Plasma endocan predicts the occurrence of acute respiratory distress syndrome (ARDS) in severe septic and septic shock patients

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Introduction: In severe septic and septic shock patients, respiratory failure usually occurs within 72 hours following admission into intensive care unit. Endocan, an anti-inflammatory molecule produced by the lung endothelium and released in the circulation in response to an inflammatory insult. The main action of endocan relates to the inhibition of leukocyte diapedesis. Thus, a high circulating level of endocan in septic patients would protect the lung from excessive inflammation. In a context of severe sepsis, we found in a pilot study that high blood levels of endocan at ICU admission (> 3.55 ng/ ml) are observed in patients who do not develop ARDS. To extend these results, a prospective observational study in a population of severe septic and septic shock patients was designed in order to confirm the predictive value of blood endocan at admission for the occurrence of ARDS.

Patients and methods: The objective was to compare endocan level at ICU admission in 3 different sets of 2 groups: presence or absence of ARDS between D0 and D3; appearance of ARDS or not between D1 and D3; respiratory worsening or not between D0 and D3. The inclusion criteria were severe sepsis or septic shock, as defined by the SSC 2008. The exclusion criteria were age < 18 years, dialysis, pregnancy, immunosuppression, systemic corticosteroid therapy. Patients were classified by 2 blinded independent intensivists. Endocan were measured in plasma EDTA in blind by 2 different laboratories. Mann-Whitney test for independent values was used for statistical analysis.

Results: 85 patients were definitively included. 58 did not develop ARDS. Among the 27 who developed ARDS, 19 had ARDS at admission. Among them, 2 worsened their ARDS at D3. 8 patients developed ARDS after admission. The mean/median levels of blood endocan in the ARDS groups (present, appeared, worsening) are significantly lower than in the control groups. The best significance is obtained when ARDS is appearing or worsening (p<10^-4, p<10^-5).

Conclusion: In severe septic or septic shock patients, an Endocan blood level < 3.58 ng/ml at ICU admission is highly predictive of appearance or worsening of ARDS. Thus, it may help to early identify patients at high risk of ARDS, who could benefit from specific ventilation support.