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The influence of HIV infection on coagulation activation during sepsis

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Background: Infection with HIV enhances the risk to develop invasive bacterial infection, often resulting in sepsis. Both HIV infection and sepsis are associated with activation of the coagulation system. The influence of HIV infection on the sepsis-induced disturbance of the hemostatic balance is unknown. We aimed to determine the impact of HIV infection on coagulation activation during sepsis.

Methods & Materials: We performed a prospective observational study in Lambaréné, Gabon, and included all patients that were hospitalized with either fever or hypothermia and at least one other SIRS (Systemic Inflammatory Response Syndrome) criterion. Blood cultures, HIV testing and malaria diagnostics were performed. Patients with evidence of infection (based on adapted Centers for Disease Control and Prevention, and International Sepsis Forum Consensus Conference definitions) were classified as sepsis cases. Citrated plasma was obtained on admission, as well as in asymptomatic controls with or without HIV infection from the same region. Statistical analyses were done using the Kruskal-Wallis test followed by a post-hoc Mann-Whitney U test.

Results: We included113 sepsis patients (34 HIV positive), and 95 asymptomatic controls (60 HIV positive). Both asymptomatic HIV infection and sepsis were associated with activation of coagulation, as reflected by elevated levels of D-dimer and fibrinogen, and endothelial cell activation, as evidenced by elevated levels of Von Willebrand factor. Sepsis was associated with similar changes albeit to a greater extent; in addition, sepsis was accompanied with downregulation of anticoagulant pathways, as reflected by reduced antithrombin and protein S levels. In asymptomatic HIV infection protein S was downregulated, whereas antithrombin levels were increased. Sepsis, but not HIV infection, resulted in prolonged prothrombin time and activated partial thromboplastin time. Co-infection with HIV did not impact on activation of coagulation during sepsis. Importantly, however, HIV co-infection did aggravate perturbations in Von Willebrand and protein S levels in sepsis patients.

Conclusion: Both HIV infection and sepsis cause a net procoagulant state. HIV co-infection augments impairment of the anticoagulant system and activation of endothelium during sepsis. These mechanisms may play a role in enhanced sepsis related morbidity of HIV patients.

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Characteristics of AIDS patients in Dutch intensive care units

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Background: In contrast to the beginning of the AIDS epidemic, when opportunistic infections were the main reasons for Intensive Care Unit (ICU) admission in HIV patients, availability of antiretroviral therapy made diagnoses and outcome in HIV patients increasingly similar to ICU patients without HIV. For patients with AIDS less information is available, but they may still form a very distinct population in the ICU. We aimed to obtain insight in the clinical characteristic of AIDS patients on the ICU.

Methods & Materials: The Dutch National Intensive Care Evaluation registry was used. AIDS was defined by HIV seropositivity combined with an opportunistic illness, or a CD4 count below 200 cells/microliter. AIDS patients were compared with (1) the entire ICU population without AIDS, and (2) ICU patients without AIDS, matched for age, sex, admission type and year of admission. To assess trends in number of AIDS admissions over years, multivariate logistic regression analyses were performed. The results were adjusted for SAPS II severity of illness score, age, gender, and admission type.

Results: From 1999 to 2013, 603,778 patients were admitted to one of 84 participating ICUs, including 960 (0.16%) AIDS cases. The percentage of AIDS patients admitted to the ICU declined over the years (per year OR 0.94; 95% CI 0.92-0.95). The most frequent diagnoses in AIDS patients were respiratory tract infections (31.4%) and sepsis (16.3%), and these diagnoses were significantly more likely in AIDS patients than in matched controls. Severity of illness, as expressed by the SAPS II score, was higher in patients with AIDS compared to matched controls. In accordance, ICU length of stay, ICU mortality and in hospital mortality were higher in patients with AIDS (2.65 vs 1.94 days, 19.0 vs 13.2%, and 29.7 vs 18.3%, all $p < 0.005$).

Conclusion: In line with the AIDS epidemic in Western Europe, the proportion of AIDS patients in Dutch ICUs declined over time. ICU admission of AIDS patients was often (47.7%), but not exclusively, for an infection, and was associated with increased severity of illness and poor outcome compared to ICU patients without AIDS.

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