

Platelet reactivity in an elderly and healthy population

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Background

Cardiovascular disease (CVD), including myocardial infarction (MI) and stroke, is the largest cause of morbidity and mortality worldwide. CVD is intrinsically linked to hemostasis and thrombosis and, therefore, platelet reactivity. As such, secondary prevention of CVD usually includes inhibitors of platelet function. Though the majority of CVD patients are over the age of 65, large healthy population studies of platelet reactivity have been performed in younger (<40) volunteers. The Bruneck Study is unique in that all participants are over the age of 65. Therefore, the aim of this study was to phenotype platelet reactivity in this elderly population.

Methods

Fasting blood was taken from 338 people into citrate (0.105M) anti-coagulant and platelet rich (PRP) and poor (PPP) plasma was obtained by centrifugation. All experiments were performed within 2 hours of blood draw. Traditional light transmission aggregometry (LTA) in response to arachidonic acid (AA), ADP, collagen, TRAP-6 amide and U46619 was performed. In addition, platelet aggregometry was also assessed using the Optimul plate-based method in response to AA (0.3-1.5mM), ADP (1-30µM), collagen (0.4-30µg/ml), epinephrine (0.6-10µM), ristocetin (0.1-1.5mg/ml), TRAP-6 (0.1-25µM) and U46619 (0.01-10µM). % aggregation was calculated and data were analysed using R with the nlpr package and GraphPad Prism. Data is reported as mean ± sem.

Results

The cohort was evenly split between sex (49% female) with a mean age of 76.1 ± 7.1 years. There was a low incidence of MI (4.7%), stroke (6.5%) and diabetes (6.2%). Concentration-response curves for Optimul aggregometry were generated and final % aggregation was compared to LTA (LTA vs Optimul, respectively): AA 1mM (29 ± 2% vs 68 ± 2%), ADP 5µM (54 ± 1% vs 77 ± 1%), ADP 20µM (59 ± 1% vs 80 ± 1%), collagen 0.4µg/ml (34 ± 1% vs 76 ± 1.2%), 4µg/ml (59 ± 1% vs 81 ± 1%), 10µg/ml (58 ± 1% vs 80 ± 1%), TRAP-6 25µM (62 ± 1% vs 87 ± 1%), U46619 10µM (63 ± 1% vs 84 ± 1%).

Conclusions

This is the first extensive platelet reactivity using multiple concentrations of a broad range of agonists in a large, healthy, elderly population. Subgroup analyses will allow us to determine whether there are any associations with platelet reactivity, age, and cardiovascular disease.