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ABSTRACT N. PO09

COMPARISON OF DIFFERENT AGGREGOMETRY METHODS FOR EVALUATION OF PLATELET FUNCTION IN PATIENTS WITH MYELOPROLIFERATIVE NEOPLASMS.

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Background and Aims:Myeloproliferative neoplasms (MPN) are clonal disorders of hematopoietic stem cells characterized by increased thrombotic and hemorrhagic complications. Several factors, such as abnormalities of platelets, blood and endothelial cells, can increase thrombotic risk, but their interaction with general vascular risk factors remains largely unknown. Current literature on platelet function in MPN reports conflicting results, mainly due to differences in aggregometry techniques and analytical conditions. Our study aims to compare platelet aggregation using two different techniques available in our laboratory.

Methods: We analyzed data from 20 MPN patients (18 ET, 2 PV) diagnosed and followed in our Department (6 M, 14 F, median age at diagnosis 48.7y, median age at sampling 61.5y). For platelet function studies, we used impedance aggregometry (Multiplate), which measures the change in electrical impedance between two electrodes when platelet aggregation is induced by an agonist, and light transmission aggregometry (LTA - CN3000-Sysmex), an automated aggregometer that measures platelet aggregation by analyzing light transmission through a platelet-rich plasma (PRP) sample. For LTA aggregometry, ADP (2 and 10 µM), collagen (2 µg/mL), ristocetin (1.2 mg/mL), and adrenaline (5 µM) were used as agonists. For Multiplate, thrombin receptor activating peptide (TRAP), ADP and arachidonic acid (ASPI) were used as inducers. Antiplatelet therapy, if ongoing, was discontinued 6 days before blood sample collection. We compared the results from MPN patients with a population of 60 healthy controls (33 M, 27 F, median age at testing 29.9 y): Multiplate test was performed in 22 subjects, and LTA aggregations were performed in the other 48.

Results:Platelet aggregation tested with Multiplate was significantly higher in MPN patients compared to healthy controls, when induced by ADP ($p < 0.001$) and ASPI ($p < 0.001$). Furthermore, in LTA aggregometry, platelet function was increased in MPN patients compared to healthy controls, when induced by ADP 10 uM (p 0.055), by collagen (p 0.019) and by ristocetin (p<0,001). No differences were observed with other inductors. Stratifying patients based on platelet count, we observed a more pronounced increase in platelet aggregation in patients belonging to higher platelet count category (> 1000 x 10^9/L) both with Multiplate (using ADP and ASPI tests) and LTA aggregometry (using collagen and ristocetin as inductors) (Table 1). Furthermore, in LTA we observed a direct correlation between increased platelet count and increased ristocetin aggregation ($p < 0.001$).

Conclusions:The underlying mechanisms of thrombotic risk in MPN are complex. While high platelet count is an established risk factor, the role of in vivo interaction between platelets and leukocytes in thrombotic diathesis represents a hallmark of MPN. In our study, we observed that platelet aggregation, assessed by Multiplate on whole blood, is significant increase in MPN compared to controls, while it is normal-high when evaluated by LTA on PRP. This suggests the prothrombotic phenotype in MPN involves both platelet-specific factors and additional variables affecting platelet aggregation when tested on whole blood. An accurate evaluation of platelet function using both techniques could provide further information regarding the indication and optimization of antiplatelet therapy in MPN patients. Further studies are needed to confirm this finding.

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Platelet aggregation in MPN patients and controls tested under different conditions.

		Platelet aggregation (%, LTA) or (AUC, Multiplate)			
		HEALTHY CONTROLS	MPN PATIENTS		
Platelet agonist	**Technique**	**Plts (x10^9/l) <500**	**Plts (x10^9/l) 500-1000**	**Plts(x10^9/l) >1000**	**p-value**
ADP Median (IQR)	MULTIPLATE	74.5 (69.2 to 84.8)	108.0 (89.0 to 114.0)	112.0 (98.5 to 120.0)	0.002
TRAP Median (IQR)	MULTIPLATE	119.0 (104.0 to 129.5)	119.0 (91.0 to 135.0)	129.0 (123.5 to 141.5)	0.116
ASPI Median (IQR)	MULTIPLATE	73.0 (58.5 to 85.0)	97.0 (92.0 to 108.0)	113.0 (103.0 to 117.0)	<0.001
ADP 2 uM Median (IQR)	LTA	81.4 (63.7 to 85.1)	85.8 (84.7 to 86.8)	85.5 (84.6 to 86.4)	0.209
ADP 10 uM Median (IQR)	LTA	85.3 (82.7 to 89.1)	88.1 (86.8 to 89.4)	86.7 (84.8 to 89.6)	0.116
Collagen 2ug/ml Median (IQR)	LTA	87.6 (84.5 to 89.3)	91.1 (88.7 to 93.1)	86.0 (84.7 to 89.2)	0.006
Adrenaline 5uM Median (IQR)	LTA	83.0 (79.0 to 86.1)	84.9 (82.6 to 87.8)	78.3 (72.2 to 82.1)	0.136
Ristocetin 1,2mg/ml Median (IQR)	LTA	87.9 (84.9 to 90.2)	91.6 (90.9 to 93.8)	92.0 (89.5 to 94.9)	<0.001