

Clinical application of clot waveform analysis in hemophilia treatment

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Hemophilia is a congenital bleeding disorder, occurred by genetic abnormalities of factor (F)VIII and FIX, resulting in the frequently repeated intra-muscular and joints bleeding. Due to disturbance of FX activation in the intrinsic complex during the blood coagulation process, severe bleeding symptoms mainly in the joints and muscles are exhibited. For the hemophilia therapy, FVIII and FIX activity by a PTT-based assay is generally measured to evaluate clinical severities and hemostatic effects by administration of clotting factor products. We have experienced, however, that there are some cases in which clinical phenotypes in the patients are discrepant from clinical severities based on the activity. Furthermore, in the recent years, the remarkable development of hemophilia treatment such as extended half-life products and non-factor product (emicizumab), we are entering a new era as a paradigm shift of hemophilia treatment, resulting in further improving quality of life for patients. However, for some hemostatic monitoring of these new therapeutic products, it is difficult to assess using conventional a PTT-based assay, as a consequence, we may be embarrassed in the clinical setting. The coagulation mechanism is considered as the cell-based coagulation model. Therefore, for the hemophilia treatment, not only evaluation of a PTT-based FVIII or FIX activity, but also a measurement method evaluating comprehensively coagulation potentials trends to be recently utilized. Clotwave form analysis (CWA) is a recently developed global coagulation technique based on the continuous observation of changes in light transmittance that occur as fibrin is formed in plasma during the performance of routine clotting tests including a PTT and PT. Recommendations on the standardization and clinical application of CWA from the Scientific and Standardization Committee of the International Society on Thrombosis and Haemostasis have recently been published. We have already reported many clinical applications on the use of CWA in hemophilia patients with or without inhibitors, in addition the hemostatic monitoring of new hemophilia products such as non-factor product (emicizumab). In the lecture, I would like to talk about the clinical application for hemostatic monitoring in hemophilia treatment using CWA.