

# **ADP Receptor Variability in Patients Undergoing Opcab Surgery and Healthy Donors, Evaluated by Thrombelastograph® Platelet Mapping™ Assay.**

L. Bochsén, A. Bybeck Nielsen, D. Steinbrüchel, P. Johansson

## **Objectives:**

Despite antiplatelet therapy of patients at cardiovascular risk, with both aspirin and clopidogrel, ~10% of these patients develop recurrent ischemic events. This may partly be explained by a considerable inter-individual variability in platelet adenosine diphosphate (ADP) receptors in different patients. The whole blood Thrombelastograph (TEG®) Platelet Mapping™ assay measures clot strength, enabling a quantitative analysis of platelet function including the contribution of ADP receptors.

## **Materials and Methods:**

Patients undergoing off-pump coronary artery bypass grafting (OPCAB) (n=22) and healthy blood donors (n=43) were evaluated. None of the study subjects had taken any antiplatelet medication for at least 6 days prior to participating. Blood samples were drawn pre-surgically and prior to blood donation, respectively. In the two groups the maximal platelet activation is measured as the clot strength, maximal amplitude, due to thrombin ( $MA_{Thrombin}$ ) and the percentage platelet ADP receptor inhibition was evaluated by the TEG® Platelet Mapping™ assay by activating platelets with ADP. Wilcoxon two sample test or Fischer's test were used as appropriate and a p value < 0.05 was considered statistically significant.

## **Results:**

The OPCAB patients  $MA_{Thrombin}$  was  $65.6 \pm 4.8$  compared to  $60.9 \pm 5.3$  mm in the healthy donors,  $p < 0.001$ . No gender difference in the  $MA_{Thrombin}$  was observed for the OPCAB patients, whereas female donors had a significantly higher  $MA_{Thrombin}$  compared to male donors (62.8 vs. 58.3 mm,  $p = 0.05$ ). Six of the 22 OPCAB patients had a  $MA_{Thrombin}$  above 69 mm, being above the normal reference range, compared to only 1 out of 43 healthy donors,  $p = 0.0049$ . The natural ADP receptor inhibition in the OPCAB patients varied between 0-69% averaging 7.6%. In the donors the ADP receptor inhibition varied between 0-58% averaging 18.6%, being significantly higher than for the OPCAB patients,  $p = 0.0004$ .

## **Conclusions:**

A high  $MA_{Thrombin}$  indicate risk of recurrent ischemic events. Consequently the increase in  $MA_{Thrombin}$  combined with the low ADP receptor inhibition in OPCAB patients compared to healthy blood donors illustrate a higher hemostatic activity due to platelets and thus the difference between the two populations in the risk of developing ischemic events. Furthermore, the variability of natural ADP receptor inhibition in the donor population may also explain why some otherwise healthy patients develop excessive bleeding when undergoing surgery. Further studies of the TEG® Platelet Mapping™ assay in patients on antiplatelet therapy are warranted.