



SIRS Criteria for Sepsis Identification in Children. Does It Work?

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Dear Editor,

Sepsis is an important problem in pediatric medicine. Early identification of the infection in children with Systemic Inflammatory Response Syndrome (SIRS) may be an appropriate guide for treatment. The process is a continuum from sepsis to severe sepsis and septic shock, and sometimes the transition may not be detectable. Sepsis may lead to systemic inflammation, immune dysfunction, microcirculatory decompensation, and end-organ dysfunction. Management of septic shock in children prevents the ominous outcomes in children due to rapid recognition of children with severe sepsis. Continuation of hemodynamic instability in these patients increases the death risk significantly. In order to better identify of shock and septic shock status in children, it is important to use the potent and accurate criteria to estimate its progression. Precise monitoring is a key point in the management of this condition. A study on the sepsis prevalence, outcomes, and therapies (SPROUT) was done on individuals younger than 18 years of age with severe sepsis and the Pediatric Acute Lung Injury and Sepsis Investigators (PALISI) Network (2013 - 2014) in 128 sites of 26 countries. A total of 8.2% of the screened patients had severe sepsis, 40% of the infection sites were respiratory, and 19% were bloodstream. The mortality rate in the hospital was 25%, and there was no change in different age groups or developed and underdeveloped countries. A total of 17% of survivors developed at least a moderate disability (1). Different microorganisms may arise infection in PICU and NICU settings. VAP (ventilation associated pneumonia) was found in 33.3% of mechanical ventilated neonates (Tehran), while, 1% of isolated organisms were klebsiella (2). During a six month period in Indian NICU and ICU centers, the incidence of sepsis was 2.04% and the most common responsible organism was klebsiella and enterococcus (3). In a study done in the Hakim Hospital in Neishabor, coagulase negative staphylococcus was the most common causative pathogen (4).

For the past two decades, Systemic Inflammatory Response Syndrome (SIRS) has been defined in adults and children as a clinical index for identification of inflammation and the presence of concomitant infection may lead to sepsis. The 1992 Consensus Conference described sepsis accompanied by one acute organ dysfunction as severe sepsis.

These criteria have a broad range of involvement, so therefore, mild conditions as influenza may fulfill it, on the other hand, Kaukonen et al. claimed that SIRS criteria were not fulfilled in 128 of adult ICU patients with infection and at least solitary organ dysfunction (5). But Kaukonen et al. claimed that 128 of adult ICU admitted patients with infection and at least solitary organ dysfunction couldn't enter in sepsis category by their criteria (5). These results imply that using the SIRS criteria would not be an appropriate way for at-risk patients screening, and taking the severity of organ dysfunction into account can be a good substitute for SIRS for identification of the risk of mortality. The 2016 Society of Critical Care Medicine (SCCM)/ The European Society of Intensive Care Medicine (ESICM) alongside the Task Force recommended elimination of the concept of sepsis without organ dysfunction and revision in the definition of the clinical criteria for identifying sepsis and septic shock cases. Therefore, it may be likely that the accuracy of sepsis epidemiology and hospital coding and outcomes will change (6). Based on these results the Sepsis-3 criteria in 2017 described the sepsis as a complicated sepsis by one or more organ dysfunction with novel criteria named LODS (logistic organ dysfunction system), SOFA (sequential organ failure assessment), and qSOFA (quick SOFA) (7). The critical care literature has not been introduced by Sepsis-3 definition because it is still somehow new.

Criteria such as (LODS) and (SOFA) scoring system are recommended to estimate the severity of organ dysfunction in septic patients. The LODS criteria calculation is a difficult task force. SOFA is easier to calculate, and cases who fulfill these criteria have predicted the mortality of

more than 10%, however, this method is relatively complex either, and in many situations, the requisite data for many patients are not enough. When these data become available, the critical time for using data in treatment may pass, thus, this method, which is recognized as the sepsis 3 criteria, seems low practical capacity (8). Besides the low sensitivity of SOFA score, this criterion has a higher predictive value than SIRS in critically ill patients for in-hospital mortality. The SOFA criteria are going to evaluate original organ functions individually and help to monitor the organs function during the disease process, for example, a 5 years old child with severe asthma may have significant improvement in cardiovascular and renal as well as a decrease of respiratory tract system function during ICU admission. In respect to the time-consuming process of SOFA criteria measurement and its low sensitivity, qSOFA can be used, which is a modified version of the Sequential (Sepsis-related) Organ Failure Assessment score (SOFA). These criteria consist of only three components (respiratory rate > 22/min, change in mental status, and systolic blood pressure \leq 100 mmHg) that are each allocated at one point. A qSOFA score of \geq 2 points indicates organ dysfunction.

The ease of SOFA calculation and high specificity of SOFA/qSOFA score may put it as a practical method for prognosis and mortality prediction in critical patients. The qSOFA scoring system limitation is its poor sensitivity so it cannot be used as an early sepsis screening tool, which has the most effect on the treatment.

Most of the correct death prediction reports are estimated with SOFA criteria, however it is not clear which one (SIRS criteria or qSOFA score) has a better mortality prediction value in the emergency setting specially in our country (1). However, but which one (SIRS criteria or qSOFA score) has a more prognostic accuracy of mortality in the emergency setting is not clear yet and it needs more research, especially in our ED (Emergency Department) (1). Although guidelines published by the SSC has developed the recommendations on management of children with septic shock, as a practical recommendation, ‘hour 1 bundle’ was developed and revised from ‘hour 3 and 6 bundle’ to confirm the importance of time in the process of Sepsis management in children, which is consisted of measurement of initial lactate level, getting blood culture prior to antibiotic administration, using broad-spectrum antibiotic, initiation of 30 mL/kg crystalloid, and vasopressor administration in the presence of hypotension, meanwhile or after fluid resuscitation in order to decrease mortality in sepsis children (9). Many emergency and PICU centers in Iran are using the SIRS as SEPSIS criteria for detection of inflammation and sepsis and septic shock in children; physicians and health care personnel training program in this issue is important to increase the sensitivity

of early identification of pending to sepsis and critically ill children in order to choose early treatment intervention. Controlled researches in choosing the best criteria in critically ill children are strongly recommended.

Footnotes

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