The Official Journal of the Italian Society for the Study of Hemostasis and Thrombosis
SISET
Società Italiana per lo Studio dell'Emostasi e della Trombosi
Corso Nazionale SISET
Bergamo | 23-25 ottobre 2025

29TH NATIONAL CONFERENCE OF THE ITALIAN SOCIETY FOR THE STUDY OF HEMOSTASIS AND THROMBOSIS, 2025

ABSTRACT N. CO21

LABORATORIO E FATTORI PREDITTIVI

VISCOELASTIC TESTING IN INHERITED BLEEDING DISORDERS: A CROSS-SECTIONAL COMPARISON BETWEEN VISCOELASTIC COAGULATION MONITORING (VCM) AND ROTATIONAL THROMBOELASTOMETRY (ROTEM).

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Background and Aims. Congenital bleeding disorders show complex haemostatic defects that routine assays overlook. Viscoelastic Coagulation Monitoring (VCM, native whole blood) and Rotational Thromboelastometry (ROTEM, citrated whole blood) provide dynamic clot assessment but are still little used bedside. We compared the two platforms in a group of patients with congenital bleeding disorders and healthy controls, and explored their sensitivity to FVIII levels in haemophilia A (HA), to build baseline data for future acute-bleeding studies.

Methods. Single-centre cross-sectional study. VCM and ROTEM were run on the same draw in 52 subjects: HA 36, von Willebrand disease (VWD) 7, rare bleeding disorders (RBD: FV, FXIII deficiency, afibrinogenaemia) 3, controls 6. Therapy type and plasma FVIII were recorded in all HA patients. For the FVIII correlation analysis, HA patients with and without replacement therapy were included; four patients on non-replacement agents (emicizumab or fitusiran) were excluded. One-way ANOVA compared HA, VWD and controls ($p < 0.05$). Spearman correlation (ρ) was used: (i) to assess the association between residual FVIII and VCM/ROTEM parameters in HA; (ii) to evaluate agreement between homologous VCM and ROTEM parameters in the entire cohort.

Results. VCM showed significant prolongation of clotting time (CT) and clot-formation time (CFT) and a significant reduction in maximum clot firmness (MCF) in both HA and VWD versus controls (ANOVA $p < 0.001$). ROTEM-INTEM confirmed CT prolongation ($p < 0.001$), but changes in CFT and MCF were not significant. In HA patients (excluding the four on non-replacement therapy), FVIII levels showed a stronger inverse correlation with VCM-CT ($\rho = -0.614$, $p < 0.001$) than with ROTEM-CT ($\rho = -0.547$, $p = 0.001$); MCF did not significantly correlate with FVIII in either method. Across the whole cohort, VCM tracked INTEM well (CT $\rho = 0.681$, CFT $\rho = 0.592$, MCF $\rho = 0.675$; all $p < 0.001$). EXTEM and FIBTEM parameters showed no significant inter-group differences. For individual RBD, both VCM and ROTEM detect global hypocoagulability, but ROTEM's multiparametric channels allow more detailed characterization of the underlying defect, as shown in Figure 1.

Conclusion. Our preliminary data suggest that VCM, operating on native whole blood, may reveal a larger delay in clot initiation and a greater drop in clot strength than ROTEM-INTEM. If validated in larger and acute-bleeding cohorts, this added sensitivity could benefit rapid triage and true bedside monitoring. Conversely, ROTEM adds EXTEM and FIBTEM channels that examine tissue-factor activation and fibrinogen contribution—features not fully captured by VCM—and therefore could give a more specific characterisation of the coagulation profile for algorithm-based decisions.

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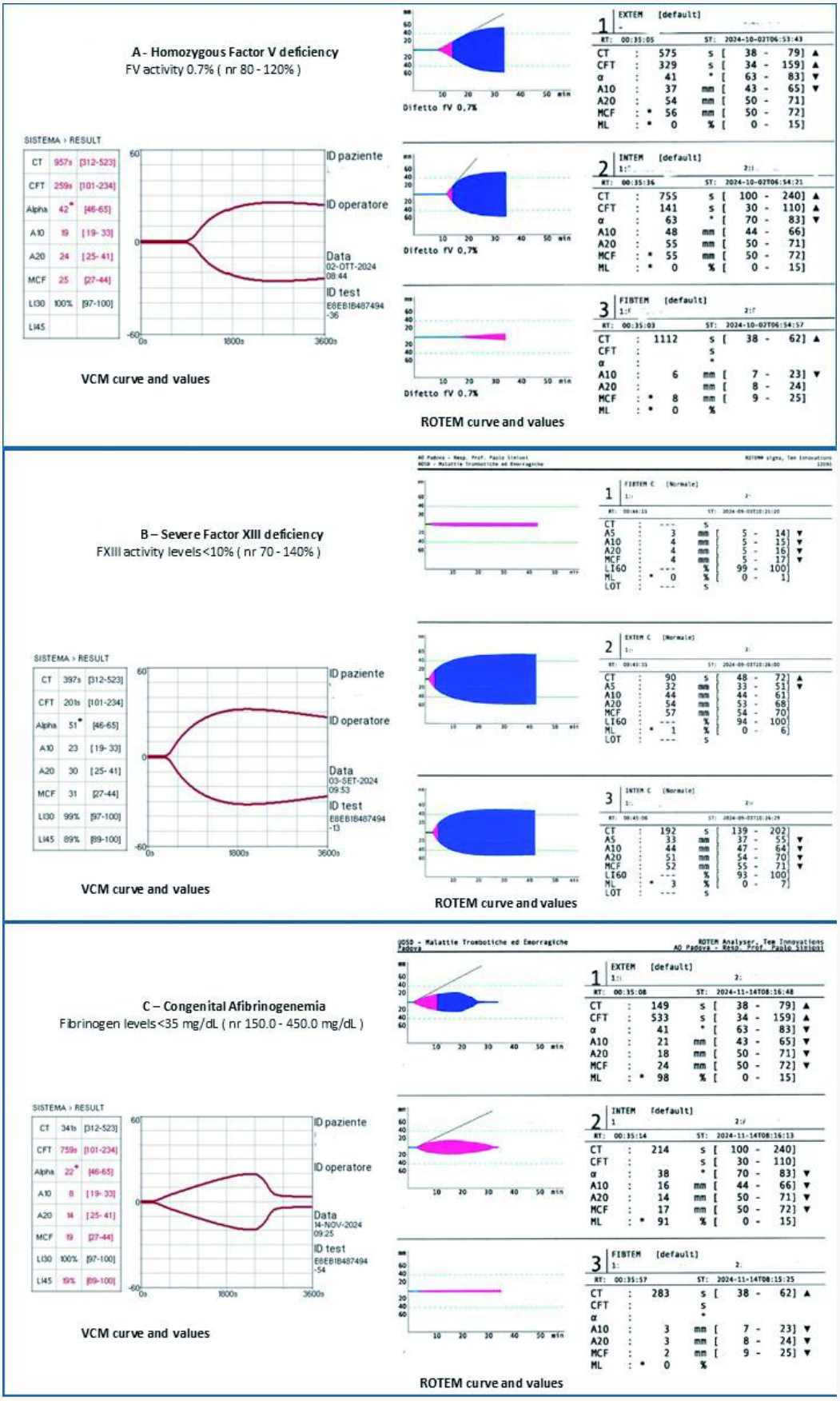

VCM and ROTEM tracings in rare bleeding disorders: (A) Homozygous factor V deficiency; (B) Factor XIII deficiency; (C) congenital afibrinogenemia.