LETTER

Soluble triggering receptor expressed on myelocytes-1 compared to procalcitonin in patients with infectious and autoimmune systemic inflammatory response syndrome

Dear Editor,

Up to date, sepsis diagnosis is based on the identification of systemic inflammatory response syndrome (SIRS) and a severe, uncontrolled infection. However, SIRS criteria are characterized by ambiguous sensitivity and low specificity[1].

Currently, the most widely used biomarker for the diagnosis of sepsis is serum procalcitonin (PCT). However, there are conflicting data regarding the utility of PCT in distinguishing infection from systemic aseptic inflammation.

It has been proposed that soluble triggering receptor expressed on myelocytes-1 (sTREM-1), is capable of discriminating the infectious from non-infectious causes of SIRS with adequate diagnostic accuracy[2]. So, we prospectively investigated the value of sTREM-1 in differentiating patients with SIRS of infectious and autoimmune origin, through its comparison to serum PCT.

Fifty-three individuals were enrolled and divided into two groups. Group A consisted of 37 adult patients (mean age 69.7 ± 15.2 years) with sepsis, diagnosed according to the Sepsis International Conference criteria[1]. Group B included 16 patients with systemic autoimmune inflammation (non-infectious SIRS) enrolled from the outpatient clinic of Clinical Immunology Unit; eight patients with Rheumatoid Arthritis (subgroup B1, mean age 65 ± 21 years, Disease Activity Score 4.8 ± 0.8) and eight had active Systemic Lupus Erythematosus (subgroup B2, mean age 45 ± 5 years, SLE Disease Activity Index 8 ± 3). Diagnosis was made according to EULAR criteria. Exclusion criteria for both groups were age <14 years, pregnancy and use of immunosuppressants. In group B, concurrent infection was excluded by proper clinical and laboratory investigation and confirmed by response during follow-up.

Levels of sTREM-1 in serum were measured by commercially available ELISA kits (USCN Life Sciences, SEA213Hu, Wuhan, China) following the manufacturer's protocol. PCT was measured using enzyme-linked fluorescence analysis (VIDAS BRAHMS PCT kit, bioMérieux, Marcy l'Etoile, France). Through the one-sample Kolmogorov-Smirnov test, the values of sTREM-1 were skewed without normal distribution. Therefore, the natural logarithm transformation of the sTREM-1 variable for normal distribution was performed. Mann-Whitney test was used to compare mean values between two groups and $p < 0.05$ were considered significant.

Mean values of sTREM-1 were 124.6 ± 36.1 pg/ml and 43.6 ± 17.4 pg/ml for group A and group B respectively. PCT values for group A were 7.2 ± 15.1 ng/ml and 1 ± 0.49 ng/ml for group B ($p < 0.001$). To evaluate the clinical implication of sTREM-1 for differentiating sepsis from autoimmune diseases, we arbitrary set the cut-off value for sTREM-1 at 80 pg/ml, with sensitivity of 94% and specificity of 93%. These values for PCT (cut off value 2.1 ng/ml) are sensitivity 89% and specificity 93%. Positive and negative predictive value were 97% and 88% for sTREM-1, and 97% and 78% for PCT, respectively.

Our study showed that titers of sTREM-1 and PCT are increased significantly in patients with SIRS[3]. sTREM-1 may be characterized by a slightly better sensitivity than PCT for sepsis discrimination in patients presenting with SIRS. We, therefore, concluded that the measurement of sTREM-1 could be valuable when accompanied by a negative PCT, when clinical suspicion for sepsis is high.

References

1. Dellinger RP, Levy MM, Rhodes A, Annane D, Gerlach H, Opal SM, et al. Surviving Sepsis Campaign: international guidelines for management of severe sepsis and septic shock, 2012. Intensive Care Med. 2013; 39: 165-228.
2. Rivera-Chavez FA, Minei JP. Soluble triggering receptor expressed on myeloid cells-1 is an early marker of infection in the surgical intensive care unit. Surg Infect (Larchnt). 2009; 10: 435-439.
3. Gkougkourelas I, Sarantopoulos A, Tselios K, Kalogeridis A, Pantoura M, Boura P, et al. Membrane-bound and soluble triggered receptor expressed on myeloid cells 1 discriminates sepsis from other causes of systemic inflammation. Benedict G. Sepsis shock: diagnosis management and treatment. 1st Edition. Nova publishers, NY, USA, 2015, 89-110.

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