BIOLOGICAL VARIATION OF INFLAMMATORY AND HEMOSTATIC MARKERS

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Background: Plasma levels of hemostasis variables are influenced by a number of environmental factors, of which the ambient factors give rise to biological variation, i.e. the natural within-subject variation in levels of these risk factors over time. Knowing the magnitude of this biological variation is important for several reasons: (i) the number of repeated measurements needed to obtain the true habitual level of an individual, (ii) the recommended maximal analytical imprecision for diagnosis and monitoring, and (iii) determining the time of sampling as a result of seasonal and diurnal variation.

Objectives: The aim of this study was to determine the biological variation of fibrinogen, C-reactive protein (CRP), platelet aggregation, thrombin generation and prothrombin time (PT), protein C (clotting activity and antigen) and antithrombin.

Subjects and Methods: We collected a total of 520 blood samples over a one-year period from a cohort of 40 healthy individuals, and determined their between-subject, biological within-subject and seasonal variation in levels of the studied inflammatory and hemostasis variables.

Results: Three repeated measurements were sufficient to reduce the contribution of the biological variation to 11-22% of the total variation, except for platelet aggregation, where more than three repeated measurements were needed to reduce this contribution to 20%. For diagnosis, the maximal recommended coefficient of analytical variation (CV) was calculated to be 4-27% for all variables, except for CRP where it was 77%. For monitoring, these CVs were on average 3% lower. Finally, seasonal variation was observed in levels of fibrinogen and thrombin generation, which could explain approximately 11% of their total variation.

Conclusion: This study provides insights into the biological variation of several inflammatory and hemostasis variables, which can be used for sample size calculations and to determine the analytical quality specifications for their corresponding assays.

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