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Letter to Editor (Pages: 189-192)

Integrated Care for Critically Ill Children with Cancer: The Need for a Shared PICU–Pediatric Oncology Pathway

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Abstract,

Children with cancer are vulnerable to life-threatening complications related to the malignancy itself, chemotherapy, hematopoietic stem-cell transplantation, and treatment-associated immunosuppression. Sepsis and septic shock, acute respiratory failure, hemorrhage, tumor lysis syndrome, neurologic complications, acute kidney injury, and multiple-organ dysfunction are among the principal indications for admission to the pediatric intensive care unit (PICU) in this population.

Despite substantial improvements in overall childhood cancer survival, outcomes during episodes of critical illness remain strongly dependent on early recognition of clinical deterioration, timely referral to the PICU, prompt initiation of time-sensitive treatment, and close coordination between pediatric critical care and oncology teams. This letter highlights the need for an integrated PICU–pediatric oncology clinical pathway. Such a pathway should incorporate early-warning systems, joint assessment of high-risk patients, oncology-adapted bundles for sepsis and respiratory failure, surveillance for oncologic emergencies such as tumor lysis syndrome, daily multidisciplinary rounds, and early integration of palliative-care principles.

Key Words: Childhood cancer, Pediatric intensive care, Pediatric oncology, Sepsis, Tumor lysis syndrome.

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Dear Editor,

Advances in multimodal anticancer therapy, hematopoietic stem-cell transplantation, and targeted therapies have substantially improved survival for many childhood malignancies. However, these therapeutic advances have also increased the need to manage acute complications caused by both the malignancy and cancer-directed treatment. Children with cancer may require admission to the pediatric intensive care unit (PICU) because of severe infection, septic shock, acute respiratory failure, hemorrhage, metabolic emergencies, tumor lysis syndrome, neurologic complications, cardiac or kidney dysfunction, and multiple-organ dysfunction (1, 2).

Historically, PICU admission for a child with cancer was often associated with considerable concern regarding prognosis. Nevertheless, decisions regarding the intensity of care should not be based solely on the presence of malignancy. A child with a curable or controllable cancer who develops a potentially reversible acute complication should receive timely and comprehensive intensive care. Conversely, for children with progressive, treatment-refractory disease or irreversible multiple-organ failure, decisions regarding treatment limitation or redirection should be individualized and based on a realistic assessment of prognosis, the reversibility of the acute condition, and the goals and values of the child and family. Sustained collaboration between PICU and pediatric oncology teams is therefore not merely an organizational preference; it is an essential component of safe, ethical, and patient-centered care.

This letter emphasizes the need to develop and implement an integrated clinical pathway for critically ill children with cancer. The pathway should be jointly designed by PICU and pediatric oncology teams, with active input from infectious-disease specialists, nurses, clinical pharmacists, laboratory and imaging services, nephrologists, and palliative-care clinicians, as needed. Its purpose is to replace fragmented or delayed consultation with structured risk recognition, shared assessment, and timely escalation of care.

Early recognition of clinical deterioration is the cornerstone of this approach. In children with cancer, signs of critical illness may be subtle or atypical. Fever may be masked by corticosteroids or antipyretics; conventional inflammatory responses may be attenuated in profound neutropenia; and early respiratory compromise may be underestimated in children with anemia, severe fatigue, or exposure to analgesics and sedatives. A rising oxygen requirement, tachypnea, increased work of breathing, persistent tachycardia, hypotension, altered mental status, increasing lactate concentration, decreasing urine output, active bleeding, coagulation abnormalities, or escalating transfusion requirements should prompt immediate reassessment.

The structured use of pediatric early warning systems (PEWS) in oncology wards can establish a shared language among ward clinicians, rapid-response teams, and PICU staff. Such systems may identify worsening physiological trends before profound shock, cardiopulmonary arrest, or established multiple-organ failure develops. A multicenter study conducted in resource-limited hospitals in Latin America found that PEWS implementation was associated with lower mortality from clinical deterioration events among children with cancer, although these observational findings should be interpreted in the context of local staffing, critical-care resources, and response capacity (3). PEWS should therefore be accompanied by a clearly defined escalation pathway, explicit PICU consultation criteria, and the capacity for rapid transfer. An early-warning score without an effective response system has limited clinical value.

Sepsis and septic shock are major causes of rapid deterioration in children with cancer. Neutropenia, chemotherapy-induced mucosal injury, central venous catheters, repeated hospital admissions, prior antimicrobial exposure, and the risk of multidrug-resistant bacterial or invasive fungal infections complicate assessment and treatment. In a febrile, clinically unstable child, diagnostic sampling should not delay the administration of appropriate empiric antimicrobial therapy. The 2023 guideline for fever and neutropenia in pediatric patients with cancer and hematopoietic cell transplantation recipients recommends initiating guideline-consistent empiric antibacterial therapy as soon as possible in clinically unstable febrile patients (4). Likewise, the Surviving Sepsis Campaign pediatric guideline

recommends prompt antimicrobial therapy and hemodynamic resuscitation guided by repeated clinical assessment (5).

Fluid resuscitation in this population requires particular caution. Children with cancer may be especially susceptible to fluid overload because of capillary leak, hypoalbuminemia, anthracycline-associated cardiotoxicity, kidney dysfunction, repeated blood-product exposure, or pre-existing pulmonary disease. Frequent reassessment of perfusion, respiratory status, urine output, lactate concentration, and, when available, bedside cardiac function is essential to guide resuscitation. In patients who fail to demonstrate an adequate response after appropriate fluid assessment, vasoactive support should not be unnecessarily delayed.

Acute respiratory failure also requires close PICU–oncology collaboration. Potential causes include bacterial, viral, or fungal pneumonia; sepsis; diffuse alveolar hemorrhage; fluid overload; pulmonary edema; drug-related pulmonary toxicity; pediatric acute respiratory distress syndrome (PARDS); leukostasis; and airway or vascular compression caused by a mediastinal mass. Management should focus on identifying the underlying cause, providing stepwise respiratory support, and avoiding delays in necessary interventions. High-flow nasal cannula oxygen or noninvasive ventilation may be considered for selected children who are alert and hemodynamically stable. However, worsening respiratory distress, refractory hypoxemia, hemodynamic instability, or reduced consciousness should prompt urgent assessment for invasive airway support. In children with PARDS, lung-protective ventilation strategies consistent with PALICC-2 recommendations and close monitoring of clinical response are important (6).

Tumor lysis syndrome provides another clear example of why integrated care is required. Children with acute leukemia, hyperleukocytosis, high tumor burden, or rapidly proliferating lymphoma may develop hyperuricemia, hyperkalemia, hyperphosphatemia, hypocalcemia, and acute kidney injury, either spontaneously or after initiation of anticancer therapy. Risk stratification before treatment, hydration tailored to cardiac and renal status, close monitoring of electrolytes and kidney function, and timely administration of uric acid–lowering therapies are central to prevention and management (7). Persistent electrolyte disturbances, oliguria, or progressive kidney injury should prompt early nephrology consultation and assessment for kidney replacement therapy.

A shared PICU–oncology pathway should extend beyond the first hours of resuscitation. Daily joint rounds can align decisions concerning antimicrobial therapy, chemotherapy timing, transfusion thresholds, central venous catheter management, bleeding and thrombosis risks, kidney replacement therapy, and the need for invasive procedures. An international survey of European PICUs found considerable variation in the availability of oncology-specific protocols, joint rounds, and shared morbidity-and-mortality meetings, highlighting an opportunity to standardize care processes for this high-risk population (8).

Palliative care should also be integrated early into this model rather than reserved exclusively for the final days of life. Early palliative-care involvement supports the management of pain, dyspnea, and anxiety; provides psychosocial support; facilitates honest communication; and strengthens shared decision-making alongside active, life-sustaining treatment. The American Academy of Pediatrics emphasizes family-centered communication, attention to the preferences of the child and family, and ongoing support during difficult end-of-life decisions (9).

CONCLUSION

Critically ill children with cancer need more than access to a PICU bed; they need an organized, continuous, and shared model of care between pediatric intensive care and pediatric oncology. A joint pathway should include early recognition of deterioration through PEWS, prompt shared assessment and transfer, timely sepsis treatment, individualized respiratory support, prevention and management of emergencies such as tumor lysis syndrome, daily multidisciplinary rounds, and early integration of palliative-care principles. Locally adapted shared protocols may reduce delays in escalation, minimize fragmented decision-making, and provide a foundation for improved clinical and family-centered outcomes.

CONFLICT OF INTEREST: None.

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