MAR Pediatrics (2026) 7:2

Research Article

Prospective Study Abstract Evaluating Predictors of Outcome in Neutropenic Shock and Septicaemia in a Paediatric Oncology PICU in Sohag Cancer Center

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Received: 18 December 2025

Published: 07 April 2026

DOI: https://doi.org/10.5281/zenodo.19465302

Background

Neutropenic shock and septicemia remain leading causes of PICU admission and mortality in pediatric oncology, where early risk stratification can guide timely resuscitation and escalation. In resource-constrained settings, pragmatic biomarkers and simple hemodynamic parameters may offer rapid, reproducible prognostic value.

Objective

To evaluate the predictive performance of initial lactate, central venous oxygen saturation (ScvO2), pulse oximetry SpO2, C-reactive protein (CRP) titre, hypotension at presentation, and early fluid bolus administration (within 15 minutes) for short-term outcomes in children with neutropenic shock or septicemia admitted to the PICU of Sohag Cancer Center

Methods

Design: Prospective observational cohort over 12 months from jan 2025 to dec2025

Setting: Pediatric Oncology PICU, Sohag Cancer Center (Upper Egypt).

Participants: Fifty consecutive patients (age 1 month–18 years) with chemotherapy-related neutropenia (ANC < 1500/µL; risk strata: mild 1000–1500, moderate 500–999, severe <500) presenting with suspected/confirmed septicemia or septic shock.

Exposures (collected at PICU admission): Initial serum lactate, ScvO2 (if central line available), SpO2, CRP titre, presence of hypotension (age-adjusted), and time to first fluid bolus; "early bolus" defined as initiation within 15 minutes of PICU arrival.

Primary outcome: Composite of 28-day mortality or persistent organ dysfunction at day 7 (PELOD-2 ≥ 10 or need for vasoactive support of more than 1 drug.

Secondary outcomes: PICU length of stay, need for mechanical ventilation, time to lactate clearance (<2 mmol/L), and bloodstream infection confirmation.

Analysis: Univariable and multivariable logistic regression for the primary composite outcome; model building with clinical covariates (age, ANC category, malignancy type, prior antibiotics). Discrimination assessed by AUROC; calibration by Hosmer–Lemeshow; sensitivity analyses excluding patients without central access (no ScvO2). Time-to-event exploratory analysis for mortality with Cox models. Threshold performance (Youden index) for lactate and ScvO2. Missing data handled by multiple imputation if >5%.

Sample size rationale: With n=50 and an anticipated event rate of ~30%, the study targets preliminary effect estimates and feasibility metrics rather than definitive inference.

Expected impact

Identifying a minimal, rapid prognostic set (lactate, ScvO2/SpO2, CRP, hypotension, and fluid timing) could enable early interventions and enforce local care pathways, improving outcome in resource-limited PICU contexts.

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