Brachial Artery Endothelial Function Predicts Platelet Function in Healthy Subjects and in Patients with Acute Coronary Syndrome

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Background - Platelet activation occurs in conditions associated with impairment of endothelium-dependent flow-mediated vasodilation (FMD). Nitric oxide, a key product of the endothelium, is antithrombotic via potent antiaggregating and antiadhesive properties. The aim of the present study was to explore the association between platelet function and endothelial function assessed by brachial artery FMD in healthy subjects and patients with acute coronary syndrome (ACS).

Methods and Results - We prospectively assessed FMD in 151 consecutive subjects [47 ACS patients (31%) and 104 healthy subjects (69%)], 115 men (76%), mean age 53±11 years. Following overnight fasting and discontinuation of all medications for ≥ 12 hours, percent improvement in brachial artery FMD (%FMD) and nitroglycerin-mediated vasodilation (%NTG) were assessed using linear array ultrasound. Platelet aggregation was studied by conventional aggregometry, while platelet adhesion and aggregation under flow conditions were assessed by the cone-and-plate(let) technology (Impact-R). Cigarette smoking, type 2 diabetes and hypertension were more common in the ACS patients compared to healthy subjects (43% vs 18%, 17% vs 5%, 45% vs 17%, $p<0.01$; respectively). Furthermore, the use of aspirin, clopidogrel, beta-blocking agents, angiotensin-converting enzyme inhibitors and statins was more common in ACS patients compared to healthy subjects (81% vs 12%, 58% vs 0%, and 55% vs 7%, 47% vs 4% and 60% vs 22%, $p<0.01$; respectively). %FMD and %NTG were significantly lower in ACS patients compared to healthy subjects (10.2±6.2% vs 16.4±9.4% and 14.2±6.9% vs 19.0±9.7%, $p<0.01$; respectively). %FMD was significantly and inversely associated with platelet function ($p<0.001$) in all study participants as well as in ACS patients and healthy subjects. Furthermore, while dividing the entire study cohort into 2 groups: < and ≥ the median FMD of 13.4%, platelet function was significantly higher in the former compared with the latter group ($p<0.001$).

Conclusions - Endothelial function is inversely associated with platelet function in healthy subjects and ACS patients, suggesting that endothelial function may play a major role in determining platelet reactivity.