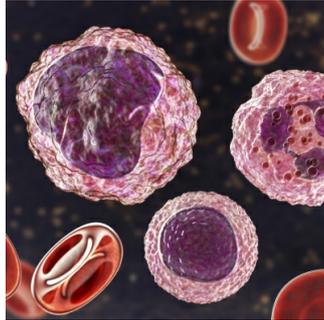


Monocyte Distribution Width as Biomarker for Early Sepsis Detection



Existing biomarkers provide limited use for rapid detection of sepsis since they cannot accurately distinguish sepsis from other common conditions encountered in the emergency department (ED). Now a U.S. clinical trial suggests that the monocyte distribution width (MDW) can be a useful indicator of Sepsis-2 and Sepsis-3 in high-risk ED patients.

"Changes in the volume of peripheral blood monocytes, specifically an increase in MDW, effectively identify septic patients and infected patients who are at increased risk for progression to sepsis in the ED," says the study published in the journal *Critical Care Medicine*. In conjunction with WBC, study authors point out that the MDW biomarker could potentially improve the quality of clinical decision-making during early sepsis management in the ED.

Delays in the diagnosis and treatment of sepsis are associated with adverse clinical outcomes and with increased costs of care. That is why ongoing efforts seek to find biomarkers and develop protocols for more rapid and accurate detection of sepsis in the ED.

The definitions of sepsis, from Sepsis-1 to Sepsis-3, are based on the activation of the host's immune response during the transition from a localised inflammatory response to a systemic immune response. Systemic inflammatory response syndrome (SIRS) reflects the systemic release of proinflammatory cytokines that regulate the immune system's response to pathogens. However, as the study authors point out, SIRS is a manifestation of many other acute noninfectious illnesses confronted in the ED setting. Hence, they say SIRS criteria are of limited value for sepsis detection due to poor specificity.

The current trial included adult patients, aged 18 to 89 years, with complete blood count (CBC) performed upon presentation to the ED, and who remained hospitalised for at least 12 hours. A total of 2,158 subjects were enrolled and divided based on Sepsis 2 criteria including the control group, systemic inflammatory response syndrome, infection, and sepsis and Sepsis-3 criteria, including control, infection, and sepsis.

Researchers aimed to determine whether an MDW of greater than 20.0 U, alone or in combination with WBC, improves early sepsis detection by Sepsis-2 criteria. Based on the results, MDW greater than 20.0 U distinguished sepsis from all other conditions based on either Sepsis-2 criteria or Sepsis-3 criteria. MDW less than or equal to 20 U had negative predictive values of 93% for Sepsis-2 and 94% for Sepsis-3.

The study also found that MDW greater than 20.0 U combined with an abnormal WBC further improved Sepsis-2 detection. Normal WBC and MDW inferred a six-fold lower sepsis probability, according to the researchers. They also suggest that incorporating MDW into clinical decision making could enhance the clinical utility of the WBC and other SIRS criteria for early sepsis detection in the ED based on statistical decision curve analyses.

The presence of sepsis is usually confirmed using biomarkers such as procalcitonin, C-reactive protein, and lactic acid. However, the monocyte distribution biomarker can be reported with the CBC and can be used as an additional tool to detect sepsis during initial encounter in the emergency department. Even then, prospective clinical utility studies are needed to confirm the added clinical value predictions described in the current study.

Source: [Critical Care Medicine](#)

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