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Diagnostic value of neutrophil CD64, procalcitonin, and interleukin-6 in sepsis: a meta-analysis

Shan Cong, Tiangang Ma, Xin Di, Chang Tian, Min Zhao and Ke Wang*

Abstract

Background: The aim of the study was to conduct a meta-analysis to evaluate the accuracy of neutrophil CD64, procalcitonin (PCT), and interleukin-6 (IL-6) as markers for the diagnosis of sepsis in adult patients.

Methods: Various databases were searched to collect published studies on the diagnosis of sepsis in adult patients using neutrophil CD64, PCT, and IL-6 levels. Utilizing the Stata SE 15.0 software, forest plots and the area under the summary receiver operating characteristic curves were drawn. The pooled sensitivity, specificity, positive likelihood ratio, negative likelihood ratio, diagnostic odds ratio, and area under the curve (AUC) were calculated.

Results: Fifty-four articles were included in the study. The pooled sensitivity, specificity, and AUC of neutrophil CD64 for the diagnosis of sepsis were 0.88 (95% confidence interval [CI], 0.81–0.92), 0.88 (95% CI, 0.83–0.91), and 0.94 (95% CI, 0.91–0.96), respectively. The pooled sensitivity, specificity, and AUC of PCT for the diagnosis of sepsis were 0.82 (95% CI, 0.78–0.85), 0.78 (95% CI, 0.74–0.82), and 0.87 (95% CI, 0.83–0.89), respectively. Subgroup analysis showed that the AUC for PCT diagnosis of intensive care unit (ICU) sepsis was 0.86 (95% CI, 0.83–0.89) and the AUC for PCT diagnosis of non-ICU sepsis was 0.82 (95% CI, 0.78–0.85). The pooled sensitivity, specificity, and AUC of IL-6 for the diagnosis of sepsis were 0.72 (95% CI, 0.65–0.78), 0.70 (95% CI, 0.62–0.76), and 0.77 (95% CI, 0.73–0.80), respectively.

Conclusions: Of the three biomarkers studied, neutrophil CD64 showed the highest diagnostic value for sepsis, followed by PCT, and IL-6. On the other hand, PCT showed a better diagnostic potential for the diagnosis of sepsis in patients with severe conditions compared with that in patients with non-severe conditions.

Keywords: Sepsis, Neutrophil CD64, Procalcitonin, Interleukin-6, Meta-analysis

Background

In recent years, the incidence and mortality of sepsis have increased significantly due to the increase of drug-resistant bacteria, the widespread use of antibiotics, and the aging of the population. The latest epidemiological study, including septicemia cases in 195 countries around the world, showed that in 2017 there were 48.9 million

sepsis patients and 11 million deaths from sepsis worldwide, which was equivalent to 19.7% of total deaths throughout the year [1]. In 2016, the Society of Critical Care Medicine (SCCM) and the European Society of Intensive Care Medicine (ESICM) jointly issued the definition of Sepsis 3.0 as the life-threatening organ dysfunction caused by dysregulation of the host's response to infection [2]. At the same time, the diagnostic criteria for sepsis were proposed. For patients with ICU infection or suspected infection, sepsis is diagnosed when the sequential organ failure assessment (SOFA) score is ≥ 2 [3]. However,

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compounds isolated from serum urine or other fluids can be used as an indicator of the presence or severity of a particular disease state The use of biomarkers is becoming a fundamental practice in medicine Biomarker research involves a significantly greater scope of laboratory medicine This monograph presents information on several types of biomarkers for general pathologies preeclampsia metabolic syndrome iron metabolism bone disease liver function renal function cardiovascular pathology including atrial fibrillation peripheral artery disease thrombotic disorders and sepsis Additional information on endocrine and salivary biomarkers is also presented New Trends in Biomarkers and Diseases An Overview is an ideal reference for medical students pathology trainees and clinical researchers seeking information on biomarkers in medicine

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