It is important to point out that this is not the first systematic review conducted on pediatric acute rehabilitation—in fact, it is the third in 4 years.17,18 The take-home from all of these reviews has been consistent—it’s time to study the outcomes. Early mobilization in the PICU is safe and feasible when approached systematically. However, we still don’t know how it changes the short- and long-term trajectory of pediatric survivors of critical illness. This aspect is critically important, given the current landscape of pediatric critical care, where decreased mortality has been exchanged for increased short- and long-term morbidities.19 We also have not determined the optimal timing, dose, or duration of rehabilitation interventions in critically ill children. How much is too much? Or too often? Is there a threshold where the risk–benefit actually weighs heavier toward risk?

There are few places in the hospital that rival the heterogeneity of the PICU, where the same nurse may be assigned to care for a 1-month-old cardiac surgery patient and a 17-year-old patient with diabetic ketoacidosis during the same shift. That same variability poses unique challenges for transdisciplinary rehabilitation research, including the need for both age- and size-specific equipment and standard pediatric tools for evaluating functional outcomes across the age and developmental spectrum. Indeed, a lack of efficacy data makes it difficult to overcome the inertia of PICU immobility culture. However, the promising effects of early mobilization in adults should be the impetus for large-scale pediatric studies evaluating not only its efficacy but the mechanisms by which early mobilization makes a difference. The opportunities for discovery as a pediatric critical care community are expansive. Data on the baseline acute rehabilitation practices in PICUs internationally will likely illuminate specific areas for targeted research.20 Building on the ABCDEF bundle, we are learning that optimizing sedation, integrating sleep promotion, and preventing delirium go hand in hand with creating healing environments for infants and children too,21-23 and the SCCM Pediatric Collaborative data are forthcoming. We are investigating ICU-acquired weakness in children and modalities for monitoring and diagnosis,24-26 and have established the PICU framework for postintensive care syndrome.27

It is crucial to establish the safety and feasibility of early mobilization in the PICU setting. Now we need to focus not on the “if” but instead sharpen our focus on the “how” and “why.” How should we approach it? Why does it work? Why should we do it? How does it improve outcomes? It’s time to move on.

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References

Slow Steps Toward Transition

It was just over 35 years ago that Giulio Barbero, MD, a pediatrician, penned a letter in the *Annals of Internal Medicine* encouraging internists to concede that they might learn something from pediatricians and exhorting pediatricians to trust their patients to internists.1 At that time, transition was described as occurring by default, rather than by design.2 Surgeon General C. Everett Koop at a conference in 1984 in Wayzata, Minnesota, and then a follow-up convocation in 1989 in Jekyll Island, Georgia, addressed some of the shortfalls of transition, not the least of which was a recognition that there was a lack of research on the developmental milestones to direct the optimal time for transition between the child-focused care setting and the adult world.3,4

In the decades since those 2 convenings, transition has, slowly at first, and now with continual growth, attracted the attention of most subspecialties as we recognize that if not done well, it is associated with a deterioration in the health of individuals with chronic conditions.5 A recent Cochrane Review found only limited evaluable models of transition care with low confidence in the estimate of effect.6 Much of the work is limited to specific chronic illnesses with questionable generalizability.

The article in this volume by Zhong et al adds yet another data point in our gradual understanding of how to best approach the transfer of care from childhood to adulthood.7 The authors used longitudinal measurements of a tool (the TRxANSITION Score)8 with data points extending over nearly a decade and a unique approach to evaluation more commonly seen in the fields of economics and education. They show that self-management skills in the 10 domains measured improved over time and could

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