The role of thalassaemic red cell in the mechanism process of hypercoagulable state in thalassemia intermedia and major patient

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ABSTRACT

Introduction: Thromboembolic events (TEEs) resulting from a hypercoagulable condition are a relatively new complication in beta-thalassemia patients. Many mechanisms are postulated for thrombosis events, such as RBC membrane disruption, chronic platelet activation and defect in the coagulation pathway. This study aims to compare the percentage of fragmented red blood cells (FRCs) and measured hypercoagulable markers (protein C, free protein S, anti-thrombin III (ATlll), and erythrocyte phosphatidylserine (PS)) exposure in patients with Thalassemia Intermedia, Thalassemia Major, and the control group. **Methods:** This prospective case-control study was conducted over 12 months in HUSM involving a total of 44 subjects: 21 patients from Major Thalassemia, 13 from Intermedia Thalassemia and 10 from the control group. The mean percentage of FRCs, protein C, free protein S, antithrombin III and erythrocyte PS exposure were measured and analysed. **Results:** The percentage of FRCs, and erythrocyte PS exposure was significantly lower (0.10 IQR 0.37 and 0.15 IQR 0.13 respectively) in controls as compared to Thalassemia Major groups (5.68 IQR 6.99 and 0.74 IQR 1.80) and Thalassemia Intermedia groups (6.25 IQR 5.55 and 0.22 IQR 1.74). The mean protein C and free protein S levels were significantly lower (55.00 ± 10.20% and 65.77 ± 8.66% respectively) in Thalassemia Major and in Thalassaemia Intermedia patients (61.23 ± 16.99% and 61.11 ± 14.65% respectively) as compared to normal controls (101.60 ± 18.97% and 95.12 ± 23.57% respectively), whereas mean antithrombin III levels were similar. **Conclusions:** The PS exposure, protein C, and protein S levels were significantly difference in the thalassemia groups than controls. This should push for the establishment of early prophylactic policy against TEE for the vulnerable groups.

Keywords: Thalassemia Major, Thalassemia Intermedia, Hypercoagulable, Fragmented RBCs, Phosphatidyl serine (PS) exposure, Protein C, Protein S, Antithrombin III