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Impact of Residual Stenosis of Side Branch on Clinical Outcomes in Patients treated with 1-stent technique for Coronary Bifurcation Lesions

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Background: In coronary bifurcation lesions, little is known about the effect of residual side branch (SB) stenosis after main vessel (MV) stenting on long-term clinical outcomes.
Methods: A total of 2,897 consecutive patients who underwent percutaneous coronary intervention using a drug-eluting stent for a coronary bifurcation lesion with a SB $\geq$ 2.3 mm were enrolled from 18 centers in South Korea. Of these, we analyzed data from 1,563 patients who were treated with 1-stent technique for non-Left main bifurcation lesions and finally have TIMI flow grade 3 of the SB. We compared cardiac death or myocardial infarction according to residual diameter stenosis (DS) of the SB ostium in those patients.
Results: 574 patients have residual SB DS $\geq$50%, and 989 patients residual SB DS $<$ 50% after the index procedure. During a median follow-up duration of 37 months, patients with residual SB DS $\geq$50% have a higher incidence of cardiac death or myocardial infarction (1.4 versus 3.3%, p=0.01) than those with residual SB DS $<$ 50%. Multivariate analysis revealed a higher risk of cardiac death or myocardial infarction (hazard ratio [HR], 2.52; 95% confidence interval [CI], 1.20-5.28; P=0.02) in the residual SB DS $\geq$50% group compared to the residual SB DS $<$ 50% group.

Table. Clinical Outcomes.

n=1,563	rSB DS <50% (n=989)	rSB DS ≥50% (n=574)	Unadjusted HR (95% CI)	p Value	Adjusted HR (95% CI)	p Value
All cause death	26 (2.6)	20 (3.5)	1.48 (0.83-2.66)	0.19	1.14 (0.61-2.12)	0.68
Cardiac death	6 (0.6)	7 (1.2)	2.14 (0.72-6.37)	0.17	1.82 (0.56-5.91)	0.32
MI	9 (0.9)	12 (2.1)	2.66 (1.12-6.31)	0.03	2.90 (1.15-7.32)	0.03
Cardiac death or MI	14 (1.4)	19 (3.3)	2.63 (1.32-5.26)	0.01	2.52 (1.20-5.28)	0.02
Stent thrombosis†	3 (0.3)	3 (0.5)	1.87 (0.38-9.30)	0.44	1.44 (0.27-7.69)	0.67
TLR	62 (6.3)	39 (6.8)	1.22 (0.82-1.83)	0.33	1.26 (0.82-1.94)	0.29

*Adjusted covariates included history of chronic renal failure, bifurcation location, true bifurcation, and SB DS before procedure.
†Definite or probable stent thrombosis.
TLF = cardiac death, MI, or TLR
CDMI = cardiac death or MI; CI = confidence interval; HR = hazard ratio; MI = myocardial infarction; TLF = target lesion failure; TLR = target lesion revascularization.

Conclusions: In patients treated with 1-stent technique for non-left main coronary bifurcation lesions, residual SB DS $\geq$50% may be associated with a worse clinical outcome compared to residual SB DS $<$ 50%. These findings need to be confirmed in randomized controlled trials.

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Clinical and angiographic outcome of mini-crush stenting for the treatment of true coronary bifurcation lesions

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Background: To evaluate the clinical and angiographic outcome of mini-crush stenting for the treatment of true coronary bifurcation lesions. Percutaneous treatment of coronary bifurcations lesions (CBL) is associated with a low procedural success rate and high incidence of target lesion revascularization (TLR), and stent thrombosis. The provisional approach is accepted as the default technique, but stent implantation on both branches of the bifurcations is still required in 15%-30% of cases. The "mini-crush" is one of the techniques used to implant stents on both branches of a CBL and provides complete coverage of the ostium of the side branch, while minimizing the length of the crushed stent. Data about outcomes for this technique are limited.
Methods: Between January 2006 and December 2012, 98 consecutive patients underwent implantation of DES with mini-crush technique for the treatment of true CBL. Clinical follow-up at our out-patient clinic was performed at 1-year. For the first 50 patients an angiographic control was scheduled at 9 months.
Results: Clinical presentation was an acute coronary syndrome (ACS) in 71% of the cases and stable coronary artery disease in the remaining 29%. Unprotected left main was treated in 27% of patients. Two-step kissing balloon inflation and final kissing balloon inflation was systematically performed. First-generation DES were used in 90% of patients. Immediate procedural success was obtained in all of the cases. One episode of definite stent thrombosis was documented 10 days after the index procedure (premature DAP discontinuation). No deaths were documented. The 1-year cumulative incidence of MACE was 5%: 2 episodes of myocardial infarction, and 3 repeat procedure of revascularization. Angiographic restenosis was documented in 8% (4/50 patients) and was localized at the ostium of the side branch in all of the cases.
Conclusions: Our results suggest that the treatment of bifurcation lesions by means of mini-crush stenting technique is associated with excellent immediate success and provides good angiographic and clinical outcomes at 1-year in a high-risk patients population.

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Procedural Feasibility and Clinical Efficacy of Bioresorbable Vascular Scaffold in the Treatment of Bifurcation Lesions: Results from a Single Center Experience

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Background: The strut thickness and deliverability of bioresorbable vascular scaffold (BVS) may lead to more challenging for bifurcation lesions. Furthermore, all data concerning BVS feasibility for bifurcation lesions are still limited.
Methods: We analyzed clinical outcome data of patients treated with BVS between May 2012 and May 2014. The measured end-points were cardiac death, follow-up myocardial infarction (MI), target lesion revascularization (TLR), target-vessel revascularization (TVR) and major adverse cardiac events (MACE) defined as combination of cardiac death, follow-up MI and TVR.
Results: A total of 100 consecutive bifurcation lesions were successfully treated in 85 patients. The mean age was 62.8 $\pm$ 11.6 years, and 88.6 % were males. Of these lesions, 69 lesions were bifurcation lesions involving left anterior descending artery (LAD) / diagonal branch and 5 lesions involved left main bifurcation lesions. True bifurcation lesions (Medina classification [1,1,1], [1,0,1], [0,0,1]) were observed in 64 lesions. Provisional single-stenting technique was used in 76 bifurcation lesions, systematic double stenting technique was applied in 18 bifurcations with double BVS in 13 lesions and mixed BVS-DES in 5 lesions (T-stenting in 11 lesions; Mini-crush technique in 6 lesions; V-stenting technique in one lesion). Meticulous lesion preparation with dedicated devices was needed in 19 lesions. Angiographic success was achieved in 99.0%. At median follow-up of 231 days after the procedure, the overall rates of cardiac death, MI, TLR, TVR and MACE were 0%, 1.2%, 5.9%, 7.1% and 8.2%, respectively. Definite stent thrombosis occurred in one case after discontinuation of dual antiplatelet therapy.
Conclusions: Our results suggest that the treatment with BVS is feasible and effective in a real life setting of bifurcation lesions, despite thick strut ($>$ 150 µm) scaffolds and limitation of side-branch access. Improvements in scaffold design may reduce the need for meticulous lesion predilatation with dedicated devices and increase the spectrum of lesions amenable to treatment with BVS.

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2-year outcomes and angiograms from the bifurcation subgroup of the e-BioMatrix registry

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Background: PCI of bifurcation lesions is associated with higher rates of restenosis and stent thrombosis compared to non-bifurcation lesions. In the e-BioMatrix registry we compared the 2 year outcomes of bifurcation and non-bifurcation lesions treated with one or more BioMatrix™ or BioMatrix Flex™ drug-eluting stents (BES). These stents have an abluminal biodegradable polymer coating that releases Biolimus A9™. The coating fully absorbs within 6-9 months of implantation.
Methods: A total of 504 patients had PCI of at least one bifurcation lesion, 4968 patients were in the non-bifurcation subgroup. The primary endpoint was Major Adverse Cardiovascular Events (MACE) defined as a composite of cardiac death, myocardial infarction (MI) and clinically-indicated target vessel revascularization (ci-TVR) at 12 months. Secondary endpoints were MACE at 30 days, 6 months, 2 and 3 years, stent thrombosis (ST), major bleeding (MB) and total revascularization rates at 30 days, 6 months, 12 months, 2 and 3 years. Dual anti-platelet therapy (DAPT) treatment was mandatory for 6 months and recommended up to 12 months.
Results: Clinical follow-up at 2 years was obtained in 95.2% of the bifurcation subgroup and 93.7% of the non-bifurcation subgroup. DAPT compliance at 2 years was of 30.9% vs. 30.5% respectively (p=NS). A single stent strategy was employed in 79.9% of patients. MACE rates at 2 years were 10.9% vs. 6.4% (p$<$ 0.001) in the bifurcation and non-bifurcation groups, respectively. This difference was driven principally by MI (4.7% vs. 2.2%, p$<$ 0.001) and ci-TVR (8.1% vs. 3.9%, p$<$ 0.001) with no difference in cardiac death (1.2% vs. 1.5%, p=0.6). Both peri-procedural (1.6% vs. 0.4%, p=0.002) and spontaneous MIs (2.3% vs. 1.1%, p=0.02) were