Local evaluation of a pediatric sepsis recognition tool and the development of enhanced screening and workflow

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Study Objective: The primary objective of this study is to evaluate local performance of the two-tiered sepsis screening tool, previously introduced by Balamuth *et al.*, in children diagnosed with sepsis. Secondary objectives included the evaluation of additional clinical data that might improve performance of this screening tool as well as its integration into the workflow of our institution.

Methods: We completed a retrospective cohort study of patients <18 years presenting between 1/2017 and 3/2018 with a diagnosis code for sepsis or severe sepsis. Two tiers were established prior to review: Tier one consisted of age-adjusted, vital-signs based SIRS criteria and tier two consisted of the criteria employed by Balamuth *et al.*, inclusive of patient historical factors and exam findings. The two-tiered alert was applied retrospectively to all patients at the onset of sepsis and sensitivity was calculated in this patient cohort. Additional patient characteristics were combined with the screening tool to assess for improved sensitivity (Table1).

Table 1

Screening Variable	Sensitivity in All Sepsis Patients	Sensitivity in Severe Sepsis Patients
Two Tier Clinical Screen: SIRS: Fever + abnormal heart rate, blood pressure or respiratory rate Tier Two: Delayed Capillary Refill Altered Mental Status Age ≤ 56 days old Asplenia Stem Cell Transplant Malignancy Immunodeficiency Central Venous Line Tech Dependence Chronic Neurologic Condition	61.9%	70.8%
Postoperative Status (within 14 days)	19.0%	16.7%
Two Tier Screen + Postoperative	66.7%	79.1%
Abnormal WBC count (Goldstein criteria)	61.7%	62.5%
Two Tier Screen + Abnormal WBC count	87.1%	91.7%
Abnormal Lactate (lactate >2)	43.1%	43.5%
Two Tier Screen + Abnormal Lactate	69.8%	75%

Results: 63 patients met inclusion criteria for sepsis and 24 of those were identified as severe sepsis. 39 of the 63 cases (sensitivity of 61.9%) were identified by the two-tiered screening tool, while 17 of the 24 cases of severe sepsis (sensitivity 70.8%) were identified. We determined the sensitivity of the two-tier screen with the addition of age-adjusted abnormality of WBC, lactate and postoperative status.

Conclusion: Identification of pediatric sepsis remains difficult. The previously developed two-tiered system missed 38% of all sepsis cases and 29% of patients with severe sepsis in our population. Preliminary investigation suggests that altering the second-tier criteria to include postoperative status as well as including an automated alert to clinicians for specific abnormal laboratory data, may enhance sepsis detection. A prospective study evaluating these proposed adjustments to the sepsis screening tool is currently in development.

Biography

Chelsea Kadish is a graduate from Tulane University School of Medicine and has completed her pediatric residency at New York University in New York City. She is an attending physician in the department of pediatric emergency medicine at NYU where her research focuses on sepsis identification in the pediatric population.

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