

with less than 10% stress TPD. In addition, women benefited from early revascularization at higher threshold of stress TPD.

P4598

Atherosclerotic pattern in patients with recurrent acute coronary syndromes versus patients with long-standing stable angina: optical coherence tomography findings and long-term clinical outcome

R. Vergallo, I. Porto, D. D'Amario, G. Annibaldi, S. Benenati, S. Migliaro, A.M. Leone, G. Niccoli, C. Aurigemma, F. Burzotta, C. Trani, F. Crea. *Catholic University of the Sacred Heart, Rome, Italy*

Background: Clinical observations suggest that, among patients with coronary artery disease, some exhibit recurrent coronary instabilities, while others develop effort-induced angina and remain clinically stable for a long time.

Purpose: We aimed: i) to compare the coronary atherosclerotic profile between patients with history of recurrent ACS and patients with long-standing stable angina using optical coherence tomography (OCT); and ii) to assess the long-term clinical outcome in these patients.

Methods: We enrolled: i) patients with recurrent ACS (rACS), defined as history of ≥ 3 acute myocardial infarctions (AMIs), or ≥ 4 ACS (AMI or unstable angina) with at least 1 AMI; and ii) patients with uncomplicated long-standing stable angina pectoris (IsSAP), defined as a minimum 3-year history of stable angina without any episode suggestive of acute event, and normal ECG and preserved left ventricular ejection fraction ($\geq 50\%$). Patients with single AMI followed by prolonged clinical stability (≥ 3 years) served as control group (sAMI). Non-culprit plaque features were assessed by OCT, including the presence of lipid-rich plaque, thin-cap fibroatheroma (TCFA), macrophage infiltration, and calcifications. The presence of layered pattern, defined as homogeneous, signal-rich tissue with a signal intensity lower than surrounding or deeper layers of intimal tissue, was assessed (Figure 1A). The incidence of major adverse cardiac events (i.e., cardiac death, non-fatal AMI, and new hospitalization due to unstable angina) was assessed at follow-up.

Results: A total of 105 patients were enrolled (30 rACS, 37 IsSAP, and 38 sAMI). Median time of clinical stability was 8 [4.5–14.5] years in IsSAP group, and 9 [5.0–15.0] years in sAMI group. Median follow-up period was 33.1 months [17.2–53.3]. At OCT analysis, patients with rACS showed significantly higher incidence of lipid rich-plaque and TCFA than patients with IsSAP, but not compared with those with sAMI (lipid-rich plaque: 80.0% vs. 37.8% vs. 76.3%, $p < 0.001$; TCFA: 40.0% vs. 8.1% vs. 34.2%, $p = 0.006$). Macrophage infiltration was significantly more frequent in patients with rACS than in those with IsSAP and sAMI (53.3% vs. 18.9% vs. 18.4%, $p = 0.002$), as well as the presence of spotty calcifications (70.0% vs. 40.5% vs. 44.7%, $p = 0.038$). The incidence of layered pattern was significantly higher in patients with IsSAP and sAMI than in those with rACS (3.3% vs. 29.7% vs. 28.9%, $p = 0.014$) (Figure 1B). The presence of layered pattern was associated with a significantly lower incidence of MACE (8.3% vs. 32.5%, $p = 0.017$) (Figure 1C).

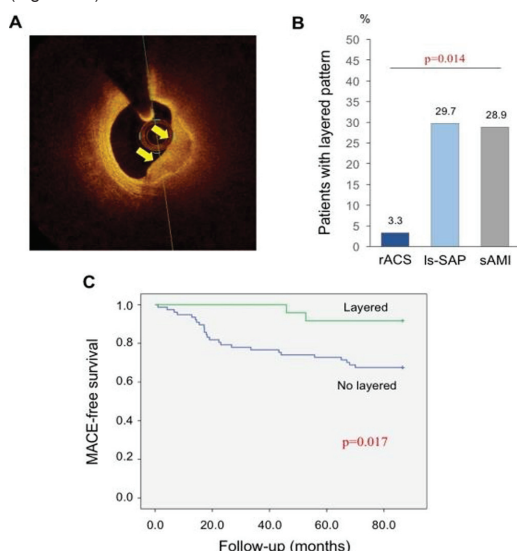


Figure 1

Conclusions: Patients with rACS showed a distinct atherosclerotic pattern compared with patients with IsSAP, including higher incidence of TCFA and macrophage infiltration. Layered pattern was rarely observed in patients with rACS, and was associated with a significantly lower incidence of MACE at follow-up, potentially representing a morphological signature of long-term clinical stability.

P4599

Impact of cardiovascular risk factors on erythrocrine function in the setting of ischemia/reperfusion-injury in a Langendorff heart model

L. Moellhoff, J.M. Muessig, J. Noelle, S. Kaya, M. Masyuk, A.M. Nia, M. Kelm, C. Jung. *University Hospital Dusseldorf, Division of Cardiology, Pulmonology and Vascular Medicine, Dusseldorf, Germany*

Introduction: During myocardial infarction both, the ischemia and the reperfusion after intervention, cause myocardial damages, called ischemia/reperfusion-injury (I/R-injury). Cardioprotective nitric oxide (NO) reduces infarct size and improves ventricular function after infarction. Endothelial NO-synthase (eNOS) is an important source of NO. It was shown that not only endothelial cells but also red blood cells (RBCs) express eNOS. Thus, RBCs are able to increase NO bioavailability. The eNOS can be indirectly inhibited by the enzyme arginase as both compete for their common substrate arginine.

A local or systemic inhibition of the arginase, which is up regulated in cardiovascular diseases, leads to an increase of NO bioavailability and thereby to a smaller infarct areal after I/R. The actual effect of RBC eNOS is not fully understood though.

Purpose: The aim of this study is to examine the impact of RBCs on infarct size and ventricular function after myocardial I/R in dependency of cardiovascular risk factors. Furthermore, this study examines whether the RBC mediated cardioprotection can be improved by arginase inhibition in RBCs.

Methods: The coronary system of murine hearts in a Langendorff heart model was loaded with the inhibitors of arginase (norNOHA) and eNOS (L-NAME) as well as with human RBCs from young and healthy volunteers and from old patients with diabetes mellitus. In separate experiments, RBCs were incubated with norNOHA and/ or L-NAME before loading. This was followed by 40 minutes of global ischemia. Left ventricular function and the coronary flow were documented after a reperfusion period of 60 minutes. The infarct size was measured after 120 minutes reperfusion time using a TTC staining.

Results: Addition of human RBCs obtained from healthy volunteers to the coronary system of Langendorff perfused murine hearts significantly improved the recovery of left ventricular developed pressure (64 ± 19 vs. $24 \pm 7\%$ of baseline levels, $p = 0.001$) and reduced the infarct size (24 ± 14 vs. $51 \pm 9\%$ of left ventricular volume, $p = 0.04$) compared to Krebs Henseleit buffer treated controls. RBCs taken from diabetic patients failed to show this cardio protective effect. Treatment of RBCs taken from diabetic patients with norNOHA before loading to the Langendorff system partly restored the cardio protective function in terms of infarct size ($32 \pm 6\%$ vs. 41 ± 5 of left ventricular volume, $p = 0.02$) but not with regard to left ventricular developed pressure ($52 \pm 15\%$ vs. 42 ± 9 of baseline levels, $p = 0.32$).

Conclusion: The cardio protective function of human RBCs on myocardial function after I/R is influenced by cardiovascular risk factors (diabetes mellitus and age) in a NO related manner. Treating of RBCs obtained from diabetic patients with norNOHA restores the cardio protective effect.

This new pathway of cardiovascular dysfunction could be a future target of pharmacological treatment and prevention of I/R-injuries.

Funding Acknowledgements: Forschungskommission of the Medical Faculty of Heinrich Heine University Dusseldorf

P4600

Clinical utility of biwaco score for the patients with atrial fibrillation after percutaneous coronary intervention: biwaco study

T. Takeda¹, K. Douchi², A. Miyamoto³, T. Douke⁴, Y. Ueno², M. Fujii⁵, H. Mabuchi¹, T. Matsui³, A. Wada⁵. ¹Koto Memorial Hospital, Cardiology Department, Higashi-Ohmi, ²Nagahama Red Cross Hospital, Cardiology, Nagahama, ³JCHO Shiga Hospital, Cardiology, Otsu, ⁴Kohka Public Hospital, Cardiology, Kohka, ⁵Kusatsu General Hospital, Cardiology, Kusatsu, Japan

Background: Previous studies reported several risk scores for predicting the risk of clinical outcomes in patients after PCI. However, the risk stratification in Japanese patients with atrial fibrillation (AF) after PCI still has not been established. Therefore, we developed BIWACO-scoring system.

Methods: BIWACO-score according to a multivariable in Cox proportional-hazard model was developed using 188 patients enrolled in BIWACO-study (Bleeding and thrombotic risk evaluation in patients With Atrial fibrillation under Coronary intervention study), which was retrospective five-multicentre study of AF-patients after PCI between 2010 and 2015. We defined net adverse clinical events (NACE) as all-cause mortality, myocardial infarction, stent thrombosis, stroke and major-bleeding (BARC type ≥ 2) within 4 years after PCI. We compared predictive ability to PRECISE-DAPT, PARIS-MB, ORBIT and HASBLED score using C-statistics.

Results: In multivariate modeling, the following 5 risk factors remained independently associated with NACE: Brain infarction history (HR2.91, $p = 0.006$), Impaired renal function (HR2.38, $p = 0.025$, eGFR < 60), Warfarin-use (HR2.31, $p = 0.018$), Cardiac failure (HR2.64, $p = 0.020$, EF < 40), Older age (HR2.16, $p = 0.048$, age ≥ 78). The sum of these factors represented the total risk score for each patient. C-statistic of BIWACO-score (0.774, 95% CI: 0.678–0.848) for NACE was significantly higher than that of ORBIT (0.657, $p = 0.033$) and HASBLED (0.610, $p = 0.005$), and tended to be high compared with that of PRECISE-DAPT (0.726) and PARIS-MB (0.703).

Conclusions: BIWACO-score was useful for predicting long-term clinical outcomes in Japanese AF-patients after PCI, and simplified the risk scoring compared with the existing scoring system because of using only 5 factors.