TCT-16
Renal Artery Nerve Distribution and Density in the Porcine Model: Biological Implications for the Development of Radiofrequency Ablation Therapies
Armando Tellez1, Serge Rousselle2, William Rate1, Joan Wicks1, Piotr Buzzman1, Maxwell Afari1, Greg Kaluz1, Juan Granada3
1Cardiovascular Research Foundation, Orangeburg, NY, 2Alizec Pathology, LLC, Thurmont, MD

Background: Catheter based renal artery denervation has demonstrated to be effective in decreasing blood pressure among patients with refractory hypertension. The anatomical distribution of renal artery nerves may influence the safety and efficacy profile of this procedure. We aimed to describe the anatomical distribution and density of renal artery nerves in the porcine model.

Methods: A total 8 porcine renal arteries were included in the analysis. A tissue block containing the renal arteries and peri-renal tissue was extracted. Each artery was divided into 3 individual segments (proximal, mid and distal) and stained for histological analysis. Histological sections were assessed for total number, size (0-50 μm, 100-200 μm, 200-500 μm) and depth (1 to 6 mm from renal artery) of the nerves according to the location. Immunohistochernistry, targeting tyrosine hydroxylase (efferent nerve fibers [ENF]) and calcitonin gene related peptide (CGRP, afferent nerve fibers [ANF]) was performed in a mid-section.

Results: Nerve counts were greatest proximally (57.2% of the total nerves) and decreased gradually distally (23.5% in mid-sections and 19.3% in distal sections). The distribution in nerve size was similar across all three sections (~40% of the nerves = 50-100 μm, ~30% of the nerves = 0-50 μm, ~20% of the nerves = 100-200 μm and ~10% of the nerves = 200-500 μm). In the proximal segments ~3% of the nerves were located within 2-mm from the arterial wall. In the mid (28%) and distal segments (42%) were located within 1-mm from the arterial wall. Sympathetic efferent fibers overwhelmingly outnumbered sensory afferent fibers. The afferent and efferent fibers were frequently intermixed within the nerve bundle.

Conclusions: In the porcine model, renal artery nerves are more frequently seen in the proximal segment of the artery. Nerve size distribution appears to be homogeneous throughout the artery length. Nerve bundles progress closer to the arterial wall in the distal segments of the artery. This anatomical distribution may have implications for the future development of renal denervation therapies.

Adjunct Imaging and Physiology
D239
Tuesday, October 23, 2012, 10:30 AM–12:30 PM
Abstract nos: 17-24

TCT-17
Serial Changes of Everolimus-Eutting Stent Malapposition: An Optical Coherence Tomography Subanalysis from the RESET Trial
Kamihito Shimagura1, Takashi Kubo1, Takashi Akasaka2, Yasushi Inou3, Yoshisuke Nakagawa4, Keichi Igashira5, Kengo Tanabe6, Yoshihiro Morino7, Masashi Ishibashi8, Kazuo Kimura9, Ken Kogame10, Takeshi Kimura11
1Wakayama Medical University, Wakayama, Japan, 2Tenri Hospital, Tenri, Japan, 3Hokkaido Social Insurance Hospital, Sapporo, Japan, 4Mitsui Memorial Hospital, Tokyo, Japan, 5Tokai University Hospital, Isehara, Japan, 6Kokura Memorial Hospital, Kitakyushu, Japan, 7Yokohama City University Medical Center, Yokohama, Japan, 8Teikyo University Hospital, Tokyo, Outside US, 9Kyoto University Graduate School of Medicine, Kyoto, Japan

Background: The long term outcome of stent malapposition after stent implantation remains unclear. The aim of this study was to evaluate serial changes of stent malapposition after everolimus-eluting stent implantation by using optical coherence tomography (OCT).

Methods: Randomized Evaluation of Sirolimus-eluting versus Everolimus-eluting stent Trial (RESET) was a prospective dual-arm randomized trial of everolimus-eluting stents and sirolimus-eluting stents in 3200 patients with coronary artery disease. From the RESET trial, 70 patients with everolimus-eluting stents who underwent serial OCT examination (post-stenting and 12-month follow-up) were investigated.

Results: At post-stenting, acute stent malapposition was observed in 23 (32%) everolimus-eluting stents, and 115 malapposed stent struts were detected. Mean stent malapposed distance (distance from stent strut to lumen surface) was 210 ± 240 μm at post-stenting. At 12-month follow-up, 15 (65%) stent malapposition was resolved, however 8 (35%) stent malapposition was persistent. A total of 41 persistent malapposed stent struts were detected, and mean stent malapposed distance was 110 ± 190 μm at 12-month follow-up. The ROC curves showed that stent malapposed distance > 290μm at post-stenting was the best cut-off to predict persistent stent malapposition at 12-month follow-up in everolimus-eluting stents.

Conclusions: The stent with malapposed distance > 290μm at post-stenting has a high risk for persistent stent malapposition at 12-month follow-up in everolimus-eluting stents. OCT can predict persistent stent malapposition and provide useful information to optimize percutaneous coronary intervention.

TCT-18
Long-term Outcome Of Discordance Between Fractional Flow Reserve And Coronary Flow Velocity Reserve After Deferral Of Percutaneous Coronary Intervention.
Tim van de Hoof1, Martijn Pick1, M. Meuwissen2, Renak Delevi3, Peter Damman4, Mariella Hassell 1, Steven Chamuleau5, Michiel Voskuil6, Jan Tijsman7, Jan Pick8
1Academic Medical Center, Amsterdam, Netherlands, 2Amphia Hospital, Breda, Netherlands, 3Academic Medical Center, Amsterdam, Noord-Holland, 4Academic Medical Center - University of Amsterdam, Amsterdam, Netherlands, 5University Medical Center Utrecht, 3584 CX, Netherlands, 6University Medical Center Utrecht, Utrecht, Netherlands, 7Academic Medical Center, Amsterdam, The Netherlands

Background: Discordance between Fractional Flow Reserve(FFR) and Coronary Flow Reserve(CFVR) reflects divergent extremes of focal epicardial and small vessel disease. Discordance is ignored in daily clinical practice, although it occurs in 30% of intermediate lesions, and data on its relevance for long-term clinical outcome is lacking.

Methods: We studied intermediate coronary lesions that were evaluated by FFR and CFVR between April 1997 and September 2006. Treatment was deferred when non-invasive testing was negative or non-diagnostic. Ten year follow up was performed to document the occurrence of major adverse cardiac events (MACE): cardiac death, non-fatal myocardial infarction, or target vessel revascularization.

Results: FFR and CFVR were evaluated in 191 deferred coronary lesions. Discordance was present with FFR<0.75 and CFVR<2.0 in 24 lesions (13%), and FFR<0.75 and CFVR≥2.0 in 29 lesions (15%). MACE related to 80 lesions (42%). Ten-year Kaplan Meier (KM) estimates of MACE were higher for discordant lesions compared to concordant negative lesions: 27% in concordant lesions, versus 52% when FFR<0.75 and CFVR<2.0 (P=0.01 versus concordant negative for both). Importantly, KM-estimates of 10-year MACE did not differ between both groups of discordance(Figure).

Conclusions: Deferral of lesions with discordant results between FFR and CFVR is associated with an increase in long-term MACE compared to concordant negative results,