a blinded analysis. The images were analyzed by image analysis software. The density and area of the pixels was proportionate to the amount of the clot formed on the graft surface.
Results: The pressure gradient between the groups was identical throughout the study, meaning similar flow characteristics were maintained in all branches. The pretreated grafts had fewer blood clots adhered to the surface by direct visual inspection. The image analysis showed 5 vs.39 clots, 0.01% vs. 1.8% clotted area and 62 vs. 5630 clot pixel area between the treated and non-treated grafts respectively, $p < 0.05$.
Conclusion: Pretreatment of the synthetic graft with heparin prior to implantation reduces the risk of early clot formation. This simple practice might be helpful to prevent initial thrombosis of the graft and later occlusion especially in critical situations where the patency of the graft is crucial.

TECHNOLOGY

Drug Coated Balloons

CRT-123

A Novel Nano Particle Sirolimus Delivery Via Coated Balloon

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Objectives: Objective of this study was to develop non-polymeric sirolimus nanoparticle coated balloon and demonstrate in-tissue transfer through DCB in rabbit model.
Background: Drug coated balloon (DCB) is an emerging technology. To date paclitaxel is a choice in DCB. Due to lipophilic properties of sirolimus, short time delivery through DCB is a major challenge. To overcome current limitations, we hypothesized; nanoparticle sirolimus coated on the balloon can provide better delivery and retention.
Methods: We prepared phospholipid encapsulated sirolimus and coated on the balloon with novel coating formulation. The characteristics of the nanoparticle sirolimus DCB was tested in both an in-vitro and preclinical in-vivo models. New Zealand rabbits underwent drug coated balloon dilatation in iliac arteries for pharmacokinetics, confocal microscopy and scanning electronic microscopy studies.
Results: Sirolimus nanoparticles were ~400nm with stable solution. Coating surface was smooth without defect and irregularities. In-tissue uptake of sirolimus was at 1, 7 and 14 days with concentration of 140.6, 15.5 and 5.5 ng/mg, respectively. Sirolimus coated balloon with 3x inflations was also safe in the rabbit iliac arteries. Confocal microscopy showed homogeneous fluorescent tagged nano sirolimus (DTF-nSRL) distribution into the artery wall with intima to adventitia flow. None of the in-vivo investigation has reflected emboli in downward stream.
Conclusion: Present set of experiments showed adequate amount of sirolimus was delivered through non-polymeric DCB. Multiple inflation demonstrated safety to co-relate with actual clinical outcome. Confocal imaging has showed homogenous distribution in cross section and longitude parts. Path of drug travel was to the deepen area of arterial wall upon time from intima to adventitia (Table 1).

Table 1. Depth of DTF-nSRL signal punctuation in rabbit iliac arteries

Time Point	24 hour	3 day	7 day
Depth of penetration	10-20μm	10-30μm	10-40μm

Drug Eluting Stents

CRT-124

Comparative In Vitro Effects Of Paclitaxel, Everolimus, And Tacrolimus On Macrophage-derived Foam Cells, Smooth Muscle Cells, And Endothelial Cells

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Background: Macrophage-derived foam cells (FC) play a key role in atherosclerotic lesion progression. Effects of different drugs used in drug-eluting stents (DES) on FC behavior have not been well characterized. We used an in vitro model to compare effects of paclitaxel, everolimus, and tacrolimus on FC, human coronary endothelial cell (HCAEC), and human coronary smooth muscle cell (HCASMC) viability, FC gene expression, and FC inflammatory cytokine levels.
Methods: FC were derived from human THP1 macrophages with acetylated LDL, followed by treatment with paclitaxel, everolimus, or tacrolimus (10-5-10-11M) for 24 hrs (n=4). HCAEC and HCASMC were similarly treated with all three drugs. Cell lysates and media supernatants were analyzed for apoptosis/necrosis using a Cell Death Detection ELISAPLUS (Roche, Pleasanton, CA) assay. FC lysates were also evaluated for apoptosis (survivin, clusterin) and autophagy (MAP1LC3) gene expression via a Quantigene® Plex assay (Affymetrix, Santa Clara, CA). FC supernatants were analyzed for MCP1 levels via a Procarta® mmunoassay (Affymetrix). Statistical significance was set at $p<0.05$ by ANOVA/Holm's t-test.
Results: FC apoptosis was significantly increased compared to control at 10^{-5}M for both everolimus and paclitaxel, with no effects on FC necrosis for both drugs. Tacrolimus did not affect FC apoptosis or necrosis. Paclitaxel (10^{-5}M) significantly increased clusterin and decreased survivin expression in FC. Tacrolimus did not affect gene expression while everolimus (10^{-5}M) significantly increased MAP1LC3 and clusterin ($p=0.10$) and decreased survivin expression in FC. Everolimus (10^{-5}M) significantly decreased MCP1 in FC supernatants. Effects of all three drugs on HCASMC and HCAEC viability were also explored. While everolimus and tacrolimus did not affect apoptosis or necrosis, paclitaxel (10^{-5}M) significantly increased HCASMC and HCAEC apoptosis and necrosis.
Conclusion: The three drugs explored in this study have variable effects on FC, HCASMC, and HCAEC. Unlike paclitaxel and tacrolimus, everolimus may inhibit FC accumulation in atheromas through selective autophagy/apoptosis of FC and inhibition of monocyte recruitment into the arterial wall.

CRT-125

Do Second-Generation Drug-Eluting Stents Outperform First-Generation Drug-Eluting Stents When Used in "Full Metal Jacket" Percutaneous Coronary Intervention Procedures?

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Background: Diffuse coronary lesions are often treated with long and overlapping drug-eluting stents (DES) creating a full metal jacket, however the impact on clinical outcomes comparing different generation DES has not been described.
Methods: We conducted a retrospective analysis of 98 patients with full metal jacket stenting, defined as the total and continuous stent length of ≥ 50 mm in a single vessel, treated using either first-generation (sirolimus- and paclitaxel-eluting) DES or second-generation (everolimus-eluting) DES.
Results: Full metal jacket stenting was performed in 36 patients/71 lesions with second-generation DES (Xience V or Promus); and 62 patients/151 lesions with first-generation DES (Cypher or Taxus). Baseline characteristics were similar between the groups. More second-generation DES were used per patient than first-generation DES (3.2 vs. 2.6, $p<0.001$); mean stent length (23.9 vs. 25.3mm) and diameter (2.9mm in both) were similar (p=NS). Angiographic success was 100% in both groups. At 1-year