Long-term post-discharge coagulation abnormalities in patients with moderate to severe COVID-19

G. Artemyeva[1], A. Kalinskaya[2], O. Dukhin[2], A. Lebedeva[1], A. Rozin[1], A. Shpektor[2], E. Vasilieva[2]

[1]Davydovsky City Clinical Hospital, Moscow, Russian Federation; [2]Moscow State University of Medicine and Dentistry, Moscow, Russian Federation

Introduction: Coagulopathy plays a significant role in COVID-19 pathogenesis. Benefit from anticoagulation is well established in hospitalized patients. But since there is a lack of data on coagulopathy resolution: there is no consensus in guidelines if extended anticoagulation is required.

Purpose: The purpose of our work was to analyze coagulation abnormalities at 2 to 5 months after moderate to severe COVID-19.

Methods: COVID-19 reconvalescents (CR), discharged from our hospital, were called for follow-up at 2–3 (CR1 group, 21 patients) or 5–6 (CR2 group, 26 patients) months after discharge. All CR were not on the anticoagulation therapy by that time. In addition to clinical examination and standard lab tests, we performed an FMD-test to analyze endothelial function, impedance aggregometry to analyze platelet aggregation, and a thrombodynamics test to assess thrombogenesis and fibrinolysis. The control group was recruited before the pandemic started.

Results: All CR were free from thrombotic complications after discharge from the hospital.

Endothelial function was not significantly impaired in CR compared with control, and was still in the normal range (7,07, IQR (3,36; 11,56) vs. 7,87 (5,42; 13,45)).

Platelet aggregation was significantly lower in CR1 than in the control group in ADP-induced mode (37, IQR (19; 47) vs. 46, IQR (41; 50), p=0,02) and didn't differ in other groups and other modes (Asa, TRAP-induced).

Thrombodynamics tests revealed suppression of the clot formation process in both CR1 and CR2 compared with control. There were decreased clot growth rates (µm/min) (CR1/CR2: 27,1, IQR (26,1; 29,2)/27,6, IQR (26,4; 30,0) vs. 32,2, IQR (30,0; 35,1), both p<0,001); decreased clot size (µm) (CR1/CR2: 1099, IQR (1069; 1194)/1199, IQR (1058; 1221) vs. 1304, IQR (1164; 1380), both p<0,001), and decreased optical density (arb units) (CR1/CR2: 21'607, IQR (20'363; 24'545)/22'741, IQR (21'344; 25'961) vs. 26'556, IQR (24'672; 29'387, p<0,001 and p=0,09 respectively.

Fibrinolysis was enhanced in CR groups compared with control (lysis progression was significantly higher for CR2 only, CR1/CR2: 2,9, IQR (2,5; 3,8)/3,8, IQR (2,6; 5,4) vs. 2,5, IQR (1,1; 3,4) %/min, p=0,087 and p=0,007 respectively; expected clot lysis time was shorter in both CR1 and CR2: 36,5, IQR (29,8; 44,2)/31,7, IQR (24,3; 42,7) vs. 65,9. IQR (36,3; 95,5) min, p=0,019 and p=0,016 respectively).

There was no statistical difference in clot formation and in fibrinolysis between CR1 and CR2.

Conclusion: In the deferred period (2–5 months) of COVID-19 the fibrinolysis process remains still active whereas the process of clot formation is mostly suppressed. Endothelial function assessed via the FMD test is within the normal range in the post COVID period.