Clinical and experimental studies to minimize bleeding risk in patients with thrombocytopenia and platelet dysfunction

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Abstract

Background:
Thrombocytopenia on admission to an intensive care unit (ICU) is associated with increased mortality, however it is unclear whether other routine coagulation tests also correlate with mortality. The aim of Study I was to investigate if activated partial thromboplastin time (APTT) or prothrombin time – international normalized ratio (PT-INR) in patients with severe sepsis or septic shock was associated with mortality.

Patients with haematological diseases who receive chemotherapy often develop thrombocytopenia that can lead to severe haemorrhagic complications. The condition is treated with platelet transfusion but the platelet increment after transfusion varies considerably. The aim of Study II was to explore the longitudinal development of platelet increments after platelet transfusion.

Methods:
In Study I we analysed data from all patients with severe sepsis or septic shock admitted to our ICU from 2007 to 2014. APTT and PT-INR on admission as well as simplified acute physiologic score 3 (SAPS 3) were used as explanatory variables in a Cox regression.

In Study II we divided the patients into four groups: Group 1, patients with acute leukemia, Group 2, patients after autologous stem cell transplantation (SCT), Group 3, patients after allogeneic SCT, Group 4, patients receiving platelet transfusion prior to intervention.

Results:
In Study I we found that both APTT and PT-INR correlated significantly with mortality. Hazard ratio (HR) for APTT was 1.014 [95% confidence interval (CI)(1.006–1.023)] and for PT-INR 1.422 (1.117–1.811). HR for SAPS 3 was 1.036 (1.028–1.044).

In Study II we found that the decrease in corrected count increment (CCI) 1-24 hours after transfusion could in all groups be described as linear functions. The decline was 2.0% ± 0.6% (mean ± standard deviation) per hour in Groups 1-3. For patients in Group 4, the decline of CCI was 2.8% ± 1.2% per hour.

Conclusions:
Prolongation of APTT and raised PT-INR on ICU admission in patients with severe sepsis or septic shock is associated with increased mortality independent of SAPS 3 score. This indicates that APTT prolongation and PT-INR increase represent morbidity that is not accounted for in SAPS 3.

Platelet count after platelet transfusion declines in a linear fashion in patients with chemotherapy-induced bone marrow aplasia.
Publications
