

Platelet microparticles in relation to disease-related risk factors in polycythemia vera and essential thrombocythosis

Mohamed Hussam Aswad^{1,2}, Jarmila Kissova^{1,2}, Petra Ovesna³, Miroslav Penka^{1,2}

¹ Department of Clinical Hematology, Faculty of Medicine, University Hospital Brno

² Faculty of Medicine, Masaryk University

³ Institute of Biostatistics and Analyses, Faculty of Medicine, Masaryk University, Brno

Abstract

Introduction:

Thromboembolism is a common life-threatening complication in patients with polycythemia vera (PV) and essential thrombocythemia (ET), accounting for a mortality rate of 41% and 26% of patients with an incidence rate of 3.8% and 1.9% per year, respectively. Besides older age and history of thrombosis being the definite risk factors of thrombosis, disease-related factors, such as JAK2^{V617F} mutation and blood count results, have been linked to the increased risk of thrombosis. Circulating microparticles (MPs) may contribute to thrombosis through expressing pro-coagulant phosphatidylserine and tissue factor.

Patients and methods:

The absolute count of platelet microparticles (PMPs) and MPs procoagulant activity (MP-activity) were evaluated in relation to disease-related thrombotic risk factors in a cohort of 170 patients (51 with PV and 119 with ET). MP-activity was measured by the Zymuphen functional assay in 363 samples. PMPs were enumerated by flow cytometry in 466 samples.

Results:

Compared to healthy individuals, patients with ET or PV have significantly higher MPs levels. The pathological values of MP-activity are significantly higher in PV patients than in ET patients. Regarding disease-related risk factors, the presence of JAK2^{V617F} mutation is associated with a significantly higher PMPs count. During the follow-up, patients who had their hematocrit value >45%, platelet count >400×10⁹/L, or leukocytes count >10×10⁹/L have significantly increased MPs levels. Patients with a history of thrombosis before PV or ET diagnosis have significantly higher MP-activity values than thrombosis-free patients. Treatment during the follow-up probably affects MPs levels as patients with arterial or venous thrombotic complications after diagnosis have significantly lower MPs values.

Conclusion:

Levels of platelet microparticles and their procoagulant activity are increased in disease-related risk factors for thrombosis, and this relationship indicates a possible role of MPs in thrombotic complications of patients with polycythemia vera and essential thrombocythemia.

Acknowledgment:

Supported by MH CZ–DRO (FNBr–65269705).