

COMPREHENSIVE EVALUATION OF COAGULATION PROFILES IN REFRACTORY MODERATE-TO-SEVERE ULCERATIVE COLITIS

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Background and Aims. Patients with inflammatory bowel disease (IBD) are at increased risk of thromboembolic events, though the link between inflammation and hypercoagulability is not fully understood, as standard coagulation tests fail to capture the dynamic changes in hemostasis. Prothrombotic mechanisms are multifactorial, involving elevated procoagulant factors, increased platelet reactivity, and endothelial activation driven by systemic cytokines. This study aimed to characterize the hemostatic profile of patients with moderate-to-severe ulcerative colitis (UC) compared to healthy controls using standard assays, viscoelastic testing, and impedance aggregometry, and to evaluate associations with systemic and mucosal inflammation.

Methods. A prospective, single-center case–control study was conducted. Twenty-three patients with confirmed moderate-to-severe ulcerative colitis (UC), defined by a Mayo endoscopic subscore ≥2, and 23 age- and sex-matched healthy controls were enrolled. All patients had failed at least one prior line of therapy and were awaiting initiation of anti-JAK treatment. Standard coagulation assays were performed alongside rotational thromboelastometry and whole-blood impedance aggregometry. Disease activity in UC patients was assessed using the Mayo endoscopic subscore, as well as total and partial Mayo scores; systemic and mucosal inflammation were evaluated by C-reactive protein (CRP) and fecal calprotectin, respectively. Spearman's correlation analysis was used to assess the relationships between hemostatic parameters and inflammatory markers.

Results. Standard assays demonstrated significantly higher activities of Factor VIII (175 ± 43% vs 143 ± 21%, p=0.003) and Factor X (120 ± 26% vs 98 ± 12%, p<0.001). Rotational thromboelastometry showed a shortened clot formation time (CFT) in the extrinsic pathway (76 ± 22 s vs 101 ± 27 s, p=0.001). In addition, maximum clot firmness (MCF) was significantly increased in the extrinsic (67 ± 5 mm vs 57 ± 4 mm, p<0.001), intrinsic (65 ± 6 mm vs 57 ± 3 mm, p<0.001), and fibrinogen-specific (23 ± 8 mm vs 12 ± 3 mm, p<0.001) assays. Whole-blood impedance aggregometry revealed enhanced platelet aggregation in response to adenosine diphosphate (ADP test) (75 ± 21 vs 55 ± 11 U, p<0.001) and arachidonic acid (ASPI test) (94 ± 30 vs 45 ± 14 U, p<0.001). Regarding disease activity, systemic inflammation, as reflected by CRP levels, showed positive correlations with several procoagulant factors, including Factor VIII (p=0.013) and fibrinogen (p<0.001), as well as fibrinogen-specific MCF (p=0.006). In contrast, markers of localized intestinal inflammation, including fecal calprotectin, and clinical disease severity assessed by Mayo endoscopic subscore, total Mayo score, and partial Mayo score, were not significantly associated with either standard or viscoelastic hemostatic parameters.

Conclusions. Patients with moderate-to-severe ulcerative colitis show a marked hypercoagulable state and increased platelet reactivity versus healthy controls, mainly driven by systemic inflammation rather than local disease activity, underscoring the role of systemic markers in thromboembolic risk assessment; larger prospective studies are needed to confirm mechanisms and guide clinical strategies.