to assess minimal stent diameter and area (MSD and MSA). Stent expansion was defined as MSD (or MSA) divided by the values predicted by the manufacturer’s compliance charts. Patients were divided into 4 groups according to the median values of arc and area of calcium.

**Results:** Mean stent expansion was 73.3 ± 8.7% for MSD and 65.2 ± 12.0% for MSA. Stent expansion defined by MSD was significantly different among the groups (p = 0.02) (Figure). Similar trend was observed for stent expansion defined by MSA (p = 0.16).

**Conclusions:** Stent expansion of the 2nd generation DESs may be predicted by the amount of target lesion calcification assessed by OCT.

**TCT-564**

Implications of the local hemodynamic forces on vessel wall responses following drug-eluting biodegradable vascular scaffold implantation: an optical coherence tomography analysis

Christos Bourantas1, Michael I. Papafaklis2, Katsoia Anna3, Vasim Farouq4, Cécile Dorange5, Dimitrios I. Fotiadis6, Josep Gomez-Lara7, Lampros Michalis8, Takashi Muramatsu9, Katerina K. Naka10, Yoshinobu Onuma11, Richard Rapoza12, Hector M. Garcia-Garcia13, Patrick W. Serruys14

1Thoraxcenter, Rotterdam, Netherlands, 2Brigham & Women’s Hospital, Harvard Medical School, Boston, MA, 3University of Ioannina, Ioannina, Greece, 4Thorax Center, Rotterdam, Rotterdam, 5Abbott Vascular International BVBA, Diegem, Belgium, 6Hospital Universitari de Bellvitge, Hospitalet de Llobregat, Spain, 7Thoraxcenter, Erasmus Medical Center, Rotterdam, Netherlands, 8ThoraxCenter, Rotterdam, Rotterdam, 9Abbott, Santa Clara, CA, 10Thoraxcenter, Erasmus MC, N/A

**Background:** The aim of this study is to examine the implications of the local endothelial shear stress (ESS) on neointimal proliferation following an Absorb Biodegradable Vascular Scaffold (BVS) implantation.

**Methods:** Twelve patients who had an Absorb BVS implantation in a stenotic, relatively straight arterial segment and who were investigated with serial optical coherence tomographic examination at baseline and 1 year follow-up were included in the current analysis. The optical coherence tomographic data acquired at follow-up were used to reconstruct the treated segment. Blood flow simulation was performed on the luminal surface at baseline defined by the Absorb BVS struts and the estimated ESS was related to the neointima thickness measured at 1 year follow-up.

**Results:** The protruded struts appeared to affect the ESS patterns. Low ESS and recirculation zones were noted between the struts areas and high ESS zones on the top of the struts. At baseline, 61% of the measured ESS were <1 Pa. At follow-up, the mean neointima thickness was 113±45 μm while the percentage area obstruction was 13.1±6.6%. A weak but statistically significant inverse correlation was noted between baseline ESS and neointima thickness at 1 year follow-up in all studied segments (correlation coefficient range: -0.110 to -0.620). Mixed linear regression analysis between baseline ESS and neointima thickness at follow-up yielded a slope of -29 μm/Pa and a y-intercept of 142 μm.

**Conclusions:** The hemodynamic micro-environment appears to regulate response following an Absorb BVS implantation. These findings underline the role of the ESS patterns on vessel wall healing and should be taken into consideration in the design of biodegradable devices.

**TCT-565**

OCT evaluation of the time course of vessel healing following implantation of novel generation biodegradable polymer-coated and sirolimus-eluting cobalt-chromium coronary stent system (ALEX OCT Study)

Jack Legutko1, Robert J. Giś2, Pawel E. Bucman3, Greg L. Kucza4, Marek Krol5, Roman Wojdyla1, Tomasz Pawlowski1, Michal Brezinski6, Marek Kondys7, Bartosz Skowarna8, Jacek Jakula9, Tomasz Roleder9, Wojciech Zasadza7, Dariusz Dudek10

1Jagiellonian University Medical College, Krakow, Poland, 2Central Clinical Hospital of the Ministry of Internal Affairs and Administration, Warsaw, Poland, 3American Heart of Poland, Katowice, Poland, 4Kraowski Centrum Kardiologii Inwazyjnej, Krakow , Poland, 5University Hospital, Krakow, Poland, 6Thoraxcenter, Erasmus Medical Center, Rotterdam, Netherlands, 7Thoraxcenter, Rotterdam, Netherlands, 8Thoraxcenter, Rotterdam, Netherlands, 9Abbott Cardiovascular Research Institute, Krakow, Poland, 10Thoraxcenter, Rotterdam, Netherlands

**Background:** Biodegradable stent coatings are hoped to improve the vessel wall healing. ALEX is a new generation, biodegradable polymer-coated, sirolimus-eluting cobalt-chromium coronary stent system.

**Methods:** A prospective, single arm, multi-centre registry enrolled 60 patients with de novo native coronary lesions treated with ALEX stent and examined the outcomes by quantitative coronary analysis (QCA) and optical coherence tomography (OCT) at multiple timepoints (3 subgroups of 20 patients each at 3, 6 and 12 months) to capture the time course of vessel healing. Stent strut coverage, stent apposition and neointimal proliferation were assessed by OCT. Safety endpoint was the composite of death, myocardial infarction, target lesion re-intervention (TLR) and stent thrombosis (ST) at 30 days and 12 month follow-up.

**Results:** At baseline, reference vessel diameter was 2.85 (IQR 2.45-3.17) mm, lesion length was 12.00 (IQR 9.67-14.58), minimum lumen diameter was 1.02 (IQR 0.89-1.2). Correlation coefficient of lesion length (mm) and percent diameter stenosis (%DS) was 0.64:15.1 by QCA. We have treated 31% of lesions type A/B1 and 69% of lesions type B2/C. Median stent diameter was 3.0 (IQR 2.75, 3.50) mm, stent length was 15 (IQR 12, 20) mm. Procedural device success rate was 96.6% (95% CI, 94.0-99.1%); post-procedural stenosis rate was 20.0% (IQR 2.0-8.5). CCA analysis revealed median late lumen loss (mm) 0.035 (IQR 0.007-0.01) at 3 months, 0.17 (IQR 0.01, 0.32) at 6 months and 0.14 (IQR 0.07, 0.42) at 12 months. The OCT analysis presented full strut coverage in 96% at 3 months, in 98% at 6 months, and 100% at 12 months. The rate of uncovered stent struts per section (RUST) >0.3 was 1.35% at 3 months, 1.0% at 6 months, and 0% at 12 months of follow-up, and the malapposition rate was 0.13%, 0.03% and 0.02%, respectively. There was one death (1.7%), one TLR (1.7%) and no definite ST at 12th months of follow-up.

**Conclusions:** Biodegradable polymer-coated, sirolimus-eluting ALEX stent appears to feature very favourable profile of arterial wall healing already at 3 months post implantation.
implantation, balanced with a sustained antiproliferative effect up to 12 months of follow-up. A larger study is warranted to examine the safety of shortening the dual antiplatelet therapy regimen on this background.

TCT-566

GEOGRAPHICAL MISS OF STENT IS ASSOCIATED WITH PLAQUE VOLUME, VULNERABLE PLAQUE AND MAJOR ADVERSE CARDIOVASCULAR EVENTS

Patrick A. Calvert1, Cathy Jaworski2, Adam J. Brown1, Liam M. McCormick1, Stephen P. Hoole2, Nick E. West1, Martin R. Bennett1

1University of Cambridge, Cambridge, Cambridgeshire, 2Papworth Hospital, Cambridge, United Kingdom, 3University of Cambridge, Cambridge, United Kingdom, 4Addenbrooke’s Hospital, Cambridge, United Kingdom

Background: Angiographically-identified geographical miss (GM) of atherosclerotic plaques during percutaneous coronary intervention (PCI) is common. However, the relationship between GM and the underlying plaque as identified by virtual histology intravascular ultrasound (VH-IVUS) as not been studied. We aimed to determine whether GM is associated with specific plaque characteristics, PCI-related myocardial infarction (MIa) and future major adverse cardiovascular events (MACE).

Methods: Patients with stable angina (n=100) or myocardial infarction (MI) (n=70) underwent 3- vessel VH-IVUS prior to PCI. GM was defined as 3 uncovered VH-IVUS frames in stented lesions with plaque area >40% at either stent edge. MACE comprised death, MI, hospitalization with unstable angina or unplanned revascularization.

Results: 30372 mm VH-IVUS and 1096 lesions were analysed: 858 (78.2%) plaques were unstented, 165 (15.1%) stented without GM, and 80 (7.3%) stented with GM. GM was associated with increased plaque volume, necrotic core %, dense calcium % and VH-defined thin cap fibroatheroma (VH-TCFA) and with reduced fibrous tissue % (table). GM was not associated with increased MIA (33 (54%) vs. 71 (72%), p=0.15) or inflammatory cytokine release. MACE (n=43) occurred in 28 patients over a median follow-up of 1115 (968-1357) days. MACE were directly linked to 11/858 (0.8%) unstented plaques, 7/165 (4.2%) fully covered stented lesions and 8/80 (10%) stented lesions with GM (log rank p<0.001). In patients presenting with MI, stented lesions with GM had increased future MACE compared to fully covered lesions (log rank p=0.015).

Conclusions: GM is associated with larger plaques with a more vulnerable composition and with future MACE in MI patients undergoing PCI. Whether the association of GM with future MACE is independent of adverse plaque anatomy is not clear and requires a much larger study to determine.

TCT-567

Comparison of vascular response after Everolimus-Eluting Stents and Bare Metal Stents implantation in ST-segment Elevation Myocardial Infarction Assessed by Optical Coherence Tomography

Yasutaka Iino1, Takashi Kubo1, Tomoyuki Yamaguchi1, Hirokori Kitabata1, Makoto Orii1, Yuichi Ozaki1, Kanhiro Shimamura1, Katsuki Satogami1, Yasutaka Shiono1, Yamano Takashi1, Takashi Tanimoto1, Kumiko Hirata1, Atsushi Tanaka1, Toshihiko Imamura1, Takashi Akasaka1

1Wakayama Medical University, Wakayama, Japan, 2Wakayama Medical University, Wakayama, Japan, 3Waikam Medical University, Wakayama, Japan

Background: Implantation of drug-eluting stents (DES) in patients with ST-segment elevation myocardial infarction (STEMI) undergoing primary percutaneous coronary intervention (PCI) reduces in-stent restenosis compared with bare metal stents (BMS), however, the long-term risk of DES use in STEMI has been pointed. Previous pathological and optical coherence tomography (OCT) study reported that first generation DES use in STEMI resulted in higher rates of uncovered and malapposed stent struts at follow-up. The long-term safety of second generation everolimus-eluting stents (EES) use in STEMI remains unknown. We used OCT to examine vascular response including stent coverage and malapposition in patients with STEMI treated with EES and BMS.

Methods: We enrolled 85 patients with STEMI who underwent primary stenting and 10-month follow-up OCT (EES: 47 patients and BMS 38 patients).

Results: A total of 18244 stent struts were analyzed. There were no significant differences in the percentage of uncovered and malapposed stent struts per lesion between 2 stents (2.8±3.08% versus 1.47±2.46%, P=0.182 and 0.57±1.22% versus 0.41±0.84%, P=0.499, respectively). Averaged neointimal thickness was smaller in EES lesions (103 ± 38 μm vs. 135 ± 151 μm, P<0.001). Intra-stent thrombus was observed in 12.8% of EES lesions and 10.5% of BMS lesions (p = 0.758).

Conclusions: In STEMI patients undergoing primary PCI, there are no significant differences in the percentage of uncovered and malapposed stent struts, and the incidence of intra-stent thrombus at 10-month follow-up between EES and BMS. On the other hands, EES as compared with BMS significantly reduces neointimal hyperplasia. EES has a potential to achieve low late loss without sacrificing safety.