


Prognostic Biomarkers in Sepsis

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Abstract

Broca aphasia is a non-fluent aphasia in which spontaneous speech output is markedly diminished, and normal grammatical structure is lost. We report a case of aphasia presenting different features of aphasia following cerebral hemorrhage in the left frontoparietal lobe, which includes Broca's area. A 25-year-old man presented to our emergency department with a headache, Broca aphasia, and difficulty in vision that started two days ago. Bilateral hemorrhagic areas were seen in dilated fundus examination. A CT scan was performed and showed multiple intracranial hemorrhages. Although stroke is considered a disease of the elderly, it can also be present among young people. An underlying malignancy may be the trigger for hemorrhagic ischemia. Injury to the frontal regions of the left hemisphere impacts how words are strung together to form complete sentences. This can lead to Broca's Aphasia.

Keywords: Broca's aphasia, Stroke, Hemorrhage

Dear editor

We read with great interest the article titled "Evaluation and Diagnostic Effectiveness of Hemogram, Biochemistry and Inflammatory Markers (Immature Granulocyte, Procalcitonin, CRP, NLR, PLR) in Patients with Sepsis" prepared by Gedik and Çiftçioğlu and published in the second issue of your journal in 2023 (1). We would like to thank the authors and the editorial board for this descriptive study sharing data from a tertiary hospital in Kahramanmaraş province. However, we would like to touch upon a few points that may contribute to the discussion of the study about prognostic values of biomarkers.

Early recognition of sepsis, which is life-threatening organ dysfunction caused by an unregulated host response to infection, is of utmost importance. Intensive monitoring and intensive care are often required for the management of septic patients (2). Early detection of critically ill patients is important for the effective use of healthcare resources and especially intensive care unit beds. To this end, early warning systems such as qSOFA, REMS, RAPS, and MEWS, which are based on vital parameters, and more complex scoring systems such as APACHE II, which are based on vital parameters and laboratory parameters, are being used up till now (3,4). Nevertheless, despite advancing technology, newly discovered drugs, and the increasing number of

intensive care unit beds, the mortality of septic patients in the intensive care unit remains around 15% (5).

In order to recognize sepsis early, inflammatory biomarkers have been studied primarily based on the involvement of dysregulated host response in its pathogenesis. Furthermore, acute phase reactants have also shown promise in prognosticating septic patients (6). Neutrophil-lymphocyte ratio (NLR), also presented in the study of Gedik and Çiftçioğlu, is one of the first investigated inflammation-related markers. NLR was shown as a predictor of septic shock and mortality in critical care patients with prolonged intensive care unit stay. NLR have some prognostic value in septic patients reflected by an area under the curve (AUC) of 0.695 with the cut-off value of 23.8 (Sensitivity: 81.3%, Specificity: 53.6%) (7).

CRP is a liver-derived positive acute phase reactant and is a frequently used biomarker in evaluating the response to antibiotics in patients with bacterial infection (8). Among critically ill patients admitted to the emergency department, the mortality group has high initial CRP values. In emergency department patients with sepsis large amounts of inflammation reflected by increased CPR was associated with early mortality (AUC of 0.68) and late mortality (AUC of 0.64) (9). Elevated CRP concentrations (> 100 mg/L) appear to be associated with higher mortality rates (odds ratio of 55.75, 95% confidence interval: 2.8-1108.8) (10).

Procalcitonin is the precursor of the calcitonin hormone and is normally secreted from thyroid C cells. However, in case of bacterial infection, its release from all parenchymal tissues in the body increases and its serum level increases. It is thought that the rapid PCT elevation that develops after the injection of bacterial endotoxins is closely related to the induction of proinflammatory cytokines (11). The increase in procalcitonin after intravenous injection of bacterial endotoxin follows the increase in TNF- α and IL-6, similar to CRP. Procalcitonin levels appear to be related with mortality and severity in emergency department septic patients although with a modest prognostic value (AUC of 0.68) (12).

Another important point for all these inflammatory markers is the timing of testing. Inflammation increases starting from the early stages of sepsis and becomes an exaggerated host response. Initial test and day of death tests may have different prognostic values. For example, in an intensive care unit study, the AUC for the CRP value on the first day of hospitalization was found to be 0.57, and the AUC for the CRP value on the third day was 0.72 (13).

Apart from easily accessible NLR, CRP and procalcitonin in sepsis, there are many prognostic biomarkers that are still under study, with or without demonstrated prognostic value. For example, studies on adipocytokines continue. While the poor prognostic value of leptin is revealed (AUC of 0.56), good prognostic values are reported for adiponectin (AUC of 0.68) and resistin (AUC of 0.68) (14,15). The cardiovascular system is regulated by mechanisms involving various neural and hormonal factors, including vasoactive peptides. One of these vasoactive peptides is adrenomedullin (16). In this way, it has been reported that adrenomedullin may be a short-term mortality predictor in sepsis based on hazard ratio of 2.6 (17). SCUBE-1 is a peptide synthesized from platelets and associated with thrombosis, hypoxia and inflammation (18,19). Increased SCUBE-1 concentrations in the systemic circulation are associated with mortality in sepsis based on AUC of 0.813 with a specificity of 75.6%, a sensitivity of 81.3%, and a cutoff value of ≥ 4.73 (20).

As a result, despite scientific advances, infection-related death rates are still relatively high. Research related to sepsis and septic management continues. Research funds on this subject should be increased and researchers should be encouraged to conduct research on sepsis and septic shock.

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