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Qualitative and quantitative neointimal characterization by optical coherence tomography in patients presenting with in-stent restenosis

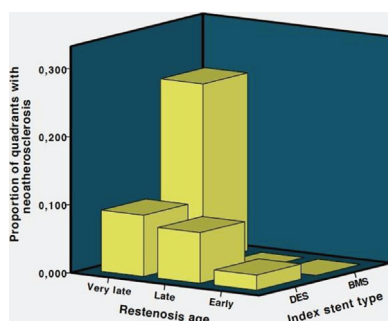
E. Xhepa¹, R.A. Byrne¹, F. Rivero², A. Rroku¹, J. Cuesta², S. Kufner¹, T. Bastante Valiente², S. Cassese¹, M. Garcia-Guimaraes², H. Schunkert¹, M. Joner¹, M.J. Perez-Vizcaino³, N. Gonzalo³, F. Alfonso², A. Kastrati².
¹Deutsches Herzzentrum Technische Universität, Munich, Germany; ²University Hospital De La Princesa, Madrid; ³Hospital Clinic San Carlos, Madrid, Spain

Background: In-stent restenosis (ISR) represents a major cause of stent failure. Optical coherence tomography (OCT) provides valuable additional information for the characterisation of ISR, otherwise not available on angiography.

Purpose: To perform a qualitative and quantitative neointimal characterisation of ISR lesions and identify predictors of neointimal patterns and neoatherosclerosis.

Methods: Patients undergoing frequency-domain OCT prior to PCI for ISR in 3 European centres were included. Quantitative and morphometric OCT analyses were performed in a core laboratory every 1 mm along the entire stented segment. Additional qualitative and quantitative [gray-scale signal intensity (GSI)] analysis of neointimal tissue was performed on a per-quadrant basis at the frame displaying the maximal %AS as well as the 5 preceding and following analysed frames.

Results: A total of 107 patients were included with one lesion being imaged and treated per patient. Predominantly homogeneous lesions included 4.5 (0.0–14.3)% non-homogeneous quadrants while predominantly non-homogeneous ones included 28.1 (20.3–37.5)% homogeneous quadrants. GSI values were significantly different between homogeneous [108.4 (92.5–123.6)], non-homogeneous [79.9 (61.2–95.9)] and neoatherosclerosis [88.3 (72.8–104.9)] quadrants ($p < 0.001$ for all between group comparisons). Stent underexpansion (defined as stent expansion index < 0.80) was observed in 16 (48.5%) and 44 (61.1%) of predominantly non-homogeneous and homogeneous ISR lesions respectively ($p = 0.225$). Presence of any frame with neoatherosclerosis was registered in 33 (30.8%) ISR lesions. Multivariable analysis showed that female sex [OR: 3.67; 95% CI: 1.03–13.2; $p = 0.046$], maximal neointimal thickness (OR for 1 mm increase 14.3; 95% CI: 2.09–98.57; $p = 0.007$), angiographic ISR pattern (OR for diffuse vs. focal restenosis 0.24; 95% CI: 0.008–0.73; $p = 0.011$) and diabetes mellitus (OR: 0.34; 95% CI: 0.11–0.98; $p = 0.046$) independently correlate with neointimal pattern. Among all analysed variables, time from index stenting procedure (OR for 1 year increase: 1.25; 95% CI: 1.09–1.42; $p = 0.001$) was the only independent predictor of neoatherosclerosis.



Prevalence of neoatherosclerosis

Conclusions: Despite predominance of one neointimal pattern, there is coexistence of different neointimal qualities in a significant number of ISR lesions. GSI analysis could represent a valuable quantitative adjunct for neointimal characterisation. Stent underexpansion, a potentially correctable trigger of ISR, often not detectable on angiography, was frequently identified in both groups. Female sex, maximal neointimal thickness, angiographic pattern of ISR and diabetes mellitus independently correlate with neointimal pattern, while time from index stenting procedure with presence of neoatherosclerosis. Neoatherosclerotic changes display different courses in DES compared to BMS, with earlier appearance in the former group.

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First assessment of the clinical impact and confirmation of the diagnostic ability of the 18F-FDG-PET/CTA prosthetic valve endocarditis. New data supports initial results

M.N. Pizzi¹, N. Fernandez-Hidalgo², H. Cuellar-Calabria³, M.T. Gonzalez-Alujas¹, I. Ferreira-Gonzalez¹, O. Maisterra-Santos⁴, R. Rios⁵, A. Sambolla-Ayala¹, D. Garcia-Dorado¹, B. Almirante², P. Tornos¹, S. Aguade-Bruix⁶, J. Castell-Conesa⁶, A. Roque³.
¹Hospital Vall d'Hebron, Cardiology Department, Epidemiology Unit, Barcelona, Spain; ²University Hospital Vall d'Hebron, Infectious Diseases Department, Barcelona, Spain; ³University Hospital Vall d'Hebron, Radiology Department, Barcelona, Spain; ⁴University Hospital Vall d'Hebron, Neurology, Barcelona, Spain; ⁵University Hospital Vall d'Hebron, Cardiovascular Surgery, Barcelona, Spain; ⁶University Hospital Vall d'Hebron, Nuclear Medicine Department, Barcelona, Spain

Background: A previous study from our group has shown that PET/CTA was very

useful to improve the diagnosis of prosthetic infective endocarditis (PVE), with an important additional value to the conventionally used modified Duke criteria (DC). While its impact on the Expert Team decisions regarding patients' management seems obvious, it has not been assessed so far in any study.

Objective: Confirmation of the PET/CTA diagnostic ability in a cohort of patients with suspected PVE between 01/2013 and 01/2018 studied. Initial assessment of its impact on the decision-making about patients' management in a subgroup of this cohort.

Methods: We studied a cohort of 106 patients (71±11.5 years, 36 women) with suspected PVE admitted to a referral centre with an Endocarditis Unit who were evaluated according to the DC and who had undergone a PET/CTA. We calculated the diagnostic yield of PET/CTA using the final evaluation of our Expert Team, in possession of all the clinical, bacteriological and image information after a clinical follow-up of at least 3 months, as the gold standard. The PET/CTA impact on patients' decision-making was analysed in a subgroup of 47 patients of this cohort.

Results: The PET/CTA sensitivity, specificity, and positive and negative predictive values were of 81.7%/95.7%/96.1%/80.0%, respectively. Regarding PET/CTA impact on treatment decisions (n=47): 1) It changed the antibiotic treatment (ATB) in 19/47 (40%) cases (shortening of ATB in 12 cases (from 42±1 to 15±8 days; extension of ATB in 5 cases (from 21±19 to 53±17 days); changed the type of ATB in 2 cases due to daptomycin pulmonary toxicity diagnosis 2) 5 out of the 14 operated patients underwent surgery due to the PET/CTA findings (4 severe peri-valve complications and 1 due to the confirmation of an IE relapse) 3) it detected 6 unknown colonic lesions that motivated the indication of a colonoscopy in 4 cases (lesion removal was performed in all cases including 2 malignant lesions) 4) PET/CTA provided an alternative infectious diagnosis helping patients' management in 5 out of 17 Rejected IE cases (2 pneumonia, 1 mediastinitis, 1 temporary epicardial leads infection, 1 prostatitis).

Conclusions: PET/CTA has shown again an excellent PVE diagnostic ability with a very important added value to the DC. Initial results suggest that PET/CTA findings might significantly influence patients' treatment management.

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Are cholesterol crystals findings predictors for progression of non-culprit coronary plaque after acute myocardial infarction? (From optical coherence tomography study)

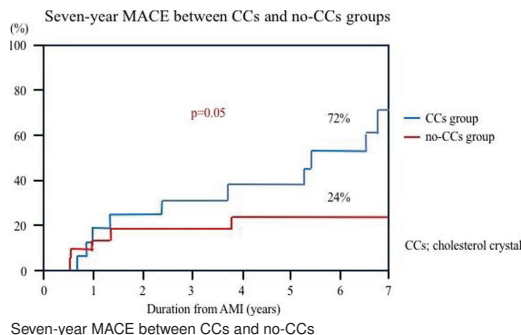
K. Suruga, K. Dai, Y. Kobayashi, Y. Ikegami, Y. Nakao, H. Takemoto, T. Higaki, K. Ooi, T. Kawase, Y. Nakama, K. Suenari, K. Nishioka, M. Otsuka, Y. Masaoka, N. Shiode. Hiroshima City Hospital, Cardiology, Hiroshima, Japan

Background: The impact of cholesterol crystals (CCs) at non-culprit plaque on outcomes after acute myocardial infarction (AMI) remains unknown.

Purpose: This study was investigated to evaluate between the presence of CCs at non-culprit plaque and the progression of non-culprit plaque after AMI.

Method: This study consisted of 40 AMI patients who underwent primary percutaneous coronary intervention within 24 hours of the onset of AMI. After TIMI-3 flow was obtained, optical coherence tomography (OCT) was performed to evaluate the morphologic characteristics at culprit lesion and non-culprit plaque. We assessed the presence of plaque rupture (PR) at culprit lesion and thin-cap fibroatheroma (TCFA), microchannel, and cholesterol crystals at non-culprit plaque. These patients were divided into 2 groups based on the presence or absence of CCs. A major adverse cardiac event (MACE) was defined as revascularization of new lesions. Kaplan-meier method was used to compare 7-year MACE between CCs and non-CCs group.

Results: CCs was observed in 43% of all the patients. In AMI patients presenting with PR at culprit lesions, CCs at non-culprit plaque were more frequently observed than those without PR (58% vs 42%, $p = 0.02$), although there was no significant difference in TCFA and microchannel between AMI patients with PR and those without PR. There was a tendency toward the higher 7-year MACE in CCs than non-CCs groups (72% vs 24%, $p = 0.05$).



Conclusion: This study demonstrated that CCs was observed more frequently in AMI patients with PR and CCs were associated with the progression of non-culprit plaque after AMI. This findings might explain the poorer outcome in AMI patients with PR than those without PR.